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PUBLIC SERVICE COMMISSION OF WISCONSIN
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Nemadji Trail Energy Center Generation Project

Final Environmental Impact Statement

PSC Dockets 9698-CE-100, 9698-CE-101

Date Issued: September 2019

PUBLIC SERVICE COMMISSION OF WISCONSIN
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Nemadji Trail Energy Center Generation Project

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This final Environmental Impact Statement for the proposed Nemadji Trail Energy Center project, and theproposals of South Shore Energy, LLC, a subsidiary of ALLETE, Inc., Dairyland Power Cooperative, and Superior Water, Light and Power Company to construct power plantfacilities, and to construct, operate, and relocate natural gas lines, and electric transmission lines is progress towards compliance with the Public Service Commission's requirement under Wis. Stat. § 1.11and Wis. Admin. Code § PSC 4.30. It also is progress toward compliance with the Department of Natural Resources requirements under Wis. Admin. Code § NR 150.22.

By: Date: September 27, 2019

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To the Reader

This final environmental impact statement (EIS) fulfills part of the requirements of the Wisconsin Environmental Policy Act (WEPA) Wis. Stat. § 1.11. WEPA requires state agencies to consider environmental factors when making major decisions. The purpose of this final EIS is to provide the decision makers, the public, and other stakeholders with an analysis of the social, cultural, and environmental impacts that could result from the construction of a new power plant and its associated facilities. This document has been prepared jointly by the Public Service Commission of Wisconsin (Commission or PSC) and the Wisconsin Department of Natural Resources (DNR).

This final EIS will become part of the record used by the Commission to make its final decisions on this project. At this time, the Commission decision on the proposed project is expected in late 2019 or early 2020.

The Commission decision on the merits of this project will be based on the record of a public hearing that will be held on Monday, October 28 and Tuesday, October 29, 2019, at the Belgian Club, 3931 East 2nd Street, Superior Wisconsin. The hearing session on Monday, October 28 is scheduled for 6:00 p.m. and the session on Tuesday October 29 is scheduled for 2:00 p.m. There is also a hearing session for parties to the proceeding at 10:00 a.m. on Tuesday, October 29 in the same location. The Commission issued a Notice of Hearing for both the 9698-CE-100 and 9698-CE-101 dockets on September 9, 2019. The hearing will satisfy the WEPA requirements of the Commission and DNR. The final EIS and testimony from the public hearing will be included in the hearing record.

If necessary, DNR will hold separate hearings on its water permits or other DNR regulatory actions discussed in this final EIS.

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Executive Summary

PROPOSAL

South Shore Energy, LLC (SSE), a subsidiary of ALLETE, Inc. (ALLETE), and Dairyland Power Cooperative (DPC), (together, applicants) propose to build a new natural gas powered electric generating facility in the City of Superior in northeast Douglas County. The proposed facility is referred to as the Nemadji Trail Energy Center (NTEC).

On January 8, 2019, SSE and DPC, a not-for-profit generation and transmission electric cooperative, submitted an application to the Public Service Commission of Wisconsin (Commission or PSC) for a Certificate of Public Convenience and Necessity (CPCN) under Wisconsin Statutes (Wis. Stat.) § 196.491(3) and Wisconsin Administrative Code (Wis. Admin. Code) ch. PSC 111, for authority to construct and operate a large natural gas fired electric generating facility with a capacity of approximately 625 megawatts (MW).

In addition, SSE and DPC submitted an application for a CPCN under Wis. Stat. § 196.491(3) and Wis. Admin. Code ch. PSC 111 to construct a new 345 kilovolt (kV) electric transmission line to supply electricity to the proposed NTEC plant. The new line would tie NTEC into the existing electric transmission grid by connecting to the Arrowhead to Stone Lake transmission line, located approximately 3 miles south of the proposed NTEC plant.

Further, Superior Water, Light and Power Company (SWL&P) submitted an application for a Certificate of Authority (CA) under Wis. Stat. § 196.49 and Wis. Admin. Code § PSC 133.03 to construct a new natural gas lateral to supply NTEC with fuel. The new gas pipeline would extend from the location of the proposed NTEC plant to a tap point on the existing Great Lakes Gas Transmission (GLGT) pipeline. The GLGT pipeline is located approximately 6.5 miles south of the proposed NTEC facility. SWL&P has also submitted an application for a CA to remove, abandon, and relocate portions of existing natural gas pipeline adjacent to the proposed NTEC plant. Relocation of the gas pipeline and existing transmission lines would provide additional space needed for the construction of the proposed NTEC plant and associated natural gas and electric infrastructure.

This final EIS provides discussion and analysis of impacts to natural resources and the local community that could occur from construction of the proposed power plant and the associated transmission line. Potential environmental impacts regarding the construction of the proposed gas infrastructure including the new fuel source pipeline and relocation of existing pipeline at the NTEC site, are being analyzed in dockets 5820-CG-105 and 5820-CG-106, respectively.

Before the proposed NTEC plant could be constructed, it is likely that additional auxiliary plant infrastructure would be required. Specifically, Commission staff is anticipating the project would require water infrastructure to support plant operations such as a pipeline to provide sanitary services and back-up water supply. Such water infrastructure may include the construction of several high capacity wells and a pipeline that would provide a water source for the proposed project. It is also likely that, if the project is approved, American Transmission Company LLC (ATC) would need to construct an additional substation near the interconnection point of the proposed transmission line and the existing 345kV Arrowhead to Stone Lake line. Commission staff has requested additional information from the applicants to determine

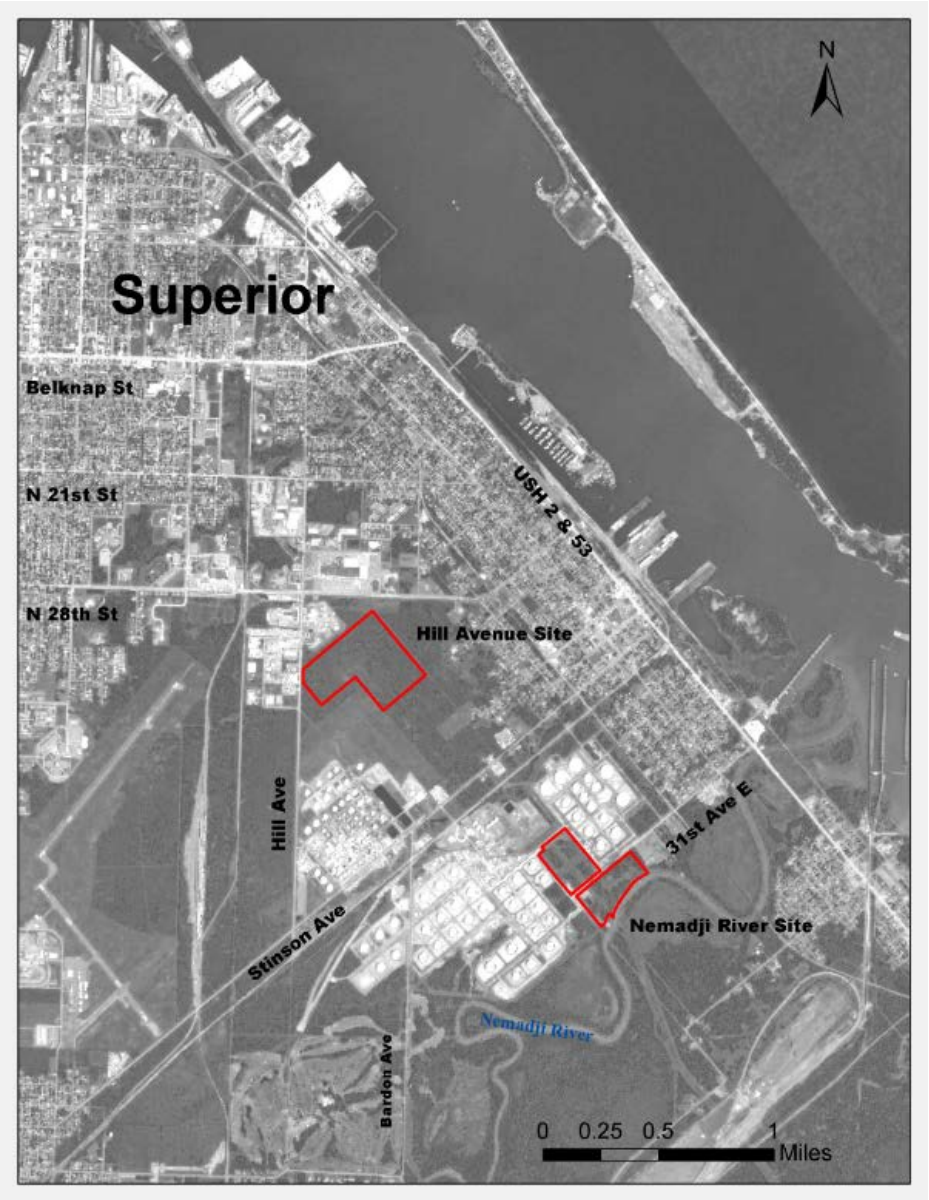
the nature and design of any yet to be submitted construction projects that would be required for the successful installation and operation of the NTEC plant.

PROJECT LOCATION

The applicants have evaluated two potential locations for the NTEC Generating Facility, the Nemadji River Site and the Hill Avenue Site (Figure ES-1). Both sites are located in the City of Superior within northeast Douglas County, Wisconsin. The Nemadji River Site would be east of the existing Enbridge Energy Superior Terminal Facility on the banks of the Nemadji River. The site is accessible from U.S. Highway (USH) 2/USH 53 via 31st Avenue East from the northeast. The site is approximately 26.3 acres in size with an additional 24.8 acres of staging and laydown area across the street on 31st Avenue East. It is currently mostly wooded with a parking lot and small stormwater retention pond in the southwest corner. Several existing transmission lines extend through the parcel.

The Hill Avenue Site would be approximately 1.2 miles northwest of the Nemadji River Site. The site is accessible from the west via Hill Avenue. USH 2/USH 53 is accessible via Hill Avenue to North 28th Street East, then 18th Avenue east to the highway. No other access to the site currently exists. The site is approximately 75.5 acres in size and is undeveloped. An existing transmission line extends along the northeast border of the site.

Figure ES-1 General location map



PROJECT DESCRIPTION

SSE and DPC have requested Commission approval for a natural gas fired electric generating facility with a capacity of approximately 625 MW. The project would consist of one H-class gas turbine generator (GTG), one heat recovery steam generator (HRSG) with duct firing, and one steam turbine generator (STG). The plant would burn natural gas with the capability to use fuel oil as a backup fuel.

The proposed NTEC facility would be 100 percent owned by SSE and DPC (50 percent by each entity). The applicants would be responsible for the design of the plant, construction, start-up testing, and operations and maintenance. SSE would be the construction and operating agent for the proposed plant.

SSE is a Wisconsin subsidiary of ALLETE, formed for the purpose of owning ALLETE's share of the project. Neither DPC nor SSE serve retail electric customers or are public utilities under Wisconsin law.

The proposed NTEC facility would be operated as a merchant plant as defined in Wisconsin Act 204, the Electric Reliability Act, which legalized the development of wholesale merchant plants in the state. DPC would sell electric power generated by the plant at market-based rates to investor-owned utilities, cooperative utilities, power marketers, and other purchasers for resale in Wisconsin and throughout the Midwest region.

The project would require a transmission line connection between the collector bus located near the proposed NTEC facility, a new switching station located southeast of facility, and a tap location along the existing Arrowhead to Stone Lake 345 kV transmission line. The new transmission line would be between 3.5 and 7 miles long, depending on the route selected, and consist of single-circuit 345 kV structures as well as double-circuit 345/161 kV structures.

A natural gas lateral, to be constructed and operated by SWL&P, would be constructed to supply fuel for NTEC. The new 16-inch lateral would be between 6.7 and 9.7 miles long, depending on the route selected, and extend from the proposed NTEC facility to a tap point on the GLGT pipeline.

Some existing electric and natural gas infrastructure at the Nemadji River Site would need to be relocated prior to the initiation of construction activities associated with the project. Electric distribution and transmission lines that currently traverse the Nemadji River Site would be relocated to the south end of the site. Similarly, portions of the existing natural gas pipeline near the Nemadji River Site would be relocated. SWL&P would abandon and relocate approximately 1,200 feet of 10-inch diameter natural gas main to a location 250 feet west of its current location near the Nemadji River Site. Relocation of the existing natural gas line would only occur if the Nemadji River Site is constructed for the NTEC project.

As previously indicated, Commission staff's environmental review of the proposed gas projects can be found in dockets 5820-CG-105 and 5820-CG-106.

Project need and cost

Wisconsin Stat. § 196.491(3)(d)3. provides that the Commission may not consider alternative sources of supply or engineering or economic factors if an application is for a wholesale merchant plant. As such, the cost and need of the proposed NTEC facility are not analyzed in detail in this document as NTEC would be a merchant plant, not a utility rate-based facility.

ENVIRONMENTAL IMPACTS

Based on Commission staff and Department of Natural Resources (DNR) analysis, the most significant environmental impacts associated with the proposed NTEC plant and its planned infrastructure include:

- the permanent loss of wetland resulting from the construction of the NTEC plant.
- impacts to nearby natural resources resulting from construction on soils within the vicinity of the proposed plant sites that are highly susceptible to erosion.

Each of these topics are discussed in more detail in the following section, as well as in Chapters 3 and 4 of this final EIS.

A majority of the public comments received during the EIS scoping comment period voiced strong concern about the potential for the proposed NTEC plant to emit greenhouse gases.

The following sections summarize, by resource area, the most important/significant environmental impacts.

Air emissions

The DNR air pollution control construction permits for this project are intended to include requirements for Prevention of Significant Deterioration (PSD), protection from hazardous air pollutants, adherence to federal New Source Performance Standards (NSPS), and to assure compliance with National Ambient Air Quality Standards (NAAQS). The department's permits address, among other things:

- Emission limitations based on Best Available Control Technology (BACT) for each emission unit and pollutant triggering review.
- Permit conditions to address ambient air impacts analyses and ensure the proposed project complies with NAAQS and PSD allowable concentration increments.
- Permit conditions addressing impacts to visibility, soils, and vegetation.
- Permit conditions to protect against ambient air impacts of hazardous air containment (HAC) as regulated under Wis. Admin. Code ch. 445, which does not cover emissions from natural gas or ultra-low sulfur diesel (ULSD) combustion but would cover ammonia from emission control systems.
- NSPS for regulation of greenhouse gas (GHG) emissions under federal rule, 40 CFR 60, Subpart TTTT, which would apply to the project.

Nitrogen oxides, carbon monoxide, particulate matter, particulate matter less than 10 microns in diameter, particulate matter less than 2.5 microns in diameter, sulfur dioxide, volatile organic compounds, sulfuric acid mist, lead, and greenhouse gas emissions are expected from the proposed project.

Additionally, the process of extracting natural gas from the earth could lead to indirect environmental impacts. Such impacts are associated with the hydraulic fracturing method of gas extraction, a process which requires large amounts of water and the use of chemicals that could pose a health concern if exposed to the public.

Water

The proposed project includes construction of five non-potable high capacity wells, each with a projected capacity of 750 gallons per minute, for a total of 5.4 million gallons per day from groundwater within the Lake Superior Basin. The wells would be constructed beneath a clay layer, within the sand and gravel aquifer, above the Precambrian sandstone. DNR reviews and issues approvals for non-potable high-capacity wells under Wis. Stat. § 218.34, and Wis. Admin. Code ch. NR 812. For new withdrawals at this volume (> 1 MGD for 30 consecutive days) in the Great Lakes basin, the applicant would need to obtain a Water Use Permit under Wis. Admin. Code ch. NR 860.

The high capacity wells for the Hill Avenue Site would be located in the same locations as the Nemadji River Site, approximately 1.2 miles southeast of the Nemadji River.

There appear to be discrepancies in the conceptual model developed by the applicant, and that developed by DNR. In addition, DNR is concerned that the aquifer will not yield the required volumes of water, based on review of nearby off-site well construction reports.

Wastewater discharges from the Nemadji River Site would require the installation of sewer pipeline from the northern boundary of the site to a tie-in location northeast of the site along 31st Avenue East. The

proposed route includes approximately 2,500 feet along 31st Avenue East. Potential environmental impacts that could result from the sewer installation arise from stormwater runoff and excessive sedimentation. As such, if dewatering is expected, a pit/trench dewatering general permit will be needed and all requirements must be followed. Additionally, adequate erosion control measures such as but not limited to: silt fences, stormwater inlet protection, rock dams, and entrance/exit pads must be utilized when found necessary through the sewer installation to prevent excessive off-site sedimentation and stormwater runoff.

Due to site's proximity to Husky Refinery and the use of aqueous firefighting foam containing per- and polyfluoroalkyl substances (PFAS) during the fire and explosion that occurred on April 26, 2018, DNR intends to require that any dewatering discharges be screened for PFAS. If sample results indicate that PFAS are present, DNR may evaluate whether a secondary value limitation is warranted to protect human health and the environment.

Habitats

The electric transmission routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both switching stations would be located within forested wetland and lowland scrub/shrub wetlands. Although the proposed transmission routes would be constructed primarily within existing gas and electric utility corridors, clearing of upland and wetland cover types, including forests, shrublands, and grasslands, would be required for construction of the NTEC plant at either of the site alternatives. Additional impacts would occur to these resources as a result of constructing the proposed transmission line regardless of which routing option is selected.

Rare and sensitive species

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's Natural Heritage Inventory (NHI) database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0-mile buffer for aquatic species.

For specific route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this final EIS.

The NHI database indicates an occurrence for the bald eagle, which is federally protected through the Bald and Golden Eagle Protection Act within the vicinity of the project. While the specific nests are more than 0.5 mile from the project right-of-way (ROW), there is suitable habitat (large trees in proximity to lakes and rivers) along these segments for the species to be present and nesting. Per U.S. Fish and Wildlife Service guidelines, it is a requirement to maintain a buffer of at least 660 feet between project activities and an active bald eagle nest. Work may be conducted closer if done outside of the nesting season (August through mid-January).

There are ten rare plant species that may have suitable habitat present within the Nemadji River Site and eight rare plant species within the Hill Avenue Site. In addition, at least three of these plant species has been observed within or immediately adjacent to the Nemadji River Site and at least five with or immediately adjacent to the Hill Avenue Site. Conducting surveys to determine specific locations of these species is highly encouraged. If found, the best avoidance measure is to avoid areas where known plants

occur; however, given that this is a construction project, that is likely not feasible. Therefore, the best way to minimize impacts is to relocate plants from out of the project area to an area where these plants will likely not be impacted, preferably on state lands where these plants will be protected.

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of these locations. All work within 300 meters of the Nemadji River is required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary. There is also a state special concern herptile which prefers wetlands and associated upland habitat for nesting. By following the Broad Incidental Take Authorization for the aforementioned species would also help to protect this state special concern species.

A special concern fish species may be present within the Nemadji River. One special concern dragonfly species is known to be present within the Nemadji River and wetlands that are within and adjacent to the project area, and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

A Northern Long-eared Bat (NLEB) maternity roost record is crossed by the Eastern Route and within the vicinity of the Western Route. As this is a federally listed species, the applicants will be required to follow the 4(d) rule and not cut trees within 150ft of known roost trees from June 1–July 31. Surveys may be required in order to determine where known roost trees are located. The NLEB is also state-listed and the applicants should follow the Cave Bat Broad Incidental Take Authorization and limit tree clearing throughout the project area from June 1–August 15.

The Eastern and Western Electric Transmission Routing options are nearly identical to each other in terms of potential rare species impacts. While there are subtle differences between the two, from a known rare species standpoint, no one route would be significantly more impactful over the other. However, the Western Route would create more new right of way which may negatively impact birds and other species that need large contiguous habitats to survive.

Wetlands

The construction of the Nemadji River Site would permanently fill 4.36 acres of wetland, and the associated laydown area would impact 14.82 acres of wetland, for a total of 19.18 acres of wetland impact. More information on the wetland impacts proposed for the Nemadji River Site can be found in Section 3.2.6.

The construction of the Hill Avenue Site would permanently fill 34.27 acres of wetland. And the associated laydown portion of the site boundary would impact 34.32 acres of wetland. More information on the wetland impacts proposed for the Hill Avenue Site can be found in Section 4.2.6.

The wetland impact associated with the transmission line component of the project are described in Sections 3.4.5.5 and 4.4.5.5, as well as measures to minimize impacts to wetlands.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

Wetland compensatory mitigation would be required for unavoidable wetland impacts associated with the overall project. Compensatory mitigation involves the restoration, enhancement, creation or preservation of wetlands to compensate for unavoidable adverse impacts to wetlands from a proposed project. As part of the permitting process, DNR and the U.S. Army Corps of Engineers would review the wetland impacts to determine the appropriate compensatory mitigation credit for the project prior to the start of construction.

In addition to the protections for water resources, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands.

Special construction issues

Although the area in which the NTEC plant would be built is relatively flat, the surrounding area exhibits significantly more topographic relief. The land slopes from higher elevations in the northwest portion of the Nemadji River Site to lower elevations in the southeast near the Nemadji River, a difference in elevation of 30 to 40 feet. Because many of the soils near the Nemadji River Site are very susceptible to erosion, construction in areas with steep slopes can lead to environmental impacts. Specifically, there is a high risk for impact to natural resources, including an environmental corridor located along the slopes of the Nemadji River. Construction on the Nemadji River Site could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan is prepared, approved prior to construction, and rigorously followed during construction.

At the Nemadji River Site, the main power block area would be raised approximately 5 feet with some of the north end of the area being raised approximately 15 feet. The grading of the power block area would require approximately 120,000 cubic yards of imported fill. The source of the potential fill is uncertain at this time. Importing fill from other locations could have the potential to introduce invasive species and other contaminants or pests. There would be some excavation for underground utilities and deep structures such as pump pits and the suitable material from these excavations will be used for trench backfill and site grading. The excavation to enlarge the existing stormwater pond is included in the site grading quantities. Installation of the sheet pile wall would require approximately 26,000 cubic yards of excavation and approximately 80,000 cubic yards of select material backfill.

A secondary effect is the potential spread of invasive species. Invasive species provide little food and habitat for wildlife and can outcompete native vegetation. Proper protocols should be implemented to ensure not to introduce or increase the abundance of invasive species.

The use of heavy equipment on waterway banks may also cause soil compaction. Withdrawal of surface water for structure foundation construction may temporarily impact waterways. Constructing in areas with seeps and springs may temporarily alter the surface and subsurface hydrology feeding waterways. Overhead transmission lines may also have an aesthetic impact on the natural scenic beauty of the waterway. Transmission facilities may also pose a potential collision hazard for waterfowl and other large birds, especially when located in a migratory corridor. Recreational use such as sightseeing, boating, fishing, or bird watching could be adversely affected by new transmission facilities.

Temporary clear span bridges (TCSB) are often required for vehicle access across waterways. Under Wis. Admin. Code § NR 320.04(1), a five-foot clearance must be maintained between the water and TCSB, unless the requirements in NR 320.04(3) can be met, including providing portage for anyone navigating the waterway. In order to protect fish spawning habitat, TCSBs cannot be installed and/or removed during the fish spawning timing restriction period (March 1–June 15 for non-trout waters and September

15–May 15 for trout waters), unless the local DNR Fisheries Biologist reviews the proposal and determines that these timing restrictions can be waived.

For this project, the applicants have developed a planning document that addresses both erosion and stormwater control. The Erosion Control and Storm Water Management Plan describes the methods that would be employed to reduce and mitigate impacts during and after construction of the proposed project. Site-specific plans would be developed during the final design phase of the project and provided to DNR and the City of Superior for review and approval prior to commencement of construction. Best management practice (BMP) erosion control techniques would be used to mitigate soil impacts. Additionally, the applicants must obtain, prior to initiating any land-disturbing construction activities within the boundaries and jurisdiction of the City of Superior, an Erosion Control/Grading Permit and Storm Water Management Permit from the Public Works Department. The application requirements include the permit application forms, an Erosion & Sediment Control Plan, Storm Water Management Plan, and the required fees.

Land use

The Nemadji River Site is located in the City of Superior in Douglas County, Wisconsin, and is currently owned by ALLETE. According to a 2015 Phase I Environmental Site Assessment provided by the applicants, a review of the earliest available records from 1938 through 2015 show the majority of the Nemadji River Site has remained undeveloped and heavily wooded, with the exception of a gravel parking lot and a stormwater pond located on the western side. Land use immediately surrounding the Nemadji River Site is industrial, commercial, and residential. Several residential areas are present within 0.5 mile of the site, with the densest areas located to the north and east of the site. Residential areas are significantly less dense to the west, south, and east of the site. An industrial tank farm is located just south of the site.

The Hill Avenue Site is currently owned by Superior Refining Company, LLC. The applicants have an option to purchase the site. The applicants would acquire right-of-way on an additional 24.8-acre area that covers parcels owned by Lakehead Pipeline Company LTD and Enbridge Energy during construction. Right-of-way easements would be acquired for other aspects of the project, including transmission line easements, railroad crossings, etc. The applicants would purchase the land and undertake civil work to prepare a site for the new switching station that would be constructed by ATC. The resource and environmental impacts for the site preparation work are included in this final EIS, but further permitting may be required by ATC for construction of the new switching station. The Hill Avenue Site has residential property to the northeast and east, with commercial property to the north and industrial property to the west and south. The site has no residences within a half mile to the west. The nearest residences are located generally to the east. The site has residential property to the northeast and east, with commercial property to the north and industrial property to the west and south. If the Hill Avenue Site were selected for the NTEC plant, the project would require zoning changes based on current zoning and permitted uses of existing zoning districts.

All of the electric transmission routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both proposed switching station sites are located within forested wetland and lowland scrub/shrub. The Eastern Route is within an existing transmission line corridor along this length and would require some additional ROW. The Western Route extends through wetland and forested areas, the majority of which will require all new ROW. The future land use for a portion of the forested area near the ESS is agricultural and medium density residential, however. The existing land use at the ESS is forest with a future land use of medium density residential.

Local community services

The project would be connected to the City of Superior municipal water treatment system to discharge sanitary waste. Emergency medical services would be provided by Essentia Health St. Mary's-Superior Clinic, St. Luke's Mariner Medical Clinic Urgent Care and Gold Cross Ambulance. Fire protection would be provided by the City of Superior Fire Department, which is approximately 1.0 mile from the site. Police protection would be provided by the City of Superior and the Wisconsin State Patrol during both construction and operations.

The project would require construction of water pipelines to connect with the municipal system. The applicants do not anticipate any change in capacity citing adequate existing municipal sewer water system capacity.

The applicants anticipate that existing healthcare facilities would be sufficient for the project during construction and operation, and do not expect that improvements to such facilities would be required. The project design, as currently proposed, includes internal fire suppression measures, which the applicants consider sufficient to meet the requirements of the project.

Preliminary engineering design include facilities for the storage of hazardous materials. This storage would require coordination activities with the City Fire Department. The applicants do not anticipate that improvements would be required in order to successfully coordinate with, or adhere to, safety measures required by the City of Superior Fire Department. As previously mentioned, police protection would be provided by the City of Superior and the Wisconsin State Patrol during both construction and operations. The applicants do not anticipate that any plant design modifications would be required in order to allow police patrols and routine law enforcement activities.

Roads

Construction traffic entering the project site would primarily consist of automobile traffic for craft labor, construction management staff, contractors, equipment, and vendors. Material and equipment deliveries may be made by large trucks as well as heavy haul vehicles. Onsite, traffic is anticipated to primarily consist of heavy construction equipment and material transport equipment. When possible, bulk deliveries would be scheduled to avoid peak traffic on local roads. The applicants have proposed construction of pull over areas for material delivery trucks to reduce congestion.

A local resident who lives near the proposed power plant site and proposed access route has expressed concern over the pre-construction and construction local traffic activity that would be disturbing to local residents.

Noise

The state of Wisconsin and the City of Superior do not have noise regulations applicable to the project. As there are no specific government agency-related numeric noise limits for the project, the project has elected to follow the U.S. Environmental Protection Agency (EPA) noise guidelines. The EPA establishes noise guidelines in The Noise Control Act of 1972 (Act). The Act provides sound level guidelines to "promote an environment for all Americans free from noise that jeopardizes their health or welfare." As such, the sound levels identified in the Act as those sufficient to protect public health and welfare were used as the design goal for the project. A day-night sound level (Ldn) of 55 A-weighted decibels (dBA) at the nearest residential receivers was selected as the design goal for the project.

Noise impacts on local receptors, including residents, from construction activities, could be reduced by ensuring that appropriate engine exhaust mufflers are installed and adequately maintained on all vehicles used during the construction phase of the project.

During steam blows, the start-up team would install external piping and silencers to discharge the steam to the atmosphere. Noise from steam blows is mitigated using silencers and at tempering water.

It is not anticipated that any future residences would be built that would be more impacted by operational noise than the current residences due to the industrial nature of the area, the existing cemetery, and the proposed NTEC facility. If the proposed NTEC plant were to operate at the Nemadji River Site for a consecutive 24-hours, the calculated day-night sound level from the Nemadji River Site at the nearest residential receiver would be 56.5 dBA Ldn. In order to bring project sound level impacts below 55 dBA Ldn at the neighboring residences, mitigation measures would need to be implemented for the proposed cooling tower. Modeling results show the cooling tower needs to be limited to 62 dBA at 400 feet in order to meet the design goal or fall below EPA recommended guidelines. The applicants have stated that based on past project experience, it is anticipated that the cooling tower vendor could reasonably mitigate the cooling tower to 62 dBA at 400 feet using splash attenuation or another method of their choice.

The overall project-generated sound level at the Hill Avenue Site would be 55.1 dBA Leq. If the simulated NTEC plant were to operate for a consecutive 24-hours, the calculated overall project-generated sound level at this location would be 61.5 dBA Ldn. If the proposed NTEC plant were to operate at the Hill Avenue Site for a consecutive 24 hours, the calculated day-night sound level from the project at the nearest residential receiver would be 61.5 dBA Ldn. The applicants' modeling results indicated that after applying the same cooling tower mitigation as was applied to the Nemadji River Site scenario, the sound level impacts slightly exceeded the design goal of 55 dBA Ldn. In order to limit project sound level impacts for the Hill Avenue Site to below 55 dBA Ldn at the neighboring residences, mitigation would need to be applied to multiple project sound sources. In order to limit project sound level impacts to below 55 dBA Ldn at the neighboring residences, mitigation would need to be applied to multiple project sound sources. The Hill Avenue Site was applied the same cooling tower mitigation as the Nemadji River Site, limited to 62 dBA at 400 feet and found that additional mitigation would be required to achieve the design goal. Modeling results indicate that additional mitigation would be required to lower project sound levels to to 62 dBA at 400 feet in order to meet the design goal or fall below the EPA recommended guidelines. Based on past project experience, it is anticipated that the cooling tower vendors could reasonably mitigate the cooling tower to 62 dBA at 400 feet using splash attenuation or another method of their choice. Enacting such additional mitigation measures would increase project costs if the Hill Avenue Site is selected.

Visual impact

The Nemadji River Site would have tree buffers between the site footprint and other land uses to lessen the visual impact of the generation plant. The project would also be located near existing oil and gas infrastructure.

Visible cooling tower plumes are defined as those plumes that occur during daytime conditions and have sufficient optical density as to appear opaque to the observer. At the Nemadji River Site, the worst-case cooling tower modeling results predicted a maximum of 24.7 hours per year, to occur at 200 meters (about 656 feet) towards the northeast of the cooling tower, which occurs over the cemetery to the northeast.

The stack and turbine building would be visible. Trees would remain on the eastern boundary of the site to provide a buffer to partially shield the site from view. Trees not required to be cleared for construction

and outside the chain-link perimeter security fence would also remain along the Nemadji River on the south side of the site.

Residences east of the Nemadji River Site would experience an increase in lighting impact, though current facilities located north of this alternative have lighting. The trees on the eastern boundary of the site would help mitigate additional lighting impacts. Lighting impacts would be mitigated by measures such as fully shielded light fixtures, directing lighting downward, and scheduling construction activities during daylight hours when possible.

At the Hill Avenue Site, the worst-case cooling tower modeling results predicted a maximum of 25.8 hours per year, to occur at 200 meters (about 656 feet) towards the northeast of the cooling tower. Visible plumes are expected to occur on nearby shrubland. The applicants have stated that since this is not a populated area, or a location in which equipment would be located, visible plumes are not expected to be a significant concern.

The Hill Avenue Site would be situated in an area that is currently undeveloped wetland. Components of the site would be visible from Hill Avenue to the west, North 28th Street to the north, from East 12th Street to the east, and East 22nd Avenue to the south. The stack and turbine building would be visible. Existing trees would remain around the property boundary, obscuring the view of most of the site components to the north, east, south, and much of the west side of the site when the trees have leaves. The perimeter of the property will have a chain-link security fence.

The proposed transmission structures would predominately range in height from 120 feet to 160 feet above grade based on similar structure designs used for other projects. The proposed structures would likely be steel self-supporting structures on concrete foundations. All routing options would be visible from multiple viewpoints throughout the area; most of the proposed route is within undeveloped forested areas along existing utilities.

The transmission routing options would be located within industrial or wooded and undeveloped areas for the majority of their length. A significant portion of the Eastern and Western Routes would be located parallel to or double circuited with existing transmission infrastructure.

Although the applicants state that no concerns regarding the aesthetics of the transmission line were recorded at the public open houses, it is possible that some nearby residents may find the appearance of the project aesthetically displeasing. The applicants cited the lack of public comment regarding the degradation of aesthetics as reason to not conduct photo simulations depicting post-construction transmission infrastructure.

Historic properties

The review discovered one archaeological site within the Nemadji River Site, consisting of concrete building remnants and scattered historic artifacts from an early 20th century dairy farm and residence. Field tests revealed mixed soils indicating previous disturbance and evidence of secondary deposits, which suggest low site integrity. The site is not recommended eligible for National Register of Historic Places (NRHP) listing.

The review concluded, and the State Historical Preservation Office concurred, that no additional investigations are recommended and that no historic properties or human burial sites are likely to be impacted by the proposed project should the Nemadji River Site be selected for NTEC.

One archaeological site is located within the Eastern Route area of potential effect (APE). The finding consists of an abandoned railroad grade, associated facilities, and scattered artifacts from the late 19th to mid-20th century that functioned as part of the Iron River to Superior DSS&A Railway. The site has poor integrity, with removed hardware and overgrown grade, but includes *in situ* artifacts adjacent to the grade.

The site is not recommended eligible for NRHP listing. The investigation concluded that no additional investigations are recommended and no that there is a low likelihood that historic properties or burial sites would be effected by the proposed project within the Eastern Route.

One archaeological site is located within the Western Route area of the APE, a residential building from the 1940s. The project would affect the remains of a gravel driveway associated with the residence. The site is not considered historically significant and is not recommended eligible for NRHP listing. The review stated that no additional investigations are recommended, and no historic properties or burial sites are anticipated to be impacted by the proposed project within the Western Route.

Connecting Facilities

Construction of the NTEC plant is part of a larger group of proposed projects; which, if approved would construct the infrastructure components necessary for sustained operation of the NTEC plant. Specifically, these projects would involve the construction of a natural gas line to provide fuel to the plant, a 345 kV transmission line connection to the existing transmission system, and finally, the relocation of an existing natural gas pipeline to provide adequate space for the construction of the plant and transmission lines. The Commission has received applications for each of these supporting projects, Table ES-1 provides additional detail regarding each of these project.

Table ES-1 Applications received by the commission for the construction of NTEC

Proposed project	Applicant(s)	Commission approval	Commission docket ID	Notes
Construct NTEC plant	SSE and DPC	CPCN	9698-CE-100	Focus of EIS
Construct 345 kV transmission line connecting NTEC to transmission grid	SSE and DPC	CPCN	9698-CE-101	The routing options available would depend upon which site alternative is selected for NTEC. Potential routes range from 1.6 miles to 7.1 miles.
Construct natural gas pipeline for fuel delivery	SWL&P	CA	5820-CG-105	Environmental impacts are being analyzed and discussed in that docket.
Relocate existing natural gas pipeline	SWL&P	CA	5820-CG-106	Only required if the Nemadji River Site is selected for NTEC. To allow for construction of NTEC and transmission line. Environmental impacts are being analyzed and discussed in that docket.

1.1. COMMISSION DECISIONS

The Commission, in reviewing SSE and DPC's application for a CPCN, will decide, among other items, whether to build the plant, and where to build the plant. If it approves the plant, it would also decide whether to impose any conditions on the construction of these facilities. In addition, the Commission would decide the location and configuration of the proposed transmission line and the proposed natural gas pipeline. As previously mentioned, the relocation project would be required in the event that the Nemadji River Site is the selected site for NTEC.

CHAPTER

1

1. Project Overview and Regulatory Requirements

1.1. PROPOSAL AND PURPOSE OF PROJECT

1.1.1. Proposed electric generation facility

South Shore Energy, LLC (SSE) and Dairyland Power Cooperative (DPC) (together, applicants) are proposing to build a new natural gas-fired, combined-cycle electric generation facility in the City of Superior in Douglas County. The proposed facility is referred to as the Nemadji Trail Energy Center (NTEC), and would have a total generating capacity of approximately 625 megawatts (MW). The facility would include one H-class gas turbine generator (GTG), one heat recovery steam generator (HRSG) with duct firing, and one steam turbine generator (STG). The plant would burn natural gas with the capability to use fuel oil as a backup fuel. The plant would have an anticipated life span of at least 30 years.

The applicants have evaluated two potential locations for the NTEC Generating Facility, the Nemadji River Site and the Hill Avenue Site (Figure ES-1). Both sites are located in the City of Superior within Douglas County, Wisconsin. The Nemadji River Site would be east of the existing Enbridge Energy Superior Terminal Facility on the banks of the Nemadji River. The site is accessible from U.S. Highway (USH) 2/USH 53 via 31st Avenue East from the northeast. The site is approximately 26.3 acres in size with an additional approximately 24.8 acres of staging and laydown area across the street on 31st Avenue East. It is currently mostly wooded with a parking lot and small stormwater retention pond in the southwest corner. Several existing transmission lines extend through the parcel. The Hill Avenue Site would be approximately 1.2 miles northwest of the Nemadji River Site. The site is accessible from the west via Hill Avenue. USH 2/USH 53 is accessible via Hill Avenue to North 28th Street East, then 18th Avenue east to the highway. No other access to the site currently exists. The site is approximately 75.5 acres in size and is undeveloped. An existing transmission line extends along the northeast border of the site.

SSE and DPC applied to the Commission for a Certificate of Public Convenience and Necessity (CPCN) under Wis. Stat. § 196.491(3) and Wis. Admin. Code ch. PSC 111, to construct and operate a large natural gas-fired electric generating facility with a capacity of approximately 625 MW. SSE is a Wisconsin subsidiary of ALLETE, Inc. (ALLETE), formed for the purpose of owning ALLETE's share of the project. Neither DPC nor SSE serve retail electric customers or are public utilities under Wisconsin law.

The proposed NTEC facility would be 100 percent owned by SSE and DPC (50 percent by each entity). The applicants would be responsible for the plant's design, construction, start-up testing, and operations and maintenance. SSE would be the construction and operating agent for the proposed plant. The proposed

plant would be operated as a merchant plant as defined in 1997 Wisconsin Act 204, the Electric Reliability Act, which legalized the development of wholesale merchant plants in the state.

The development of the NTEC facility as a wholesale merchant plant is not dependent on any pre-existing power purchase arrangements with public utilities. As defined in Wis. Stat. § 196.491(1)(w), a merchant plant is a power plant that may sell power at wholesale to utilities but does not provide retail electric service and is not owned by a public utility. DPC would sell electric power generated by the plant at market-based rates to investor-owned utilities, cooperative utilities, power marketers, and other purchasers for resale in Wisconsin and throughout the Midwest region.

1.2. GENERAL COMMISSION CONSTRUCTION CASE PROCESS

1.2.1. Application for Commission certification

Project developers must file a detailed application with the Public Service Commission (Commission). Application filing requirements for proposed electric generation facilities and high-voltage transmission lines are posted on the Commission's web site. When an application is filed with the Commission, copies are also placed in libraries and provided to municipal clerks in the project area (refer to Wis. Stat. § 196.491 and Wis. Admin. Code § PSC 111.51). The CPCN application is reviewed by Commission staff to see that it is complete. If it is not, additional information or a new application must be filed.

Commission staff analyzes utility construction applications for need, and potential impacts of the plant and any associated facilities, except that the Commission may not consider alternative sources of supply, engineering, or economic factors for a wholesale merchant plant. Two aspects of a proposed project determine the type of review the Commission must conduct: 1) size and cost; and 2) potential environment impact. A project that falls under a low threshold for size and cost, receives an informal review from Commission staff. A project that goes above those thresholds requires a Certificate of Authority from the Commission before construction may commence, which is the case with the two natural gas dockets that are discussed separately outside of this final EIS. Proposed electric generation facilities of 100 MW or more, and proposed high-voltage electric transmission lines of 100 kilovolts (kV) or more, require a CPCN prior to construction. The Commission review process varies depending upon the size and complexity of the project and the certificate sought by the applicant, but it generally takes about six months to a year to complete. The proposed power plant and transmission facilities proposed for this project meet the criteria for a CPCN, and are described in this final EIS and analyzed as part of this project.

Once the Commission deems an application complete, it must take final action on the project within 180 days, although the chairperson of the Commission may extend the time period by a single 180-day period, to a maximum of 360 days. The Commission makes its decisions on a CPCN project application based on the hearing record (transcripts and exhibits). The hearing record is the product of a technical hearing and a public hearing conducted by an Administrative Law Judge. If the Commission does not extend the review period or issue a final decision within the 180-day period, the project is automatically approved as proposed (refer to Wis. Stat. § 196.491(3)).

1.2.2. Joint Public Service Commission/Department of Natural Resources pre-application consultation process

An applicant must consult with both the Commission and the Department of Natural Resources (DNR) prior to submitting its application (Wis. Stat. § 30.025(1m) and Wis. Admin. Code § PSC 4.70(1)). This

pre-application consultation process is a series of discussions with the staff of these two agencies. Each agency has its own requirements, but the two agency reviews interrelate.

A proposed project will likely require water, air, and possibly solid waste permits from DNR. During the consultation process, the Commission docket coordinator will identify the number of paper copies of these DNR applications the Commission may require.

Topics discussed during the pre-application process include:

- Commission and DNR staff contacts
- Applicable portions of the filing requirements for each agency
- Appropriate application formats and subject matter, such as for maps and diagrams
- Specific permits and approvals required for the project
- Commission's and DNR's projected review timelines and important milestones
- Site alternatives and project boundary
- Appropriate type, scope, and timing of required field work (habitat assessments, wetland delineations, biological surveys, etc.)

During the pre-application period, the applicant should also solicit additional information from other interested persons through public outreach.

1.2.3. Required priorities for meeting energy demands

In addition to the above statutory determinations, the Commission must address the priorities in Wis. Stat. §§ 1.12 and 196.025. These laws require the Commission to give priority to specific methods of meeting energy demands to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

- Energy conservation and efficiency
- Noncombustible renewable energy resources
- Combustible renewable energy resources
- Advanced nuclear energy using a reactor design or amended reactor design approved after December 31, 2010, by the U.S. Nuclear Regulatory Commission
- Nonrenewable combustible energy resources, again in the order listed:
    - Natural gas
    - Oil or coal with a sulfur content of less than one percent
    - All other carbon-based fuels

If the Commission finds that any of these statutorily preferred options, or a combination of these options, constitutes a cost-effective and technically feasible alternative to the project, the Commission must reject all or a portion of the project as proposed.

1.2.4. Required priorities for siting electric transmission projects

Wisconsin Stat. § 1.12(6) also directs the Commission to consider corridor sharing opportunities when reviewing transmission facility projects. The statute states that, when siting new electric transmission facilities, it is the policy of the state to attempt to share existing corridors to the greatest extent feasible.

When selecting existing corridors to share, the Commission must determine that corridor sharing is consistent with economic and engineering considerations, reliability of the electric system, and protection of the environment. When feasible, corridors should be utilized in the following order of priority:

- Existing utility corridors
- Highway and railroad corridors
- Recreational trails, to the extent that the facilities may be constructed below ground and that the facilities do not significantly impact environmentally sensitive areas
- New corridors

1.2.5. Intervenors in the Commission process

A number of organizations, local government offices, utilities, and community groups have requested to "intervene", to become parties to the docket before the Commission. The intervenors in this docket are[1]:

- American Transmission Company LLC (ATC)
- Citizens Utility Board of Wisconsin
- Clean Wisconsin (Clean WI)
- Sierra Club
- Wisconsin Legislative Black Caucus
- Wisconsin Senator Janet Bewley

1.2.6. Public involvement

Public involvement and comments throughout the review process also contribute to the Commission's analysis of the impacts of a proposed project. Public input on the proposed project is received through:

- Written and spoken comments from public information meetings sponsored by the applicants;
- Written comments received during the draft EIS scoping period
- Written comments on the draft EIS
- Testimony at public hearings.

1.2.6.1. Summary of comments received during draft EIS scoping period

The Commission received 316 comments regarding the proposed NTEC project under docket 9698-CE-100.

Several comments and letters were received from local and state officials, a trade union, a construction trade council and a development and construction association, stating support for the project, and the benefits it would provide. Some of these benefits included; benefits to the local economy, jobs the project would create, allowance for local constituents to get better access to renewable energy via DPC's interest in the project, lower emissions than a coal generating facility, and allowance for consistent energy production during gaps in production of already existing renewable facilities.

1 Order on Requests to Intervene (PSC REF#: 366168).

In terms of quantity, the majority of comments received were in opposition to the project in general, and specifically cited the burning of fossil fuel to power the facility, associated carbon emissions, and suggested meeting the need for this project through the use and creation of more renewable energy sources.

A local resident commented in opposition to the project, and expressed concerns relating to the disturbance and nuisance that the eventual plant would create. Specific concerns were; the truck and traffic disturbance and noise during construction, noise of the plant once in operation, local air pollution once in operation, possible accidents, spills, or explosions once in operation, potential icing, fogging, and salt deposits, and light pollution.

A citizen's group commented in opposition to the project. They expressed concern over impact on drinking water supplies. They believe that since the proposed plant would be natural gas-fired and fracking is a source of new natural gas supplies, the proposed plant may negatively impact drinking water supplies.

Clean WI and Sierra Club provided scoping comments relating to the draft EIS's discussion of project purpose and need, alternatives, and direct, indirect, and cumulative environmental impacts associated with the operation of the proposed plant. [2]

1.2.6.2. Summary of written comments received on the draft EIS

The comment period for the draft EIS ran from July 24 to September 9, 2019. The Commission received approximately 50 comments from the general public , as well as comments from the applicants, and intervenors. An overview of the comments received on the draft EIS is presented in the following section.

Comments received from the general public:

Many of the public commenters voiced a concern about using natural gas as a fuel source for the proposed NTEC plan. These comments generally expressed concern about the potential impacts associated with obtaining natural gas and emissions associated with its combustion. Several commenters expressed a specific concern regarding the volume of Co2 emissions that would be released over the expected lifetime of the plant. The commenters also expressed an opposition to natural gas as a fuel source, and suggested that the electrical demand that NTEC is intended to satisfy could be achieved using electricity from renewable resources including wind energy, solar energy, biomass fuel sources, and hydroelectric power.

Comments received from the applicants:

SSE and DPC filed comments on the draft EIS jointly. Comments from the applicants consisted primarily of suggested editorial changes as well as suggested changes to the narrative of the document. The applicants' comments and suggested revisions to the narrative of the document covered a wide range of topics and sections of the EIS including natural resources, local community impacts, proposed infrastructure, and environmental permitting.

[2] The draft EIS complied and this final EIS complies with the Wisconsin Environmental Policy Act (WEPA) and Wis. Admin. Code § PSC 4.30(3)(b) by describing the cumulative impacts of this project. For the convenience of the parties, however, a summary of some Commission analysis that relates to the environmental impacts specific to the proposal of Superior Water, Light and Power Company to construct a natural gas lateral to supply the project with gas (docket 5820-CG-105), and to abandon and relocate existing natural gas pipeline infrastructure (docket 5820-CG-106), which is being developed for those separate dockets, is provided for reference as Appendix C.

Comments received from intervenors:

Clean Wisconsin

Clean Wisconsin offered several comments. Clean Wisconsin stated the draft EIS must independently assess the environmental impacts of the NTEC Proposal and whether these impacts can be successfully mitigated. One example set out be Clean Wisconsin is that in the discussion of special construction considerations due to soil conditions (sec. 3.2.4.1, p. 45) the draft EIS acknowledges that the soils near the Nemadji River site are very susceptible to erosion, and at a high risk for impact to natural resources. It then leap-frogs to the conclusion that impacts could be limited "if a carefully designed Construction and Mitigation Plan is prepared, approved prior to construction, and rigorously followed during construction." The section provides no substantive analysis of how these particular practices would or would not be effective on this particular landscape.

Clean Wisconsin also commented that the "Project Purpose and Need" section of the draft EIS does not even attempt to demonstrate that the project is needed to supply energy. The draft EIS should offer an independent analysis regarding whether, or to what extent, a gas plant is needed for energy and reliability.

Clean Wisconsin stated that the draft EIS must address all project impacts—direct, indirect, and cumulative. Clean Wisconsin believes the draft EIS understates the impacts to neighbors, by not looking cumulatively at all the plant impacts. These impacts are addressed one by one, in the section where each of these impacts is considered. Yet neighbors, particularly on 31st Avenue, would experience a significant and wide range of adverse impacts during construction, including substantial construction traffic, heavy trucks bringing in an as-yet unquantified amount of fill, likely construction of a water line under the street, transmission construction, dust from traffic and construction, safety hazards associated with truck traffic and construction, and noise. After the plant is constructed, those same neighbors would be subject to increased air emissions, fog/ice/condensation, visual impacts, employee traffic, lights, possible stormwater changes, and an increased safety hazard in a neighborhood that already suffered a major industrial accident at the nearby Husky refinery.

Clean Wisconsin comments the application is a moving target due to the fact that the applicants filed changes to infrastructure after the draft EIS was issued so it cannot have addressed or reviewed it.

Sierra Club

Sierra Club comments that the draft EIS' proposed statement of purpose and need for the proposed NTEC project does not describe the generation needs that are motivating this project. While the draft EIS mentions multiple types of generation providers, and notes that "intermediate resources have become more prolific in the electric generation fleet," it does not specifically describe whether there is a specific need that NTEC is expected to meet.

Sierra Club states the EIS must address the full range of all significant direct, indirect, and cumulative environmental and socioeconomic impacts, as set out in Wis. Admin. Code § PSC 4.30(3). Sierra Club does not believe the draft EIS meets these requirements because it does not evaluate the impacts of the complete proposed project, ignores the increased impact NTEC will have in a changing climate, ignores the climate impacts of upstream gas extraction, overlooks local burial sites that will be impacted, and contains an inadequate analysis of impacts to local water supplies.

Sierra Club also comments that the Commission is required to fully consider a range of alternatives to the project, as required by Wis. Stat. § 1.11(2)(e) and Wis. Admin. Code § PSC 4.30. Sierra Club states that it

does not believe this obligation to consider alternatives is negated by the separate limitations placed on PSC's decision-making under Wisconsin Stat. § 196.491(3)(d)3. Sierra Club does not believe the draft EIS meets the requirements of Wis. Stat. Section 1.11(2)(e) and Wis. Admin. Code § PSC 4.30 because it improperly declines to consider demand side management alternatives, improperly declines to consider wind and solar system support alternatives, completely ignores electric storage as a project alternative, and does not consider alternative gas supplies.

The Red Cliff Band of Lake Superior Chippewa Indians provided a comment submittal as well. The submittal includes comment on the following topics: Impact on Sacred Landscapes and Cultural Artifacts; Impact on Treaty Rights; and Impact on Climate Change and Air Pollution. The Band stated that no cultural, sacred or traditional Anishinaabe sites or landscapes were identified in the draft EIS. They stated their concern with potential impacts to Bald and Golden Eagles was not adequately addressed. They requested that regional tribes be contacted for additional surveys, and that tribal monitors be used for any land and water disturbing work. They describe the potential harm to wetlands and the land at the project area site as a violation of their treaty rights, and request a review of the wetland mitigation plans created for the proposed project. Like many members of the public, the Band describes its concern of the contributions of the project to climate change, both from direct emissions, and from the fracking necessary to extract the natural gas fuel source.

1.2.7. Department of Natural Resources permitting authority

During the review of this project, Commission staff have consulted with DNR to assess the potential impact the proposed project may have on Wisconsin's natural resources. Commission and DNR staff are required under Wis. Stat. § 196.025(2m)(b)(1)1. and 3. to prepare an EIS cooperatively and include all of the information needed by both agencies to carry out their respective duties under Wis. Stat. § 1.11 (Wisconsin Environmental Policy Act (WEPA), the governmental consideration of environmental impact). DNR and Commission staff are co-authors of the final EIS, with the Commission acting as the lead agency.

DNR is the permitting authority of Wis. Stat. ch. 30 related to navigable waterways, including temporary clear span bridges (TCSB) over streams. DNR is also the permitting authority of Wis. Stat. § 281.36 related the discharge of dredged or fill material in wetlands. DNR reviews utility projects with Commission staff and provides an evaluation of impacts to wetlands and water resources as a result of the construction and operation of facilities. The Commission typically requires an applicant obtain all permits prior to the start of construction, therefore, working with agencies that have the remit of permitting impacts to wetlands and water resources during the EIS process allows the Commission to discover whether a project is permittable as proposed or would require actions to mitigate impacts to wetlands and water resources before a permit could be issued.

DNR is also the permitting authority for construction site erosion control. Stormwater permits must be obtained from DNR under Wis. Stat. ch. 283 and Wis. Admin. Code chs. NR 216 and NR 151.

DNR also reviews and permits potential impacts to endangered resources and would process any Incidental Take Permits or Authorizations under Wis. Stat. § 29.604.

DNR may consult with the U.S. Army Corps of Engineers (USACE) and the U.S. Fish and Wildlife Service (USFWS) to evaluate the applicants' proposed construction activities. However, these federal agencies may require separate permitting beyond what would be provided by DNR or ordered by the Commission.

The developer of a proposed power plant must obtain several permits from DNR. One of the DNR approvals needed before power plant construction may begin is the construction permit for a new source potentially emitting significant quantities of air pollutants. Other DNR permits may be required for various components of a power plant project, depending on the proposed impacts. Similarly, the developer of a high-voltage transmission line must also obtain approvals from DNR prior to construction. DNR regulated activities typically associated with construction of a high-voltage transmission line include placing temporary bridges over navigable waters, wetland fill, discharging stormwater from construction sites, and potential impacts to state listed threatened and endangered species.

1.2.8. Wisconsin Historical Society

Wisconsin Admin. Code § PSC 4.30(3)(f) directs the EIS to include an evaluation of the archaeological, architectural, and historic significance of any affected resources, and that the evaluation include consultation with the state Wisconsin Historical Society (WHS). The role of WHS, through the State Historic Preservation Office (SHPO), is to work with the Commission to evaluate any adverse effects that proposed projects may cause to historic properties. According to Wis. Stat. § 44.31(3), historic properties include any building, structure, object, district, area, or site, whether on or beneath the surface of land or water, that is significant in the history, prehistory, architecture, archaeology, or culture of this state, its rural and urban communities, or the nation.

The relationship between the Commission and WHS is further described in Wis. Stat. § 44.40 and the PSC-SHPO Interagency Programmatic Agreement. These direct the Commission to assess possible adverse effects to known historic properties within the area of potential effect (APE), and as necessary coordinate a review with SHPO. If the review determines that an adverse effect may occur, SHPO may propose a mechanism to avoid, minimize, or mitigate the adverse effect.

The SHPO also works with federal agencies, such as USACE and Rural Utilities Service (RUS), on the Section 106 process of the National Historic Preservation Act (NHPA) using the guidelines from 36 CFR 800. This process requires that federal projects, activities, or programs either funded, permitted, licensed, or approved by a federal agency consider the effects of their undertakings on historic properties. The SHPO coordinates with these federal agencies to evaluate any adverse effects to historic properties. As part of this process, federal agencies often must survey project areas for unrecorded historic properties. If the project is approved, the final site and route(s) would be reviewed under the Section 106 process in order to identify all recorded and unrecorded historic properties within the project corridor, assess any impacts that may occur from the project, and propose methods to mitigate any impacts.

In accordance with Wis. Stat. § 44.40(5), the Commission does not conduct a consultation with SHPO for the proposed project since RUS is conducting the Section 106 review process. Instead, for the proposed project the Commission is a consulting party in the RUS Section 106 review for the project, which would occur if the project is approved and only for the final approved site and route(s). The review comprises a consultation between interested parties and SHPO to identify and evaluate recorded and unrecorded historic properties, assess the effects on historic properties, and attempt to negotiate an outcome. The outcome of the Section 106 review can range from avoidance of historic properties to the acceptance of adverse effects to historic properties. Should the project pose adverse effects to historic properties, RUS must consult to attempt to reach an agreement on how to resolve those adverse effects. Consulting parties participate with RUS to establish agreed upon measures to resolve the adverse effects. Once an agreement is reached, RUS must implement all agreed upon measures.

In addition, WHS is responsible for preserving human burials under the state burial sites preservation program as described in Wis. Admin. Code § HS 2 and Wis. Stat. § 157.70. Burial sites are defined as any

place where human remains are buried, which may be any part of the body of a deceased person in any stage of decomposition in a context indicating substantial evidence for burial. Burial sites are often indicated by stone monuments, spirit houses, wooden crosses, or Native American mounds. No person may intentionally cause or permit the disturbance of a burial site; therefore, any proposed activities that may disturb burial sites must receive a Burial Site Disturbance Authorization/Permit from WHS. For the proposed project, the applicants have reviewed the project area for known burial sites and would obtain permits if the project is approved as appropriate.

1.2.9. Wisconsin Environmental Policy Act

WEPA, Wis. Stat. § 1.11, requires all state agencies to consider the environmental impacts of all their actions, and issue environmental impact statements on major actions that could significantly affect the quality of the human environment. An action on a simple-cycle or combined-cycle power plant constructed at a new electric generation site, or the construction of a new high-voltage transmission line typically requires the preparation of an EIS under Wis. Admin. Code § PSC 4.10. While the Commission is the lead agency, the Commission and DNR prepare the EIS jointly. The EIS describes the project, discusses possible alternatives to the proposed action, and evaluates the project impacts of those alternatives on the natural and human environment.

After an application is filed, the Commission notifies the public that the review process is beginning. The Commission sends a public notification letter to all property owners on or near the potential sites, as well as local government officials, local libraries, the media, and other agencies and interested persons. This notification briefly describes the project; includes a map; identifies the level of environmental review the project will require; lists places where copies of the application are available for review; and gives contact information for comments and questions.

The draft EIS is an extensive document that analyzes the project need, alternatives, fuel, technology, air and water discharges, solid and hazardous waste issues, land resources, and community impacts. Members of the public can download a copy of the draft EIS from the Commission's website, review the document at a local library or municipal office, or request a printed copy from the Commission. The applicant and the public then have about 45 days to comment on the draft EIS. The final EIS is prepared considering the comments and concerns raised by the public. DNR reviews the application for air, solid waste, water quality, water use, and water discharge permits. DNR and the Commission may propose changes in project design or site location to protect the environment or affected community.

The final EIS helps inform the Commissioners and the public of the potential effects of the proposed project. After issuance of the final EIS, there is a 30-day period of review to allow individuals to read the final EIS and prepare for the public hearing. The Commission must give notice to the public and hold a public hearing in the project area. The hearing is the opportunity for the public to make their views known to the Commissioners through the hearing record.

1.3. PROCESSES AND PUBLIC PARTICIPATION FOR THIS DOCKET

On January 8, 2019, SSE and DPC, a not-for-profit generation and transmission electric cooperative, submitted an application to the Commission for a CPCN for authority to construct and operate a large natural gas-fired electric generating facility and associated high-voltage transmission interconnection facilities. Applications for several permits were also filed with DNR at about the same time the CPCN application was filed.

Also on January 8, 2019, SWL&P submitted an application for a CA to construct a new natural gas lateral to supply NTEC with fuel (docket 5820-CG-105). SWL&P also submitted an application for a CA to remove, abandon, and relocate portions of existing natural gas pipeline adjacent to the proposed NTEC plant (docket 5820-CG-106). Relocation of the gas pipeline would provide additional space needed for the construction of the proposed NTEC plant and associated natural gas and electric infrastructure.

On February 15, 2019, the Commission determined that both CPCN applications were complete and under Wis. Admin. Code § PSC 111.51(4) ordered the applicants to distribute an electronic copy of the applications to clerks and public libraries near the project area. On February 19, 2019, the Commission received confirmation that applications had been provided to the Superior City Clerk, town of Superior Clerk, town of Parkland Clerk; in addition to the Superior Public Library, Jim Dan Hill Library, La Crosse Public Library, and the Murphy Library Resource Center in La Crosse.

On April 19, 2019, the Commission issued a notification announcing that the public scoping process was commencing, to solicit comments regarding the scope of the draft EIS.

1.3.1. Remaining Commission process for this project

The remaining steps in the Commission's review of the proposed project are outlined below.

Public and technical hearings are anticipated to occur in October 2019 at dates and times to be determined, in Superior, Wisconsin. The CPCN applications, this final EIS, and testimony from the public will be included in the hearing record. The Commission must issue a formal Notice of Hearing at least 30 days prior to the hearing date.

Upon completion of the public and technical hearings, transcripts of the hearings are reviewed, the Commissioners will make a decision to approve, modify, or reject the proposed project, based on information presented at the hearing. If the project is approved, the Commission will select the site for the plant as well as a route for the proposed transmission line. Any conditions it determines necessary will also be included in the Commission's construction order.

The Commissioners will make their decisions on the project at a meeting that is open to public observation in the Commission offices in Madison. After the Commission decisions are made, an order to the applicants will be prepared and issued. Because the Commission declared the CPCN application complete on February 15, 2019, the Commission's order must be issued by August 14, 2019, to comply with the statutory requirement to review the project in 180 days or less. On April 5, 2019, an extension of time was granted, providing an extension of time of up to an additional 180 days. The extended deadline for the Commission's order is currently February 10, 2020.

1.4. PUBLIC PARTICIPATION TO DATE AND FUTURE OPPORTUNITIES

1.4.1. Previous public meetings

Public participation to date has included stakeholder meetings, public open houses, and a formal project scoping meeting held by RUS.

Stakeholder meetings were held in Superior, Wisconsin, on July 13, 2017, and November 12, 2018, providing an opportunity for various leaders in the community to learn more about the project. The

meeting consisted of an open house style presentations by Minnesota Power and DPC staff about the NTEC Project, a mapping exercise, and a question and answer portion.

On September 7, 2017, two open houses were held at the Elks Lodge in the City of Superior and on November 12, 2018, an additional open house was held at the Belgian Club in the City of Superior. The open house format consisted of multiple stations with tour guides (groups of three to four attendees) providing information about each station and subject matter experts on hand to answer technical questions on such topics as environmental impacts and project engineering. At the end of the tour there were large maps of the project study area for attendees to view and ask specific questions about certain areas, a comment form station, and a social area. The applicants' staff took notes of topics and issues discussed with attendees and recorded them as part of the outreach process.

On September 21, 2017, the RUS Formal Scoping Meeting was held at the Elks Lodge in Superior, Douglas County, Wisconsin. The meeting format was similar to the September 7, 2017, open houses; however, the tour guides were representatives from RUS and subject matter/technical experts at the stations were from Minnesota Power (MP) and DPC.

Table 1-1 Open house and RUS formal scoping meeting attendance

Meeting Type	Date	Time	Attendees (no.)	Comment Forms (no.)
Open House	Thursday, September 7, 2017	11:00 a.m.-1:00 p.m.	44	9
		5:00 p.m.-7:00 p.m.	19	5
	Monday, November 12, 2018	4:00 p.m.-7:00 p.m.	46	7
		Total	109	21
RUS Formal Scoping Meeting	Thursday, September 21, 2017	4:00 p.m.-7:00 p.m.	13	2

Technical and Public hearings on the final EIS and the proposed project is anticipated to occur in October 2019 in Superior, Wisconsin. At the technical hearing, the applicant and the Commission staff will present testimony with exhibits. The main exhibit from SSE and DPC will be the project application. The main exhibit from Commission staff will be the final EIS. The hearing will be the Commission's opportunity to obtain direct testimony from the public on its views of the project and potential impacts. The record of this hearing, including testimony, statements, and exhibits, will be the basis for the Commissioners' decisions.

1.5. LOCAL, STATE, AND FEDERAL PERMITS AND APPROVALS

Table 1-2 provides a preliminary list of the local permits and regulatory approvals anticipated for the project. All permits listed below are anticipated to be applicable to both proposed site alternatives for the NTEC facility. Tables 1-3 and 1-4 list the anticipated state and federal permits and regulatory approvals.

Table 1-2 Anticipated local permits and approvals

Agency	Planned Activity	Type of Approval	Agency	Contact Name and Phone Number
Douglas County	Delivery of large/heavy components over county- controlled roads	Heavy Haul/Oversized Load permits, as authorized by Wis. Stat. §§ 348.25- 348.28; Douglas County Highway Department 2018 Weight Limits	TBD	TBD
City of Superior	Construction of facilities	Building, electrical, and plumbing permits, Superior Code of Ordinances Chapter 34 (Construction Code)	TBD	TBD
	Delivery of large/heavy components over City- controlled roads	Heavy Haul/Oversized Load permits, as authorized by Wis. Stat. §§ 348.25- 348.28, Superior Code Chapter 112 Section 112-33 (Heavy traffic [truck] route)	TBD	TBD

Agency	Planned Activity	Type of Approval	Agency	Contact Name and Phone Number
	Pretreatment permit for discharge of wastewater to a municipal treatment facility	WPDES1 permit, Wis. Admin. Code chs. NR 108, 211, and 220-297	TBD	Robert Liska (608) 267-7631

Table 1-3 Anticipated state permits and approvals

Agency	Planned Activity	Type of Approval	Status	Contact (Name and Phone Number)
PSC	Building and operating generating units and 345 kV transmission line	Certificate of Public Convenience and Necessity (Wis. Stat. § 196.491(3))	Submitted January 8, 2019	Jim Lepinski (608) 266-0478
	Relocation of the existing 10-inch gas pipeline currently located on Preferred Site	Certificate of Authority (Wis. Stat. § 196.49)	Submitted January 9, 2019	[assigned after permit submitted]
	Construction of 16-inch pipeline to serve Project	Certificate of Authority (Wis. Stat. § 196.49)	Submitted January 9, 2019	[assigned after permit submitted]
	Relocation of existing transmission assets currently located on Preferred Site	Affiliated Interest Agreement approval of agreement between SWL&P and its affiliate SSE (Wis. Stat. § 196.52)	Filing date TBD	[assigned after permit submitted]
	Relocation of existing 10-inch gas pipeline currently located on Preferred Site	Affiliated Interest Agreement approval of agreement between SWL&P and its affiliate SSE (Wis. Stat. § 196.52)	Filing date TBD	[assigned after permit submitted]
	Construction of 16-inch pipeline to serve Project	Affiliated Interest Agreement approval of Development Agreement between SWL&P and its affiliate SSE (Wis. Stat. § 196.52)	Approved in Docket No. 5820-AG-100 on May 7, 2018	Daniel Grant (608) 267-1473
	Construction of 16-inch pipeline to serve Project	Affiliated Interest Agreement approval of Construction and Service Agreement between SWL&P and its affiliate SSE (Wis. Stat. § 196.52)	Filing date TBD	[assigned after permit submitted]
DNR	Construction and operation of new source of air emissions	Construction and operating permits: (Wis. Admin. Code ch. NR5 405 through 407, 40, CFR Part 52.21), and acid rain permit (40 CFR Part 75 and NR 409)	Submitted December 18, 2018	Megan Corrado (608) 405-0327
	High capacity well system for non- potable use	Approval of high capacity wells (Wis. Admin Code ch. NR 812.09)	Submitted December 18, 2018	Ian Anderson (608 266-2432)
	Erosion control and stormwater management for land disturbance during construction	Construction site stormwater discharge permit (Wis. Admin. Code ch. NR 216)	Filing Date TBD	Christine (Kim) Gonzalez (608) 267-2759
	Hydrostatic test water for water supply system water	Wis. Stat. § 283	Submitted December 18, 2018	Trevor Moen (608) 266-3906
	Nontransient Noncommunity Public Water System	Public Water Supply (Wis. Admin. Code chs. NR 809 and 810)	TBD	Christian Martinez (715) 685-0430

Agency	Planned Activity	Type of Approval	Status	Contact (Name and Phone Number)
	Operational stormwater pollution prevention plan	Industrial stormwater discharge permit (Wis. Admin. Code ch. NR 216)	Submitted December 18, 2018	Matt Jacobson (715) 682-3273
	Various land disturbance construction activities	Potential impact to federal and state threatened and endangered species	Guidelines to be followed	Stacy Rowe (608) 266-7012
	Water Use Permit	Water Withdrawal Individual Permit (Wis. Admin. Code ch. 860)	Submitted April 5, 2019	Nicki Clayton (608) 266-9254
	Water Loss Approval	Water Use Approval (Wis. Stat. 281.35, Wis. Admin. Code ch. 142)	Submitted May 1, 2019	Nicki Clayton (608) 266-9254
	Placing temporary bridges over navigable waterways	Wis. Stat. 30.123 and Wis. Admin. Code ch. NR 320	Joint filing with CPCN application	Lindsay Tekler (608) 535-2602
	Wetland fill	Wis. Stats 281.36	Joint filing with CPCN application	Lindsay Tekler (608) 535-2602
Wisconsin Department of Safety and Professional Services	Construction of all buildings and structures	Approval of plans and specifications (Wis. Stat. § 101.02)	To be filed	TBD
	Installation of fuel or lubricating oil storage tanks	Approval of plans and specifications (Wis. Stat. § 101.09)	To be filed	Bureau of Weights and Measure
Professional Services	Installation of dust filtering and HVAC equipment	Approval of plans and specifications (Wis. Stat. § 101.12)	To be filed	TBD
	Installation and registration of boilers, pressure vessels, and power piping	Machines and boilers, safety requirements (Wis. Stat. 101.17)	To be filed	TBD
WisDOT	Delivery of equipment to the construction site	Oversized Equipment Delivery Permit	To be filed	TBD
Wisconsin Historical Society	Site preparation and grading	Approval of archaeological surveys (Wis. Stat. § 44.40) and Section 106 Cultural Resources Clearance	Filed with CPCN Application	John H. Broihahn (608) 264-6496

Table 1-4 Anticipated federal permits and approvals

Agency	Planned Activity	Type of Approval	Status	Contact Name and Phone Number
FAA	Construction or alteration of structures more than 200 feet above ground level	7460 Notice of Proposed Construction or Alteration (14 Code of Federal Regulations (CFR) S77.13)	8-25-17	Vivian Vilaro (847) 294-7575
USFWS	Various land disturbance construction activities	Endangered Species Act and National Bald Eagle Management Guidelines	Guidelines to be followed	Pete Fasbender (952) 252-0092 ext. 210
USACE	Discharge of dredged or fill material into waters of the U.S.	Clean Water Act - Section 404 Permit	Filing date TBD	Bill Sande (651) 290-5525
USEPA	Storage of petroleum products	Spill Prevention, Control and Countermeasures Plan and Facility Response Plan (40 CFR 112)	To be implemented and kept on site	N/A

CHAPTER

2

2. Project Description

2.1. GENERATING FACILITIES

2.1.1. Description of generating facilities

SSE and DPC propose to construct a natural gas, combined-cycle generating facility for operation as a "wholesale merchant plant" as defined by Wis. Stat. § 196.491(1)(w). The plant could operate at any time that it is not in a planned or forced outage for maintenance; including both night and day on weekdays, weekends, and holidays. Several factors may be considered in determining when a combined-cycle plant operates; including overall system power demand, system power prices, natural gas and fuel oil pricing, temporary transmission constraints, outages of other units, and during periods when intermittent generating resources are not operating. Intermittent generating resources are those that are not dispatchable, such as wind and solar generating resources. Typically, system demand is highest during the week when all industry is in operation and is highest in the hot summer and cold winter (especially early morning and early evening).

In the event that firm natural gas supply becomes unavailable or uneconomical, it is possible that the plant could be retrofitted with backup fuel oil capabilities, using fuel oil from a neighboring fuel supplier. The fuel oil would be utilized by the gas turbine generator (GTG) when natural gas is unavailable due to limited availability or curtailment.

A combined-cycle plant offers efficiency by using the waste heat from the turbine exhaust to create steam to run an additional turbine. The following section provides a generalized description of combined-cycle technology.

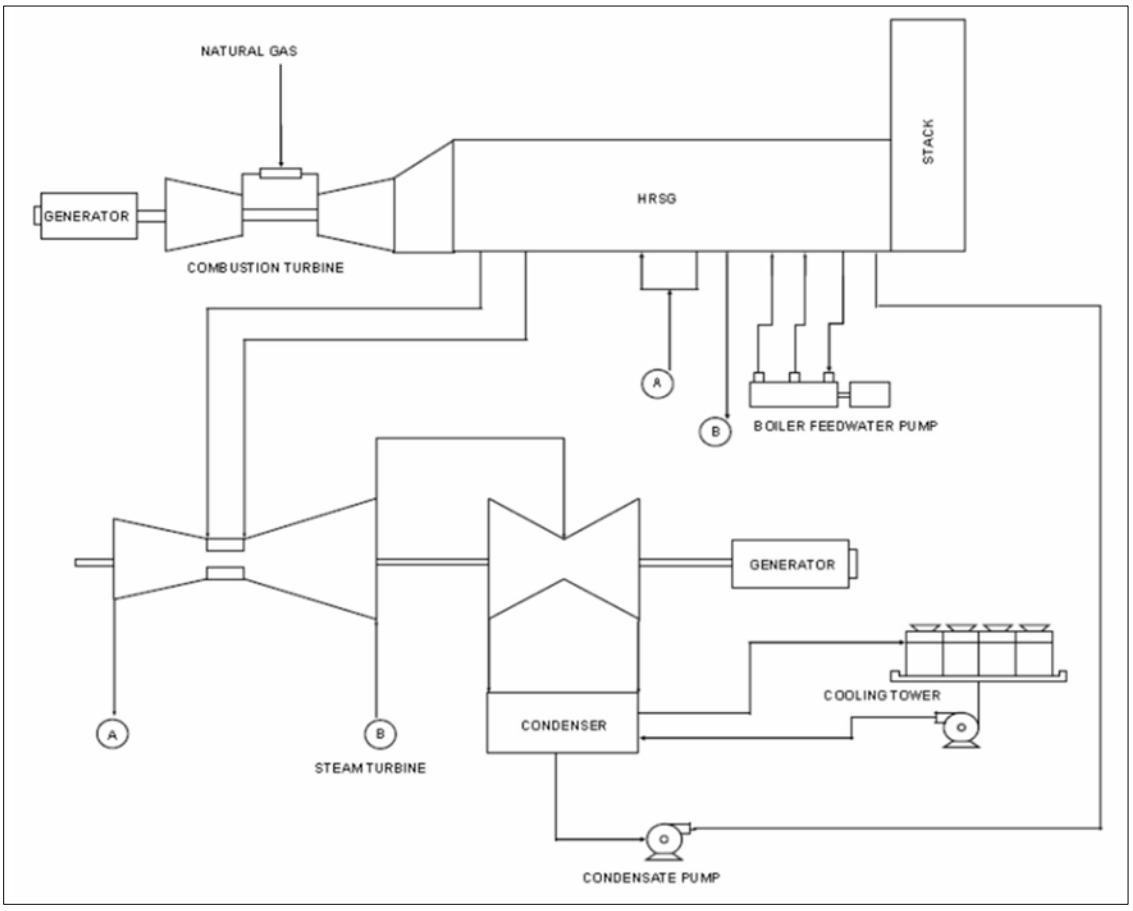
2.1.1.1. Generic description of combined-cycle technology

In a combined-cycle power plant, both gas and steam turbines are utilized. The use of the steam cycle increases the efficiency of the power plant by generating steam from heat that would have otherwise been discharged by the combustion turbine. Steam sent to a turbine is converted to mechanical energy that in turn spins the attached heat recovery steam generator (HRSG). This additional generation may occur with or without additional fuel being consumed. Supplemental duct firing with low-nitrogen oxide (NO_X) natural gas burners in the HRSG would provide additional steam production. Selective catalytic reduction (SCR) and oxidation catalyst would be installed to control NO_X, carbon monoxide, and volatile organic compound emissions after combustion.

A combustion turbine consists of a compressor, a gas turbine, and a generator, which are all mechanically linked. The compressor provides high-pressure air to the combustor where it is mixed with fuel. The fuel-air mixture is burned in the combustor and directed to the gas turbine. As the expanding gasses from the combustion pass over blades attached to the rotor inside the gas turbine, the rotor spins and drives the

generator which produces electricity. The hot air exiting the combustion turbine is routed to an HRSG, where the waste heat of the combustion turbine is utilized for the steam cycle. The gas cycle operates at temperatures in the range of 2,000 to 3,000 degrees (º) Fahrenheit (F), while the steam cycle operates in the range of 1,000ºF to 1,100ºF. The HRSG supplies steam to the steam turbine for additional generation of power. The steam then exits the steam turbine and proceeds to the condenser so that the condensed water can be pumped back to the HRSG. Heat removed from the steam passing through the condenser would be dissipated using cooling towers. The schematic in Figure 2-1 illustrates the basic processes and equipment in a combined-cycle power plant.

Figure 2-1 Combined-cycle process flow diagram, with heat values



2.1.1.2. Major components of the proposed plant

A short description of each major component of the proposed plant follows.

Size of Units and Dimensions of Proposed Plant

The proposed combined-cycle plant would be the same for both sites, and would consist of a one H-class GTG, one HRSG with duct firing, and one steam turbine generator (STG) with a total generating capacity of approximately 625 MW. The following two figures depict the proposed layout for the Nemadji River Site and the Hill Avenue Site, respectively.

Figure 2-2 Proposed infrastructure layout for the Nemadji River Site

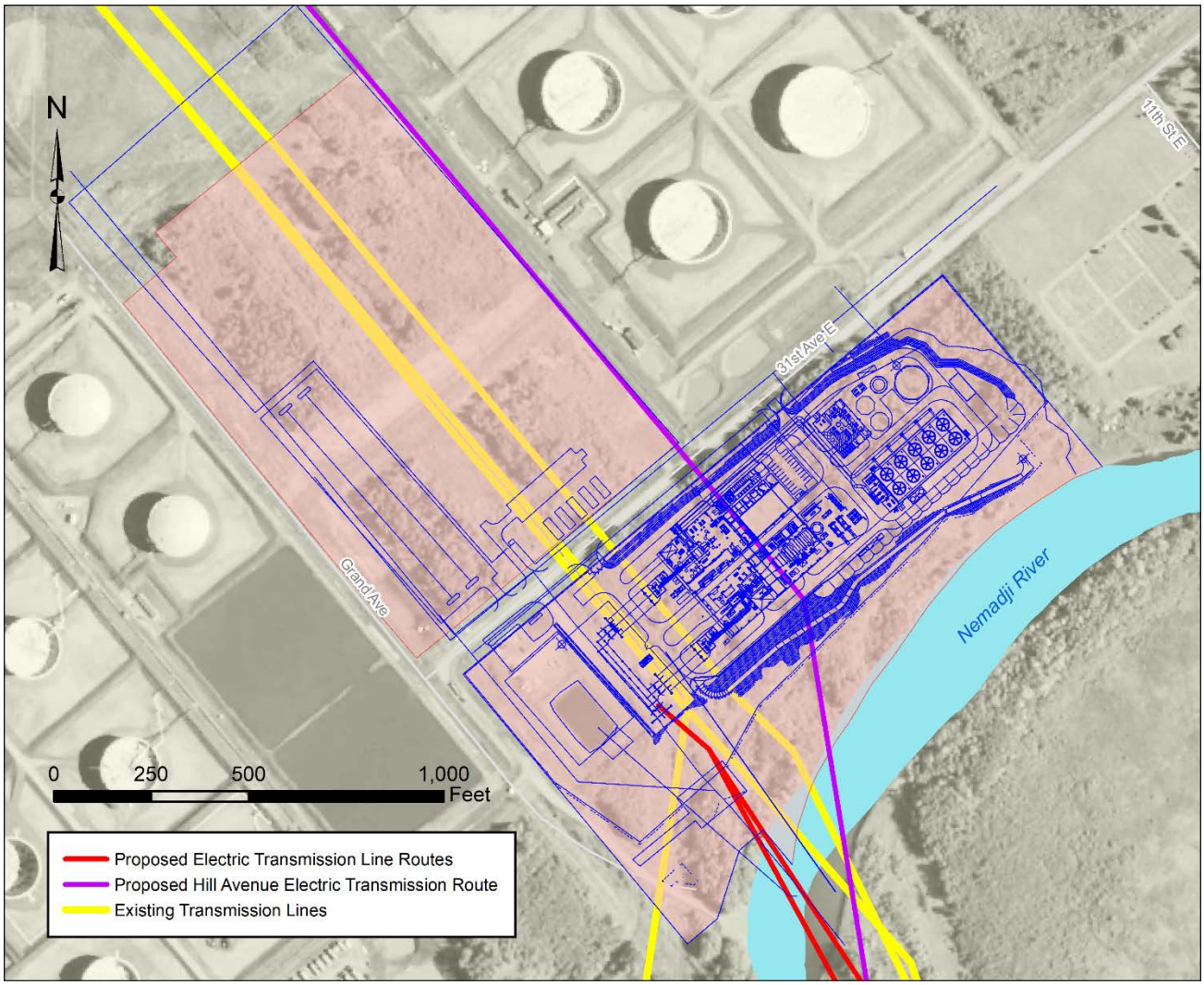
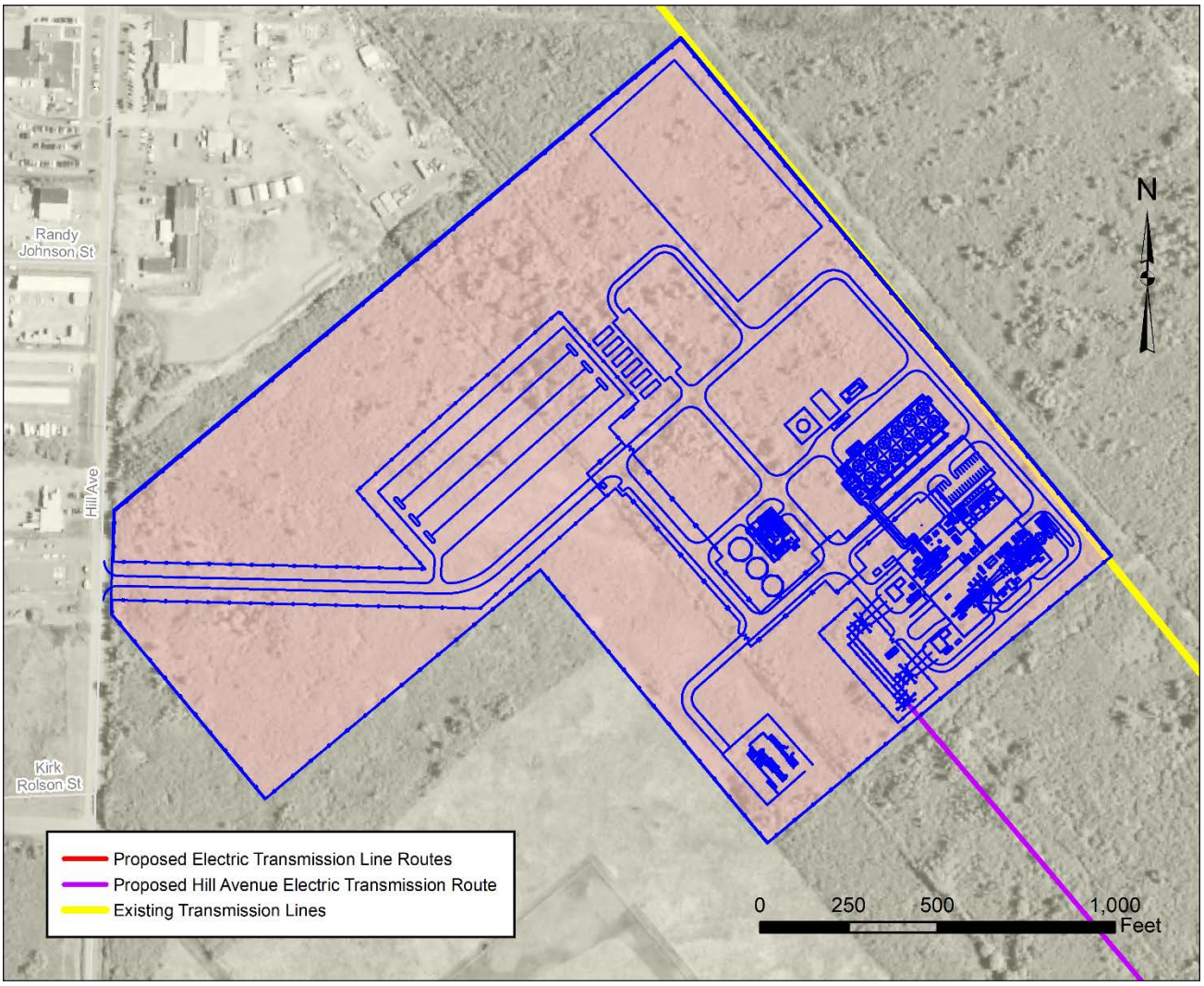


Figure 2-3 Proposed infrastructure layout for the Hill Avenue Site



Primary and Backup Fuel Sources

A new natural gas lateral, connecting NTEC to the Great Lakes Gas Transmission (GLGT) pipeline, would provide fuel for the plant. The combined-cycle plant configuration at either site is expected to have a maximum hourly fuel consumption rate of 4,671 million British thermal units (Btu) per hour or 110 million standard cubic feet (SCF) per day, assuming a heating value for natural gas of 1,020 Btu per SCF. The maximum natural gas fuel heat input for the proposed combustion turbine is approximately 3,665 million Btu per hour and the maximum heat input to the duct burner is approximately 1,006 million Btu per hour. The anticipated annual firm transportation for the plant is 33,480 dekatherm (dth) per day. Expedited firm gas is anticipated to be 26,480 dth per day. By comparison, an average residential natural gas customer uses approximately 100 dth per year.

In the event that firm natural gas supply becomes unavailable or uneconomical, the plant could be retrofitted with backup fuel oil capabilities using fuel oil from a neighboring fuel supplier. The fuel oil would be utilized by the GTG. The fuel oil supply system would include forwarding pumps required to handle the maximum fuel supply requirements of the GTG. A minimum flow recirculation valve would be provided. Additional pumps would be included for fuel oil unloading and transfer. An onsite short-

term storage tank and a truck unloading station would be included for times that fuel oil is not available from a direct connection to the local supplier.

Gas Turbine Generator

The GTG would be of H-class technology and consist of a 3,600 revolutions per minute (rpm) generator driven by the gas turbine. The gas turbine compressor section would compress the inlet air and convey it to the combustion section of the turbine where fuel is introduced and combustion takes place. Dry low-NO_X combustors are used to minimize NO_X formation while firing natural gas. The hot combustion products are then expanded through a multi-stage power turbine that produces the energy to drive both the compressor and the generator. Evaporative coolers would condition the gas turbine inlet air to enhance the electrical generating capacity of the GTG during warm ambient air conditions. The GTG would be designed to operate in dry low-NO_X mode at loads from approximately 25 to 100 percent baseload rating. Operation at loads below the minimum emissions compliance load would only occur during start-up and shutdown.

A wash water skid would be provided as part of the GTG Supplier's scope of work. Wastewater generated from a gas turbine wash would be stored in the wash drains tank. A false start drains tank would be provided for storing fuel oil drainage in the event of a false start when firing fuel oil.

Heat Recovery Steam Generator

The HRSG would recover gas turbine exhaust heat to preheat natural gas for the gas turbine, to heat feed water, and to produce steam at three pressure levels using the heat from the gas turbine exhaust gases. The HRSG would provide high-pressure (HP) steam and low-pressure (LP) steam to the steam turbine. The HRSG would also receive cold reheat steam from the exhaust of the HP STG, at which point it would add intermediate-pressure (IP) steam to the reheat steam flow and heat the steam before re-admitting to the STG as hot reheat steam. Supplemental duct firing with low-NO_X natural gas burners in the HRSG would provide additional steam production. SCR and an oxidation catalyst would be installed to control NO_X, carbon monoxide (CO) and volatile organic compounds (VOC) emissions post-combustion. Emission levels can change based on load operation, which is also controlled by the DNR) air pollution control permit, discussed in more detail in Chapters 3 and 4.

Steam Turbine Generator

The STG would consist of a 3,600 rpm generator driven by a tandem compound, reheat, condensing steam turbine. The STG would be designed to accept steam from the HRSG. HP steam from the HRSG would be admitted to the HP turbine. The steam would leave the HP turbine where it would return to the HRSG for reheating after mixing with IP steam from the HRSG. The reheated steam would return to the STG where it would be admitted to the IP section. After passing through the IP section, the steam would enter the LP section of the turbine where it would mix with LP steam produced in the HRSG and would finally be exhausted into the condenser.

Efficiency and Heat Balance

The overall higher heating value (HHV) efficiency of the NTEC combined-cycle unit is typically expected to be between approximately 50 to 56 percent at full load. By comparison, the existing base-load coal plants in Wisconsin typically have an overall efficiency of approximately 30 percent.

Because the heat exhausted from the simple cycle combustion turbine is used to power a HRSG, combined-cycle technology enables a plant to operate more efficiently than an otherwise comparable simple-cycle plant. In typical combined-cycle plants, approximately 31 percent of the energy from natural gas will be used by the combustion turbine to produce electricity. The remaining energy exhausts to the

HRSG which in turn produces steam. Steam from the HRSG drives a turbine where an additional 19 percent of the energy will be used to generate electricity. This boosts the overall plant efficiency to approximately 50 percent. About 20 percent of the total energy is exhausted up the stack as heat from the HRSG. The remaining 25 to 30 percent of total heat input is emitted to the atmosphere from the cooling towers where water is cooled before discharge.

2.1.2. Expected hours of operation, expected outages, and expected plant life

NTEC would be available to operate at any time that it is not in a planned or forced outage for maintenance, including both night and day on weekdays, weekends, and holidays. Several factors affect when the plant operates, including overall system power demand, system power prices, natural gas and fuel oil pricing, temporary transmission constraints, outages of other units, etc. Since these factors vary, operation of the plant will vary.

Based upon historical operation data obtained from the North American Electric Reliability Corporation Generating Availability Data System (GADS), equivalent availability rates for combined-cycle facilities are approximately 86.7 percent. Equivalent planned outage rates (EPOR) are approximately 11 percent and equivalent forced outage rates (EFOR) are approximately 3.6 percent. These data reflect operation of plants reporting to GADS in the 100 to 3,000 MW size range that are less than 10 years old for the time period of 2011 to 2017.

The applicants expect the reliability and associated availability for the proposed facility to be higher than those represented in this GADS sampling due to technological improvements in the equipment involved. Further, the planned outage rate should be reduced and associated availability increased compared to this sampling, as technology improvements have increased the operating hour intervals between major maintenance activities on the gas turbine and steam turbine since the installation of the facilities included in this GADS sampling. As a minimum, these improvements are expected to result in a 1.1 percent improvement in availability from historical operation.

2.1.3. Reliability

Wis. Stat. 196.491(3)(d) requires the Commission to consider reliability of the electric system in its determination of whether a project requiring a CPCN is in the public interest. A new power plant would become part of the electric system. Power plant design and location affects electric system reliability.

Factors affecting power plant potential reliability:

- The choice of fuel and back-up fuel, if any. Natural gas and fuel oil supply is discussed in this chapter, and in Chapters 3 and 4.
- Restrictions on operation specified within the DNR air permit. The DNR air pollution control permit issues are discussed for each site under "Air" in Chapters 3 and 4.
- Restrictions based on the DNR water use or discharge permits. The DNR water permit issues are discussed for each site under "'Water Resources" in Chapters 3 and 4.
- The potential impacts on the existing electric transmission system and the modifications to that system that might be needed. The related electric transmission system issues are discussed in the sections on electric transmission construction impacts in Chapters 3 and 4.
- Equipment availability and maintenance.

2.1.4. Location alternatives

Site Alternatives

The applicants propose to build the plant on one of two sites, designated here as the Nemadji River Site and the Hill Avenue Site. The following is a narrative describing the basic criteria and the process followed by SSE to locate the two proposed power plant site alternatives. A more detailed description of the two alternative sites can be found in Chapters 3 and 4 of this final EIS.

Search Criteria for a General Location

A siting study was completed to evaluate locations for the plant. The siting study considered sites across the upper Midwest that could potentially be used for joint development of such a facility by multiple regional utilities. Specific sites were evaluated based on site location, ability to serve the needs of the participating utilities, and capability of the facility to integrate into the systems of the participating utilities. The study identified several suitable sites throughout the upper Midwest that appeared to provide reasonable sites for new gas-fired generation. Evaluation criteria included factors related to electric transmission; fuel supply and delivery; water supply and delivery; environmental resources at the site; air quality impacts; and site development factors.

The applicants evaluated whether or not an existing switchyard was located on the site and if sufficient space appeared to be available for switchyard expansion to support the new gas-fired generation facility.

Fuel supply and delivery was evaluated because a gas-fired generating plant needs access to a high-pressure natural gas transmission pipeline. For the purposes of the study, Burns & McDonnell, a consultant working on the applicants' behalf, contacted and evaluated the major fuel suppliers near each candidate site area to estimate the expected cost of natural gas system upgrades required.

Natural gas-fueled combined-cycle generating facilities typically require a reliable and abundant supply of water for steam cycle makeup and for cooling. The ability to secure groundwater at a candidate site area was evaluated by examining nearby aquifers and yields from existing wells as well as the permitting potential for those sites. The ability to secure a significant amount of water through a municipal reclaim water supply was evaluated as an additional potential source of water for the study. To obtain a significant amount of treated wastewater effluent, the site would need to be located near a large municipality with an available supply of municipal reclaim water.

Environmental considerations included wetland impacts, geography and floodplain evaluation, cultural resources, endangered resources, and air emissions including Class I areas and possible constraints on allowable emissions. Wetland and stream impacts were to be avoided or minimized to the extent practicable by the project, to minimize permitting requirements and reduce potential regulatory issues. Any construction within a floodplain that could have the unintended effect of increasing floodwater levels upstream was to be avoided. A review was conducted to determine the likelihood of impacting cultural resources during the development of the proposed power plant for each site area. To estimate the likelihood of having a project adversely affect a sensitive species or its habitat, the study included a review of federal and state listed species for each county for where a site was located. Depending upon the anticipated emissions from a fossil-fuel power generation facility, air permitting was evaluated for sites to minimize the need for more challenging permit conditions, and offsets that could be required for certain pollutants.

Site development constraints include factors that may hinder the development of a new gas-fired generation facility due to characteristics of the specific parcel of land or the immediate area surrounding

the specific parcel of land being evaluated. Existing land use may affect the ability to develop the new generation facility. Generally, sites in industrialized areas or brownfield sites are considered to be preferred areas for development because they are in an area that has already been disturbed and are compatible with the surrounding development. Wisconsin Stat. § 238.13(1)(a) defines a brownfield as "abandoned, idle, or underused industrial or commercial facilities or sites, the expansion or redevelopment of which is adversely affected by actual or perceived environmental contamination." Wisconsin Stat. § 196.491(3)(d)8. requires brownfields to be used to the extent practicable for large electric generating facilities. Several existing brownfield sites are located near the Nemadji River and Hill Avenue siting area and were evaluated for potential use. These sites were either located in close proximity to residential areas, did not have sufficient land available for the project, and/or were located in high-density developed areas of Duluth, and were therefore not considered for the project.

If an industrialized area was not available, areas of cultivated land would be the next most preferred site as they tend to allow for fewer environmental impacts relative to areas that contain more native or natural areas such as prairie or forest areas. It is advantageous to the owner of a new generation facility if existing paved roadways are already in place at a candidate site in order to support materials and equipment delivery and construction and operation of the facility. There are a number of factors that determine whether the noise from construction or operation of the project would significantly impact any sensitive receptors (i.e. buildings, residences, places of worship, hospitals, schools, etc.) in the vicinity. The FAA regulates airspace related facilities (i.e. airports, helipads, etc.) that could affect power plant siting beyond the boundaries of their facilities.

During the siting study, preliminary site areas were identified by overlaying maps of infrastructure critical to economic combined-cycle generation power plant development. This infrastructure includes major surface water sources, municipal wastewater treatment plants, electric transmission lines and substations rated at or exceeding 230 kV, and natural gas pipelines having a diameter of 16 inches or greater. Line taps and substations were identified as potential development sites; however, existing power plants were not considered for expansion.

Search Criteria Based upon the Available Sites after a Larger Search Criteria was Completed

The applicants proposed two site alternatives after evaluating sites based on the following technical, geographic, and land use criteria. Preliminary siting areas were required to be:

- Located directly adjacent to a transmission line or substation operating at 230 kV or higher.
- Within five miles of a 16-inch diameter or larger natural gas pipeline.
- Greenfield in nature, no existing power generation facilities were reviewed for expansion.
- Within five miles of either a major river or a municipal waste water treatment facility of sufficient capacity.

Using the criteria listed above, the locations of infrastructure critical to economic power plant development were determined and corresponding site areas were identified. This resulted in the identification of 115 site areas throughout the study area for additional screening investigations.

The Nemadji River Site was finally selected for development of the project. Among other factors, the applicants specifically cited the following favorable criteria in their decision:

- Reduced level of transmission system concerns;
- Presence of an adequate water source; and,
- Centralized location within the boundaries of the MP and DPC service areas.

Having identified the Nemadji River Site as a specific area for further investigation and development for the project, the region around the site was evaluated for potential alternative generation sites. Other areas in the nearby vicinity of the site were subsequently investigated and considered for alternative sites for project development. The following factors were considered while attempting to locate an alternative generation site:

- Sufficient land space is available for the generating unit and supporting infrastructure;
- Corridors to connect electricity transmission and natural gas pipelines are available to access the site;
- Proximity to appropriate electricity grid and natural gas pipeline tap locations to minimize impacts and costs associated with the development of this infrastructure; and
- Avoided major approval or permitting concerns such that the site would have a reasonable probability of being approved and permitted if selected for the project.

The area around the Nemadji River Site contains a variety of developments. Tank farm facilities lie to the north of the site, and additional commercial and residential development lies further north. The Nemadji Golf Course is to the west, and slightly beyond the golf course to the west is the Richard I. Bong Memorial Airport, creating potential concerns for cooling tower and stack height restrictions and above ground electrical transmission infrastructure across much of the area. Residential development is located to the east, with Lake Superior less than one mile to the east. The area to the south of the Nemadji River Site is relatively undeveloped, although it contains numerous utility corridors and some mining facilities. The area is heavily wooded and contains extensive wetlands.

Investigations of the area identified an alternative site for the facility approximately 1.5 miles north of the Nemadji River Site to the east of Hill Avenue. The Hill Avenue Site is located just north of the tank farm and west and south of dense residential areas of the City of Superior. An open corridor is available to extend electricity and gas infrastructure into the site. The proposed site alternatives are discussed further in Chapters 3 and 4 of this final EIS.

2.2. PROJECT PURPOSE AND NEED

The project is proposed to provide intermediate capability to meet overall system power demand and maintain electric system reliability. Typical system demand in the area is highest during the week when all industry is in operation and is highest in the hot summer and cold winter (especially early morning and early evening). The applicants state that demand during other periods is anticipated to necessitate operation as well, especially during outages of other power generation facilities, or when the intermittent sources such as wind or solar are not available (the wind is not blowing or the sun is not shining).

Energy Demand

As previously discussed, combined-cycle facilities offer enhanced efficiency when compared to simple-cycle plants. Combined-cycle plants, such as the proposed NTEC plant are capable of using fuel at a more efficient rate, which translates to a relatively higher production of electricity per unit of fuel used.

The "load curve" in Figure 2-4 shows a simplified electric demand curve by time of day from a utility that experiences its demand peak in the winter. The kinds of power plants that meet the demand illustrated in the "load curve" are known as base load plants, intermediate plants, and peaking plants. This curve will change in the future as additional intermittent resources are constructed and placed into operation.

Base load plants provide a base level of electricity to the system and are typically large generating units. Historically, nuclear or coal have powered base load plants. Base load plants tend to be operated continuously except when down for scheduled maintenance or an unplanned (forced) outage. They have a relatively high "capacity factor," typically in the range of 60 percent or greater. The capacity factor is the ratio of the amount of power actually produced in a given period to that which could have been produced if the plant operated at 100 percent capacity for 100 percent of the time.

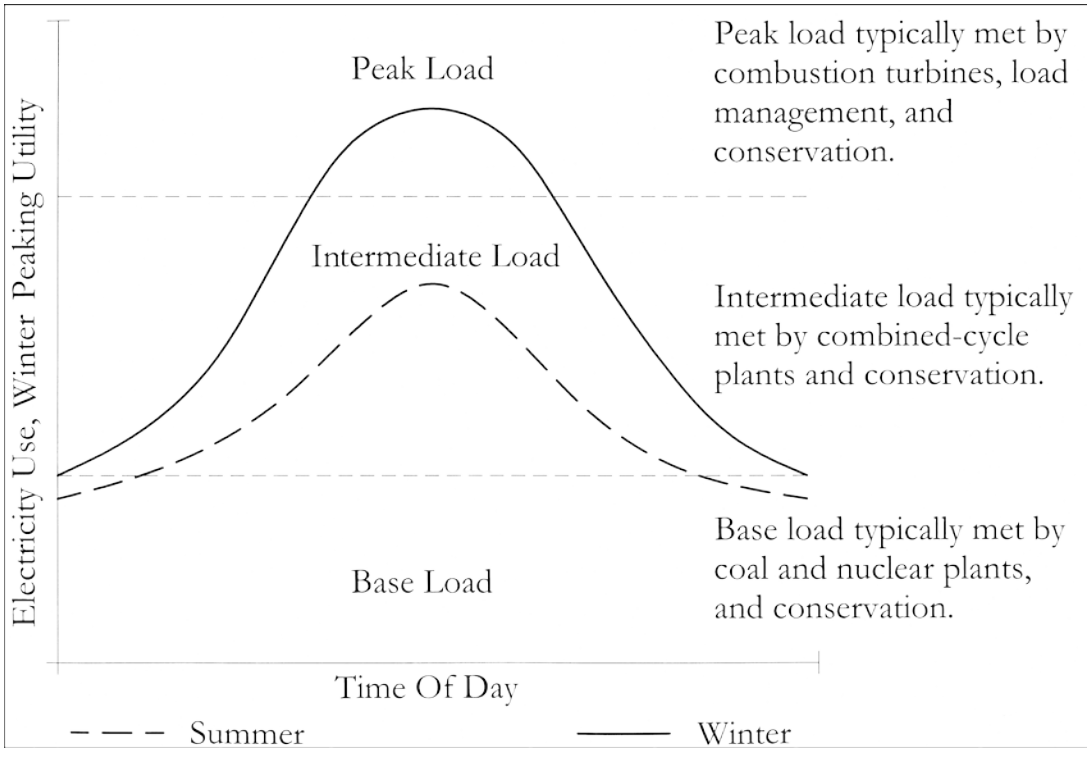
Base load plants traditionally have had access to comparatively lower cost fuel, and combined with their higher capacity factors, are able to produce power at lower unit costs than intermediate and peaking plants.

Intermediate plants are constructed specifically for cyclic operation and may be older, less efficient plants. They are normally operated only during times of elevated demand and therefore can have a lower capacity factor than base load plants, typically in the range of 25 to 75 percent.

Peaking plants are designed to provide the additional power needed during peak system demand periods, such as those caused by heating and lighting during winter months or air conditioning use during summer months or when maintenance is being performed on base load plants. The capacity factor of peaking plants is fairly low, typically less than 15 percent. These plants are more economical to build than base load or intermediate load plants but are usually more expensive to operate.

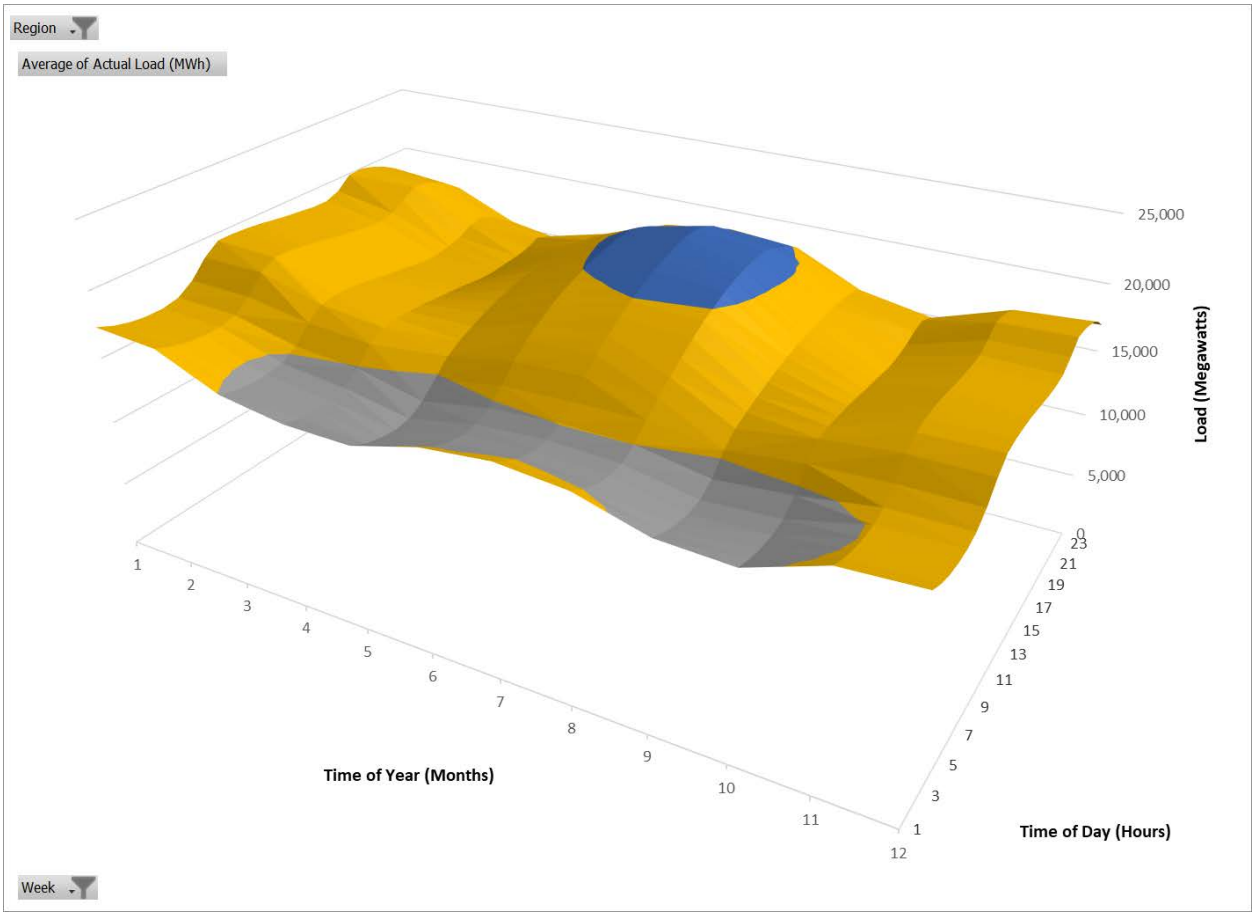
Recently, intermittent resources have become more prolific in the electric generation fleet. Two examples of common intermittent resources include wind and solar electric generation facilities. Intermittent resources depend on a non-controllable resource to operate, and therefore must operate when that resource is available. For example, solar electric generating resources cannot produce electricity at night. Some advantages of intermittent resources include low or no fuel costs, and for wind and solar, no air emissions.

Figure 2-4 Simplified typical winter peaking electric load curve with typical plants



The actual load curve in the broader MISO area is more complex than the simplified version shown in Figure 2-4. Figure 2-5 shows the actual load curve in the MISO North area for calendar year 2018. The load curve is averaged over sequential 30-day periods, to more clearly show typical daily and seasonal variations. The 30-day periods generally correspond with the 12 calendar months.

Figure 2-5 MISO North Annual Hourly Load, 30-day averages



Currently, wind and solar electric generating facilities comprise the bulk of intermittent resources in MISO North states, at approximately 25,900 MW and 1,100 MW, respectively.[3] Table 2-1 summarizes all resources currently in the MISO Generator Interconnection Queue in Definitive Planning Phases (DPP) as of September 2019.

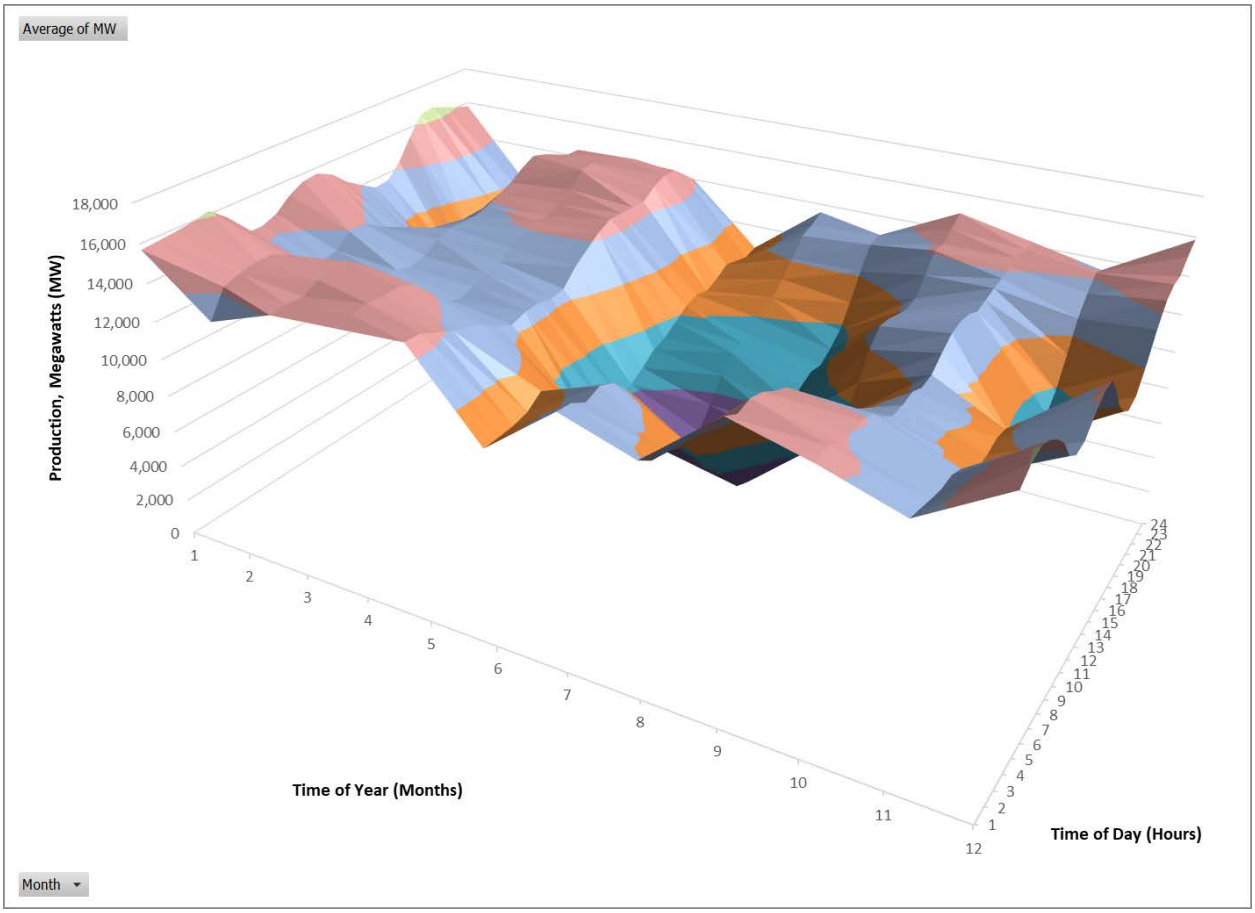
Table 2-1 Resources Currently in the MISO Generator Interconnection Queue in DPP in MISO North States

	Battery Storage	Combined Cycle	Diesel	Natural Gas	High Voltage DC	Hybrid	Hydro	Solar	Wind
Capacity, MW	2,242	2,952	14	3,698	2,000	2,699	110	40,700	23,136

[3] U.S. Energy Information Administration (EIA) Form EIA-860, https://www.eia.gov/electricity/data/eia860/.

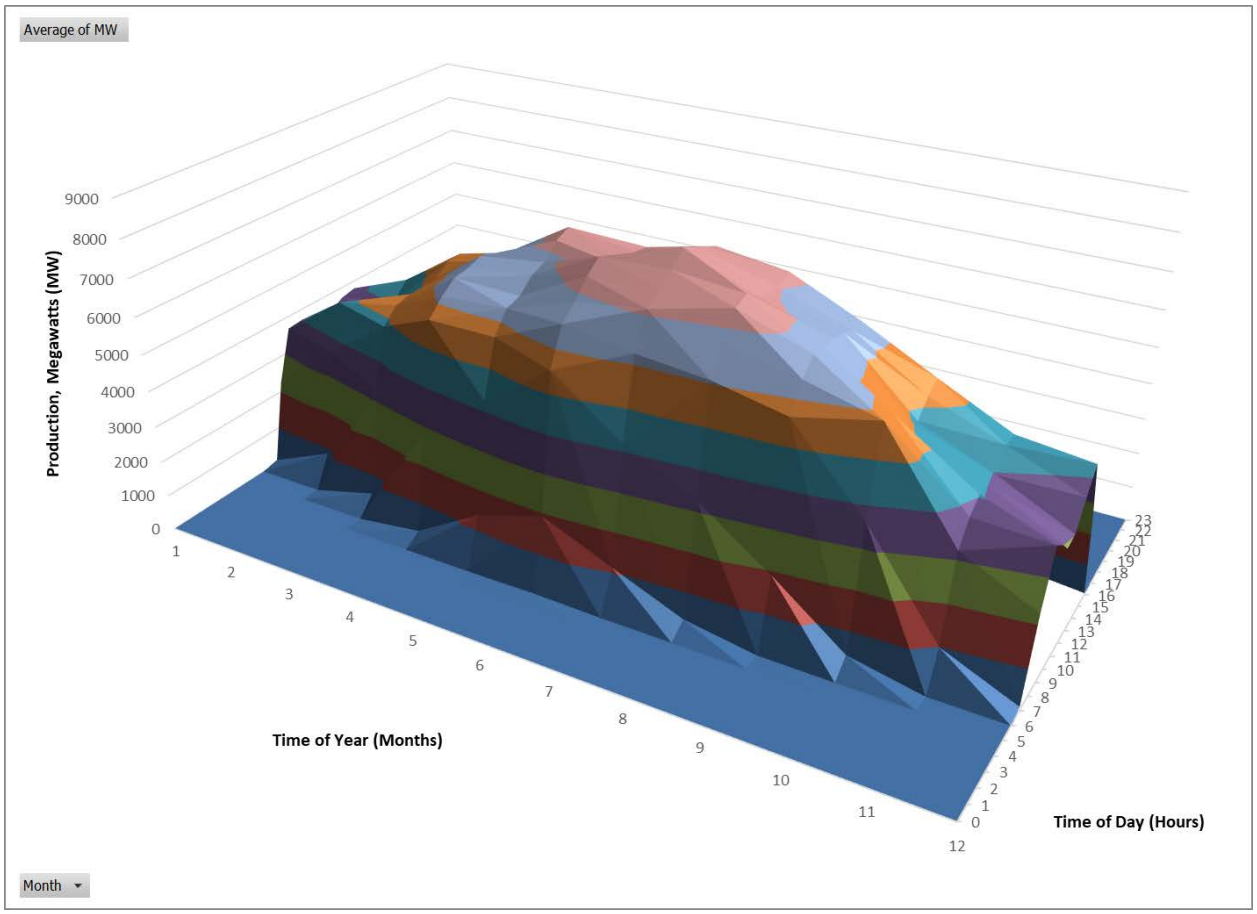
As shown in Table 2-1, there are wind and solar generating resources in the MISO Generator Interconnection Queue in DPP phases of approximately 23,100 and 40,700 MW, respectively.[4] Historically, approximately 21 percent of generating resources entering the MISO generator interconnection queue reach commercial operation.[5] Combining existing wind and solar resources in MISO North states with those currently in the MISO interconnection queue likely to reach commercial operation, it is possible that there may be 30,700 and 9,700 MW of intermittent wind and solar resources in the MISO North area at some point in the future.[6] Based on these values, typical wind and solar production curves are shown in Figures 2-6 and 2-7.

Figure 2-6 Possible future MISO North Annual Hourly Wind Production, 30-day averages



[4] https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/
[5] PSC REF#: 357406 at 14.
[6] The amounts of wind and solar likely to reach commercial operation in this example are likely understated, as the 21 percent success rate applies to all projects that enter the MISO Generation Interconnection Queue. In this example, 21 percent of projects in DPP phases are assumed to reach commercial operation. Since many projects drop out of the Queue prior to reaching DPP phases, more than 21 percent of those projects that reach DPP phases are likely to reach commercial operation.

Figure 2-7 Possible future MISO North Annual Hourly Solar Production, 30-day averages



As discussed above, the curves shown in Figures 2-5 through 2-7 are based on 30-day averages, and are intended to show the seasonal variation of both load and electrical production. In reality, large variations in both can occur on a day-to-day basis, depending on factors like outdoor temperature, wind conditions, cloud cover, and resources out-of-service for maintenance, to name a few. In addition, solar resources in particular commonly ramp up to, and down from, full production very quickly. When this occurs, some other resource must be available to quickly respond to maintain adequate generating resources to meet demand. Because natural gas combined cycle facilities are capable of ramping up and down quickly, they are appropriate resources to accommodate greater proliferation of intermittent resources. In the future, storage devices may help accommodate intermittent resources, but it is unclear at this point when and to what extent storage will proliferate.

2.3. CONSTRUCTION ACTIVITIES AND SCHEDULE

Construction of the proposed power plant may not be started unless and until the applicants receive the necessary DNR air emissions permits and Commission approval for the project. Commission approval is anticipated in late 2019 or early 2020, and the applicants anticipate receiving air permits from DNR December 2020. If approved, preliminary utility relocations onsite would begin in 2020 with commercial operation planned for December 2024. The following list shows the applicants' proposed sequence of construction activities for the construction of NTEC and associated infrastructure.

- Start storm water pond rework: April 2020
- Start 10" gas line relocation construction: June 2020
- Start fiber relocation construction: June 2020
- Start existing transmission line relocation construction: August 2020
- Construction of new 345 kV transmission line in the Nemadji River flood plain area south of the river (Phase 1): August 2020 - November 2021 (winter construction)
- Start Detailed design of power plant: December 2020
- Complete pond and relocation construction: March 2021
- Sheet pile wall construction: June 2021 - November 2021
- Construction of the new 16" natural gas lateral under the Nemadji river: September 2021 - November 2021
- Mobilize foundation contract to site: April 2022
- Construction of remaining sections (Phase 2) of new 345kV transmission line: August 2022 - March 2023 (winter construction)
- Start power train erection: December 2022
- Start Cooling tower erection: April 2023
- Construction of the new 16' natural gas lateral from point of interconnection up to the river: July 2023 - November 2023
- Construction of municipal water from point of interconnection to the site: October 2023 - January 2024
- Construction of city sewer from point of interconnection to the site: October 2023 - January 2024
- Back energization (electrical transmission): February 2024
- GTG first fire complete: May 2024
- Plant mechanically complete (ready for tuning/testing): June 2024
- Commercial operation: December 2024

2.4. AUXILIARY FACILITIES REQUIRED FOR THE NTEC PLANT

If NTEC is constructed, the plant would require additional infrastructure for day to day operation, including fuel and electricity delivery to the plant. Fuel for the plant would be provided by the construction of a new natural gas pipeline that would connect the plant to the existing GLGT pipeline, approximately 6.5 miles south of either proposed site. Access to the existing electric transmission system to deliver electricity produced by the plant would be provided by a new 345kV transmission line that would connect the plant to the existing 345kV Arrowhead to Stone Lake transmission line owned by ATC. In addition to natural gas and electricity, NTEC would require a potable supply of water, as well as the facilities required to treat and discharge wastewater.

2.4.1. Natural gas fuel source and pipeline connection

As discussed in the beginning of this chapter, the GLGT interstate gas transportation system would supply natural gas as a fuel source to NTEC. Gas would be transferred from GLGT to NTEC via a proposed new 16-inch lateral to be installed, owned, and operated by SWL&P.

The applicants have negotiated a firm transmission agreement with Great Lakes Gas Transmission Limited. The GLGT pipeline consists of two parallel pipes, ranging in diameter from 30 to 42 inches in diameter, and extends from St. Clair, Michigan through the Upper Peninsula of Michigan, through northern Wisconsin, and through northern Minnesota, finally terminating near the US/Canada border near Emerson, Minnesota. Natural gas for NTEC would be purchased from Emerson (the primary receipt point) and St. Clair (the secondary receipt point). The majority of gas transported by GLGT is produced in Western Canada; however, the system can also receive gas from the Midwestern U.S. and the Marcellus/Utica areas.

There would be no natural gas storage at the power plant site.

New facilities for the natural gas infrastructure would include a hot tap and new meter station at the Great Lakes Gas Transmission Limited interstate pipeline. There would also be a pig receiver adjacent to the new meter station to allow for inspections in the future. The proposed new 16-inch diameter lateral natural gas line would extend 6.8 miles from this meter station to the Nemadji River Site. For the Hill Avenue Site, the natural gas line would extend an additional 1.3 miles to the generation site. The lateral natural gas line would terminate at the NTEC site at the pig launcher and subsequent gas regulating station. An existing SWL&P 10-inch diameter natural gas line would need to be relocated around the Nemadji River Site as well. The proposed natural gas pipeline work associated with this project are discussed in dockets 5820-CG-105 and 5820-CG-106

The proposed project includes two natural gas-fired, fuel gas water bath heaters. Only one heater would run at a time, unless the second heater is run for emission testing or another purpose while the plant is operating. The heaters are used to warm the incoming natural gas fuel to prevent freezing of the gas regulating valves and to maintain the minimum fuel gas superheat requirement by the GTG manufacturer. The heaters would be permitted to operate 8,760 hours per year.

A fuel gas scrubber and fuel gas filter/separator on the GTG supply would remove both particulate matter and liquids from the gas prior to entering the combustion turbine. The scrubbers and filter/separators include liquid level control systems to automatically maintain safe levels of accumulated liquids in the scrubbers and filter/separators. A drain tank receives the liquid drains from the scrubbers and filter/separators and safely vents any fuel gas from the waste drain stream.

A fuel gas performance heater on the GTG supply heats the fuel gas prior to entering the combustion turbine to increase plant efficiency. The heating medium would be IP feed water extracted from the heat recovery steam generator.

Overall, the proposed natural gas facilities would be designed, constructed, tested, operated, and maintained to meet the requirements of 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards; 18 CFR Part 2.69, Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing, and Maintenance of Rights-of-Way and the Construction of Aboveground Facilities; and other applicable federal, state, and local standards.

2.5. AUXILIARY FACILITIES – WATER

2.5.1. Water supply and storage

Water use at either site would include process water sourced from high capacity wells and potable water for employee uses sourced from SWL&P's water distribution system. The primary uses for the project

would include steam cycle water, cooling tower water, NO_X injection water, evaporative cooling water and service water.

Raw makeup water would be sourced from new onsite wells. Five high-capacity (70 or more gallons per minute) wells would be used for the project. Regardless of which site is selected for NTEC, high capacity wells would be located around the perimeter of the Nemadji River Site in five locations, approximately 1.2 miles away from the Hill Avenue Site. The water pumped by the wells would solely be used for plant needs and would not be used for potable water supply. The anticipated total instantaneous demand for the project is expected to range from approximately 2,050 to 2,870 gallons per minute (GPM). The total annual plant water use is estimated to be 1,059 million gallons (or 2.9 million gallons per day (MGD)).

Raw well water would be piped directly from the wells to the cooling tower basin without any treatment or storage. The cooling tower basin would provide adequate supply volume to support pump operation to afford associated well flow control.

Raw well water would also be used for service (water treatment makeup, maintenance, and housekeeping) and fire water. Raw well water would be filtered and stored onsite in a new 550,000 gallon service and fire water storage tank, which is sized for 32 hours of service water usage plus 2 hours of fire water operation. The storage volume dedicated to fire water needs and would be isolated from service water supply using a standpipe on the service water pump suction such that the service water pumps cannot extract the water dedicated to fire water needs.

Potable water would be sourced from SWL&P's existing water distribution system. The SWL&P tie-in is located north of the Nemadji River site and the SWL&P tie-in is located west of the Hill Avenue Site. For both sites, water main extensions would be required to provide service to the facility.

2.5.2. Water discharge

Process water from the NTEC plant would be discharged to the City of Superior, while sewage would be discharged to the City of Superior municipal sewer system for off-site treatment. All wastewater and reverse osmosis (RO) reject water and cooling tower blowdown would be piped offsite to the City of Superior municipal sewer system for offsite treatment. Tie-ins to the city sewer system would be constructed. No additional treatment is expected to be necessary to meet City of Superior discharge quality standards. Evaporative cooler blowdown and HRSG blowdown would discharge to the cooling tower basin. Sanitary wastewater from bathrooms, showers and other employee areas would be collected and routed to a lift station, which would discharge to the City of Superior municipal sewer system for offsite treatment.

2.6. AUXILIARY FACILITIES – ELECTRIC TRANSMISSION

2.6.1. Existing electric transmission system

Existing and possible new electric transmission facilities near the plant site alternatives are shown in Figure 2-5. The existing electric transmission system in the Superior area is shown in Figure 2-6.

Figure 2-5 Existing and proposed electric transmission infrastructure near proposed NTEC sites

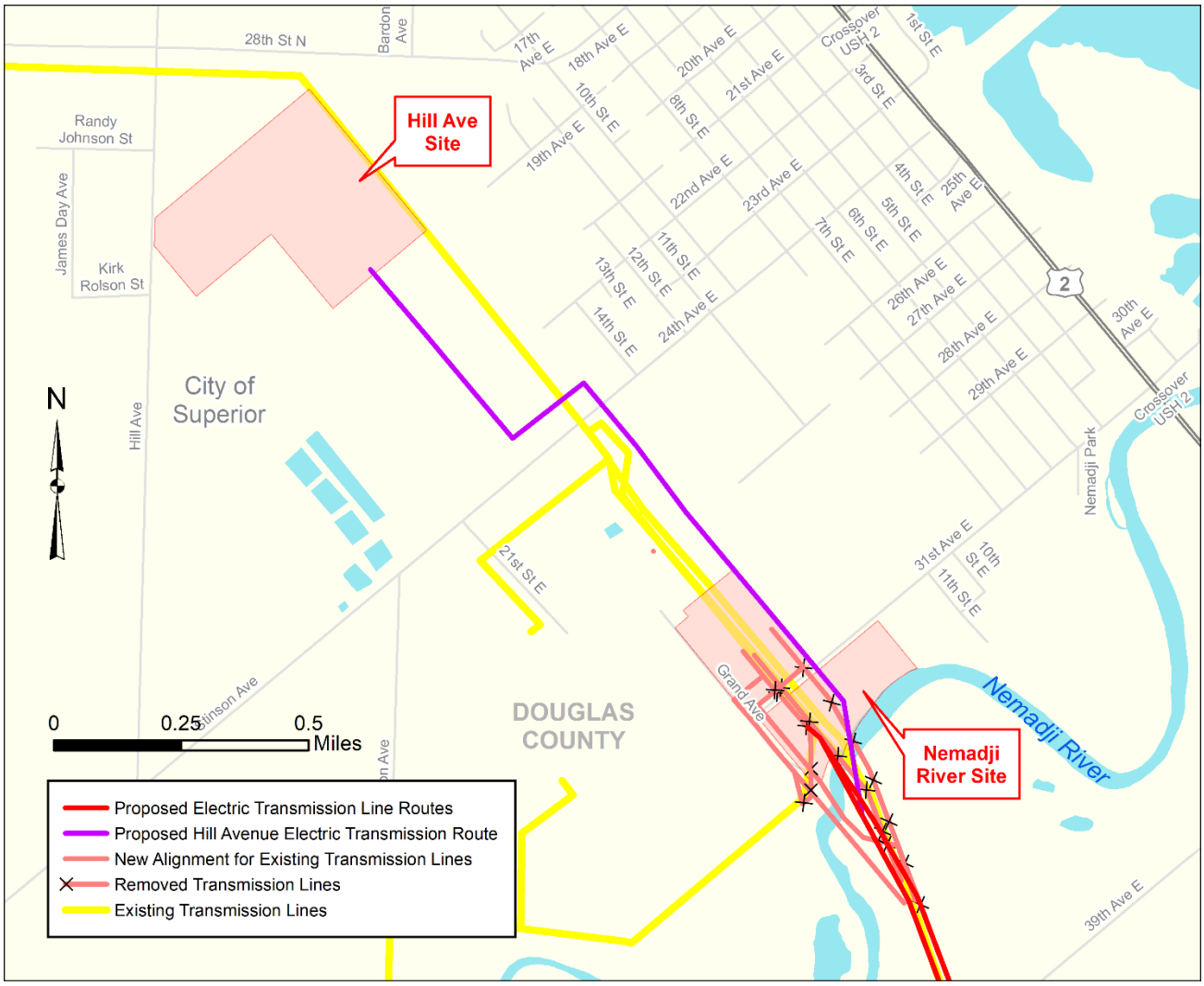
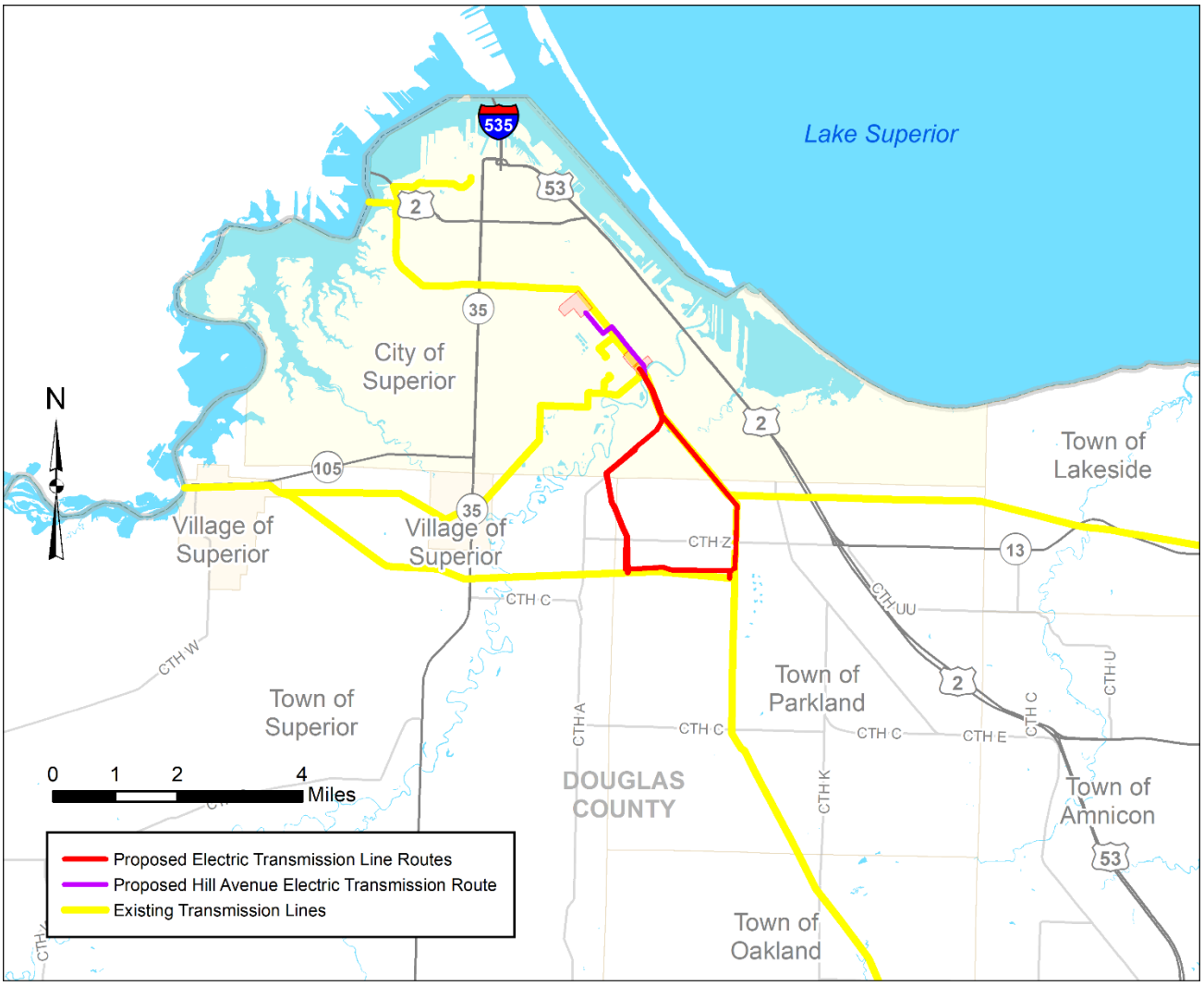


Figure 2-6 Existing electric transmission system in the Superior area



Electric distribution lines are located along Grand Avenue west of the Nemadji River Site and along 31st Avenue East to the east. Existing electric distribution near the Hill Avenue Site is found along North 28th Street to the north, Hill Avenue to the west, and in residential areas east of the site.

Three overhead electric transmission lines extend southeast through the Nemadji River Site and its temporary impact area to the north: the Gary–Stinson 115 kV transmission line, the Superior–Minong 161 kV transmission line, and the Ino–Superior 115 kV transmission line. These lines extend from the Stinson Substation, located northwest of the Nemadji River Site. The Lakehead Substation and Lakehead Tap are located west of the Nemadji River Site. The Winter–Stinson 115 kV transmission line extends along the northeastern boundary of the Hill Avenue Site and terminates at the Stinson Substation.

2.6.2. Proposed electric transmission line connection

Electricity produced by NTEC would enter the existing transmission system through a new 345 kV collector bus that would be constructed to aggregate the output from the generating plant before transmitting it to a new offsite 345 kV switching station via a new radial 345 kV transmission line (see Figure 2-8). The proposed design and routes for these transmission connections are described in

Chapters 4 and 5. The collector bus footprint, excluding the onsite stormwater pond, would be approximately 150 feet by 350 feet (1.2 acres).

The proposed radial transmission line is approximately 3.5 to 5.4 miles in length. If the Nemadji River Site is selected for the project, the line would extend from the site to the offsite 345 kV switching station, which would be owned by ATC. If the Hill Avenue Site is selected for the project, the line would extend approximately 1.2 miles from the site to a point near the Nemadji River Site, then join the route for that site and extend to the offsite 345 kV switching station. The radial transmission line would tap into the existing ATC Arrowhead to Stone Lake 345 kV transmission line.

The cost of the interconnection facilities would be paid for by SSE as part of the cost of construction of the new facility. Any modifications required to existing facilities owned by ATC would also be paid for by SSE. The tap line would be owned by SSE and DPC in equal 50 percent shares. The new proposed transition tie line would be constructed by SSE. The tie line requires a CPCN from the Commission. Additional details regarding the transmission tie line are contained in the CPCN application for the tie line in docket 9698-CE-101.

SSE is a non-utility merchant power plant developer and does not have the power to compel landowners to provide easements. If the plant is approved, the Commission would also approve the design and construction practices for the new interconnection, including the route for the new transmission line collector bus, and switching station. SSE would need to negotiate and obtain any new easements for the line, if necessary.

2.6.2.1. Relocation of existing electric lines

If the Nemadji River Site is selected, the existing electric lines that traverse the site would need to be relocated. The existing electric transmission lines would be relocated to the south end of the site to create adequate space for construction of NTEC. Relocated lines would include the following SWL&P transmission lines: the 115 kV Line No. 132; the 115 kV Line No. 761; and, the 161 kV Line No. 160. Additionally, a Great River Energy 69 kV line and a SWL&P 13.8 kV distribution line would require relocation. The relocated portions of the lines would predominately consist of steel self-supporting structures with concrete foundations. Additional discussion regarding the proposed relocation process, including pre- and post-construction configurations of these lines, can be found in Chapters 3 and 4.

2.6.2.2. Expected impacts on the transmission system

Generator Interconnection Study

In general, before a transmission utility constructs an interconnection to a new generating unit, it will carry out an interconnection study to identify impacts that interconnection of a new power plant may have on the existing system. In this case, Midcontinent Independent System Operator, Inc. (MISO) is currently studying the Large Generator Interconnection Request for the NTEC project in a queue cycle. MISO's study has not yet determined what transmission facilities would be necessary for the proposed plant. The process is currently at the MISO Definitive Planning Phase (DPP). MISO is currently experiencing backlogs due to an increased volume of regional interconnection requests.

The MISO study is not expected to affect or alter the facilities located between the generating station and interconnection switching station. If any network upgrades are identified in the MISO study that require Commission approval, the applicants expect those facilities to be permitted separately by their respective owners. The results of the MISO study are anticipated in 2019.

2.6.3. Commission energy priority requirements

Wisconsin Stat. §§ 1.12 and 196.025 require the Commission to give priority to specific methods of meeting energy demands, to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

1. Energy conservation and efficiency.
2. Noncombustible renewable energy resources.
3. Combustible renewable energy resources.
4. Advanced nuclear energy using a reactor design or amended reactor design approved after December 31, 2010, by the U.S. Nuclear Regulatory Commission.
5. Nonrenewable combustible energy resources, again in the order listed.
    a. Natural gas.
    b. Oil or coal with a sulfur content of less than one percent.
    c. All other carbon-based fuels.

If the Commission identifies an option to the proposed power plant during its review that is cost-effective and technically feasible, it could reject the project as proposed. It could not, however, order the applicants to build something else in its place.

2.6.4. Energy conservation and efficiency

Energy needs can be met by reducing energy usage—"demand side management" (DSM)—rather than increasing generation through "supply side management" (SSM). DSM techniques include energy efficiency (sometimes also called energy conservation); fuel switching, and load management. Each is defined briefly below.

Energy efficiency reduces the use of electric energy by encouraging customers to use high-efficiency technologies and energy use practices. For example, energy efficiency programs encourage customers to purchase Light Emitting Diode (LED) lights instead of higher-energy halogen lights, by educating customers on the reduced energy costs and providing financial incentives to offset the higher upfront costs of the more efficient LEDs. Similar support is provided for other technologies, encouraging homeowners to install more efficient appliances and furnaces; encouraging farms and businesses to use more efficient motors, pumps, and fans; and helping industrial customers redesign industrial processes to use less energy. Energy efficiency programs may also encourage customers to make behavioral changes to reduce their own energy usage.

Fuel switching replaces the use of electricity with the use of another energy source. Natural gas has been the frequently selected fuel of choice in the past. Examples of fuel switching include replacing electric appliances such as water heaters and clothes dryers with natural gas appliances and using propane for heating fuel instead of electric heat.

Load management reduces the peak demand for electricity during a specific period. Examples of load management include programs that provide monetary incentives for large users of electricity to shed loads during peak periods; and programs that control air conditioning loads for individual customers during times of extreme demands for electric power;, by interrupting loads or remotely increasing setback temperatures on the customer's smart thermostat.

2.6.5. DSM as an alternative to building a power plant

Currently, new power plants are constructed to either replace retiring facilities or to implement new technologies, such as wind and solar electric generation. In contrast, new power plants were previously built to generate more electricity, and to provide additional generation capacity when demand for electricity is at its greatest. In either case, DSM can often reduce or delay the need to build power plants by lowering the use of, or demand for, electricity. As such, decreasing demand can have the same effect as increasing supply.

Advantages of DSM Over Power Plants

Using DSM to meet system electric needs can have many advantages over using supply resources such as power plants and power lines. These advantages can be both economic and environmental.

The most significant economic advantage is that, when cost-effective, DSM would reduce customers' electric bills. This could help make Wisconsin businesses more competitive. By reducing the amount of dollars spent on energy in Wisconsin, DSM can also improve the state's economy in general. This is because most of every dollar spent on coal, natural gas, or uranium leaves Wisconsin and our economy. An economic modeling study of Wisconsin's statewide energy efficiency program, Focus on Energy, estimated that, due to those effects, spending $200 million over the two-year period of 2015-16 increased gross state product by $762 million.

DSM can also serve as an economical, least-cost resource for a generating utility. Multiple studies have found that the levelized cost of energy efficiency programs in Wisconsin and nationwide typically range between 1 and 4 cents per kWh saved, which is in many case lower than the costs per kWh of generating from sources of supply.

From an environmental perspective, DSM is the best option for meeting energy needs. Efficiency, load management, and some forms of fuel switching reduce air pollution, water use, coal and uranium mining, disposal of radioactive waste, production of greenhouse gases, and the depletion of non-renewable resources.

Efficiency, fuel switching and load management, by reducing the need for power plants and power lines, also reduce the negative impacts of those facilities such as the use of valuable land, destruction of natural habitats, and aesthetic impacts. Almost all of the environmental impacts of the proposed power plant, noted elsewhere in this final EIS, could be avoided if DSM could substitute for the power plant.

There are some potential negative impacts associated with DSM measures. Switching fuels would still have impacts due to the use of the alternate fuel. Load management, if not designed properly, can lead to discomfort or the inefficient disruption of industrial production. Overall, though, the negative effects of DSM measures are negligible compared to the building and operation of power plants.

The Commission's Legal Requirements Regarding DSM as an Alternative to the Proposed Plant

DSM, if available, could be an alternative to a power plant. However, Wis. Stat. § 196.491(3)(d) states that the Commission cannot consider alternative sources of supply when deciding whether or not a proposed merchant power plant is "in the public interest."

NTEC is not required by law to provide any data on how much of the proposed capacity or energy produced by the plant would be used to meet Wisconsin energy needs, nor is it required to provide data on the cost of generating electricity at the proposed power plant. With no costs to compare to the cost of equivalent DSM, the Commission cannot determine DSM's cost-effectiveness as an alternative as required under Wis. Stat. § 1.12 and 196.025, or even how much DSM would be equivalent to the proposed plant.

2.6.6. Renewable resources as an alternative to a power plant fueled by natural gas

The proposed power plant would use natural gas as the fuel to generate electricity. In some instances renewable energy sources can be used to supplement, or provide a partial alternative to, the power produced by natural gas fueled power plants. In Wisconsin, these energy sources may include solar power, wind power, hydroelectric power, and biomass fuels.

From an economic perspective, money paid for local renewable resources to produce electricity for the state could remain in the state, instead of being paid to out-of-state entities for natural gas or other fossil fuels.

There are generally fewer or lesser environmental impacts with generation from renewable resources than with generation from fossil fuels. Most of the environmental advantages of renewable resources are related to air emissions. None of the renewable resources noted above produce significant air emissions, if any, except for the burning of biomass fuel. Of the various renewable resource technologies, only biomass power would have water use impacts similar to a fossil fueled power plant. Each of the renewable resources would have their own impacts on land use. Some renewable technologies also have particular kinds of negative impacts. For instance, wind power in certain locations has been criticized for aesthetic reasons or for its potential to cause bird and bat injuries and deaths due to collisions with the towers and turbines.

2.6.7. Natural gas and other nonrenewable combustible energy sources

Natural gas is the proposed fuel choice for the plant, with fuel oil as a potential back up fuel. Coal and other carbon-based fuels are not proposed.

2.7. SOLID WASTE GENERATION AND RECYCLING

The project would not generate an ash byproduct because it would be fueled by natural gas or fuel oil. No other solid wastes would be generated by the project during the production of electricity. Solid waste produced during the project would only occur from construction debris, wastes produced by construction workers, and wastes produced by employees onsite during operation of the project. These wastes would be collected in trash containers throughout the project site and sent to a local landfill. Recycling pickup services are anticipated to be provided by a local disposal company. Production and disposal of solid waste is further discussed in Section 3.2.2.

2.8. EVALUATION OF REASONABLE ALTERNATIVES TO THE PROJECT AND THEIR ENVIRONMENTAL CONSEQUENCES INCLUDING THE NO ACTION ALTERNATIVE

The applicants state that the proposed project is a form of generation that counterbalances the variable nature of wind power and other renewable energy resources and provides energy for periods of high demand. Like DSM, renewable resources could be an alternative to the power plant and have a higher priority under Wis. Stat. § 1.12 than natural gas combustion. The following section examines the no-action alternative. The alternatives evaluated by the applicants and other possible alternatives to this proposed action are examined in previous sections of this chapter.

2.8.1. No action alternative

The no-action alternative might require the applicants to continue to search for another way to meet the need for the proposed project. That could include a number of possible solutions, which could include a new proposal or proposals that could require approvals from DNR and the Commission, or various combinations of any number of agencies or government bodies. By denying the application, there would be no change in the number of power plants in the state. Electricity providers would have the same sources of electricity available as they have currently and the power grid would operate largely the same as it is today.

Taking no action on this application, by not making a final commission decision, would result in automatically granting a CPCN to the applicants under Wis. Stat. § 196.491(3)(g). The applicant would then have the option of constructing the plant at either of the two proposed sites.

2.9. HORIZONTAL MARKET POWER

Wisconsin Stat. § 196.491(3)(d)7 requires the Commission, before issuing a CPCN, to find that the proposed wholesale merchant power plant facility "will not have a material adverse impact on competition in the relevant wholesale electric service market." The Commission will make its decision regarding adverse impact on completion as part of its decision in this docket.

CHAPTER

3

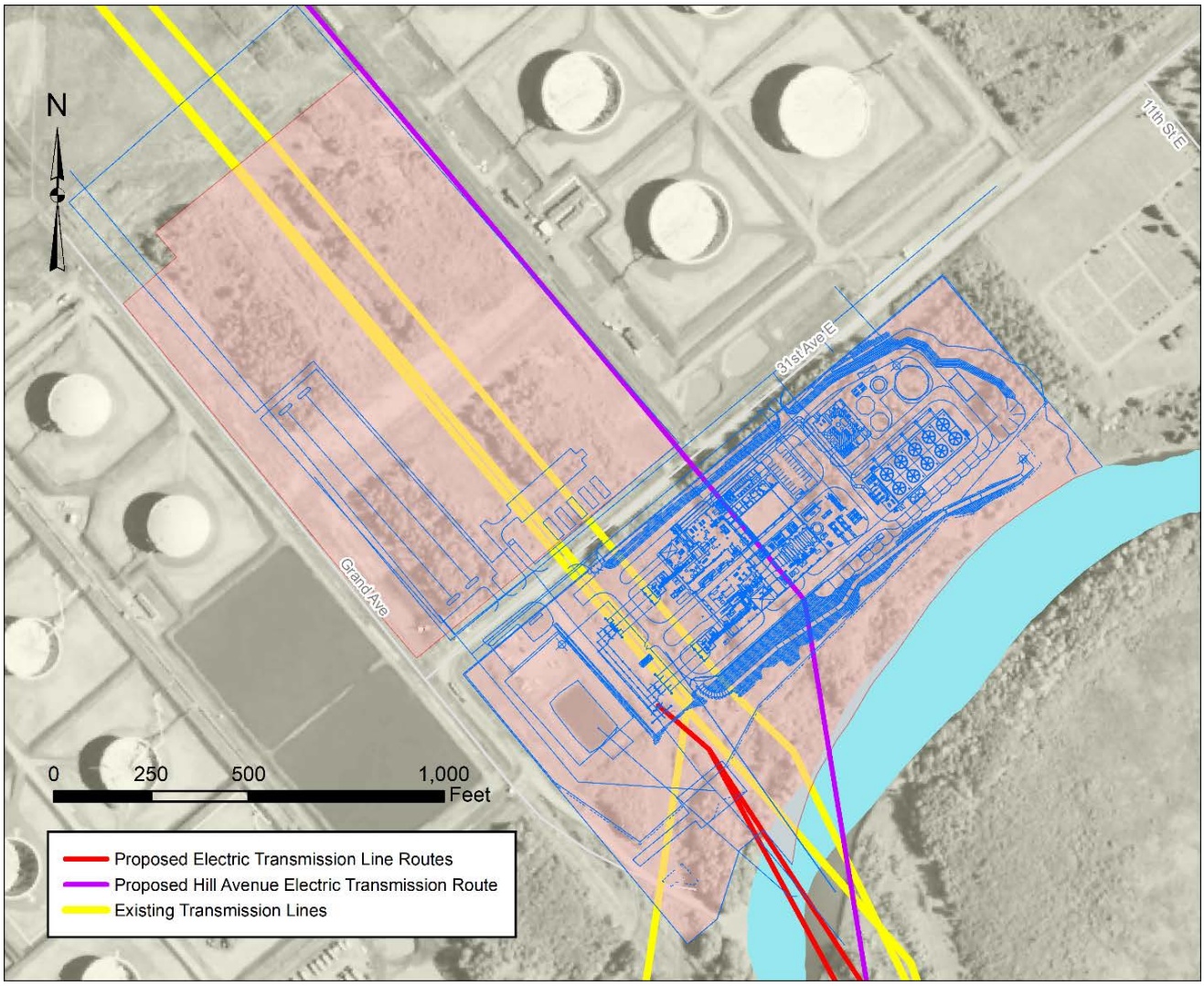
3. Environmental Review – Nemadji River Site

3.1. SITE DESCRIPTION

The Nemadji River Site is located in the City of Superior in Douglas County, Wisconsin. The proposed Nemadji River Site lies east of the existing Enbridge Energy Superior Terminal Facility (EESTF) on the banks of the Nemadji River. The site is accessible from USH 2/USH 53 via 31st Avenue East from the northeast. The site is approximately 26.3 acres in size with an additional approximately 24.8 acres of staging and laydown area across the street on 31st Avenue East.

Within the surrounding area, the primary land cover is woodland with a mixture of deciduous and evergreen forest. Wetlands are also prevalent throughout the area. The site contains a parking lot and small stormwater retention pond in the southwest corner. Several existing transmission lines extend through the parcel. The area surrounding the Nemadji River Site contains a variety of developments. Tank farm facilities lie to the north of the site within the City of Superior, including commercial and residential development, further north. The Nemadji Golf Course is to the west, and slightly beyond the golf course to the west is the Richard I. Bong Memorial Airport. Residential development is located to the east, with Lake Superior less than one mile to the east. The area to the south of the Nemadji River Site is relatively undeveloped, although it contains numerous utility corridors and some mining facilities.

Figure 3-1 Location and the facility arrangements within the proposed Nemadji River Site



3.2. NATURAL RESOURCES AND IMPACTS

3.2.1. Air emissions

South Shore Energy LLC, a subsidiary of ALLETE, and Dairyland Power Cooperative have submitted to DNR a Prevention of Significant Deterioration (PSD) permit application for Nemadji Trail Energy Center (NTEC) under Wis. Admin. Code ch. NR 405. PSD is a federal permit program for major air pollution sources that is meant to prevent the air quality in an attainment area from getting worse. Wisconsin DNR has responsibility for review of permit applications and issuance of air pollution control permits in accordance with federal CAA requirements and Wisconsin Statutes. The Commission, under Wis. Stat. § 196.491(3)(d)3. and 4., has notable constraints in this regard:

> In its consideration of environmental factors, the Commission may not determine that the design or location or route is not in the public interest because of the impact of air pollution if the proposed facility will meet the requirements of ch. 285.

Chapter 285 of the Wisconsin Statutes is the chapter on "Air Pollution" and is enforced by DNR. Wis. Admin. Code chs. NR 400–NR 499 contain the rules promulgated by the department to implement Wis. Stats. ch. 285.

The DNR air pollution control construction permits for this project are intended to include requirements for PSD, protection from hazardous air pollutants, adherence to federal New Source Performance Standards (NSPS) and to assure compliance with National Ambient Air Quality Standards (NAAQS). The department's permits address, among other things:

- Emission limitations based on BACT for each emission unit and pollutant triggering review.
- Permit conditions to address ambient air impacts analyses and ensure the proposed project complies with NAAQS and PSD allowable concentration increments.
- Permit conditions addressing impacts to visibility, soils, and vegetation.
- Permit conditions to protect against ambient air impacts of HACs as regulated under Wis. Admin. Code ch. 445, which does not cover emissions from natural gas or ULSD combustion but would cover ammonia from emission control systems.
- NSPS for regulation of greenhouse gas (GHG) emissions under federal rule, 40 CFR 60, Subpart TTTT, which would apply to the project.

The issuance of a major source construction permit under Wis. Admin. Code chs. NR 405 is considered an integrated analysis action under Wis. Admin. Code § NR 150.20(2)(a)4. Actions specified under Wis. Admin. Code § NR 150.20(2) require a WEPA compliance determination under Wis. Admin. Code § NR 150.35, but do not require a separate environmental analysis under Wis. Admin. Code ch. NR 150. The proposed project has been reviewed considering Wis. Admin. Code ch. NR 150 and DNR has determined that this type of proposal is not expected to have the potential to cause significant adverse environmental or secondary effects.

However, under WEPA, a state agency like the Commission must consider whether its actions would significantly affect the quality of the human environment. Impacts of the decision whether to issue a CPCN for a proposed power plant could easily include impacts to air quality, and these must be considered.

3.2.1.1. Description of proposed emissions units

Potential emission sources to be examined include:

- S01/P01/C01a (SCR)/C01b (oxidation catalyst) – One 3,665 MMBtu/hr, (HHV) Natural Gas-Fired, Siemens SGT6-8000H Combined-Cycle Turbine with 3,021 MMBtu/hr (HHV) Fuel Oil back-up and a 1,006 MMBtu/hr (HHV) Natural Gas-Fired Duct Burner
- S02/B02 – One 100 MMBtu/hr Natural Gas-Fired Auxiliary Boiler with ultra-low NO_X burners and flue gas recirculation (FGR)
- S03/P03 – 12-Cell Cooling Tower with High Efficiency Drift Eliminators
- S04/P04 and S05/P05 – Two Natural Gas-Fired 10 MMBtu/hr Heaters
- S06/P06 – One 282 hp Emergency Diesel Fire Pump
- S07/P07 – One 1,490 hp Emergency Diesel Generator
- T01 – 180,000-gallon diesel fuel day tank
- T02 – 1,700-gallon diesel fuel generator tank

- T03 – 350-gallon diesel fuel fire pump tank

3.2.1.2. Potential to emit from proposed emissions units

NO_X, CO, particulate matter (PM), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), VOC, sulfuric acid mist (H_2SO_4), lead, and greenhouse gas emissions (CO_{2e}) are expected from the proposed project. The following table (Table 3-1) shows the potential to emit (PTE) by emissions unit, by pollutant, and totaled compared to PSD significant emission rates as specified in Table A to Wis. Admin. Code § NR 405.02(27). Significant emission rates are used to determine whether a major modification has occurred per Wis. Admin. Code § NR 405.02(21).

Table 3-1 PTE by emission unit, by pollutant, and totaled compared to PSD significant emission rates

Pollutant	Combined-Cycle Combustion Turbine[a] (tpy)	Auxiliary Boiler (tpy)	Cooling Tower (tpy)	Natural Gas Heater #1 (tpy)	Natural Gas Heater #2 (tpy)	Emergency Diesel Fire Pump (tpy)	Emergency Diesel Generator (tpy)	Storage Tanks (tpy)	Total[b] (tpy)	PSD Significant Emission Rates (tpy)
NO_x	255.6	4.8	–	2.1	2.1	0.5	3.9	–	**269**	40
CO	1,991.1	16.2	–	3.6	3.6	0.4	2.1	–	**2,017**	100
PM	163	3.3	6.4	0.3	0.3	0.02	0.1	–	**173**	25
PM_{10}	163	3.3	2.8	0.3	0.3	0.02	0.1	–	**170**	15
$PM_{2.5}$	163	3.3	2.8	0.3	0.3	0.02	0.1	–	**170**	10
SO_2	28.2	0.3	–	0.03	0.03	0.1	4.5.E-03	–	29	40
VOC	237.3	2.4	–	0.2	0.2	0.2	0.3	0.04	**241**	40
H_2SO_4	43	0.04	–	3.9.E-03	3.9.E-03	0.02	6.9.E-04	–	**43**	7
Lead	0.01	2.1.E-04	–	4.3.E-05	4.3.E-05	–	–	–	0.01	0.6
CO_2e	2,675,731	51,289	–	5,129	5,129	80	841	–	**2,738,198**	75,000
(a) Represents worse-case emissions scenario										
(b) Numbers in bold indicate the PSD significance level is exceeded										

A source's PTE reflects the maximum capacity of emissions units, taking into account physical and operational limitations. For the above emissions estimates, the following assumptions were made (Table 3-2):

Table 3-2 Assumptions made for emissions estimates

Assumptions		
Unit	**Limitation**	**Units**
Turbine	8,760	Natural gas hours per year
	50	Number of natural gas cold starts per year
	150	Number of natural gas warm starts per year
	900	Number of natural gas hot/fast starts per year
	1,100	Total number of combined natural gas start-ups per year (cold/warm/hot/fast)
	1,100	Total number of natural gas shutdowns per year
	1,525.0	Hours of natural gas Startup/Shutdown per year
	500	Fuel oil hours per year with or without duct burning
	11,025,196	gallons/year fuel oil
	42	Number of fuel oil startup/shutdowns per year
	105.0	Hours of fuel oil Startup/Shutdown
Natural Gas Duct Firing	8,760	Hours per year
Auxiliary Boiler	8,760	Hours per year
Cooling Tower	8,760	Hours per year
Natural Gas Heater #1	8,760	Hours per year
Natural Gas Heater #2	8,760	Hours per year
Emergency Diesel Fire Pump	500	Hours per year
Emergency Diesel Generator	500	Hours per year
Fuel oil heating value	137,000	Btu/gal

Facility-wide federal hazardous air pollutants (HAP) were calculated four different ways, with the assumptions to the left in each scenario below and the highest individual federal HAP totals and all federal

HAP combined totals to the right in each scenario below for comparison against the 10 tpy (individual federal HAP) and 25 tpy (combined federal HAPs) Part 70 thresholds. Emission factors are citations are within each Scenario's table (Tables 3-3 to 3-6).

Table 3-3 Scenario 1

Hours of Operation			**HAP**	**HAP**	**tpy**
Combustion Turbine Natural Gas Hours =	8760	hours per year	1st maxium -	Ethane	3.28
Combustion Turbine Fuel Oil Hours =	0	hours per year	2nd maxium -	Pentane	2.09
Duct Burner =	0	hours per year	3rd maxium -	Hexane	1.03
Auxillary Boiler =	8760	hours per year		All HAPs	9.33
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 3-4 Scenario 2

Hours of Operation			**HAP**	**HAP**	**tpy**
Combustion Turbine Natural Gas Hours =	0	hours per year	1st maxium -	Ethane	8.71
Combustion Turbine Fuel Oil Hours =	0	hours per year	2nd maxium -	Pentane	0.36
Duct Burner =	8760	hours per year	3rd maxium -	Hexane	0.02
Auxillary Boiler =	8760	hours per year		All HAPs	9.16
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 3-5 Scenario 3

Hours of Operation			HAP	HAP	tpy
Combustion Turbine Natural Gas Hours =	0	hours per year	1st maxium -	Ethane	8.26
Combustion Turbine Fuel Oil Hours =	500	hours per year	2nd maxium -	Pentane	0.60
Duct Burner =	8260	hours per year	3rd maxium -	Hexane	0.56
Auxillary Boiler =	8760	hours per year		All HAPs	9.65
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 3-6 Scenario 4

Hours of Operation			HAP	HAP	tpy
Combustion Turbine Natural Gas Hours =	8260	hours per year	1st maxium -	Ethane	3.31
Combustion Turbine Fuel Oil Hours =	500	hours per year	2nd maxium -	Pentane	1.97
Duct Burner =	0	hours per year	3rd maxium -	Hexane	0.97
Auxillary Boiler =	8760	hours per year		All HAPs	9.82
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

3.2.1.3. Air quality review

Wis. Stat. § 285.63(1)(b) allows the department to approve a permit application if it finds the source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment. See the Criteria for Permit Approval section later in this document. This section describes the department's finding under Wis. Stat. § 285.63(1)(b).

Emissions units P06 and P07 are intermittent sources because they do not have a set operating schedule, operate for short periods of time during the year (generally outside of the facilities' control) and do not contribute to the normal operation of the facility. These intermittent emissions units are not included in dispersion modeling analyses.

The emissions units covered by these permits would be capable of emitting VOCs. There are no ambient air quality standards specifically for VOCs. Therefore, dispersion modeling of VOC emissions from direct stationary sources is not performed.

The emissions units covered by these permits would be capable of emitting NO_X. The Air Dispersion Analysis memorandum for draft air pollution control construction permit number 18-MMC-168 assesses the impact of the proposed emissions units on 1-hour and annual NO_2 concentrations (Appendix B).

Volatile organic compounds and nitrogen oxides are both precursors to ground level ozone concentrations. Ozone is a regional pollutant that is formed in the atmosphere through complex chemical reactions. U.S. Environmental Protection Agency (EPA) has established an approach for addressing the impact of single-source VOC and NO_X emissions on ozone. The department assessed the impact of emissions on ozone concentrations as part of the review. Appendix B includes the results of the air emission modeling for both the Nemadji River Site and the Hill Avenue Site NTEC site alternatives.

The emissions units covered by these permits would be capable of emitting PM_{10}, $PM_{2.5}$, SO_2, NO_X, and CO. The department performed dispersion modeling analyses as part of the review for these permit to predict the source's/project's potential impact on ambient concentrations of these pollutants. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169.

SO_2 and NO_X are both precursors to ambient $PM_{2.5}$ concentrations. U.S. EPA has established an approach for addressing the impact of secondarily formed $PM_{2.5}$ in combination with direct emissions of $PM_{2.5}$. The department assessed the impact of emissions on $PM_{2.5}$ ambient concentrations as part of the review. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169.

The proposed facility may be capable of emitting NH_3 with ambient air standards in column (g) of Table A at rates that exceed the thresholds in Table A of s. NR 445.07, Wis. Admin. Code, for the corresponding stack height category. The department performed dispersion modeling analyses as part of the review for this permit to predict the facility's potential impact on ambient concentrations of these hazardous air contaminants.

The results of the dispersion modeling are summarized in Appendix B as dispersion modeling memoranda dated March 15, 2019. The dispersion modeling analyses predict that the source impact will not cause or exacerbate a violation of the ambient air quality standards/ambient air increments, taking into consideration background concentrations. Assuming the emission rates and stack parameters listed in their respective tables at the end of the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169, air quality standards and increments will be attained and maintained for PM_{10}, $PM_{2.5}$, SO_2, NO_X, and CO.

3.2.1.4. Additional impacts analysis

Growth Impacts

The construction of NTEC would result in temporary air quality impacts but should not result in an increase in the permanent workforce in the area. The temporary increase of emissions due to construction would be minimized by performing regular maintenance on construction equipment, reducing engine idling time, and controlling release of fugitive dust. Materials transportation, equipment, and supplies would be needed, but this is not expected to have a measurable effect on residential, commercial, or industrial growth.

Soils and Vegetation Impacts

Particulates can be detrimental to vegetation or soils in the immediate vicinity of the source, but the effect of particle deposition on a plant or soil is difficult to measure. Experimental evidence indicates that

deposition of common particulate materials on leaf surfaces results in less harm to plants than absorption of phytotoxic gases. At the level of the modeled concentration, it is unlikely that the increase of emission would impact either vegetation or soils near NTEC.

Visibility Impairment Analysis

Any facility emitting SO_2, PM_{10}, and/or NO_X may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. Near the proposed project site, under certain meteorological conditions, the stacks will emit a visible steam plume that, after traveling a relatively short distance, will dissipate by dispersion and evaporation. A visible steam plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed and the time required for evaporation.

3.2.1.5. Best Available Control Technology

The department has determined the BACT for each emissions unit.

For the Siemens SGT6-8000H combined-cycle turbine with diesel fuel oil back-up [Maximum continuous rating: 3,665 MMBtu/hr higher heating value (HHV) when combusting natural gas, 3,021 MMBtu/hr, HHV when combusting diesel fuel oil] with a 1,006 MMBtu/hr natural gas-fired duct burner, the BACT determinations proposed for the draft permits include the following requirements: efficient design, emissions limitations, restrictions to only combust pipeline natural gas and fuel oil with no more than 15 ppm sulfur content, good combustion practices according to the manufacturer's recommendations, selective catalytic reduction, water injection, low-NO_X burners, a restriction on the quantity fuel oil combusted, an oxidation catalyst, time, and mass restrictions on start-up and shutdown.

For the 100 MMBtu/hour natural gas fired auxiliary boiler, the BACT determinations proposed for the draft permits include the following requirements: only combusting pipeline quality natural gas, emissions limitations, operation and maintenance according to the manufacturer's recommendations, periodic tune-ups, ultra-low NOx burners, flue gas recirculation, and an oxidation catalyst.

For the 12-cell cooling tower, the BACT determinations proposed for the draft permits include the following requirements: limitations on total dissolved solids, drift rate, and emissions.

For the two 10 MMBtu/hour heaters, the BACT determinations proposed for the draft permits include the following requirements: operation and maintenance according to the manufacturer's recommendations, only combusting pipeline quality natural gas, emission limitations, low-NOx burners, and periodic tune-ups.

For the 282 hp emergency diesel fire pump, the BACT determinations proposed for the draft permits may include the following requirements: a restriction to only combust fuel oil with no more than 15 ppm sulfur content, operation and maintenance according to the manufacturer's recommendations, emissions limitations, a restriction to 500 hours per each 12 consecutive calendar months, and being certified by the manufacturer to EPA's criteria for Tier 3 reciprocating internal combustion engines.

For the 1,490 hp emergency diesel generator, the BACT determinations proposed for the draft permits may include the following requirements: a restriction to only combust fuel oil with no more than 15 ppm sulfur content, operation and maintenance according to the manufacturer's recommendations, emissions

limitations, a restriction to 500 hours per each 12 consecutive calendar months, and being certified by the manufacturer to EPA's criteria for Tier 2 reciprocating internal combustion engines.

For the diesel fuel tanks, the BACT determinations proposed for the draft permits may include the following requirements: use of fixed roof tanks and equipped with pressure relief valves, performing submerged-filling or bottom loading only, only storing diesel fuel, and for transfers to storage tanks having greater than 1,000-gallons capacity, a permanent submerged fill pipe.

Criteria for Air Permit Approval

Section 285.63, Wis. Stat., sets forth the specific language for permit approval criteria. The Department finds that:

- The source will meet emission limitations.
- The source will not cause nor exacerbate a violation of an air quality standard or ambient air increment.
- The source is operating or seeks to operate under an emission reduction option. Not Applicable.
- The source will not preclude the construction or operation of another source for which an air pollution control permit application has been received.

In addition to meeting the above criteria, all major source construction or major modification located in attainment areas must meet the following criteria for permit approval. For this source, the department finds that:

- The source will apply BACT for each applicable air contaminant.
- The effects on air quality as a result of the source and the growth associated with the source were analyzed.
- The source will not adversely affect the air quality related values of any federal Class I prevention of significant deterioration area.
- The permit applicant agrees to conduct monitoring specified by the department as necessary to determine the effect of the source on air quality, if applicable.

3.2.1.6. Greenhouse gases

GHGs would be emitted by the project during operation. Potential impacts of GHG emissions on global climate change and its potential effects are described in the reports of the Intergovernmental Panel on Climate Change, the scientific body set up by the World Meteorological Organization and the United Nations Environment Programme to provide an objective source of information about global climate change.[7] Potential impacts worldwide and in Wisconsin, including costs of mitigation, were summarized in the environmental impact statement issued in 2008 that discusses WP&L's proposed Nelson E. Dewey Generating Station Unit 3.[8] A scan of news sources shows that developments and research worldwide are identifying more and not less of the potential impacts since these publications were issued.

[7] For example, the website of the Intergovernmental Panel on Climate Change provides an objective source of information and reports about global climate change: https://www.ipcc.ch/.
[8] Public Service Commission of Wisconsin and Wisconsin Department of Natural Resources. *WPe&L 300 MW Power Plant Final Environmental Impact Statement.* PSC docket 6680-CE-170. July 2008, pp. 135-152.

Global warming potentials of the various GHGs are widely different and are measured and calculated as CO_2 equivalents (CO_{2e}). For example, the global warming potential of N_2O emissions is 310 times that of CO_2, so N_2O emissions are also given as CO_{2e}. Table 3-7 shows the relative CO_{2e} multipliers for the variety of GHGs.

Table 3-7 Relative CO_{2e} impact multipliers for the global warming potential of GHG components

GHG Component	Multiplier
CO2	x 1
CH4	x 21
N2O	x 310
Total hydrofluorocarbons	x 11,700
Perfluorocarbon gases	x 6,500
SF6	x 23,900

CO_2 and CH_4 would comprise most of the GHGs emitted from the combined-cycle plant, and they would be emitted mostly from the CT and duct burners. Maximum GHG emissions based on 100 percent full-load operation over 8,760 hours per year, are listed in Table 3-8.

Table 3-8 Estimated maximum GHG emissions from 100 percent full-load operation, in tons/year

Pollutant	CT (normal operation)	Auxiliary Boiler	Natural Gas Heater #1	Natural Gas Heater #2	Emergency Generator	Fire Pump	Total for Facility
CO2	2,170,474	51,236	5,124	5,124	838	79.5	2,232,876
CH4	1,177	0.97	0.10	0.10	0.034	0.0032	1,540
N2O	1,539	0.097	0.01	0.01	0.0032	0.00064	1,177
SF6	--	--	--	--	--	--	--
Total CO2e	2,658,511	51,289	5,129	5,129	841	80	2,720,978

As with the criteria pollutants, the facility would not run at maximum capacity every hour of the year so estimated emissions based on the expected capacity factor would give a more realistic picture of the actual emissions. Table 3-9 lists estimated emissions using the expected 47.5 capacity factor.

Table 3-9 Estimated GHG emissions at 47.5 percent capacity factor, in tons/year

Pollutant	CTs (normal operation)	Auxiliary Boiler	Dew Point Heater	Emergency Generator	Fire Pump	Total for Facility
CO2	1,451,911	50,724	7,342	797	86	1,510,860
CH4	21.3	0.96	0.14	0.03	0.004	471
N2O	2.1	0.10	0.01	0.006	0.0007	694
SF6	--	--	--	--	--	16
Total CO2e	1,453,017	50,773	7,349	800	87	1,512,041

Natural Gas Extraction

Indirectly, the extraction of the natural gas fuel from the earth has potential environmental impacts as well, far removed from the actual proposed power plant site. The NTEC would not be the only natural gas customer in the U.S. but would be a large one with what would be a contract for firm supply of enough natural gas to produce 625 MW of electricity.

Natural gas has mainly been, and continues to be, extracted from the earth through vertical or horizontal drilling. Raw natural gas is comprised mostly of methane, one of the most potent greenhouse gases. It also contains a large number of other hydrocarbon gases. These techniques create impacts from the drilling and removal and storage of rock, from the industrial modification of the drilling site, and from the flaring (the burning of natural gas that is not processed or sold) of natural gas until the drilling and extraction are stabilized.

Natural gas supply has enjoyed a production renaissance because of the development of hydraulic fracturing, or fracking, which includes techniques to obtain natural gas from more difficult locations in shale rock by injection of pressurized water with sand and thickening agents to fracture the rock and free the gas. When the hydraulic pressure is removed from the well, the sand grains hold the fractures open. Being more complicated than simply drilling, fracking operations have a larger footprint at a well site. They also utilize large amounts of water and of materials that could have public health implications downstream, or down-gradient in groundwater. The fractured rock also creates a potential for seismic events like small earthquakes.

More distant adverse impacts to air, lands and waters as a result of fracking to obtain natural gas would continue to be related at least indirectly to the construction and operation of any new, large natural gas consumer such as the proposed NTEC project. Adverse impacts to lands in western Wisconsin where frack sand is mined would continue to be related in a similar way to the extent that this most-preferred fracking sand was purchased. If this sand became too expensive, less perfect fracking sand would be mined elsewhere with similar impacts.

Also more indirectly, emissions of GHGs that are not countered by resequestering carbon in the necessary timeframe could contribute to the potential for more rapid and intense global climate change and its subsequent potential environmental ramifications.

The most desired sand to utilize in fracking is found in western Wisconsin because of its geological history of sea coverage. Several frac sand mines have developed on lands around the state. These mines require the removal of "overburden" including the soils and plants above the sand. The land from which the sand has been removed is also removed from any further farm or forest production.

3.2.2. Solid wastes

The project would generate solid waste during construction and operation in the form of construction debris and employee-generated waste. The applicants propose using a local landfill for disposal of such waste. Recycling pickup services are anticipated to be provided by a local disposal company. The applicants do not anticipate any of the solid waste generated from construction or operation activities to qualify as "hazardous waste" according to state or federal law. Waste handling and disposal would be the same for either proposed site alternative. The applicants do not anticipate that DNR solid waste or landfill permits would be required.

In addition, oil based wastes would be generated by the proposed NTEC plant. The oil contaminated gravity drain system would collect waste liquid which has the potential of containing quantities of oil and conveys the waste through an oil/water separator. Oil water separator effluent would be pumped through a polishing coalescing filter and discharged to water treatment building sump for reuse. The oil/water separator would be designed to remove 20 micron and larger oil droplets to concentrations of less than 10 ppm. It would be designed to store 1,000 gallons of oil. The oil/water separator would be constructed as a double walled buried tank and will have a leak monitor to detect a breech in the inner tank wall. The tank would be cathodically protected.

Any oil collected would be pumped out as required for disposal. Oil water separator effluent would be pumped through a polishing coalescing filter and discharged to water treatment building sump for reuse.

In volume II, Appendix G of the application, the applicants provided a spill prevention control and countermeasures plan for the proposed power plant site.

3.2.3. Geology

The Nemadji River Site is located in the Lake Superior Lowland physiographic province, an area of about 1,250 square miles in northwestern Wisconsin covering portions of Douglas, Bayfield, and Ashland counties. An additional 2,400 square miles is submerged beneath the waters of Lake Superior. Its altitude ranges from less than 1,000 feet above to about 300 feet below sea level, and it rises 150 to 350 feet above and goes 600 to 900 feet below the level of Lake Superior, which stands at 602 feet above sea level. The Lake Superior basin is now a lowland because of the downward movement of a block of the earth's crust in a rift, or graben fault. Subsequent sedimentation, erosion, and sculpting by continental ice sheets have reshaped the area and notably modified the rift valley.

Bedrock consists of Precambrian-age rock. Igneous and metamorphic types make up the bedrock that is present to the north of Superior and the Lake Superior Lowlands. Bedrock underlying Superior consists of sandstone of the Precambrian Orienta Formation of the Bayfield Group. The erosion surface of the Precambrian bedrock is overlain by unconsolidated Quaternary glacial, glaciofluvial, and alluvial deposits that consist of clay, silt, sand, and gravel, with fine-grained sediment predominating.

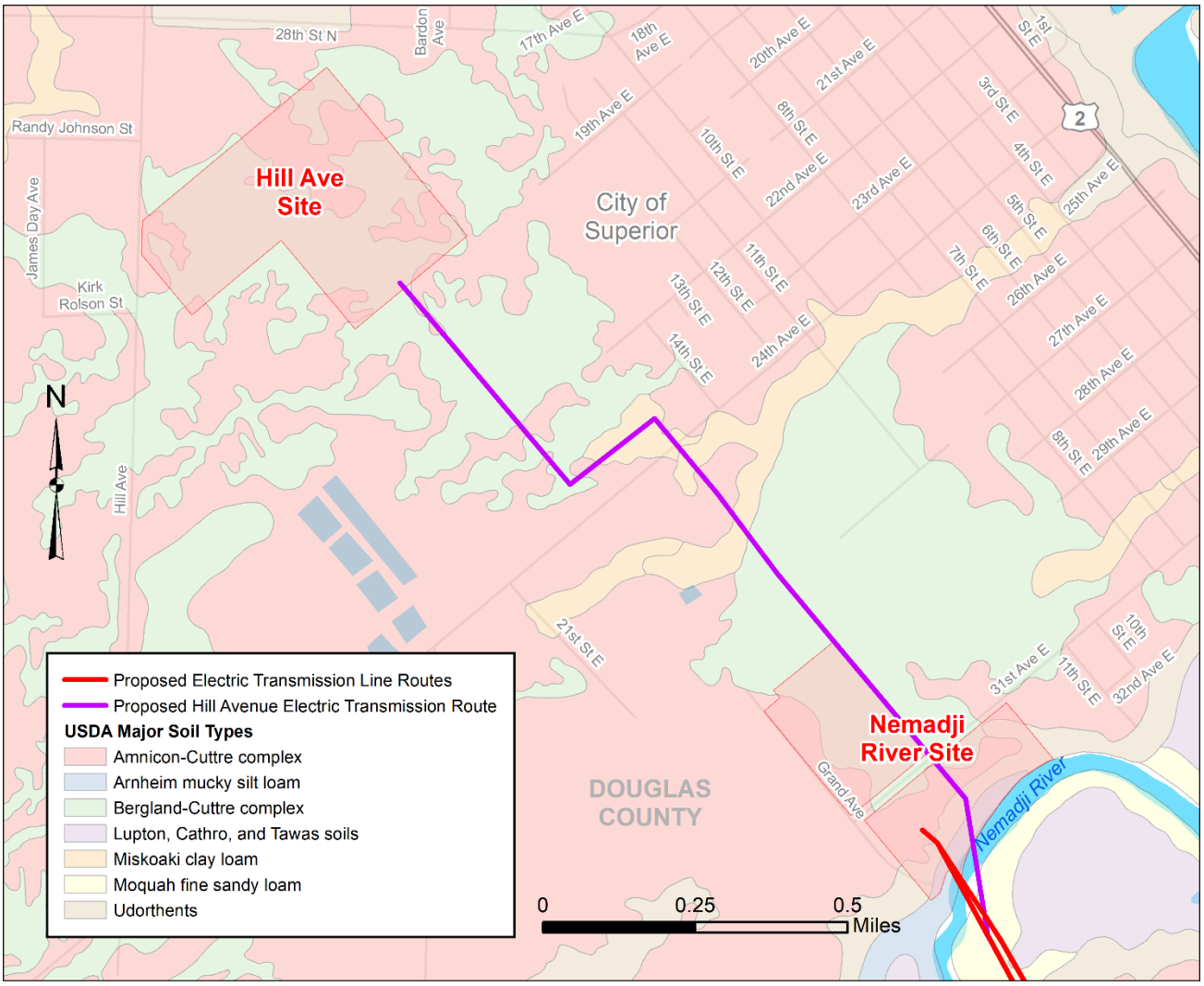
The regional aquifer near the City of Superior consists of a thick unit of glacial deposits that are comprised of clay, silt, sand, and gravel. These glacial deposits directly overlie Precambrian age sandstone bedrock. The bedrock units in Douglas County are not considered aquifers due to their low yield and mineralized water quality. The thickness of the glacial materials is variable through the County and generally increases towards Lake Superior, with a maximum thickness of over 600 feet near the St. Louis River. The maximum thickness of the glacial deposits at the Alternative Sites is approximately 280 feet.

Construction work would impact soil through earthwork and regrading of the project site. Although heavy construction equipment would be used, based on the amount of excavation required and the type of substrate at the site, construction of the project is not expected to affect geological formations the Nemadji River Site.

3.2.4. Topography and soils

According to the U.S. Department of Agriculture (USDA) NRCS Web Soil Survey, a total of four different soil types are mapped within the vicinity of the Nemadji River Site. The four soils are Bergland-Cuttre complex; Amnicon-Cuttre complex; Arnheim mucky silt loam; and udorthents, ravines, and escarpments. Amnicon–Cuttre complex soils are nearly level to gently sloping, moderately well drained to somewhat poorly drained soils on glacial till plains. The water table depth for this soil is 12 inches. The soil profile consists of silty clay loam and clay. Figure 3-2 shows the soils present within and surrounding the Nemadji River Site.

Figure 3-2 Soils present within the vicinity of the Nemadji River Site



The elevation in the vicinity of the Nemadji River Site ranges from approximately 600 to 650 feet above mean sea level. Although the area in which the NTEC plant would be built is relatively flat, the surrounding area exhibits significantly more topographic relief. The land slopes from higher elevations in the northwest portion of the Nemadji River Site to lower elevations in the southeast near the Nemadji River, a difference in elevation of 30 to 40 feet. Flatter areas are poorly drained, and the red clays in the area are generally at or near 100 percent saturation. The site would be graded and grading design would change the topography to facilitate stormwater drainage patterns.

The slope leading to the Nemadji River is highly susceptible to erosion. Slopes in this region often erode due to natural forces and events. In many areas slopes can gradually recede over time. Disturbance of the vegetation on the slope or changes in stormwater drainage patterns can lead to the development of fissures on the slope face, causing loss of soil into the Nemadji River. This kind of erosion can have a negative impact on the Nemadji River and would also damage and alter plant and animal habitat down and along the slope face. Once formed, fissures can expand very quickly, especially during heavy rainfall. Because of the slope and type of soil in this area, fissures are very difficult to control and repair.

3.2.4.1. Special construction considerations due to soil conditions

Because many of the soils in the near the Nemadji River Site are very susceptible to erosion, construction in areas with steep slopes can lead to environmental impacts. Specifically, there is a high risk for impact to natural resources, including an environmental corridor located along the slopes of the Nemadji River. Construction on the Nemadji River Site could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan, such as the applicants' proposed Erosion Control and Storm Water Management Plan (ECSWMP) is prepared, approved prior to construction, and rigorously followed during construction.

At the Nemadji River Site, the main power block area would be raised approximately 5 feet with some of the north end of the area being raised approximately 15 feet. The grading of the power block area would require approximately 120,000 cubic yards of imported fill. The source of the potential fill is uncertain at this time. Importing fill from other locations could have the potential to introduce invasive species and other contaminants or pests. There would be some excavation for underground utilities and deep structures such as pump pits and the suitable material from these excavations will be used for trench backfill and site grading. The excavation to enlarge the existing stormwater pond is included in the site grading quantities. Installation of the sheet pile wall would require approximately 26,000 cubic yards of excavation and approximately 80,000 cubic yards of select material backfill.

According to the information in the CPCN application, the Nemadji River Site would be graded, and the topography changed to facilitate stormwater drainage patterns. For this project, the applicants have developed a planning document that addresses both erosion and stormwater control. Stormwater runoff would be collected and directed to an existing stormwater detention pond located near the southwestern boundary of the site. The existing pond would be used as a sediment basin during construction to remove sediment loads from stormwater runoff in accordance with Wis. Admin. Code § NR 151.11(6m)(b)2, which states that construction sites may discharge no more than 5 tons per acre per year, or to the maximum extent practicable, of the sediment load carried in runoff from initial grading to final stabilization. Following site stabilization, the pond would be cleaned out and converted to a wet detention basin, designed to reduce the total suspended solids load by at least 80 percent, based on an average annual rainfall. The existing pond discharges to the south via an underground pipe to the Nemadji River which would be expanded to attenuate the increase in runoff volume. Stormwater runoff from associated laydown and staging area would continue to drain into an existing roadside culvert outlet.

Best management practice (BMP) erosion control techniques would be used to mitigate soil impacts. Topsoil would be kept separate from subsoils and would be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked prior to final stabilization. The Storm Water Management Technical Standards (SWMTS) from DNR would be used during construction and operation.

Additionally, the applicants must obtain, prior to initiating any land-disturbing construction activities within the boundaries and jurisdiction of the City of Superior, an Erosion Control/Grading Permit and Storm Water Management Permit from the Public Works Department. The application requirements include the permit application forms, an Erosion and Sediment Control Plan, Storm Water Management Plan, and the required fees.

3.2.4.2. Impacts during and after construction

BMP erosion control techniques would be used to mitigate soil impacts. Topsoil would be kept separate from subsoils and would be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked

prior to final stabilization. The Storm Water Management Technical Standards from DNR would be used during construction and operation.

During construction, portions of the Nemadji River Site would be cleared, grubbed, graded, excavated, and revegetated. The applicants state that in areas not impacted by these activities, existing vegetation would be preserved where practicable. The amount of soil exposed during construction would be minimized. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas where restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and Wisconsin Department of Transportation (WisDOT) Mix 75-Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where land-disturbing activities would not be performed for a period greater than 14 days. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

During construction, steps would be taken to prevent excessive emissions of particulate matter resulting from construction activities and vehicular traffic. These steps may include compacting, seeding, covering, paving, wetting, sweeping, or otherwise controlling particulate matter emissions.

Post-construction, the areas disturbed during construction would receive final cover to eliminate dust. All exposed soil areas would be seeded to grow grass, lesser-traveled road surfaces would be graveled and compacted, and the new main roads on-site would be surfaced with asphalt. The roads would be monitored and either wetted or swept to clean any fugitive dust that may occur due to on-site wheeled traffic.

Descriptions and potential impacts to natural resources in the vicinity of the Nemadji River Site are discussed in Sections 3.2.5 through 3.2.8.

3.2.5. Upland land cover

Upland land cover discussed in this final EIS includes forests, grasslands and meadows, and agricultural lands. Although wetlands may be broadly mentioned in this section, they are discussed separately, in greater detail, in the water resources sections of this final EIS. In general, agricultural lands are not a major component of the landscape in the vicinity of the proposed NTEC location.

3.2.5.1. Land cover in the vicinity of the Nemadji River Site

The existing vegetation communities in the vicinity of the Nemadji River Site consists mostly of deciduous forests, with smaller areas of mixed coniferous/deciduous forests, lowland scrub/shrub, forage grassland, and emergent/wet meadow. Approximately 2 acres of developed land, associated with an existing stormwater pond and onsite parking area, exist in the northwestern corner of the Site.

The existing vegetation community within the laydown area has been disturbed in the recent past to construct the adjacent tank farms and the existing overhead electrical transmission line and underground natural gas pipelines that cross through the area. The laydown area consists of 8.2 acres of forested wetland, 5.6 acres of grassland, and 11.0 acres of developed areas. The previously disturbed, developed, low intensity areas occur along the western and northern edges of the proposed laydown yard.

Construction of the NTEC plant and the associated laydown area at the Nemadji River Site would permanently impact 7.9 acres of forest, and 12 acres of grassland including wetland meadows.

The applicants state that the proposed project footprint at the Nemadji River Site would avoid clearing trees and vegetation along the banks, immediately adjacent to the Nemadji River. A vegetation buffer with a minimum width of 100 feet would be maintained between the NTEC plant footprint and the Nemadji River.

Applicants' Proposed Revegetation Strategy

The following describe the re-vegetation and site restoration plan for the proposed project.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 30 days, but vegetative cover is required for less than 1 year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been disturbed would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected weekly to monitor vegetative growth until final stabilization is achieved.

3.2.6. Water resources

Water resources discussed in this section include surface waters, such as wetlands, waterways, and floodplains. Other water related topics discussed in this section include the proposed supply, use, and discharge of water associated with the construction and operation of the NTEC plant at the Nemadji River Site.

3.2.6.1. Surface waters

Surface waters included in the following sections include wetlands and waterways. Figure A-1 provided in Appendix A of this final EIS shows the locations of surface waters in the vicinity of the proposed NTEC plant.

Wetlands

Wetlands provide vital functions that benefit society. Wetlands detain stormwater runoff, enabling the slow recharge of groundwater resources and lowering downstream peak flood levels; filter sediments and

pollutants from the air, precipitation, and upstream sources which results in higher water quality downstream; provide food, cover, and nesting habitat for many species of fish and wildlife; provide a recreational opportunity for bird watching and other wildlife viewing, hiking, and enjoying the aesthetics of the surrounding landscape. It is estimated that between one-quarter and one-third of all rare species in Wisconsin are found in wetlands.

Wetlands are a dynamic ecosystem and provide different functions depending on the type of wetland. The same wetland may even provide different functions from year to year and season to season. There are many different types of wetlands, typically characterized by the size, type of vegetation and amount of soil saturation or surface water found within them. Figure A-1 in Appendix A of this final EIS shows the wetlands present within the vicinity of the proposed NTEC plant.

Wetlands within and adjacent to the site

Wetlands were identified during wetland delineations conducted in the 2016 and 2017 growing seasons. Where field delineation was not possible due to access constraints, the applicants utilized available desktop mapping resources, such as the Wisconsin Wetland Inventory (WWI), soil mapping, Light Detection and Ranging (LIDAR) contours, topographic mapping, and recent aerial imagery, to map wetland boundaries. If the project is approved and the Nemadji River Site selected, the desktop delineated wetland boundaries should be field confirmed prior to construction. A Wetland Rapid Assessment Methodology (WRAM) assessment was conducted by the applicants to document the overall quality of the wetlands. However, the wetland quality data taken during the field investigations was not taken for each individual wetland, and therefore may be over-generalized.

A total of 7 wetland complexes were identified within the Nemadji River Site and associated storage and laydown area, classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. These wetlands provide values of shoreline protection; supporting habitat for rare species, birds, amphibians, and other wildlife; and flood water storage. Due to the presence of invasive species and the degraded nature due to the presence of nearby roads and industrial areas, these wetlands were documented to be of low to medium quality. Wetlands were also identified outside of the perimeter of the site.

Wetland Impacts and Minimization

The construction of the Nemadji River Site would permanently fill 4.36 acres of wetland. A portion of the laydown area associated with the Nemadji River Site contains wetland. The laydown area would initially be cleared of vegetation and trees, then topsoil would be removed and stockpiled, and suitable fill material placed to create a level area. Once construction is complete, the fill material would be removed, the stockpiled topsoil would be re-spread, and the area restored to pre-existing elevations and revegetated. This laydown yard would impacts 14.82 acres of wetland, for a duration of up to 3.5 years. In total, 19.18 acres of wetland would be impacted by the Nemadji River Site. Post-construction monitoring of the laydown area should be conducted to ensure the area reverts back to wetland conditions.

Section 2.1.4 discusses the regional site selection process and the local limitations that were factored into the site selection process. Despite efforts to completely avoid wetland impacts, the region is considerably dense with large wetland areas such that avoidance is not entirely feasible. If wetland fill cannot be avoided due to logistical and engineering constraints, wetland fill should be minimized as much as possible by minimizing or modifying the footprint of the site and associated components like storage and parking areas to utilize upland areas.

Construction activities, such as grading and vegetation clearing, and the creation of new impervious surfaces has the potential to impact adjacent wetlands by causing sedimentation, spreading invasive

species, increasing runoff, and decreasing flood storage. Direct and secondary impacts to adjacent wetlands can be minimized by the following:

- Effective, site-specific sediment and erosion control measures and devices should be installed prior to construction activities and maintained during construction and restoration phases,
- Marking the boundary of areas to be disturbed,
- Prepare and implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project,
- Construct ponds and sediment basins as soon as possible, and ensure all permanent post-construction stormwater management practices are designed to accommodate the additional runoff from new impervious surfaces and the loss of flood storage caused by permanently filling wetlands;
- Revegetate disturbed areas and areas of exposed soil as soon as possible, and seed with a cover crop and/or native seed mix to help prevent the establishment of invasive species,
- Prepare and implement an invasive species management plan that identifies known areas of invasive species populations and addresses site restoration activities and includes equipment decontamination protocols to minimize the spread of invasive species.

Wetland Permitting

DNR is responsible for regulating the discharge of dredge and fill material into wetlands under Chapter 281.36, Wisconsin Statutes, and Wisconsin Administrative Code. USACE might also require a permit under Section 4040 of the Clean Water Act. DNR and/or USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations. Wetland compensatory mitigation would be required for unavoidable wetland impacts associated with the overall project. Compensatory mitigation involves the restoration, enhancement, creation or preservation of wetlands to compensate for unavoidable adverse impacts to wetlands from a proposed project. As part of the permitting process, DNR and USACE would review the wetland impacts to determine the appropriate compensatory mitigation credit for the project prior to the start of construction. This determination is based on the amount and type of wetland impact and is consistent with federal regulations. There are three avenues for satisfying compensatory mitigation requirements, including: (1) wetland mitigation banking, which requires the permittee to purchase bank credits from a mitigation bank sponsor approved by DNR, (2) in-lieu fee, which involves purchasing compensatory credits from DNR, and (3) permittee responsible mitigation, which requires the permittee to complete a wetland mitigation project approved by DNR.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. Independent third-party environmental monitors (IEM) are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction

subcontractors. The applicants may also hire their own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

3.2.6.2. Waterways

Waterways include permanent and non-permanent streams, creeks, rivers, channels, and other linear waterbodies. Waterways present in the vicinity of the proposed NTEC plant are shown in Figure A-1 in Appendix A of this final EIS.

Waterways Within And Adjacent To The Site

The Nemadji River Site is located approximately 1 mile from Lake Superior and is proposed to be located on the bank of the Nemadji River. The Nemadji River is designated as a Priority Navigable Waterway and musky stocking occurs in this waterway.

One potential waterway, an unnamed tributary to the Nemadji River, was identified within the boundary of the Nemadji River Site during field investigations in 2016 and 2017. This feature is identified as WW-501f on figures and tables included with the CPCN application. DNR staff conducted a site visit in June 2018 and confirmed that a portion of this feature met the definition of "navigable" under Ch. 30, Wisconsin Statutes, and was therefore considered a public waterway. No waterways are located within the associated staging and laydown area.

Waterway Impacts and Minimization

The original CPCN filing in January 2019 proposed to place the footprint of the site over waterway WW-501f, and then relocate the waterway as a concrete lined channel. Due to natural resource concerns over this proposal, the applicants submitted revised project information to the Commission which showed the footprint of the site had been altered to no longer be placed over this waterway. However, the most recent project revision still proposed to place a security fence across the waterway, therefore obstructing public use of the waterway. Due to the steep slopes leading to the Nemadji River, waterway WW-501f is likely not used for navigation or to access the Nemadji River via watercraft. This waterway is also proposed to be impacted for roughly 65 feet to allow the project to transition the site grading for the facility to the existing contour of the waterway and reduce erosion potential. The work required for this transition includes varying depths of cut (dredging) in the waterway, with some depths in the main channel of the waterway extending to nearly four feet; grading of side slopes to a more gradual slope; and seeding of the side slopes to minimize future erosion. Some fill is planned on the side slope at the location of the existing Enbridge drainage pipe to fill an existing scour hole. Riprap material will be placed primarily under the drainage pipe to minimize future scouring.

Open-cut trenching within waterways, referred to as dredging, involves removing material from the waterway bed using backhoes or similar equipment. In order to create a dry workspace within a waterway channel, the water flow is temporarily diverted around the excavation by utilizing a workzone isolation system, commonly known as the "dam and pump" method. This consists of installing cofferdam structures, typically made of sandbags or sheet piling, upstream and downstream of the excavation, and utilizing an upstream pump and downstream hose to maintain flow around the

excavation. Waterways with no standing or flowing water would typically not utilize the dam and pump method, unless a rain event is expected during the dredging activity.

Construction activities, such as grading and vegetation clearing, conducted near waterways have the potential to impact water quality and aquatic species habitat. Forested and shrub areas along waterways provide a natural corridor for wildlife movement, help maintain soil moisture levels in waterway banks, provide bank stabilization, filter nutrient-laden sediments and other runoff, maintains cooler water temperatures, and encourages a diversity of vegetation and wildlife habitats. The removal of riparian vegetation can cause water temperatures to rise and negatively affect aquatic habitats, especially cold-water systems. Removing riparian wetland vegetation may decrease shoreline protection and may lead to increased sedimentation to waterways. Vegetation disturbance along the waterway can also lead to the infestation by invasive and nuisance species.

In order to minimize direct and secondary impacts to waterways, the following practices should be followed:

- Effective, site-specific sediment and erosion control measures and devices should be installed prior to any construction activity and maintained during construction and restoration phases,
- Limit the amount of soil exposed at any given time,
- Existing vegetative buffers should be left undisturbed whenever possible, or vegetation clearing should be kept to a minimum in riparian zones,
- Revegetate disturbed areas and areas of exposed soil as soon as possible,
- Construct ponds and sediment basins as soon as possible and ensure all permanent post-construction stormwater management practices are designed to direct runoff to those stormwater management practices and not adjacent waterways
- Cofferdams should not be made of earthen material;
- Dredging work should not be conducted during high-flow conditions;
- Weather forecasts should be continuously monitored to know when rainfall is expected;
- Water flows should be monitored through the dredging activity;
- Equipment should work from the banks or a TCSB, and not from the waterway bed;
- Minimize the size of the excavation in the waterway;
- The workzone isolation method should be sized accordingly based on expected flow for the time of construction at each waterway to ensure the level of flow expected is appropriately and effectively managed and that prevents scouring of the waterway bed;
- In waterways where no flow is present and therefore a workzone isolation system was not installed, materials to build a cofferdam and to maintain downstream flow should be available onsite in case unexpected rain occurs;
- Energy dissipation measures, such as filter bags, should be used to dissipate the energy of the bypass water during dredging activities;
- All intakes should be screened and floating to prevent impacts to aquatic species;
- Segregate stream bed layers to help preserve the natural stream bed material during dredging in waterways. The soil layers should then be returned to the trench in the order removed, and bed elevations restored to match pre-construction conditions;

- Remove workzone isolation systems, such as cofferdams, gradually and use in-water sediment control devices such as a silt curtain to minimize downstream impacts.

Waterways Permitting

DNR is responsible for regulating impacts to navigable waterways and waterbodies under Wis. Stat. ch. 30, and Wisconsin Administrative Code. Some of the state legal protections and permitting requirements for activities affecting public waterways include, but are not limited to:

- Wis. Stat. § 30.12 and Wis. Admin. Code NR 329 requires permits for structures placed on the bed of navigable waters;
- Wis. Stat. § 30.123 and Wis. Admin, Code NR 320 requires permits for bridges placed over public waters and culverts placed within navigable waters;
- Wis. Stat. § 30.19 and Wis. Admin, Code NR 341 requires permits for grading on the banks of navigable waters;
- Wis. Stat. § 30.195 requires permits for channel relocation of navigable waters;
- Wis. Stat. § 30.20 and Wis. Admin. Code NR 345 requires permits for removing material from the bed of navigable waters;
- Wis. Stat. § 30.29 prohibits the operation of motor vehicles in navigable waters unless it qualifies under one of the exemptions or is approved through a permit authorization.

Wisconsin Stat. § 30.025 describes DNR process for reviewing and permitting utility projects that require authorization from the Commission and DNR. DNR participates in the joint review process with the Commission, as detailed in Wis. Stat. § 30.025, with respect to wetlands, navigable waterways, and stormwater management.

USACE and/or USFWS might also require additional permits and approvals. Some of the federal legal protections and permitting requirements for activities affecting waters include, but are not limited to:

- 33 USC § 403 Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable waters of the U.S.
- 16 USC §§ 1271-1287 prohibit federal agencies from authorizing a water resources project that would have a direct and adverse effect on the values for which a river protected by the Wild and Scenic Rivers Act was established.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also hire an own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming

practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

3.2.6.3. Floodplain

The original footprint of the Nemadji River Site included with the CPCN filing in January 2019 showed the southern edge of the site within Federal Emergency Management Agency (FEMA) 100-year floodplain mapping. The applicants filed revised project information in February 2019 to the Commission which included a revised footprint of the site, and the revised site footprint no longer intersects the floodplain, but is located immediately adjacent to the floodplain. If the project is approved and the Nemadji River Site selected, the applicants should consultant with the City of Superior, the applicable zoning authority, to ensure the site complied with the city's floodplain ordinance.

3.2.6.1. Water withdrawals

High Capacity Wells

The proposed project includes construction of five non-potable high capacity wells, each with a projected capacity of 750 GPM, for a total of 5.4 MGD from groundwater within the Lake Superior Basin. The wells would be constructed with casing that extends through the surficial clay layer, screened with the sand and gravel aquifer, above the Precambrian sandstone. DNR reviews and issues approvals for non-potable high capacity wells under Wis. Stat. § 281.34 and Wis. Admin. Code ch. NR 812. For new withdrawals at this volume (at least 1 MGD for any 30 consecutive days) in the Great Lakes basin, the applicant would need to obtain a Water Use Individual Permit under Wis. Stat. § 281.346(5), and Wis. Admin. Code ch. NR 860.

The anticipated instantaneous water demand for NTEC would range from 2,350 GPM (3.4 MGD) to 2,875 GPM (4.1 MGD). Average annual use is estimated to be 2.9 MGD—a conservative estimate based on 8,760 hours of operation, including duct firing 5 days per week, 16 hours per day.[9]

As a supplement to the high capacity well application, the applicants submitted a groundwater flow model report and a report describing a pumping test that was conducted in 2014. The groundwater flow model was developed to evaluate changes in groundwater levels during steady state conditions, using four of the five proposed wells to produce an average of 2.9 MGD. The model relies on a conceptual model that assumes a productive sand and gravel aquifer below a clay layer and above sandstone. The applicants' groundwater modeling results[10] imply no impacts to nearby groundwater wells and surface waters. Prior to developing their own conceptual model, DNR's preliminary high capacity well analysis indicated the potential for impact to reviewable resources under Wis. Stat. § 281.34. DNR used well construction reports and the results from the applicants' 2014 pumping test to develop their conceptual model. The pumping test ran for 93 hours at 1,000 GPM. The results indicate 65 feet of drawdown in the pumping well and 27 feet of drawdown at monitoring well MW-04, approximately 150 feet away. Residual drawdown was five feet in all monitoring wells after four days of recovery. Drawdown data from the pumping test show an increase in the slope of drawdown versus time, which indicates a boundary condition that DNR interpreted to be clay. There appear to be discrepancies in the conceptual model developed by the applicant, and that developed by DNR.

[9] Application for Water Loss Approval for the Nemadji Trail Energy Center, Docket Number 9698-CE-100, Final, Burns and McDonnell, December 13, 2018.
[10] Id.

Specifically, DNR disagrees with the applicants' assumption that there is a thick, laterally continuous sand and gravel deposit that could supply an average of 2,000 GPM (2.9 MGD). DNR analysis of well construction reports indicate that offsite unconsolidated deposits are predominantly clay. This means that the pumping impact from the proposed wells would be isolated within the sand and gravel lens found beneath the Nemadji River site. While DNR's conceptual model suggests that it is unlikely that the proposed high capacity wells would impact existing private or municipal wells, or surface waters, it also suggests that there is not a sustainable groundwater source at either site for this proposed facility. DNR's memorandum dated September 20, 2019, describes DNR's conceptual model and how it was developed for this project. The applicants have proposed collecting additional information in the form of additional soil borings and another pumping test with the intent of demonstrating the presence of a sustainable source of groundwater for the project.

Water Use and Water Loss

The primary water uses for the project would include: steam cycle water, cooling tower water, NO_X, injection water, evaporative cooling water, and service water. The water systems would be designed to maximize water reuse and recycling, minimize water consumptive and manage water quality within the plant systems.

The main water use would be heat rejection from the steam cycle through the cooling tower. The water from the high capacity wells would be solely for plant processes (raw makeup water) and not used for potable water supply. Raw water would be stored on-site in a new 550,000-gallon service water tank which would allow for 32 hours of service water usage.

The proposed project would consume water through evaporation and draft from the cooling tower, losses from the steam cycle, and inlet air evaporative cooling. Approximately 95-96 percent of the total water loss would be from evaporation and drift.

Projects that result in water loss averaging 2 MGD over any 30-day period require a water loss approval under Wis. Stat. § 281.35. NTEC estimated average daily water loss based on monthly plant operation between 1.73 MGD and 3.97 MGD (Table 3-10).

Table 3-10 Estimated monthly average volume and rates of water loss[1]

Month	Water Loss Rate (when operating) GPM	Average Operating Hours	Average Water Loss MGD
January	2051	468	1.86
February	2158	493	2.28
March	2309	490	2.19
April	2463	351	1.73
May	2664	443	2.28
June	2814	621	3.50
July	2871	705	3.92
August	2870	714	3.97
September	2723	571	3.11
October	2540	531	2.61
November	2265	553	2.50
December	2091	485	1.96

In order to issue a water loss approval, according to Wis. Admin. Code § NR 142.06(3), DNR will need to determine the following:

(a) That no public or private water rights in navigable waters will be adversely affected;

(b) That the proposed withdrawal does not conflict with any applicable plan for future uses of the waters of the state, including plans developed under §§ 281.12 (1) and 283.83, Wis. Stat., and any water quantity resources plans prepared under § 281.35 (8), Wis. Stat.

(c) That both the applicant's current water use, if any, and the applicant's proposed plans for withdrawal, transportation, development and use of water resources incorporate reasonable conservation practices;

(d) That the proposed withdrawal and uses will not have a significant adverse impact on the environment and ecosystem of the Great Lakes basin or the upper Mississippi river basin;

(e) That the proposed withdrawal and uses are consistent with the protection of public health, safety and welfare and will not be detrimental to the public interest; and

(f) That the proposed withdrawal will not have a significant detrimental effect on the quantity and quality of the waters of the state.

As noted in the High Capacity Well section above, based on DNR's review of the applicants' 2014 pump test data and DNR hydrogeologists' high capacity well review, the proposed withdrawal volumes and associated water loss could deplete the water-bearing portion of this aquifer. Based on these data, the proposed NTEC wells may potentially impact one private golf course well (Wisconsin Unique well Number - TJ253) and any private wells, if connected to the same sand and gravel lens. The clay deposits limit aquifer recharge, therefore withdrawing groundwater at the proposed rates could significantly impact the quantity of groundwater in this area. The applicants have proposed to complete another pumping test and additional well borings in the area to verify their conclusions of a more laterally-extensive water-bearing aquifer. However, DNR's current conceptual model suggests that this aquifer is not productive enough to sustain the withdrawals required for this project. For this reason, as part of the water loss approval application, DNR requested the applicants consider other water source alternatives.

Potable Water

Potable water would be sourced by Superior Water, Light and Power (SWL&P). Water for potable uses include: drinking fountains, washrooms, showers, eye-washing stations, toilet facilities and water for fire protection. A 6- to 8-inch diameter buried water pipeline would connect to SWL&P's existing municipal water supply system. (Note: An 8-inch diameter pipe could be installed if NTEC decided to obtain water for fire protection from the water supply pipeline.) The tie in would occur along 31st Avenue East. The potable water system would provide a pressurized water supply and would be constructed to confirm to NSF/ANSI Standard 61 Drinking Water Standards.

SWL&P's water source is surface water from Lake Superior. SWL&P operates a network of well screens buried in the sand on the lake side of Minnesota Point. SWL&P can also purchase raw water from the City of Cloquet water line. The Cloquet intake extends into Lake Superior approximately two miles from the Minnesota Point shoreline.

The daily average water use for the SWL&P system from 2010 -2017 is summarized in Table 3-11.

Table 3-11 SWL&P water use by year[11]

Year	Water Use (million gallons per day)
2010	2.94
2011	2.93
2012	3.02
2013	3.28
2014	2.86
2015	2.83
2016	2.66
2017	2.63

Based on these average daily water usage rates, the proposed project needs for potable water supply would have minimal impacts on the SWLP water withdrawals.

Wastewater Discharge

All wastewater, microfiltration/ultrafiltration (MF/UF) backwash, RO reject water, and cooling tower blowdown will be piped offsite to be treated by the City of Superior's wastewater system. Wastewater discharges directly to surface water from the proposed project are not anticipated. The discharge would be sent to the City of Superior wastewater treatment plant through a new sewer lateral. The City of Superior has a Department approved Pretreatment Program and will be the "control authority" for the NTEC power plant. As such, the City of Superior is authorized to issue pretreatment permits to industrial dischargers in accordance with Chapter 114, Article II of the City of Superior, Wisconsin Code of Ordinances and Wis. Admin. Code § NR 211.235. The City of Superior would issue the NTEC facility an individual wastewater discharge permit which would authorize an average and/or maximum monthly flow rate and require NTEC wastewaters to comply with all categorical pretreatment standards, local limits, and prohibitions set out in Wis. Admin. Code chs. NR 211 and 290 and Section 114-26, Article II of the City of Superior, Wisconsin Code of Ordinances. Additionally, the individual wastewater discharge permit issued by the City of Superior would specify other requirements such as monitoring and sampling locations. RO reject water must be considered when establishing the sample point location as it is considered dilutional flow and could affect whether NTEC is in compliance with its specific discharge limits.

Majority of the influent flow would be evaporated in the cooling tower and as such, the concentration of impurities in the remaining water would be increased. With additional cooling cycles and cycles of concentration, impurities in the wastewater would be concentrated approximately four to five times of what they were in the water immediately after its withdrawal from the collector well source as stated by NTEC in the CPCN application. Process wastewater discharged from the cooling towers, known as cooling tower blowdown, would make up the majority of all wastewater discharged to the City of Superior. Cooling tower blowdown is expected to make up approximately 95 percent of the total amount of wastewater discharged. There would also be constituents from the water filtration and treatment operations that condition influent water present in the discharge to the City of Superior.

The chemical and physical attributes of the discharged waters, excluding sanitary wastewater, are provided below in Table 3-12 and are based on five cycles of concentration and the well water quality data received during onsite test well pumping. These values have been provided by NTEC and are found in the CPCN. Sodium bisulfite is the only treatment chemical proposed for wastewater discharges. It is used as a reducing agent to remove total residual chlorine levels. Chlorine is used to control biological growth. If other

[11] Design criteria assuming 2 cycles of concentration in the evaporative coolers and 5 cycles of concentration in the cooling tower (source: Application for Water Loss Approval for the Nemadji Trail Energy Center, Docket Number 9698-CE-100, Final, Burns and McDonnell, December 13, 2018).

additives are used, NTEC must notify the city of the quantities used and should demonstrate that they will pose no adverse effect to the City of Superior's wastewater treatment plant at the proposed level of usage.

Table 3-12 Combined cooling tower blowdown constituent concentrations on 95.5°F day

Parameter	Estimated Discharge Concentration (mg/L)	Estimated Mass Discharge (lbs/day)2
Total Alkalinity at $CaCO_3$	<175[1]	<1460.4
Calcium, Ca	<147	<1226.7
Magnesium, Mg	<45	<375.5
Sodium, Na	<419	<3496.6
Potassium, K	<17	<141.9
Sulfates, SO_4	<599	<4998.7
Chloride, Cl	<498	<4155.8
Silica, SiO_2	<51	<425.6
Total Dissolved Solids	<1808	<15087.8
Total Alkalinity as HCO_3	<213	<1777.5

[1]"<" indicates added margin

[2]Estimated mass discharged was calculated by multiplying the estimated discharge concentration by a daily maximum flow of 1 MGD, which would occur under the operation scenario of "Fired, Evaporative Coolers ON, 95.5 °F Dry Bulb Ambient"

The temperature of process wastewater discharged to the City of Superior would be approximately equal to the temperature of the cooling tower blowdown. The cooling tower blowdown temperature would range from 62°F to 64°F in the cold winter ambient scenarios (-34°F to 15°F) to about 88°F in the maximum summer ambient scenario (95.5°F). The expected effluent temperature values provided by NTEC are below the City of Superior's maximum temperature limit. This additional thermal load is not expected to cause or contribute to an exceedance of water quality standards for temperature at the City of Superior publicly owned treatment works (POTW) discharge to Lake Superior.

Drains around areas that contain equipment which could be contaminated with oil will be gravity fed to an oil/water separator prior to discharge. The oil/water separator would be designed to remove 20 micron and larger oil droplets to concentrations of less than 10 ppm. Effluent from the oil/water separator would be pumped through a polishing coalescing filter and discharged to the water treatment building sump for reuse. The separator would be designed to store up to 1,000 gallons of oil for later disposal as the need arises. The oil/water separator would be constructed as a double wall buried tank and would have a leak monitor to detect a breech in the inner tank wall. The tank would also be cathodically protected. The leak monitor would help NTEC fix any potential leaks immediately after they begin. To further deter any groundwater degradation, the oil/water separator must meet the minimum separation of 5 feet between the bottom of the structure and the higher of either bedrock or groundwater level per ch. NR 213.08(2)(c).

NTEC provided the following estimated daily average flows of industrial wastewater from the facility, under various operational scenarios. The average flows are included in Table 3-13:

Table 3-13 Estimated daily average flows of industrial wastewater

Operational Scenario[1]	Estimated Daily, Average Discharge Flow (cfs)[2]	Estimated Daily, Average Discharge Volume (gpm)[3]
Fired, Evaporative Coolers ON, 95.5 °F Dry Bulb Ambient	1.54	693
Fired, Evaporative Coolers OFF, Annual Average Ambient	1.16	522
Unfired, Evaporative Coolers ON, Maximum Ambient	1.12	504
Unfired, Evaporative Coolers OFF, Annual Average Ambient	0.76	343

[1]Design criteria assumes two cycles of concentration in the evaporative coolers and five cycles of concentration in the cooling tower

[2]cfs = cubic feet per second

[3]gpm = gallons per minute

All discharges to the sanitary sewer from the NTEC power plant would have to meet the requirements of the individual wastewater discharge permit issued by the City of Superior. Table 3-14 outlines the City of Superior's local limits for industrial dischargers:

Table 3-14 City of Superior industrial wastewater pretreatment limits

Pollutant of Concern	Discharge Quality Limit
Biochemical Oxygen Demand (BOD)	250 mg/L
Cadmium	1.15 mg/L
Copper	10.45 mg/L
Lead	15.20 mg/L
Mercury	0.02 mg/L
Oil and Grease	150 mg/L
Phosphorus	7.0 mg/L
Total Suspended Solids (TSS)	500 mg/L
pH (acceptable range)	5.5 – 9.5
Temperature	150 °F (65 °C)

Source: Section 114-26, Article II of the City of Superior, Wisconsin Code of Ordinances

All discharges from the NTEC power plant would also have to meet the Steam Electric Power Generating categorical pretreatment standards for new sources included within 40 C.F.R. §423.17 and within ch. NR 290.22(2) Wisconsin Administrative Code. The categorical pretreatment standards for new sources are included in Table 3-15 below. Federal and Wisconsin Administrative Code also include a pretreatment requirement that there may be no discharge of wastewater pollutants from fly ash transport water for new sources. This requirement was not included in table below because fly ash is a product of coal combustion and as a natural gas power plant, no fly ash is expected to be present at the NTEC facility. No additional wastewater treatment is expected to be necessary to meet the City of Superior's discharge quality limitations or the Steam Electric Power Generating categorical pretreatment standards for new sources.

Table 3-15 PSES and PSNS effluent limitation in mg/L

Wastewater	Copper (total) Max. for Any 1 Day	Chromium (total) Max. for Any Time	Zinc (total) Max. for Any Time	Other Priority Pollutants Max. for Any Time
Chemical metal cleaning wastes	1.0			
Cooling tower blowdown[1]		0.2	1.0	nda

[1]Except as shown for total chromium and total zinc, discharge of cooling tower blowdown shall be limited to no detectable amount for the 126 priority pollutants contained in chemicals added for cooling tower maintenance
[2]"nda" means no detectable amount

Wastewater discharges from the Nemadji River Site would require the installation of sewer pipeline from the Northern boundary of the site to a tie-in location Northeast of the site along 31st Avenue East. The primary tie-in location would be the East 2nd Interceptor (92° 2' 9.707"W, 46° 41' 46.541"N), while the alternate tie-in location will be Manhole 040176 (92° 2' 34.409"W, 46° 41' 38.381"N). The proposed sewer pipeline would be 10 inches in diameter and composed of high–density polyethylene. The total route distance for the Nemadji River Site includes approximately 2,500 feet along 31st Avenue East. Potential environmental impacts that could result from the sewer installation arise from stormwater runoff and excessive sedimentation. As such, if dewatering is expected then the pit/trench dewatering general permit will be needed and all requirements must be followed. Additionally, adequate erosion control measures such as but not limited to: silt fences, stormwater inlet protection, rock dams, and entrance/exit

pads must be utilized when found necessary through the sewer installation to prevent excessive off-site sedimentation and stormwater runoff.

Due to site's proximity to the Husky Refinery and the use of aqueous firefighting foam containing per- and polyfluoroalkyl substances (PFAS) during the fire and explosion that occurred on April 26, 2018, DNR intends to require that any dewatering discharges be screened for PFAS. If sample results indicate that PFAS is present, DNR may evaluate whether a secondary value limitation is warranted to protect human health and the environment.

3.2.7. Protected and listed species

This section discusses the potential impacts to endangered resources that may be affected by construction or operation of the proposed project at the Nemadji River Site.

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0-mile buffer for aquatic species.

This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, would not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are taken from existing sources within DNR, including the NHI database, as well as external sources, including landowners and surveys completed by the applicants.

For specific locations or route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this final EIS.

3.2.7.1. Birds

The NHI database indicates an occurrence for the bald eagle, which is federally protected through the Bald and Golden Eagle Protection Act within the vicinity of the project. While the specific nests are more than 0.5 mile from the project ROW, there is suitable habitat (large trees in proximity to lakes and rivers) along these segments for the species to be present and nesting. While there are no known bald eagles nesting within or immediately adjacent to the project area, if this location is approved, eagle nest surveys would be recommended. Per USFWS guidelines, it is a requirement to maintain a buffer of at least 660 feet between project activities and an active bald eagle nest. Work may be conducted closer if done outside of the nesting season (August through mid-January). If these guidelines cannot be followed, USFWS must be consulted for further assistance, prior to the start of construction.

3.2.7.2. Plants

There are ten rare plant species that may have suitable habitat present within this project site. In addition, at least three of these plant species has been observed within or immediately adjacent to this location. Conducting surveys to determine specific locations of these species is highly encouraged. If found, the best avoidance measure is to avoid areas where known plants occur; however, given that this is a

construction project, is likely not feasible. Therefore, the best way to minimize impacts is to relocate plants from out of the project area to an area where these plants will likely not be impacted, preferably on state lands where these plants will be protected.

3.2.7.3. Herptiles (reptiles and amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of this location. The Nemadji River is a suitable waterway for this species. Therefore, all work within 300 meters of the river is required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary. There is also a state special concern herptile which prefers wetlands and associated upland habitat for nesting. By following the Broad Incidental Take Authorization for the aforementioned species, would also help to protect this state special concern species.

3.2.7.4. Fish and aquatic invertebrates

A special concern fish species may be present within the Nemadji River. Although it does not spawn here, it is recommended that strong erosion and siltation measures be implemented to avoid impacts.

One special concern dragonfly species is known to be present within the wetlands and Nemadji River that are within and adjacent to the project area and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

3.2.7.5. Natural communities

Two wetland natural communities may be present within the project boundary. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

3.2.8. Invasive species

In compliance with Chapter NR 40 Invasive Species Identification, Classification and Control Rule, the applicants would mitigate the potential to spread invasive plant species during project activities. The applicants would control any prohibited plant species identified onsite during inspection and monitoring activities and would minimize the spread of restricted plant species beyond their known boundaries throughout the duration of the project. The applicants would identify invasive plant species locations on the construction plans and flagged on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, the applicants would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools at the project site. The owners may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to leaving the project site to reduce the risk of spreading invasive plant species beyond the site.

Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20 seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used at the project

site would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

3.3. LOCAL COMMUNITY AND IMPACTS

Both of the proposed site locations for the NTEC plant are located in the City of Superior in Douglas County, Wisconsin. Potential impacts that could affect the local community as a result of NTEC being constructed at the Nemadji River Site are discussed in the following sections.

3.3.1. Site history

The Nemadji River Site is located in the City of Superior in Douglas County, Wisconsin, and is currently owned by ALLETE. According to a 2015 Phase I Environmental Site Assessment (ESA) provided by the applicants, a review of the earliest available records from 1938 through 2015 show the majority of the Nemadji River Site has remained undeveloped and heavily wooded, with the exception of a gravel parking lot and a stormwater pond located on the western side. The stormwater pond was constructed in the mid-2000 period with the start of the work for the power plant. The pond with discharge is part of a stormwater permit with the state of Wisconsin. No existing buildings, structures, foundations or roads were identified during the Phase I ESA site visit. The visit did, however, identify three north-south oriented power-line conveyances present within the central portion of the property. No remediation activities were reported in the NTS Phase I ESA for the Nemadji River Site.

3.3.2. Nearby populations, vulnerable groups, and environmental justice issues

The Nemadji River Site is within the City of Superior, Wisconsin, which has a population composition that is nearly 92 percent white, with small percentages of black or African American, American Indian, Asian, and other races. The demographic composition of the population present within a half mile of the Nemadji River Site is similar. The median household income levels within the same area ranged from approximately $39,000 to $63,400, and the percentage of individuals living below the poverty level ranged from approximately 10 to 20%. Table 3-16 provides the population statistics by race for the City of Superior and census tracts within 0.5 mile of the proposed NTEC site locations.

Table 3-16 Population Characteristics – City of Superior and Census Tracts near the Nemadji River Site

Demographic Group	City of Superior	Census Tract 204	Census Tract 205	Census Tract 208	Census Tract 209	Census Tract 210
Total population	26,676	3,192	2,974	3,344	2,286	1,731
White	91.7	92	89	88.6	93.4	89.1
Black or African American	1.7	1.2	3.8	1.3	1.6	4.2
American Indian and Alaska Native	1.8	0.5	1.5	2.1	0.3	3
Asian	1.6	0.9	3.9	4	0	0.4
Native Hawaiian and other Pacific Islander	0	0	0	0	0	0
Some other race	0.5	0	0.3	0.2	0	0
Two or more races	2.9	5.4	1.5	3.8	4.7	3.3
Hispanic or Latino	1.6	2	1.6	0.7	0	0
Median household income	$41,030	$51,935	$63,417	$48,266	$48,409	$39,268
All people whose income in the past 12 months is below the poverty level	20.3	9.8	12.1	17	11.7	16.3

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2012-2016

The nearest hospital is the Essentia Health St. Mary's Hospital-Superior facility, located on Tower Avenue, 2.3 miles east-northeast of the site. No schools or daycare care facilities are within 0.5 mile of the site. Happy Hearts Day Care, Inc., located at 3605 East 2nd Street in Superior, is the closest day care facility, located 0.8 mile to the east. No retirement facilities are located within 0.5 miles and the Piedmont Apartments are the closest retirement facility to the site.

3.3.3. Land use

Land use immediately surrounding the Nemadji River Site is industrial, commercial, and residential. Several residential areas are present within 0.5 mile of the site, with the densest areas located to the north and east of the site. Residential areas are significantly less dense to the west, south, and east of the site. An industrial tank farm is located just south of the site. Figure A-2 in Appendix A of this final EIS shows existing land use and land cover in the vicinity of both locations proposed for the NTEC plant.

The existing zoning for the Nemadji River Site and its laydown and staging area is residential and manufacturing. Approximately 16.6 acres of the Nemadji River Site is currently zoned apartment residential (R-3) and approximately 9.6 acres zoned heavy manufacturing (M-2). The laydown and staging area is currently zoned for heavy manufacturing (M-2; 24.8 acres) as well.

Permitted uses of apartment residential R-3 districts include apartment hotels, multiple dwellings, rooming houses, row or group dwellings, and nursing homes, in addition to other dwelling types. Permitted uses of heavy manufacturing (M-2) districts include any use permitted in light manufacturing districts; the manufacture, compounding, processing, packaging, or treatment of a variety of products; and:

> Any other use, other than those enumerated in subsection (11) of this section [uses approved by common council], not in conflict with any state statute or provision of this chapter regulating nuisances, including the manufacture, compounding, processing, packaging or treatment of the following or similar products together with any similar new or improved uses, as determined by the board of zoning appeals, which are not likely to create any more offensive noise, vibration, dust, heat, smoke, odor, glare or other objectionable influences than the minimum amount normally resulting from other uses permitted. (Superior Code of Ordinances, Section 122-558. Information in brackets inserted.)

No dwellings are permitted in M-2 zones except for a watchman or caretaker employed at the premises.

3.3.4. Local jobs

Potential employment opportunities created by the construction of the NTEC facility are anticipated to be similar for both sites. According to the applicants, the NTEC plant would employ about 25 full-time, permanent positions and create around 130 indirect jobs. Construction would create around 260 jobs at peak, drawing investment to local businesses for the up to five-year construction phase.

These jobs would include construction management staff, site superintendents, skilled craftsmen, engineers, start-up support personnel, and other miscellaneous services. The applicants, construction contractor, and sub-contractors would supply staff for management, engineering, technical, start-up, and other support staff. Contractors would be chosen from a competitive bid process and would be local whenever practical. Manufacturer's representatives would be onsite periodically, though these representatives will not significantly increase the number of workers onsite at any given time. The workforce may be sourced from different locations locally or nationwide.

Craft labor, including carpenters, heavy equipment operators, laborers, millwrights, ironworkers, masons, pipefitters, and electricians, would be required during construction. Other staff would also be onsite during construction, such as management, engineering, technical, and start-up staff. The number of workers onsite would begin at nominal levels at the beginning of construction and steadily increase over time. Skilled labor such as carpenters, heavy equipment operators, laborers, millwrights, ironworkers, insulators, painters, boilermakers, sheet metal workers, masons, pipefitters, electricians etc., would be sourced as available from sub-contractors and/or local union labor halls.

The new permanent employment positions (up to 25 full-time permanent jobs) are anticipated to include Control Room Operators; Mechanical Maintenance Technicians; and Electrical, Instrument, and Control Technicians.

3.3.5. Local road, rail, and air traffic

Construction traffic entering the project site would primarily consist of automobile traffic for craft labor, construction management staff, contractors, equipment, and vendors. Material and equipment deliveries may be made by large trucks as well as heavy haul vehicles. Onsite, traffic is anticipated to primarily consist of heavy construction equipment and material transport equipment.

The proposed construction entrance would consist of a material delivery entrance and main construction entrances located off 31st Avenue East. Craft employees would park on the north side of 31st Avenue East and proceed southeast to the site entrance. Vehicle access to either site would be controlled by site security fencing.

The frequency of the daily workforce automobile traffic would follow the project workforce numbers onsite at a given time. The daily automobile traffic to the site would increase from approximately 25 to 50 vehicles in the initial stages of construction to approximately 200 to 260 vehicles for peak months (April through December 2023). The traffic would begin to decrease until it reaches approximately 25 vehicles near construction completion.

Material and equipment deliveries are anticipated to average between 15 and 25 trucks per day. Bulk deliveries for materials such as crushed stone, hot asphalt paving, and redi-mix concrete may occasionally exceed 25 vehicles on a given day. When possible, bulk deliveries would be scheduled to avoid peak traffic on local roads. The applicants have proposed construction of pull over areas for material delivery trucks to reduce congestion.

A local resident who lives near the proposed power plant site and proposed access route has expressed concern over the pre-construction and construction local traffic activity that would be disturbing to local residents.

The nearest public use airport to the site is the Richard I. Bong Airport, located approximately 2 miles west of the site. Other nearby air facilities include the Sky Harbor Airport and Seaplane Base, a public use airport located approximately 2 miles north of the site.

Due to the proximity of the Richard I. Bong Airport, the FAA was consulted regarding potential hazards posed by tall structures associated with the construction of the NTEC plant. The applicants received correspondence from the FAA staging that if the stack height of the plant were reduced to 194 feet above ground level at the site, the stacks would not create a substantial adverse effect and a favorable determination could then be issued. This means the plant needs the stack heights at the Nemadji River site should be less than this height in order to receive approval of the project from the airport.

3.3.6. Communication towers

The applicants used Federal Communications Commission (FCC) Geographic Information System (GIS) data to survey the area within 0.5 mile of the Nemadji River Site and within 0.5 mile of the proposed electric transmission line for communication towers, such as cellphone towers and TV towers. No towers inside of this distance were detected for either of the proposed NTEC site locations. However, the project still has the potential to interfere with communication tower signals depending on existing tower heights and final project design. The applicants will work with the licensees near the site, and along its associated transmission line route, to minimize or mitigate potential interference as applicable.

3.3.7. Local community services

The project would be connected to the City of Superior municipal water treatment system to discharge sanitary waste. Emergency medical services would be provided by Essentia Health St. Mary's-Superior Clinic, St. Luke's Mariner Medical Clinic Urgent Care and Gold Cross Ambulance. Fire protection would be provided by the City of Superior Fire Department, which is approximately 1 mile from the site. Police protection would be provided by the City of Superior and the Wisconsin State Patrol during both construction and operations.

The project would require construction of water pipelines to connect with the municipal system. The applicants do not anticipate any change in capacity citing adequate existing municipal sewer water system capacity.

The applicants anticipate that existing healthcare facilities would be sufficient for the project during construction and operation, and do not expect that improvements to such facilities would be required. The project design, as currently proposed, includes internal fire suppression measures, which the applicants consider sufficient to meet the requirements of the project.

Preliminary engineering design include facilities for the storage of hazardous materials. This storage would require coordination activities with the City Fire Department. The applicants do not anticipate that improvements would be required in order to successfully coordinate with, or adhere to, safety measures required by the city of Superior Fire Department. As previously mentioned, police protection would be provided by the city of Superior and the Wisconsin State Patrol during both construction and operations. The applicants do not anticipate that any plant design modifications would be required in order to allow police patrols and routine law enforcement activities.

3.3.8. Recreation

The Nemadji River Site is located near several recreation areas. Two fishing access point are located along the Nemadji River at 11th Street and 18th Street. The 18th Street fishing access also has a boat launch area. Immediately south of the site is the Allouez Area Parcel 1 hunting area. Figure A-1, provided in Appendix A of this final EIS shows the location of recreation areas in the vicinity of the proposed Nemadji River Site.

No parks are located within 0.5 mile the site; although, several municipal parks and recreation areas are located within 1 mile of the site. Allouez Park, approximately 4,400 feet east of the site and has a playground, tennis courts, and winter skating rink. Carl Gullo Park, approximately 3,400 feet north-northeast of the site, has basketball and tennis courts, a playground, and winter skating rinks. Priest Soccer Field, a municipally owned facility, is located one mile due north of the site; the Nemadji Golf Course is approximately 3,500 feet northeast from the site.

The construction of the Nemadji River Site may impact visitors to the Orange Trail, a snowmobile and ATV trail that generally extends along 31st Avenue East and Grand Avenue southwest of the site. Potential impacts could include increased traffic crossing the trail or temporary closures during project construction, as well as slightly increased traffic crossing the trail during project operation. The applicants do not anticipated that the project would significantly impact the ability of the city and county to construct or maintain recreational trails in the vicinity of the site.

3.3.9. Property values

Several landowners provided comments during the applicants' open houses for the proposed project and some during the EIS scoping period that expressed concerns about potential effects of the project on property values. Some of the commenters voiced concerns that constructing the NTEC plant would detract from the aesthetic nature of the landscape in the immediate vicinity of the project. Other concerns included fog and noise impacts.

If noise created by the plant is significantly greater than existing levels, a slight value impact could occur. Other potential value impacts caused by the plant could include fogging and icing; phenomena sometimes associated with power plants under certain circumstances. Section 3.3.10 provides a discussion of these potential impacts, including model-based predictions specific for the NTEC plant.

Overall, property value fluctuations are caused by a complex web of desirable and undesirable aspects, including facilities, services, distances, and impacts that vary significantly from location to location. Without conducting detailed, long-term studies, it is difficult to predict or assess potential impact on property values. To date, Commission Staff is not aware of any studies that have proven a clear correlation between power plant location and reduced property values. Many factors involve individual value systems and shifting cost and benefits considerations.

3.3.10. Fogging and icing

Fogging and icing impacts are anticipated to be similar amongst the proposed NTEC site locations. The applicants commissioned a third-party cooling tower plume impact analysis using the Electric Power Research Institute (EPRI) Seasonal/Annual Cooling Tower Impact Model, Version 2 (SACTI2) for the project. The model assessed the potential impact of the cooling tower plume-induced impacts on the surrounding area. The model predicts seasonal and annual impacts of visible plumes, drift, fogging, icing, and shadowing from single and multiple sources.

Ground fog events were assessed for the cooling tower. Ground fog events are defined to occur when the plume is modeled to be in physical contact with the ground and/or the plume is below the height of the cooling tower. The location of the maximum number of ground fogging (134.7 hours per year in 2016) at any one location occurred on the proposed Nemadji River Site plant property and was 200 meters (or roughly 656 feet) southwest of the proposed location of the cooling tower. The remaining years had maximum ground fog events that ranged from 110.2 hours per year to 130.8 hours per year occurring 100 to 200 meters (or roughly 328 to 656 feet) from the cooling tower. The road directly adjacent to the site, 31st Avenue, could experience fogging up to 50 hours per year, based on the 2016 model results (worst-case year).

Rime ice may occur when the air temperature is below freezing, during a ground fog event. Rime ice occurs when the super cooled water droplets impact and freeze on contact with structures within the fog plume. The cooling tower modeling results predicted a maximum of 39.3 hours of icing for 2017 for the Nemadji River Site, which occurred at 100 meters (about 328 feet) towards the east on the banks of the

Nemadji River. The remaining years had lower hourly maximum rime ice events ranging from 12.2 hours per year to 26.1 hours per year that occurred 100 meters (about 328 feet) from the cooling tower in the easterly directions (ranging from east southeast to east northeast) from the site. In general, rime icing is expected to occur over and along the banks of the Nemadji River. The applicants have stated that since this is not a populated area or an area where equipment is located, plume rime icing is not expected to be a significant concern at the Nemadji River Site.

The proposed Nemadji River Site cooling tower could potentially result in some ground fog impacts. Minimal rime icing is predicted to occur and will be located off-site. Mineral deposition is insignificant both on and offsite. Elevated visible plumes are anticipated to be restricted to an area generally over the facility property, with a few potential off-site extended plumes. The applicants provided the following conclusions regarding cooling tower plume-induced induced impacts at the site based on the results of the study:

- An estimated 135 hours of predicted ground fog may occur in a worst-case year at the location of maximum impact onsite. The operating personnel would need to be mindful of any reduced visibility on-site during such fogging events. The cooling tower may have ground fogs that could extend northwest and may impact 31st Avenue up to 50 hours per year. It is expected that locations along 31st Avenue, adjacent to the site, could experience fogging for 25 to 50 hours per year, based on the 2016 model results.
- It is estimated that less than 40 hours of predicted offsite rime icing may occur in the worst-case model year (2017). However, this rime icing would occur is in shrublands along the banks of the Nemadji River where no equipment or residences are located. The rime ice hours would be associated with fogging events, and plant personnel would need to be aware of possibly slippery walkways and exposed metal stairs during fogging conditions in sub-freezing weather. Several hours of rime ice potential may occur towards the east of the proposed cooling tower.
- The mineral deposition is expected to be minimal and inconsequential due to the low deposition rate, low total dissolved solids (TDS) in the circulating water, and the use of a high efficiency drift eliminator. Natural salt removal phenomena such as wind and rain would also frequently clean contaminated surfaces. The electrical equipment should not be impacted by the low amounts of mineral deposition, and mineral deposition that may occur offsite is expected to be minimal.
- The majority of the elevated visible plumes are generally confined to the area immediately over the cooling tower and the cemetery to the northwest. Only a few visible plumes may extend offsite beyond the cemetery and over the Nemadji River to the east and southeast of the cooling tower. An estimated 25 hours of predicted elevated visible plumes are expected over the cemetery during the worst-case model year (2017).

3.3.11. Noise

Noise is generally regarded as unwanted sound. Local governments often attempt to limit it to reasonable levels, and local populations often react to what they hear or perceive.

3.3.11.1. Local regulations

The State of Wisconsin and the City of Superior do not have noise regulations applicable to the project. As there are no specific government agency-related numeric noise limits for the project, the project has

elected to follow EPA noise guidelines. EPA establishes noise guidelines in The Noise Control Act of 1972 (the Act). The Act provides sound level guidelines to "promote an environment for all Americans free from noise that jeopardizes their health or welfare." As such, the sound levels identified in the Act as those sufficient to protect public health and welfare were used as the design goal for the project. A day-night sound level (Ldn) of 55 A-weighted decibels (dBA) at the nearest residential receivers was selected as the design goal for the project.

3.3.11.2. Construction noise

During construction of the plant, the deliveries of equipment and operation of construction machinery would generate noise, mostly from diesel engine-driven systems that power most construction equipment such as bulldozers, excavators, dump trucks, cement trucks, and cranes. Additional noise may be introduced by the traffic associated with workers entering and existing the project site. The exact increase in noise from worker traffic has not been quantified; however, such traffic may produce a noticeable increase when compared to background or pre-construction levels. Noise emitted from construction equipment in projects similar to the proposed NTEC plant, are typically high intensity, intermittent, and occur in short bursts. Such bursts would be notable if they reached the nearest residential properties. Examples of construction noise are listed in Table 3-17.

Table 3-17 Estimated maximum noise levels in A-weighted decibels (dBA[12]) for typical construction equipment[13]

Construction Equipment	Maximum Noise Level (dBA) Typical Range: e = 50 feet
Bulldozer	85-90
Front end loader	86-90
Truck	84-87
Grader	83-86
Shovel	82-86
Portable generator	81-87
Crane	82-83
Concrete pump	78-84
Tractor	77-82

Noise impacts on local receptors, including residents, could be reduced by ensuring that appropriate engine exhaust mufflers are installed and adequately maintained on all vehicles used during the construction phase of the project. The residences nearest to the expected construction on the selected site for the NTEC plant may experience construction noise levels similar those listed in the table. Impacts to residences farther from the construction may experience slightly lower levels.

3.3.11.3. Steam blows

Before the proposed project would go into operation, occasional steam blows would have to be performed over a period of about two weeks before operation to clean out the boiler and steam path piping before it is connected to the turbine. Although steam blows can be very loud, the applicants would provide notice to nearby residents of expected timeframes for steam blow operation. During steam blows, the start-up

[12] A-weighting is a filter applied to measured or modeled decibels that reshapes the actual frequency spectrum to one that simulates human hearing response to different frequencies. It emphasizes higher frequencies because humans perceive higher frequencies more than lower ones. To estimate low frequency sound and vibration, a C-weighted filter is used, which communicates lower frequencies more realistically.

[13] Extracted from WPSC Weston Unit 4 Power Plant – Volume 1. Final Environmental Impact Statement, July 2004, Table 10-9, p. 250.

team would install external piping and silencers to discharge the steam to the atmosphere. Noise from steam blows is mitigated using silencers and at tempering water.

3.3.11.4. Operation noise

A noise monitoring and modeling protocol for the project was completed and submitted to the PSC in October 2017. SSE's consultant, Burns & McDonnell, developed this protocol to detail the methodology for ambient pre-construction sound level measurements and modeling predictions for future sound levels near the proposed project. The methodology employed was adapted from the requirements outlined in the PSCW Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants (November 2008). These background measurements were used in conjunction with predictive modeling to develop the basis for noise impacts of the proposed project on the surrounding areas. A project Ldn sound level of 55 dBA or below at the nearest residences is considered acceptable per the EPA guidelines. Therefore, a design goal of Ldn 55 dBA at the nearest residences has been selected for the project. It is not anticipated that any future residences would be built that would be more impacted (closer to the site) than the current residences due to the industrial nature of the area, the existing cemetery, and the proposed NTEC facility.

There would be several notable sources of noise at the proposed power plant. These would include but not be limited to the inlet air filters, the combustion turbines and generators in the generator building, the HRSG exhaust stacks, steam turbines, transformers, the cooling tower, circulating water pumps, and natural gas compressor in the gas compressor building. In the noise study conducted by the applicants, noise levels were modeled to estimate increases over the ambient sound that would occur during operation of the proposed NTEC plant.

Generally, according to the applicants, the plant would be run as an intermediate dispatched facility, depending on market demand, and likely during daytime hours instead of nighttime hours. But, it could be run at any time as needed.

3.3.11.5. Audible noise – dBA

The applicants also provided estimated noise levels from the proposed NTEC project, as required in the Commission's Noise Protocol. A-weighted decibel levels approximate impacts to human hearing. Table 3-18 lists dBA noise estimates for the proposed NTEC project, for the property line and nearby residential areas. Measurement points (MP) are used for measuring sound levels on the land around the project, and are also used for estimating future impacts. The closest and most impacted residence to the Nemadji River Site is located next to measurement point MP4 and additional residences are evaluated at points MP5 and MP6. The overall projected sound level at this location would be 50.1 dBA Leq, as shown in Table 3-18. If the proposed NTEC plant were to operate for a consecutive 24-hours, the calculated day-night sound level at this location would be 56.5 dBA Ldn. In order to bring project sound level impacts below 55 dBA Ldn at the neighboring residences, mitigation measures would need to be implemented at the proposed cooling tower.

Table 3-18 Estimated A-weighted decibels Sound Modeling Results with and without Mitigation at Nemadji River Site

Time of Day	Location	Ambient Sound Level	Baseline Modeled Sound Level		Predicted not Mitigated Sound Level	Predicted Mitigated Sound Level	
		(L_{eq} dBA)	(L_{eq} dBA)	(L_{dn} dBA)	(L_{eq} dBA)	(L_{eq} dBA)	(L_{dn} dBA)
Daytime	Res 1 (MP4)	42.9	50.1	56.5	50.9	48.0	54.4
	Res 3 (MP5)	45.7	44.8	51.2	48.3	43.1	49.5
	Res 4 (MP6)	45.1	44.9	51.3	48.0	43.4	49.8

3.3.11.6. Low frequency noise and vibration – dBC

Low-frequency noise would emanate from the generation buildings, as opposed to the higher-frequency noise from the cooling tower. The low-frequency noise could be greater than ambient noise at either site.

Sound waves in the frequency range below 40 Hz, if high enough in magnitude and energy, can couple with frame building walls and windows and cause vibration. The vibration problem generally occurs with simple-cycle CT plants, which can be difficult to silence below 40 Hz. In a combined-cycle plant like the proposed NTEC facility, however, the CT exhaust is directed into the HRSG, which is an exhaust silencer itself, and low-frequency exhaust noise can be reduced such that impacts from vibration are less likely to occur.

3.3.11.7. Potential impact and mitigation possibilities

The Commission's Noise Measurement Protocol requires that measurements be taken both before and after a project is constructed. By using pre and post-construction levels, the specific impacts caused by the project can be gauged, and thus allow for the incorporation of the most appropriate mitigation strategies. Post-construction measurements are required within 12 months of the date when the project is fully operational and within two weeks of the anniversary date of the required pre-construction ambient noise measurements.[14]

The closest and most impacted residence to the Nemadji River Site is located next to measurement point MP4. The overall project-generated sound level at this location would be 50.1 dBA Leq, as shown in Table 3-18. If the base project were to operate for a consecutive 24-hours, the calculated day-night sound level at this location would be 56.5 dBA Ldn. In order to limit project sound level impacts to below 55 dBA Ldn at the neighboring residences, noise mitigation measures would need to be applied, most likely to the cooling tower.

Modeling results show the cooling tower needs to be limited to 62 dBA at 400 feet in order to meet the design goal of 55 dBA Ldn. Based on past project experience, it is anticipated that the cooling tower vendors could reasonably mitigate the cooling tower to 62 dBA at 400 feet using splash attenuation or another method of their choice.

[14] http://psc.wi.gov/utilityinfo/electric/construction/documents/noiseprotocol.pdf

3.3.12. Views, aesthetics, and lighting

The Nemadji River Site would have tree buffers between the site footprint and other land uses to lessen the visual impact of the generation plant. The project would also be located near existing oil and gas infrastructure as discussed earlier in the site history and land use sections of this chapter.

Visible cooling tower plumes are defined as those plumes that occur during daytime conditions and have sufficient optical density as to appear opaque to the observer. At the Nemadji River Site, the worst-case cooling tower modeling results predicted a maximum of 24.7 hours per year, to occur at 200 meters (about 656 feet) towards the northeast of the cooling tower, which occurs over the cemetery to the northeast.

The Nemadji River Site is located near other industrial infrastructure. While its addition to the area would alter the aesthetics in the immediate surrounding, its construction would add to the industrial nature of the surrounding area. Components of the site would be visible from the north and east, along 31st Avenue East, 11th Street, and the St. Francis Cemetery. The stack and turbine building would be visible. Trees would remain on the eastern boundary of the site to provide a buffer to partially shield the site from view. Trees not required to be cleared for construction and outside the chain-link perimeter security fence would also remain along the Nemadji River on the south side of the site. These trees would provide a visual shield from 31st Avenue East, 11th Street, and the St. Francis Cemetery during the time of year when leaves are on the trees.

Residences east of the Nemadji River Site would experience an increase in lighting impact, though current facilities located north of this alternative have lighting. The trees on the eastern boundary of the site would help mitigate additional lighting impacts. Lighting impacts would be mitigated by measures such as fully shielded light fixtures, directing lighting downward, and scheduling construction activities during daylight hours when possible.

3.3.13. Historical and archeological sites

As previously discussed, in accordance with Wis. Stat. § 44.40(5), the Commission is not required to conduct a consultation with the SHPO for the proposed project since a federal agency (USDA RUS) intends to conduct the Section 106 review process as part of a separate environmental review of the proposed project. Instead, the Commission intends to act as a consulting party in the federal Section 106 review; which, if the project is approved, would be conducted only for the final approved project configuration.

The applicants commissioned a third party to investigate the Nemadji River Site for the presence of archaeological sites, potentially historic buildings, and human burial sites near the project area. The review discovered one archaeological site adjacent to the Nemadji River Site, consisting of concrete building remnants and scattered historic artifacts associated with an early 20th century dairy farm and residence. Field tests revealed mixed soils indicating previous disturbance and evidence of secondary deposits, which suggest low site integrity. The site is not recommended eligible for National Register of Historic Places (NRHP) listing.

The review concluded that no additional investigations are recommended and that no historic properties or human burial sites are likely to be impacted by the proposed project should the Nemadji River Site be selected for NTEC.

3.3.14. Local economics

The City of Superior and Douglas County would receive payments in lieu of taxes of around one million dollars annually (two-thirds to the city; one-third to the county) from the State of Wisconsin for hosting a generation facility. The City of Superior would also receive considerable fees from the facility for increased use of the City's waste water treatment system. County sales tax revenues are likely to increase over time, especially during the intense construction phase. There could be a negative local budget impact due to the increased use of 31st Avenue East, which is currently a short-paved road with an extended gravel portion that will need to be paved and maintained over time.

According to the applicants, regional economic benefits are estimated at around one billion dollars over 20 years. The facility would employ about 25 full-time, permanent positions and create around 130 indirect jobs. Construction would create around 260 jobs at peak, which may draw investment to local businesses for the up to five-year construction phase. The applicants have stated that they are both active in their other host communities (or communities in which they have previously constructed similar projects) and intend to continue that commitment to the City of Superior and Douglas County. For example, the applicants have co-sponsored a bike sharing program in the city for the next two years. The applicants are currently engaged in discussions with local partners to create a trail near the facility and to upgrade the canoe launch near the facility.

3.4. ELECTRIC TRANSMISSION SYSTEM

The applicants propose to connect the proposed NTEC plant to the existing electric transmission grid through the construction of a new 345kV transmission line. The applicants have proposed three routing options to achieve the connection; each would begin at the selected NTEC plant site and end at one of two proposed switching stations.

Two switching station alternatives were identified for the project, the Eastern Switching Station (ESS) and the Western Switching Station (WSS). Figure A-1, provided in Appendix A of this final EIS shows the proposed location of each station. The ESS is located southwest of the intersection of CTH Z and Lyman Lake Road. The ESS is approximately 13.6 acres. If the ESS is included in the Commission's final ordered route, ATC would be responsible for permitting and constructing the station as well as two short segments of 345 kV transmission line between it and a tap location on the existing Arrowhead to Stone Lake transmission line. The WSS is located along 42nd Avenue East south of 18th Street East. The WSS is approximately 14.0 acres. If the WSS is included in the Commission's final ordered route, the applicants would be responsible for site procurement and civil works to prepare the site for substation construction. ATC would then be responsible for permitting and constructing the station as well as two significantly longer segments of 345 kV transmission line between it and a tap location on the existing Arrowhead to Stone Lake transmission line.

3.4.1. Routing options available if the Nemadji River Site is selected for NTEC

The electric transmission routing options would provide three options for connecting the NTEC plant to the existing ATC transmission system. Further discussion about each of the three options available if the Nemadji River Site is selected for the NTEC plant are provided in the following sections.

All routing options, or alternatives, would begin at the southern end of the Nemadji River Site and end at one of the previously described switching station. The three routing options for connecting the NTEC plant to the existing electric transmission system if the Nemadji River Site is selected include:

- The Eastern Route to the ESS (approximately 3.7 miles)
- The Western Route to the ESS (approximately 5.5 miles)
- The Western Route to the WSS (approximately 1.5 miles)

Each of the electric transmission line routing options are described in additional detail in the following sections.

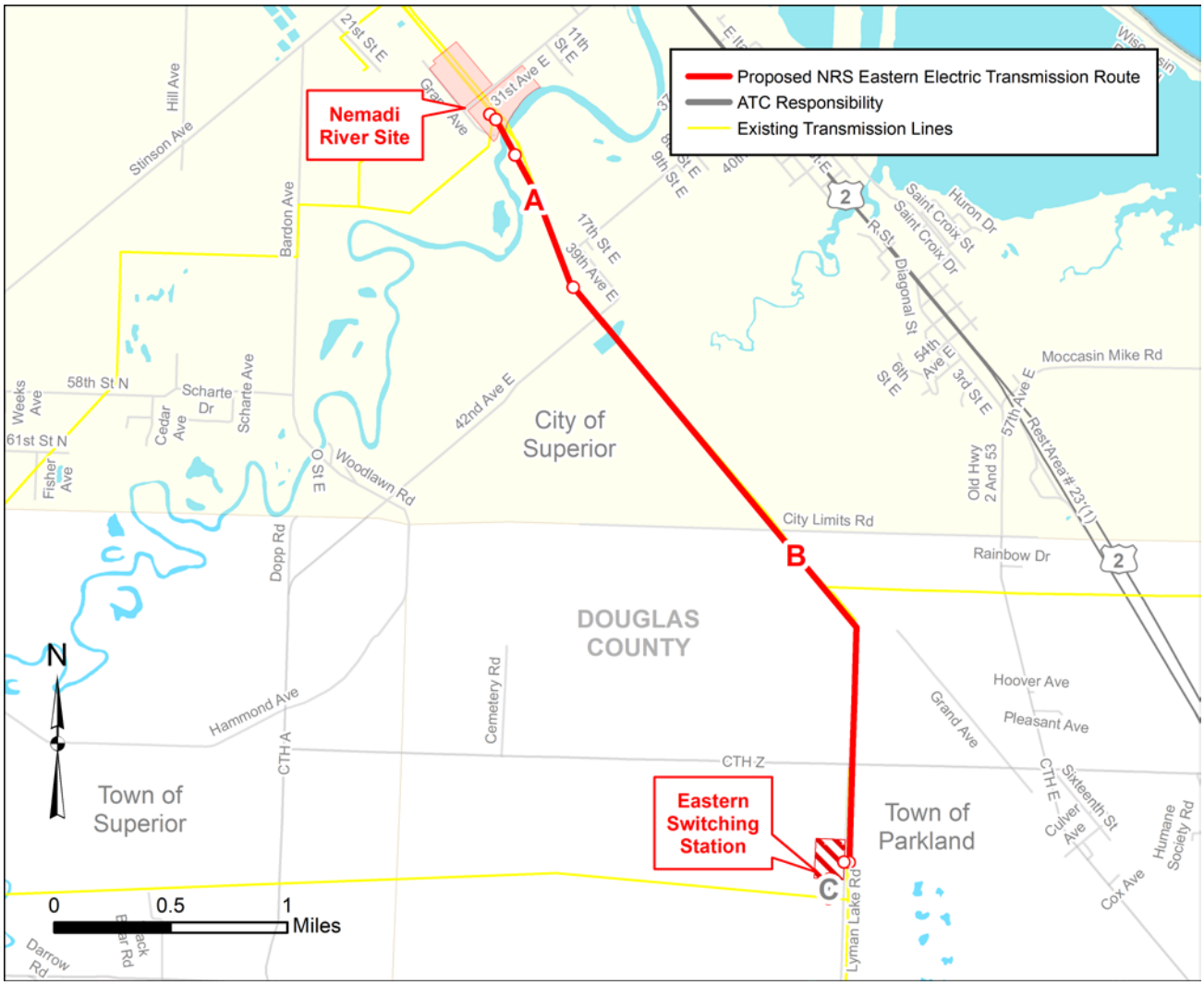
See Figures 3-3 through 3-5 for illustrations of each routing option available if the Nemadji River Site is selected for the NTEC plant.

3.4.2. Description of routing options

3.4.2.1. Eastern Route to the Eastern Switching Station

The Eastern Route would extend from the western edge of the Nemadji River Site southeast, generally paralleling two existing pipelines (SWL&P natural gas and Enbridge crude oil), and three existing electric transmission lines (161 kV Line No. 160 transmission line and the 115 kV Line No. 761) across the Nemadji River. Once across the river, the Eastern Route would be built in a double circuit configuration with the existing 161 kV Line No. 160, which parallels Line No. 761, for approximately 2.0 miles until Line No. 761 transmission line extends east. The Eastern Route would parallel the existing Line No. 761 transmission line and the SWL&P natural gas pipeline across the Burlington Northern and Santa Fe (BNSF) railyard southeast and East City Limits Road. After crossing Bear Creek, the Eastern Route continues southeast before the route turns and extends south. The Eastern Route would extend along the existing SWL&P natural gas pipeline and would be built in a double circuit configuration with the 161 kV Line No. 160 transmission line, crossing County Road Z and following Lyman Lake Road to the ESS. The Eastern Route is approximately 3.7 miles long. Figure 3-3 shows the location and segments of the Eastern Electric Transmission Routing Option.

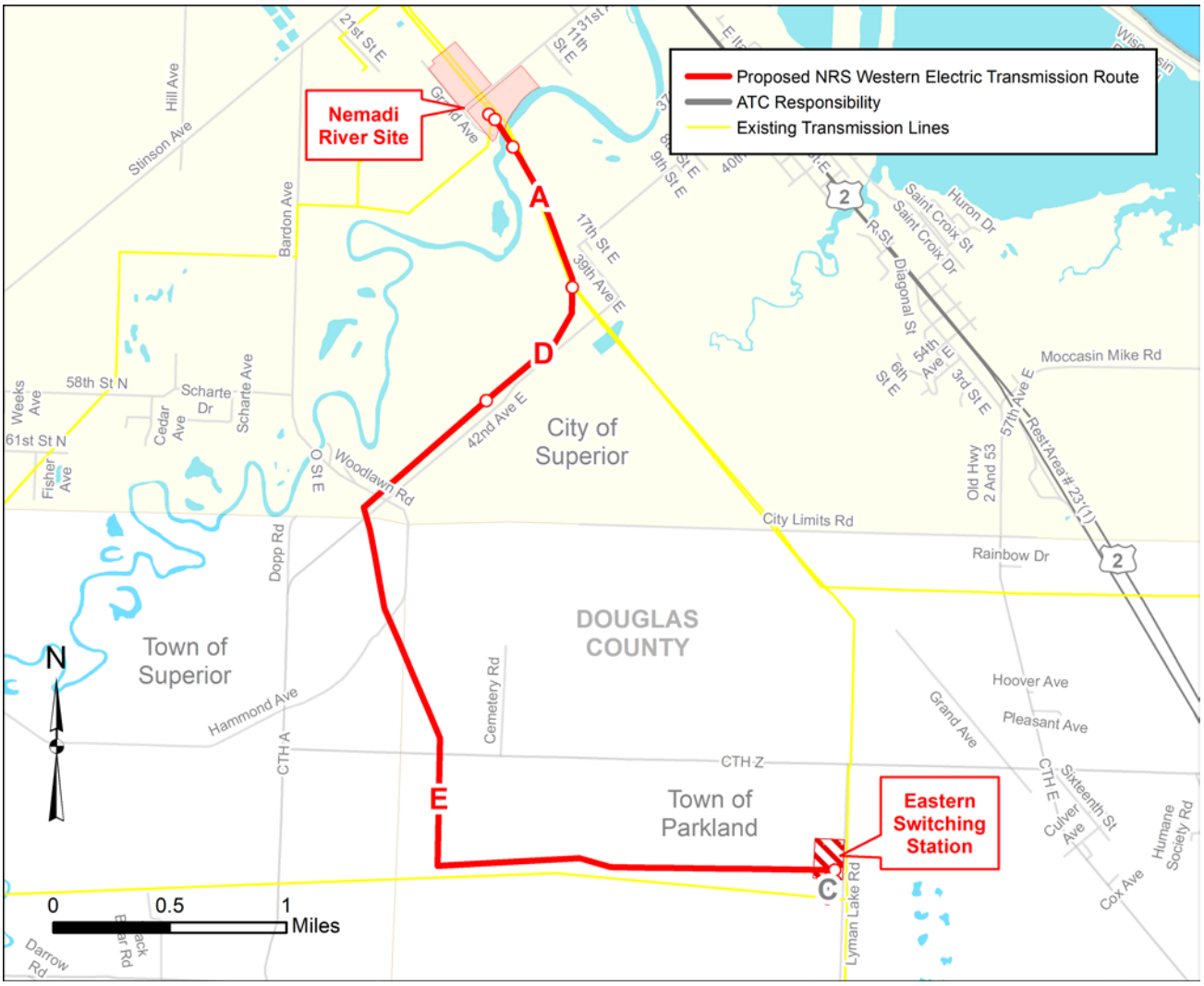
Figure 3-3 Eastern Electric Transmission Route



3.4.2.2. Western Route to the Eastern Switching Station Alternative

The Western Route would extend from the western edge of the Nemadji River Site southeast, generally paralleling two existing pipelines (SWL&P natural gas and Enbridge crude oil), the 161 kV Line No. 160 transmission line and the 115 kV Line No. 761 transmission line across the Nemadji River. The Western Route extends southeast to the existing Line No. 761 transmission line. The Western Route would be built in a double circuit configuration with the Line No. 761 transmission line for approximately 0.4 mile. The Western Route then extends from Line No. 761 near East 18th Street generally to the southwest to parallel 42nd Avenue and an existing 69 kV transmission line. The Western Route extends southeast after crossing Woodlawn Road, paralleling the existing Enbridge crude oil pipeline. The route crosses over two BNSF rail lines and CTH Z, then extends due south to the north side of a Canadian National rail line. The Western Route then extends east along the Canadian National rail line, crosses the rail line, and then continues east on the north side of the existing Arrowhead to Stone Lake 345 kV transmission line to the ESS along Lyman Lake Road. The Western Route is approximately 5.5 miles long. Figure 3-4 shows the location and segments of the Western Route to the ESS Alternative.

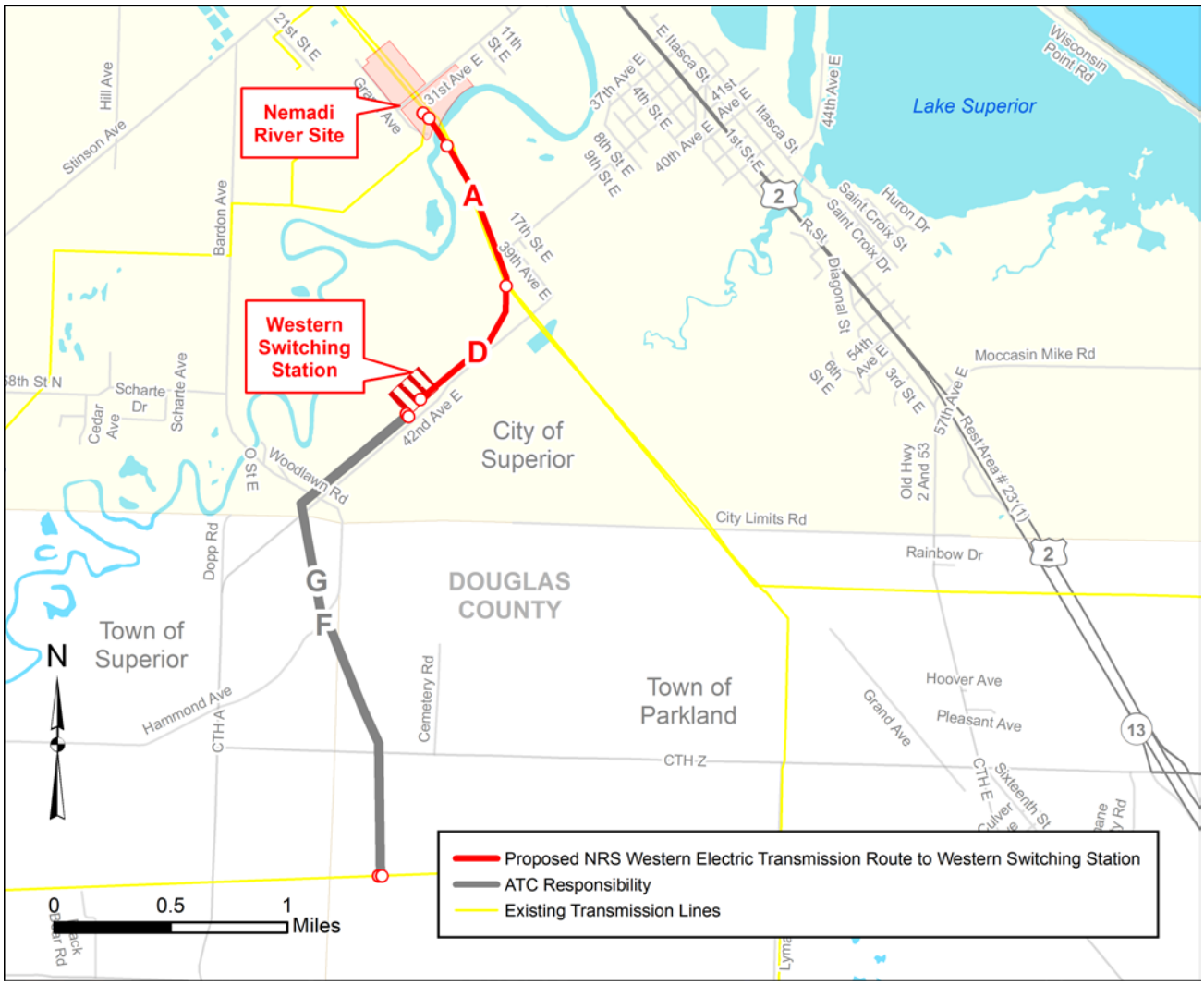
Figure 3-4 Western Route to the ESS Alternative



3.4.2.3. Western Route to Western Switching Station

The line would follow the Western Route from the western edge of the Nemadji River Site southeast to the WSS. If this option is selected, ATC would construct two 345 kV transmission lines from the WSS to a tap location on the existing Arrowhead to Stone Lake 345 kV transmission line. In the application for a CPCN for construction of the NTEC plant, the applicants stated that the transmission lines for this alternative would be the responsibility of ATC and are therefore not part of the project or this application. However, in an attempt to provide a balanced and complete discussion of resources and potential impacts associated with the proposed project, this alternative is discussed in this and following sections of this final EIS. Figure 3-5 shows the location and segments that comprise the Western Route to the WSS Alternative.

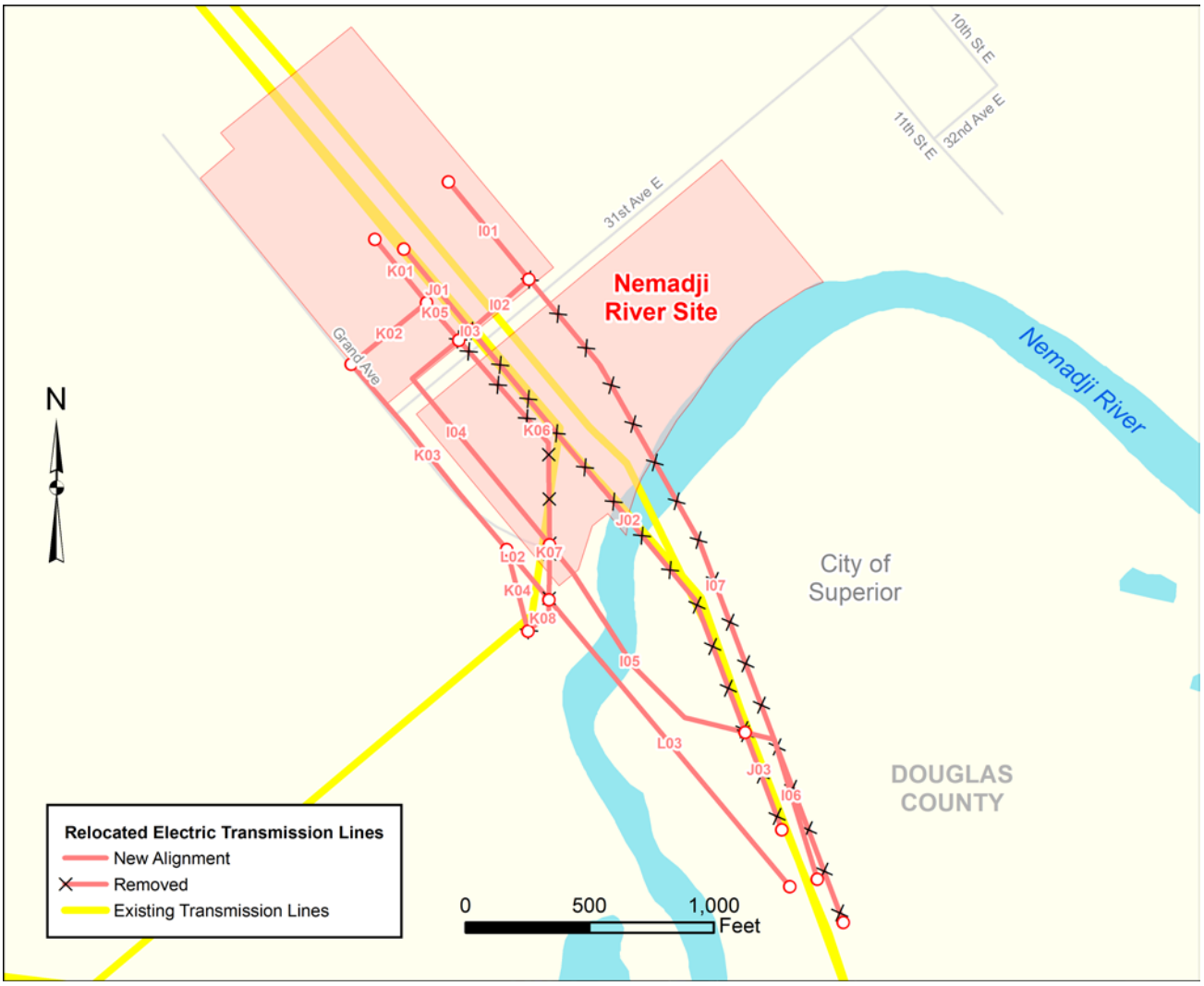
Figure 3-5 Western Route to the WSS Alternative



3.4.2.4. Relocation of existing electric lines near the Nemadji River Site

All routing options would require that several existing electric transmission lines in the vicinity of the proposed Nemadji River Site would need to be relocated to facilitate construction of the NTEC plant and transmission line. Existing electric transmission lines would be relocated to the south end of the proposed Nemadji River Site (Figure 3-6). The existing lines that would need to be relocated are 115 kV Line No. 132, 115 kV Line No. 761 and 161 kV Line No. 160. The remaining portion of this line would require new ROW. Additionally, a Great River Energy 69 kV line and a SWL&P 13.8 kV distribution line would require relocations. The relocated portions of the lines would predominately consist of steel self-supporting structures with concrete foundations.

Figure 3-6 Existing electric lines requiring relocation



3.4.3. ROW and easement requirements

In general, the ROW width for all routing options is anticipated to be 130 feet wide (65 feet either side of centerline) though the ROW width may vary along some portions of the transmission line due to structure design. The existing ROW would be used to the extent practicable where the proposed transmission line is double circuited with the existing 161 kV and 115 kV transmission lines. Some additional/new ROW along portions of the existing ROW would be required to accommodate the new transmission line. Proposed ROW for all routing options is shown on Figure A-1, provided in Appendix A of this final EIS.

Existing electric transmission line easements would be partially shared or expanded by portions of the proposed project. The following sections describe changes to existing electric easements along each of the three routing options. The existing natural gas pipeline and electric transmission line easements that would be shared by the project are owned by SWL&P. The applicants have stated that SWL&P is aware of the need to share existing ROW with the project and have no objection. No potential problems with sharing ROW are anticipated.

The applicants have stated that ROW would be shared for a majority of the project, and that they intend to bear responsibility for acquiring additional ROW while acknowledging that the existing SWL&P ROW will remain. The applicants are discussing ROW ownership arrangements with SWL&P and will finalize once a route has been determined by the Commission.

3.4.3.1. Eastern Route to the eastern switching station

This routing option would be built in a double circuit configuration for approximately 2.1 miles with the existing 161 kV Line No. 160. The existing ROW for this section is approximately 100 feet wide and would be expanded to 130 feet for this length. This would also require sharing approximately 15 feet of ROW with the existing Line No. 761 for this length as well. The route continues southeast in a double circuit configuration with Line No. 160 after Line No 761 extends East. The route then extends due south for approximately 1.0 mile in a double circuit configuration with Line No. 160 to the ESS. Along this segment, the existing ROW is sufficient for the project.

3.4.3.2. Western Route to the eastern switching station

The routing option would be built in a double circuit configuration with the existing Line No. 761 for approximately 0.4 mile, which would require sharing approximately 30 feet of ROW with the existing Line No. 160 transmission line.

3.4.4. Configuration of proposed electric transmission infrastructure

The following sections provide additional detail regarding the specific proposed electric transmission line infrastructure components.

3.4.4.1. Structures and foundations

The proposed structures would predominately range in height from 120 feet to 160 feet above grade based on similar structure designs used for other projects. The proposed structures would likely be steel self-supporting structures on concrete foundations. Structures would be single-pole or H-frame.

3.4.4.2. Transmission line configuration

The routing options would consist of a mix of single-circuit and double-circuit with existing transmission lines.

3.4.4.3. Conductor information

The project would be a 345 kV transmission line. It is anticipated that the single circuit structures would support one (1) 7/16-inch EHS shield wire, one 0.646-inch optical ground wire (OPGW) and three phases of 2-bundle 954 ACSR "Cardinal" conductor. The 161 kV circuit on the double circuit portions is owned by SWL&P and the applicants anticipate that these segments would be constructed using three phases of 954 ACSR "Cardinal" conductor. Final conductor, shield wire, and OPGW selection would be determined during detailed design of the project.

3.4.4.4. Proposed sequence of construction

The applicants have stated that they intend to conduct detailed field surveys and soil borings to determine the finalize design of the project. Based on soil conditions and locations of existing buried utilities, final pole placement will be determined and staked in the field. Other project aspects would also be staked at this time, such as tree clearing limits, ROW boundaries, and existing utility locations. Once project design is finalized and ROW acquisition is completed, construction access would begin. Access routes would be

identified, and matting would be installed where necessary. The ROW would then be cleared of vegetation. During construction access and vegetation clearing, equipment and materials would be delivered to the project area. Foundation construction would occur after vegetation clearing is complete and would begin with drilling for structure foundations. The anchor bolts would be placed in the holes once drilling is complete and concrete is placed into the hole. After the structure bases are installed, the remaining structure would be assembled at each pole location by a crane. Once structures are assembled, hardware and insulators would then be installed, and conductor would be strung using a pulley system. Once the conductor has been strung, it would then be attached to the insulators and the pulley system would be removed. If necessary, bird diverters, vibration dampers, or galloping devices may also be installed at this point in the construction process. After all line construction is complete, the ROW would be restored.

3.4.5. Natural resources and impacts

3.4.5.1. Solid wastes

Generation of solid waste products during construction of the proposed electric transmission line is anticipated to be minimal; as such, no significant impacts are anticipated to occur as a result of the proposed project.

3.4.5.2. Geology

All of the routing options are located in the Lake Superior Lowland physiographic province, an area of about 1,250 square miles in northwestern Wisconsin covering portions of Douglas, Bayfield, and Ashland counties. An additional 2,400 square miles is submerged beneath the waters of Lake Superior. Its altitude ranges from less than 1,000 feet above to about 300 feet below sea level, and it rises 150 to 350 feet above and goes 600 to 900 feet below the level of Lake Superior, which stands at 602 feet above sea level. The Lake Superior basin is now a lowland because of the downward movement of a block of the earth's crust in a rift, or graben fault. Subsequent sedimentation, erosion, and sculpting by continental ice sheets have reshaped the area and notably modified the rift valley.

3.4.5.1. Topography and soils

According to the U.S. Geological Survey (USGS) topographic data, the routing options cross areas ranging from approximately 600 to 690 feet above mean sea level. In general, the land slopes from higher elevations in the southeast to lower elevations near the Nemadji River, Bluff Creek, and Bear Creek. The land in the vicinity of the ESS gently slopes northwest from approximately 688 feet above mean sea level to 684 feet above mean sea level. The land surrounding the WSS is also relatively flat at approximately 662 feet above mean sea level.

The routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both switching stations would be located within forested wetland and lowland scrub/shrub. The Richard I. Bong Airport is located west of the Hill Avenue Site Route and the Nemadji Golf Course is located west of the WSS.

During construction of the project, topsoil would be kept separate from subsoils and will be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked prior to final stabilization. It is not anticipated that any subsoil removed for excavations would be spread in upland cropland or pasture.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing

vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75-Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where land-disturbing activities would not be performed for a period greater than 14 days. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been disturbed would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer will be applied, if applicable. Following the completion of construction and stabilization activities, the site will be inspected at least weekly to monitor vegetative growth until final stabilization is achieved. Figure 3-2 shows the soils present within the proposed electric transmission routing options.

3.4.5.2. Upland land cover

Upland land cover discussed in this final EIS includes forests, grasslands and meadows, and agricultural lands. Although wetlands may be broadly mentioned in this section, they are discussed separately, in greater detail, in the water resources sections of this final EIS. In general, agricultural lands are not a major land cover component within the proposed electric transmission routing options.

Existing and Potentially Impacted Upland Land Cover Within the Electric Routing Options

The route alternatives cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both Switching Stations are located within forested wetland and lowland scrub/shrub.

Although the electric routing options are primarily sited along existing utility corridors, construction of all routes and the associated switching station would require clearing of woody vegetation and the conversion of forested habitat to scrub-shrub or wet meadow habitat.

The Eastern Route would be constructed within an existing utility corridor that contains a natural gas pipeline and overhead electrical transmission lines; however, approximately 23.1 acres of woody vegetation would be cleared from forested lands and shrubland habitats. Woody vegetation would be removed where additional, new ROW is needed and along the edges of the exiting utility corridor.

In addition to minor impacts to forested land along the existing shared utility corridors, the Western Route would require more clearing in forested areas for new ROW. Woody vegetation clearing would occur along approximately 79.1 acres of the Western Route in forested lands and shrubland habitats.

Woody vegetation would be removed where additional, new ROW is needed and along the edges of the exiting utility corridor.

Construction of either Eastern or WSS would impact approximately 14 acres of woody vegetation in forested lands and shrubland habitats.

Grasslands within the electric routing options primarily occur in previously disturbed areas or existing, maintained utility corridors, and are dominated by reed canarygrass (*Phalaris arundinacea*). Other grassland species present include Canada goldenrod (*Solidago canadensis*) and Canada thistle (*Cirsium arvense*). Wetland grasslands typically include woolgrass (*Scirpus cyperinus*) and broadleaf cattail (*Typha latifolia*).

The applicants anticipate that most of the impacts to grasslands along the electric routing options would be temporary and occur during construction to existing grassland habitat along existing utility corridors. Some permanent impacts to grassland habitats would occur where transmission line poles and foundations would be set. No grassland habitat is present within the footprint of either switching station.

The applicants have stated that, to the practicable extent, grassland impacts would be avoided or minimized during the construction phase; and have further stated that once construction and restoration are complete, the plant and animal communities, including the grassland plant community, would return to grassland areas temporarily impacted by construction.

Applicants' Proposed Revegetation Strategy

The following describe the re-vegetation and site restoration plan for the proposed project.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75-Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 30 days, but vegetative cover is required for less than 1 year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been disturbed would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected weekly to monitor vegetative growth until final stabilization is achieved.

3.4.5.3. Water resources

Water resources discussed in the following sections include surface waters such as wetlands and waterways.

Wetlands

Wetlands provide vital functions that benefit society. Wetlands detain stormwater runoff, enabling the slow recharge of groundwater resources and lowering downstream peak flood levels; filter sediments and pollutants from the air, precipitation, and upstream sources which results in higher water quality downstream; provide food, cover, and nesting habitat for many species of fish and wildlife; provide a recreational opportunity for bird watching and other wildlife viewing, hiking, and enjoying the aesthetics of the surrounding landscape. It is estimated that between one-quarter and one-third of all rare species in Wisconsin are found in wetlands.

Wetlands are a dynamic ecosystem and provide different functions depending on the type of wetland. The same wetland may even provide different functions from year to year and season to season. There are many different types of wetlands, typically characterized by the size, type of vegetation and amount of soil saturation or surface water found within them. Figure A-1 in Appendix A of this final EIS shows the wetlands present in the vicinity of the proposed NTEC plant.

Identifying Wetlands Within and Adjacent to the ROW

Wetlands were identified during wetland delineations conducted in the 2016 and 2017 growing seasons. Where field delineation was not possible due to access constraints, the applicants utilized available desktop mapping resources, such as the WWI, soil mapping, LIDAR contours, topographic mapping, and recent aerial imagery, to map wetland boundaries. If the project is approved and the Eastern Route selected, the desktop delineated wetland boundaries should be field confirmed prior to construction. A WRAM assessment was conducted by the applicants to document the overall quality of the wetlands. However, the wetland quality data taken during the field investigations was not taken for each individual wetland, and therefore may be over-generalized. The wetlands provide values of shoreline protection; supporting habitat for rare species, birds, amphibians, and other wildlife; and flood water storage. Due to the presence of invasive species and the degraded nature due to the presence of nearby roads and industrial areas, these wetlands were documented to be of low to medium quality. Wetlands also exist surrounding the ROW.

Potential Impacts to Wetlands

Construction and maintenance of transmission lines can impact wetland functional values or can cause wetlands to be converted into another wetland type. The degree and nature of impacts to wetlands depend on factors such as the type of wetland, quality of the wetland, ground conditions at the time of construction, and the type and duration of construction activities. Short-term wetland impacts can become long-term impacts if the construction phase is not well managed, or if restoration techniques are not properly applied.

Construction in and near wetlands can cause sedimentation into wetlands. Sedimentation can occur even when sediment and erosion control BMP's are utilized, particularly if those BMP's are not inspected and maintained on a daily basis.

Clearing of the ROW would occur in preparation for construction, including the removal of shrubs and trees. Clearing of wetlands dominated by woody vegetation results in a conversion from shrub or forested wetland into herbaceous wetland and can impact wildlife habitat, impair wetland functional values, and increase the occurrence of invasive species. The debris associated with woody clearing, including wood

chips and brush, can spread invasive species, obstruct water flow, and minimize the re-growth of vegetation if not removed from wetlands. Clearing can also lead to fragmentation of wetland complexes may impact wildlife habitat. Removing riparian wetland vegetation may decrease shoreline protection and may lead to increased sedimentation to wetlands and waterways.

Another potential impact is the potential spread of invasive species. Invasive species provide little food and habitat for wildlife and can outcompete native vegetation. Additional information on potential impacts from the spread of invasive species that could result from construction of the proposed electric transmission routing options has been included in Section 3.4.5.6.

Heavy machinery used for construction can crush wetland vegetation and damage wetland soils, causing soil compaction, rutting, and soil mixing, and can transport invasive species. Soil compaction reduces the water-holding capacity of the soil and may result in increased runoff. Compacted soils can result in a change in vegetation by potentially reducing plant diversity and promoting the growth of invasive species Wetland soils consist of primarily organic matter (decomposed plant material) which forms very slowly. If disturbed by digging, filling, and compaction, these soils do not readily recover and are not easily repaired. Operating equipment in wetland can endanger amphibians and other aquatic life.

Temporary impacts to hydrology (the vertical and horizontal movement of water through the soil) can occur during foundation installation and associated dewatering activities. Dewatering activities to temporarily remove water from the foundation hole could include pit-trench dewatering or the use of high-capacity wells. The specific dewatering activity would be determined pre-construction if the project is approved. Hydrologic function can be further affected if fill is deposited in the wetland from clearing activities or for the construction of roads, bridges, and structures. Some minor changes in flow in the shallow groundwater system may occur due to compaction from heavy equipment. The placement of the concrete foundation in a wetland should have no long-term effect on either infiltration of water or the natural flow of either groundwater or surface water through wetlands. Water seeking to infiltrate would likely move laterally over the top of the relatively impervious structure and continue downward along the side. Water flowing horizontally in the aquifer would likely diverge at the upgradient end of the structure and converge on the downgradient side. Dewatering of wetlands during construction may cause a temporary loss of water but these zones should refill after the cement is placed. Geotechnical boring work would occur pre-construction if the project is approved. This survey work would help identify underlaying soil and groundwater conditions, potentially the location of springs and seeps. If seeps and springs are impacted from the foundation installation, water should redirect around the foundation.

Minimization of Impacts to Wetlands

All attempts should first be made to avoid impacting wetlands. For example, impacts to wetlands can be avoided by:

- Routing the transmission line away from wetlands;
- Adjusting structure placements to span wetlands;
- Avoid equipment access in wetlands, wherever possible;
- Siting off-ROW access roads, laydown yards, and staging areas outside of wetlands.

Where complete wetland avoidance is not possible due to engineering constraints, existing infrastructure, or other factors, wetland impacts should be minimized as much as possible. Construction methods that can reduce direct and secondary impacts to wetlands include:

- Marking the boundary of wetlands prior to construction;
- Limit construction in wetlands to winter months when soils and water are frozen and vegetation is dormant;
- Using construction matting and wide-track vehicles to spread the distribution of equipment weight when crossing wetlands during the growing season or when wetlands are not stable or not frozen;
- Use adjacent roads and existing off-ROW access roads for vehicle access when possible;
- Site structures and access roads on the edges of wetlands rather than in the middle of wetland to avoid fragmenting wetland complexes;
- Reducing the construction workspace in wetlands;
- Effective, site-specific sediment and erosion control measures and devices should be installed prior to construction activities and maintained during construction and restoration phases. These devices should be inspected daily to ensure they are in working order. If they are not in working order, they should be fixed and/or replaced immediately.
- Implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project;
- Isolate all soil piles with perimeter sediment control devices, and place all soils piles in wetlands on top of construction mats to prevent soil mixing;
- Using alternative construction methods and equipment such as helicopters, marsh buggies, and vibratory caisson foundations;
- Prepare and implement an invasive species management plan that identifies known areas of invasive species populations and addresses site restoration activities and includes equipment decontamination protocols to minimize the spread of invasive species;
- Minimize the amount of vegetation clearing in wetland and conversion of wetland types;
- Remove all brush piles, wood chips, and woody debris from wetlands following clearing activities,
- Conduct surface and sub-surface assessments prior to construction, including hydrology and soil evaluations; modify the engineering plans as needed to avoid and minimize long-term impacts to surface and subsurface resources and to re-establish conditions post-construction;
- Prepare and implement dewatering practices that prevent sedimentation into wetlands;
- Schedule construction to avoid disrupting sensitive species;
- Limit the amount of time necessary to complete construction.

Site restoration consists of the activities required to return the areas impacted by the construction of an approved project back to their original condition, if not better. Restoration typically occurs in any disturbed areas within easements or ROW, temporary construction areas, staging areas or laydown yards, transportation routes, off-ROW access roads, and any other areas used for project related activities. Temporary seeding should be used in areas of exposed soils where construction has temporarily ceased. Site restoration of the disturbed areas would be completed as soon as possible following construction. During site restoration, construction mats and debris is removed, soil rutting is corrected, topography and elevations restored to pre-existing conditions, and permanent re-vegetation activities are conducted. Seeding disturbed wetlands with a cover crop would help prevent the establishment of invasive species and would not compete with the existing seed bank. While some wetlands contain invasive species such as reed canary grass, wetlands of higher quality, dominated by native species, are also present within the

project area. Wetlands not infested with invasive species pre-construction should be evaluated individually for re-vegetation with either a native seed mix or by allowing the native seed bank to re-establish naturally and potentially with the aid of a cover crop. Wetland areas infested by invasive species pre-construction should be re-vegetated with an annual cover crop. Specific restoration monitoring protocols and methods that would be used in wetlands areas are usually determined by DNR and/or USACE permit requirements. Site restoration activities and revegetation progress should be monitored, as well as all sediment control devices to ensure they are functioning properly. Once permanent erosion control measures are installed, and vegetation is re-established, temporary erosion control measures would be removed.

Proposed Wetland Crossings and Impacts

The Eastern Route to the ESS Alternative is comprised of segments A01, A02, A03, A05, B01, B02, and C01, is approximately 3.7 miles long, and would connect the Nemadji River Site to a new ESS. A total of 32 wetlands were identified within this route alternative ROW and associated laydown areas, the ESS, and off-ROW access roads. These wetlands are classified as wet prairie, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 8.45 acres due to the placement of construction matting to facilitate equipment access across wetlands. Approximately 13 pole structures would be constructed within wetlands, as well as the construction of a new Eastern Switching Station, resulting in 13.35 acres of permanent wetland fill total. A total of 11.40 acres of shrub and forested wetland would be permanently cleared for this route alternative.

The Western Route to the ESS Alternative is comprised of segments A01, A04, A05, D01, E01, and C01, is approximately 5.5 miles long, and would connect the Nemadji River Site to a new ESS. A total of 42 wetlands were identified within this route alternative ROW and associated laydown areas, the WSS, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 15.03 acres due to the placement of construction matting to facilitate equipment access across wetlands. Approximately 40 pole structures would be constructed within wetlands, as well as the construction of a new Eastern Switching Station, resulting in 21.07 acres of permanent wetland fill total. A total of 55.14 acres of shrub and forested wetland would be permanently cleared for this route alternative.

The Western Route to the WSS Alternative is comprised of segments A01, A04, A05, D01, F01, and G01, is approximately 1.6 miles long, and would connect the Nemadji River Site to a new WSS and ultimately to an existing transmission line. A total of 24 wetlands were identified within this route alternative ROW and associated laydown areas, the WSS, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 11.76 acres due to the placement of construction matting to facilitate equipment access across wetlands. It is unknown how many pole structures would be constructed within wetlands, but the construction of a new Western Switching Station would result in 13.99 acres of permanent wetland fill total. A total of 42.26 acres of shrub and forested wetland would be permanently cleared for this route.

There are two proposed temporary laydown yards that would be used regardless of which route alternative is selected, should the project be approved. Originally, one of the laydown yards was proposed within wetland. To minimize impacts to wetlands, revised information was submitted indicating the laydown area was moved outside of wetlands. The revised laydown area was not field investigated but determined by the applicants to not contain wetlands based on a review of desktop resources. If this project is approved, field investigation should occur to confirm the absence of wetlands at this laydown area.

Wetlands Permitting

DNR is responsible for regulating the discharge of dredge and fill material into wetlands under Wis. Stat. § 281.36 and Wisconsin Administrative Code. USACE might also require a permit under Section 4040 of the Clean Water Act. DNR and/or USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations. Wetland compensatory mitigation would be required for unavoidable wetland impacts associated with the overall project. Compensatory mitigation involves the restoration, enhancement, creation or preservation of wetlands to compensate for unavoidable adverse impacts to wetlands from a proposed project. As part of the permitting process, DNR and USACE would review the wetland impacts to determine the appropriate compensatory mitigation credit for the project prior to the start of construction. This determination is based on the amount and type of wetland impact and is consistent with federal regulations. There are three avenues for satisfying compensatory mitigation requirements, including: (1) wetland mitigation banking, which requires the permittee to purchase bank credits from a mitigation bank sponsor approved by DNR, (2) in-lieu fee, which involves purchasing compensatory credits from DNR, and (3) permittee responsible mitigation, which requires the permittee to complete a wetland mitigation project approved by DNR.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also hire their own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

Waterways

Waterways include perennial and intermittent streams, creeks, rivers, channels, and other linear waterbodies. Waterways present in the vicinity of the proposed NTEC plant are shown in Figure A-1 in Appendix A of this final EIS.

Identifying Waterways Within and Adjacent to the ROW

Waterways were identified during field surveys conducted in the 2016 and 2017 growing seasons. Where field surveys were not possible due to access constraints, the applicants utilized available desktop mapping resources, such LIDAR contours, topographic mapping, and recent aerial imagery, to map waterways.

Potential Impacts to Waterways

Construction and operation of transmission lines across waterways may have both short-term and long-term impacts. Short-term impacts can become long-term impacts if the construction phase is not well managed, or if mitigation and restoration techniques are not properly applied. The type and significance of the impact is dependent on the characteristics of the waterway and the construction activities proposed. Physical features of the waterway are considered when assessing potential impacts to water quality, water quantity, habitat, recreational use, and the scenic quality of the waterway.

The use of heavy equipment on waterway banks may also cause soil compaction. Withdrawal of surface water for structure foundation construction may temporarily impact waterways. Constructing in areas with seeps and springs may temporarily alter the surface and subsurface hydrology feeding waterways. Overhead transmission lines may also have an aesthetic impact on the natural scenic beauty of the waterway. Transmission facilities may also pose a potential collision hazard for waterfowl and other large birds, especially when located in a migratory corridor. Recreational use such as sight-seeing, boating, fishing, or bird watching could be adversely affected by new transmission facilities.

Construction activities conducted near and across waterways has the potential to impact water quality and aquatic species habitat. Forested and shrub areas along waterways provide a natural corridor for wildlife movement, help maintain soil moisture levels in waterway banks, provide bank stabilization, filter nutrient-laden sediments and other runoff, maintains cooler water temperatures, and encourages a diversity of vegetation and wildlife habitats. The removal of riparian vegetation can cause water temperatures to rise and negatively affect aquatic habitats, especially cold-water systems. Removing riparian vegetation may decrease shoreline protection and may lead to increased sedimentation to waterways. Vegetation disturbance along the waterway can also lead to the infestation by invasive and nuisance species.

Construction near waterways and access across waterways can cause sedimentation into waterways. Sedimentation can occur even when sediment and erosion control BMPs are utilized, particularly if those BMP's are not inspected and maintained on a daily basis.

Access through the ROW to conduct construction activities often requires the installation of TCSBs to avoid equipment driving on the bed of waterways. TCSBs typically consist of timber mats placed across the waterway to allow equipment traffic to cross waterways. They span from top-of-bank to top-of-bank, above the ordinary high water mark, and do not require a support structure on the bed of the waterway. Potential impacts can include disturbance to the bank of the waterway, cutting of riparian vegetation, disruption to the invertebrates, fish and wildlife associated with the waterway, sedimentation into the waterway, and public access limitations. If improperly installed or maintained, TCSBs may be overtopped or dislodged, and back up water.

Minimization of Impacts to Waterways

All attempts should first be made to avoid impacting waterways. Where complete waterway avoidance is not possible, the following practices should be followed to minimize direct and secondary impacts to waterway:

- Marking the locations on waterways prior to construction;
- Using alternative equipment access, including off-ROW access roads, and installation methods to avoid needing to cross waterways with equipment;

- Effective, site-specific sediment and erosion control measures and devices should be installed prior to any construction activity and maintained during construction and restoration phases. These devices should be inspected daily to ensure they are in working order. If they are not in working order, they should be fixed and/or replaced immediately.
- Implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project;
- Isolate all soil piles from adjacent waterways with perimeter erosion control devices;
- Revegetate disturbed areas and areas of exposed soil as soon as possible;
- Existing vegetative buffers should be left undisturbed whenever possible, or vegetation clearing should be kept to a minimum in riparian zones. For areas where construction impacts cannot be avoided, low-growing native tree and shrub buffers along these streams should be allowed to regrow and/or should be replanted to maintain the pre-construction water quality in the streams;
- Avoiding the use of herbicides near waterways, or utilizing herbicides approved for use in aquatic environments;
- Conducting surface and sub-surface assessments prior to construction, including hydrology and soil evaluations; modify the engineering plans as needed to avoid and minimize long-term impacts to surface and subsurface resources and to re-establish conditions post-construction;
- Preparing and implementing dewatering practices to prevent sedimentation into waterways;
- Avoiding the withdrawal of water from surface waters;
- Marking TCSBs to alert navigators;
- Restoring waterway banks to pre-existing conditions;
- Schedule construction to avoid disrupting sensitive species;
- Limit the amount of time necessary to complete construction;
- Checking equipment for fluid leaks before crossing TCSBs;
- Anchor TCSBs to prevent them washing away during high flow conditions;
- Monitor TCSBs daily for debris and remove debris as necessary
- TCSBs should be located to avoid unique or sensitive portions of these waterways, (*e.g.*, riffles, pools, spawning beds, etc.);
- To avoid sedimentation into waterways, appropriate sediment control BMPs should be installed under and on the sides of the TCSB during the installation, use, and removal of TCSBs, and those BMPs must be regularly inspected and maintained throughout the project.

Under Wis. Admin. Code § NR 320.04(1), a 5-foot clearance must be maintained between the water and TCSB, unless the requirements in NR 320.04(3) can be met, including providing portage for anyone navigating the waterway.

In order to protect fish spawning habitat, TCSBs cannot be installed and/or removed during the fish spawning timing restriction period (March 1 to June 15 for non-trout waters and September 15 to May 15

for trout waters), unless the local DNR Fisheries Biologist reviews the proposal and determines that these timing restrictions can be waived.

Proposed Waterway Crossings and Impacts

The Eastern Route to the ESS Alternative is comprised of segments A01, A02, A03, A05, B01, B02, and C01, is approximately 3.7 miles long, and would connect the Nemadji River Site to a new ESS. A total of 13 waterways are present along this route alternative, which are the Nemadji River, and unnamed tributaries to the Nemadji River, Bluff Creek, and Bear Creek. One of these waterways, an unnamed tributary to Bluff Creek, is a designated Area of Special Natural Resource (ASNRI) waterway. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of four TCSBs are proposed to be installed across waterways for equipment access, one of which will be the ASNRI waterway. The remaining waterways would be crossed during wire pulling activities and would not require equipment crossing.

The Western Route to the ESS Alternative is comprised of segments A01, A04, A05, D01, E01, and C01, is approximately 5.5 miles long, and would connect the Nemadji River Site to a new ESS. A total of eight waterways are present along this route alternative, which are the Nemadji River, Bluff Creek, and unnamed tributaries to the Nemadji River. One of these waterways, Bluff Creek, is a designated ASNRI waterway. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of six TCSBs are proposed to be installed across waterways for equipment access, one of which would be the ASNRI waterway. The remaining waterways would be crossed during wire pulling activities and would not require equipment crossing.

The Western Route to the WSS Alternative is comprised of segments A01, A04, A05, D01, F01, and G01, is approximately 1.6 miles long, and would connect the Nemadji River Site to a new WSS and ultimately to an existing transmission line. A total of seven waterways are present along this route alternative, which are the Nemadji River, Bluff Creek, and unnamed tributaries to the Nemadji River. One of these waterways, Bluff Creek, is a designated ASNRI waterway. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of six TCSBs are proposed to be installed across waterways for equipment access, one of which would be the ASNRI waterway. The remaining waterway would be crossed during wire pulling activities and would not require equipment crossing.

Waterway Permitting

DNR is responsible for regulating impacts to navigable waterways and waterbodies under Wis. Stat. ch. 30 and Wisconsin Administrative Code. Some of the state legal protections and permitting requirements for activities affecting public waterways include, but are not limited to:

- Wis. Stat. § 30.12 and Wis. Admin. Code ch. NR 329 require permits for structures placed on the bed of navigable waters;
- Wis. Stat. § 30.123 and Wis. Admin, Code ch. NR 320 require permits for bridges placed over public waters and culverts placed within navigable waters;
- Wis. Stat. § 30.19 and Wis. Admin, Code ch. NR 341 require permits for grading on the banks of navigable waters;
- Wis. Stat. § 30.195 requires permits for channel relocation of navigable waters;
- Wis. Stat. § 30.20 and Wis. Admin. Code ch. NR 345 require permits for removing material from the bed of navigable waters;

- Wis. Stat. § 30.29 prohibits the operation of motor vehicles in navigable waters unless it qualifies under one of the exemptions or is approved through a permit authorization.

USACE and/or USFWS might also require additional permits and approvals. Some of the federal legal protections and permitting requirements for activities affecting waters include, but are not limited to:

- 33 USC § 403 Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable waters of the U.S.
- 16 USC §§ 1271-1287 prohibit federal agencies from authorizing a water resources project that would have a direct and adverse effect on the values for which a river protected by the Wild and Scenic Rivers Act was established.

DNR and/or USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also hire an own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

3.4.5.4. Protected and listed species

Endangered resources include rare or declining species, high-quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0-mile buffer for aquatic species.

This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, will not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are taken from existing sources within DNR, including the NHI database, as well as external sources, including landowners and surveys completed by the applicants.

For specific route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this final EIS.

Plants

There are ten rare plant species that may have suitable habitat present within the Eastern and Western routes. In addition, at least four of these plant species have been observed within or immediately adjacent to the Eastern Route while at least five of these plant species have been observed within or immediately adjacent to the Western Route. Additional surveys and avoidance/minimization measures for rare plant species are encouraged and recommended. Potential avoidance measures may include conducting plant surveys to determine presence/absence and/or avoiding areas where known plants occur. Other measures, such as winter construction, use of mats to limit direct disturbance, or relocation, can minimize losses. DNR would also recommend that the applicants and landowners with rare species on their property develop a plan to protect these species.

Herptiles (Reptiles and Amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of the Eastern and Western segments. The Nemadji River, Bluff Creek, and Bear Creek (Eastern Route only) all appear to be suitable waterways for this species. Therefore, all work within 300 meters of these waterways are required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary.

Fish and Aquatic Invertebrates

A special concern fish species may be present within the Nemadji River. Although it does not spawn here, it is recommended that strong erosion and siltation measures be implemented to avoid impacts.

One special concern dragonfly species is known to be present within the wetlands and waterways that are within and adjacent to both routes and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

Natural Communities

One wetland natural community may be present within and/or adjacent to the common portion of the Eastern and Western Routes. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

Mammals

A Northern Long-eared Bat (NLEB) maternity roost record is crossed by the Eastern Route and within the vicinity of the Western Route. As this is a federally listed species, the applicants will be required to follow the 4(d) rule and not cut trees within 150ft of known roost trees from June 1–July 31). Surveys may be required in order to determine where known roost trees are located. The NLEB is also state-listed and the applicants should follow the Cave Bat Broad Incidental Take Authorization and limit tree clearing throughout the project area from June 1–August 15.

Summary

The Eastern and Western Routes are nearly identical to each other in terms of potential rare species impacts. While there are subtle differences between the two, from a known rare species standpoint, no one route would be significantly more impactful over the other. However, the Western Route would create more new right of way which may negatively impact birds and other species that need large contiguous habitats to survive.

3.4.5.5. Invasive species

The applicants have submitted an invasive species survey and identified invasive plant species along the routing options including the area near the proposed switching stations. The review was completed in September 2016 and October 2017 during wetland delineation field surveys. The only invasive plant species observed was reed canary grass, which is listed as a nonregulated wetland invasive species by WNR. WNR has also indicated that emerald ash borer was detected in Douglas County in 2013.

In compliance with Chapter NR 40 Invasive Species Identification, Classification and Control Rule, the applicants would mitigate the potential to spread invasive plant species during project activities. The applicants would identify invasive plant species locations on the construction plans and flagged on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, the applicants would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools along the project. The applicants may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to leaving the project ROW to reduce the risk of spreading invasive plant species beyond the ROW.

Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20 seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used in the project ROW would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

3.4.6. Local community and impacts

All of the routing options are located in the City of Superior in Douglas County, Wisconsin. Potential impacts that could affect the local community as a result of constructing the proposed electric transmission line within the routing options are discussed in the following sections.

3.4.6.1. Site history

Site history of the area within the proposed routing options is similar to that discussed in Section 3.3.1 for the Nemadji River Site.

3.4.6.2. Nearby populations, vulnerable groups, and environmental justice issues

The area and population present within the vicinity of the three routing options is covered within scope of the discussion and analysis provided in Section 3.3.2.

3.4.6.3. Land use

All of the electric transmission routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both proposed switching station sites are located within forested wetland and lowland scrub/shrub. The Richard I. Bong Airport is located west of the Hill Avenue Site Route and the Nemadji Golf Course is located west of the WSS. Figure A-2 in Appendix A of this final EIS shows existing land use and land cover in the vicinity of the proposed NTEC plant.

In the City of Superior the routing options extend through areas currently zoned for manufacturing, suburban, and apartment residential. The WSS is within apartment residential zoning. The future land uses in the City of Superior for the routing options are industrial/manufacturing and open space/undeveloped. The existing land use crossed by the routing options in the Town of Parkland is forest and agricultural. The future use for the forested land is to remain forest land. The future use for the agricultural area is mitigated wetland. The Eastern Routing Option is within an existing transmission line corridor along this length and does not require additional ROW, however. The Western Route extends through forested areas, the majority of which will remain forest land. The future land use for a portion of the forested area near the ESS is agricultural and medium density residential, however. The existing land use at the ESS is forest with a future land use of medium density residential.

3.4.6.4. Local jobs

The working population and specific statistical data regarding local jobs is covered within scope of the discussion and analysis provided in Section 3.3.4.

3.4.6.5. Local road, rail, and air traffic

Local Roads

Construction traffic and any road closures would be temporary in nature and cease after construction is complete. Traffic during operation would primarily include maintenance vehicles. Traffic during operation of the project would increase vehicles on nearby roads but is not anticipated to significantly increase traffic due to the occasional nature of maintenance. The applicants do not anticipate permanent damage to roads. As a precautionary measure, the applicants would video-document the condition of all roads on the construction vehicle routes to document the road condition prior to the start of construction. Any documented adverse impacts to the roads incurred due to the construction of the project would be addressed through consultation with applicable road authorities regarding the applicants' responsibility for repairing the adversely impacted roads.

The closest scenic byway to the routing options is the Skyline Parkway Scenic Byway, a Minnesota State Byway located along West Skyline Parkway in Duluth, Minnesota, and the Veterans Evergreen Memorial Drive along Highway 23 in Carlton County, Minnesota, and Douglas County, Wisconsin. The routing options are over 6.0 miles southeast of the Skyline Parkway Scenic Byway. Veterans Evergreen Memorial Drive is the only scenic byway in Douglas County, Wisconsin. It is a Minnesota State Scenic Byway that crosses approximately 0.5 mile of Douglas County over 6.8 miles west of the routing options. Due to the distance from these scenic byways, it is anticipated that the project will not significantly impact any scenic roads in the area.

The applicants have stated that based on the design of the project and the proposed mitigation measures no permanent impacts to roads is anticipated.

Roads, railways, and airports in the vicinity of the proposed NTEC plant are shown in Figure A-1 provided in Appendix A of this final EIS.

Rail lines

Several rail lines are crossed by the routing options; all of which are active rail lines. All routing options cross BNSF and Canadian National lines.

In addition, some of the proposed off-ROW access roads would be required in the vicinity of existing railroad ROW. The off-ROW access roads near the BNSF railroad would be required to access the area during the construction phase of the project. The off-ROW access road north of the Canadian National railroad would be required to access the area between the railroad and Bear Creek for construction. The off-ROW access road south of this railroad would be required to access the area south the railroad and Bear Creek. The three short segments along Lyman Lake Road would be required to access the Eastern Route, east of the road.

Local Airports and Air Traffic

The nearest public use airport to the all three routing options is the Richard I. Bong Airport, located approximately 1-2 miles west of the routing options, depending on the option. Other nearby air facilities include the Sky Harbor Airport and Seaplane Base, a public use airport located approximately 1-2 miles north of the routing options; and the Carlson Airport, a private use airstrip located from 1-4 miles southwest of the routing options. St. Mary's Hospital and St. Luke's Hospital heliports are private use facilities located approximately 6-7 miles north of the routing options. The Duluth International Airport is located between 10 and 11 miles northwest of the routing options. There may be other private use facilities in the area that are not registered with the FAA. Because the locations of such facilities cannot be confirmed, they were not included in the report.

An aeronautical study was completed by the FAA for the structures along each routing options, and Notices of Presumed Hazard (NPH) were issued for three structures on July 24, 2018. The NPH letters stated that if the structure heights were reduced, these three structures would not create a substantial adverse effect and a favorable determination could then be issued. The applicants responded to the FAA on August 3, 2018, stating that the structure heights would be lowered as to not exceed the maximum heights provided by the FAA. The FAA subsequently issued a Determination of No Hazard/Does Not Exceed (DNE) letter for all the structures that were studied, including these three, on October 2, 2018.

Additionally, the applicants consulted with the WisDOT Bureau of Aeronautics and the City of Superior regarding proposed project structure heights. The WisDOT Bureau of Aeronautics indicated that they do have a permit process for tall structures but would not have jurisdiction over the portion of the project that was within the jurisdiction of the City of Superior. All but a small section of structures associated with the project were determined to be under the authority of the City of Superior. Superior stated that the FAA determinations were sufficient for their purposes and they would not require additional tall structure permits. The remaining sections of the project that are outside the authority of Superior but do not meet the WisDOT High Structure Permit criteria.

3.4.6.6. Communication towers

The applicants used the FCC GIS data to identify communication towers, such as cellphone towers and TV towers, within 0.5 mile of each routing options. No towers are located within the ROW of any routing option. Although no towers were detected within the actual proposed ROW of the routing options, there is still potential that the project would interfere with nearby communication tower signals, depending on existing tower heights and final project design. The applicants have stated that they intend to work with the licensees along the project to mitigate any potential interference as applicable.

3.4.6.7. Local community services

Refer to Section 3.3.7 for an overview of potential interactions and impacts to local services including local law enforcement, emergency services, and healthcare facilities.

3.4.6.8. Recreation

No parks are present within 0.5 mile of the routing options. Both Eastern and Western Routes would cross several recreation areas near the Nemadji River near the 18th Street fishing access and boat launch. These routes would also cross the Nemadji River near the Nemadji River Canoe Launch, and cross the Allouez Area Parcel 1 hunting area on the east bank of the Nemadji River.

The Eastern Route would cross two additional hunting areas: the Itasca Area hunting area and the Annex hunting area. The Western Route would cross the Allouez Area Parcel 2 hunting area as well as a small area of the Nemadji Sled Hill property. The Western Route would cross the Murphy Oil–5 hunting area and the Orange Trail. The Orange Trail is used by snowmobiles and ATVs.

The applicants have stated that the nearest municipal park to any routing area is over 0.5 mile away and therefore, impacts to any of the parks are expected to be nominal. The Nemadji Sled Hill property would be crossed by a small area of the Western Route ROW. This area is currently wooded, however, and it is not anticipated that the Western Route would impact sledding activities in the remaining property.

The fishing access and boat launch at 18th Street as well as the Nemadji River Canoe Launch would be near both Eastern and Western Routes. Though not directly crossed, the access may be impacted during construction of facilities through temporary road closures and temporary increased noise associated with construction. During operations there would be slightly increased traffic and noise near the fishing access at 18th Street during maintenance. Traffic during operation of the project would increase vehicles on nearby roads but the applicants do not anticipate a significant increase in traffic citing the infrequent nature of maintenance.

All routing options cross hunting areas. The Eastern and Western Routes cross the Allouez Area Parcel 1 hunting area in an existing utility corridor, generally paralleling existing transmission lines and gas pipelines. The Eastern Route extends through the Itasca Area hunting area within an existing utility corridor as a double circuit transmission line with an existing 161 kV line. The Eastern Route would not require new ROW within the Annex hunting area as the route would be double circuited with an existing transmission line in this area. The Western Route would cross the Allouez Area Parcel 2 hunting area parallel to County Road A and near an existing Enbridge crude oil pipeline. The applicants have stated that by paralleling, or sharing, existing utility or transportation infrastructure through these areas, the amount of new ROW required for the project in hunting areas and would be eliminated.

Construction of the Western Route may impact visitors to the Orange Trail. Impacts could include increased traffic crossing the trail or temporary closures during project construction, as well as slightly increased traffic crossing the trail during project maintenance activities. Construction traffic and any road closures would be temporary in nature and cease after construction is complete.

Recreation areas in the vicinity of the proposed NTEC plant are shown in Figure A-1 provided in Appendix A of this final EIS.

3.4.6.9. Property values

Although no specific surveys or studies were conducted regarding potential impacts to property values as a result of constructing the proposed transmission line, a general summary of this issue is provided below.

The potential change in property values due to the proximity to a new transmission line has been studied since the 1950s by appraisers, utility consultants, and academic researchers. Studies have been conducted mostly on residential or undeveloped properties and not commercial properties. It is very difficult to predict how a specific transmission line will affect the value of a specific property. A power line may change an individual's perception of a property's worth.

The studies that cover this subject can be difficult to generalize and must be judged on the quality of the study design and analyses of the data. Surveys and research tends to show persistent adverse perceptions of the impact of transmission lines. Most respondents believe that the presence of a transmission line would result in lower property values, or respond that they would pay less for a property encumbered by or near to a transmission line.

It is important to note that the proposed transmission lines for this project would be located in areas that already contain existing transmission lines and natural gas pipelines in many areas, and other adjacent infrastructure.

3.4.6.10. Noise

Sound levels would be expected to increase during the construction regardless of the selected routing options. In the daytime hours noise may be associated with the operation of construction equipment, if construction occurs during the nighttime hours, sound levels could also increase. At this time, the applicants do not anticipate that nighttime construction would regularly occur. The applicants anticipate that, once constructed, the project would add minimal additional noise and noise levels would be comparable to typical current ambient levels.

3.4.6.11. Views, aesthetics, and lighting activity

The aesthetics of the surrounding area would be altered by the project. The proposed structures would predominately range in height from 120 feet to 160 feet above grade based on similar structure designs used for other projects. The proposed structures would likely be steel self-supporting structures on concrete foundations. All routing options would be visible from multiple viewpoints throughout the area; most of the proposed route is within undeveloped forested areas along existing utilities.

The routing options would be located within industrial or wooded and undeveloped areas for the majority of their length. A significant portion of the Eastern and Western Routes would be located parallel to or double circuited with existing transmission infrastructure.

Although the applicants state that no concerns regarding the aesthetics of the transmission line were recorded at the public open houses, it is possible that some nearby residents may find the appearance of the project aesthetically displeasing. The applicants cited the lack of public comment regarding the degradation of aesthetics as reason to not conduct photo simulations depicting post-construction transmission infrastructure.

3.4.6.12. Historical and archeological sites

As discussed in Section 3.3.13, in accordance with Wis. Stat. § 44.40(5), the Commission is not required to conduct a consultation with the SHPO for the proposed project since a federal agency (USDA RUS) intends to conduct the Section 106 review process as part of a separate environmental review of the proposed project. Instead, the Commission intends to act as a consulting party in the federal Section 106 review; which, if the project is approved, would be conducted only for the final approved project configuration.

The applicants commissioned a third party to investigate the project in the area of the routing options for the presence of archaeological sites, potentially historic buildings, and human burial sites near the project area. The following sections discuss the findings for each of the routing options.

3.4.6.13. Eastern Route

The applicants identified and reviewed archaeological sites, potentially historic buildings, and human burial sites near the Eastern Route. One archaeological site is located within the area of potential effect (APE). The finding consists of abandoned railroad grade, associated facilities, and scattered artifacts from the late 19th to mid-20th century that functioned as part of the Iron River to Superior DSS&A Railway. The site has poor integrity, with removed hardware and overgrown grade, but includes *in situ* artifacts along the grade. The site was recommended as not NRHP eligible and SHPO concurred that the site is not recommended eligible for NRHP listing. The investigation concluded that no additional investigations are recommended and no that there is a low likelihood that historic properties or burial sites would be effected by the proposed project within the Eastern Route.

3.4.6.14. Western Route

The applicants identified and reviewed archaeological sites, potentially historic buildings, and human burial sites near the Western Route. One archaeological site is located within the APE, the remnants of a residential building from the 1940s, an associated dump pile, and a gravel driveway. The project would affect the remains of a gravel driveway associated with the residence. The site is not considered historically significant and is not recommended eligible for NRHP listing. The review stated that no additional investigations are recommended, and no historic properties or burial sites are anticipated to be impacted by the proposed project within the Western Route.

3.4.6.15. Local economics

The discussion of potential project impacts to local economics provided in Section 3.3.14 is inclusive of the segment of the population potentially impacted by the proposed routing options associated with the project.

3.4.6.16. Electromagnetic fields

Concerns over exposure to electric and magnatic fields (EMF) are often raised during transmission line construction cases. Electric and magnetic fields occur whenever and wherever we use electricity. A magnetic field is created when electric current flows through any conductor such as a power line or the electrical wiring in a home. Other sources of magnetic fields include electric blankets, fluorescent lights, appliances, and electric baseboard heating. Because there are so many common sources of EMF, we are exposed to a wide variety of magnetic fields every day. Magnetic fields are measured or estimated in units of Gauss or milligauss (mG) (a mG is equal to 1/1000 of a Gauss). Measurements of power line EMF are always reported in mG.

Scientists have found only weak and inconsistent epidemiological associations between exposure to power frequency EMF and human health. Several epidemiological studies have shown a statistical association between the risk of childhood leukemia and the kind of electric wires outside the home. However, many epidemiological studies have found no link to leukemia. Cellular studies and studies exposing test animals to EMF have shown no link between EMF and disease. Taken as a whole, the biological studies conducted over the last 25 years have not been able to establish a cause-and-effect relationship between exposure to EMF and human health effects. In addition, there have been no plausible biological mechanisms discovered by which exposure to power frequency EMF might cause human disease.

There may be some circumstances where exposure to the electric field produced by a line may result in inappropriate pacing for pacemakers or inappropriate operation of defibrillators.

For more information on EMF and human health you may wish to obtain a free publication produced by the Public Service Commission of Wisconsin entitled EMF - Electric and Magnetic Fields. This publication is also available on the PSCW web site at psc.wi.gov.

Magnetic fields produced by transmission lines decrease with distance from the line. For this project, the estimation of EMF for the new 345-161 kV single pole double circuit configuration is complex because the magnetic fields from the adjacent lines affect the magnetic fields of the new line.

Magnetic fields would increase significantly to the west of the existing transmission line ROW when the generator is on .There are not any schools, daycare centers or hospitals within 300 feet of the Eastern and Western Routes. There is one residence within 300 feet of the Western Route. There are two residences within 300 feet of the Eastern Route.

Table 3-19 below, shows estimated EMF levels for the proposed transmission line at distances from 0 to 300 feet from the centerline.

Table 3-19 Estimated magnetic fields data associated with the proposed electric transmission line

	Existing Operation (project involves existing line)		First Year of Operation 345kV		Year Ten of Operation 345kV	
	80% of Peak Load	100% of Peak Load	80% of Peak Load	100% of Peak Load	80% of Peak Load	100% of Peak Load
Current (amps)			706	883	706	883
Distance fro Centerline (f	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)
-300	2.02	2.74	2.21	2.09	2.21	2.09
-200	9.59	12.48	8.12	7.97	8.12	7.97
-150	41.66	52.86	31.77	31.38	31.77	31.38
-100	242.16	300.95	179.25	177.05	179.25	177.05
-50	49.06	58.61	44.17	45.3	44.17	45.3
-25	111.16	117.32	86.82	93.81	86.82	93.81
0	173.26	176.02	129.47	142.32	129.47	142.32
25	109.66	111.2	94.67	107.6	94.67	107.6
50	46.06	46.38	59.86	72.87	59.86	72.87
100	16.99	16.55	16.54	17.04	16.54	17.04
150	3.82	3.62	4.4	4.87	4.4	4.87
200	1.54	1.46	1.85	2.21	1.85	2.21
300	0.5	0.49	0.75	0.83	0.75	0.83

CHAPTER

4

4. Environmental Review – Hill Avenue Site

4.1. SITE DESCRIPTION

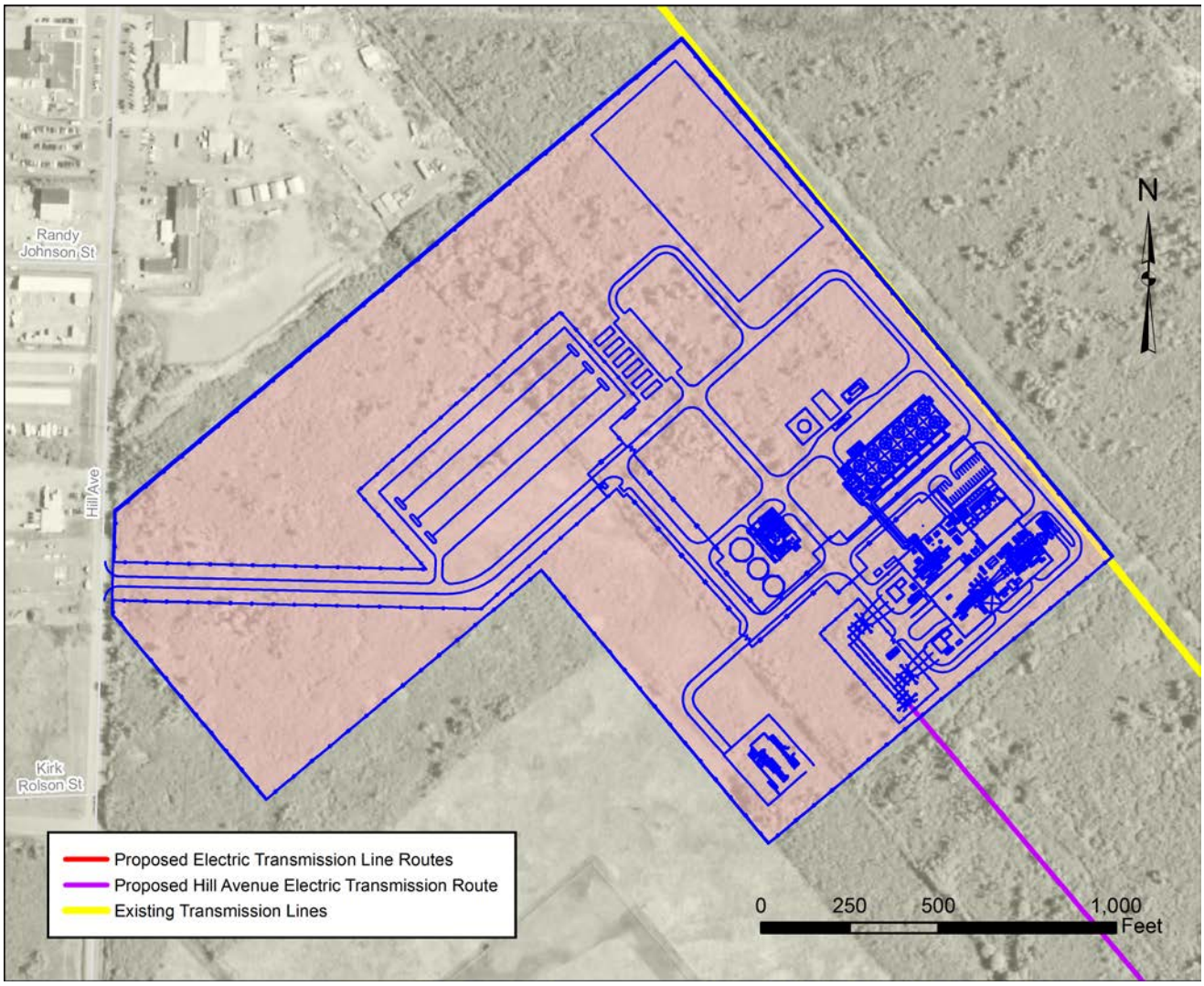
The Hill Avenue Site would be approximately 1.2 miles northwest of the Nemadji River Site. The site is accessible from the west via Hill Avenue. USH 2/USH 53 is accessible via Hill Avenue to North 28th Street East, then 18th Avenue east to the highway. No other access to the site currently exists. The site is approximately 75.5 acres in size and is undeveloped. An existing transmission line extends along the northeast border of the site.

Residential areas lie to the east of the Hill Avenue Site (within 0.5 mile) including the Central Park Neighborhood, the Pattison School Neighborhood, the East End Neighborhood, and the South End Neighborhood.

Land cover surrounding the site is predominately woodland with a mixture of deciduous and evergreen forest. Wetlands are also prevalent throughout the area.

Existing electric distribution lines near the Hill Avenue Site are located along North 28th Street to the north, Hill Avenue to the west, and within the previously mentioned residential areas east of the site. Two existing crude oil lines and one natural gas line extend north-south along the western boundary along Hill Avenue. The Winter–Stinson 115 kV transmission line extends along the northeastern boundary of the site.

Figure 4-1 shows the location and the preliminary facility arrangements for the Nemadji River Site.



4.2. NATURAL RESOURCES AND IMPACTS

4.2.1. Air emissions

SSE, a subsidiary of ALLETE, and DPC have submitted to DNR a PSD permit application for NTEC under Wis. Admin. Code ch. NR 405. PSD is a federal permit program for major air pollution sources that is meant to prevent the air quality in an attainment area from getting worse. Wisconsin DNR has responsibility for review of permit applications and issuance of air pollution control permits in accordance with federal CAA requirements and Wisconsin Statutes. The Commission, under Wis. Stat. § 196.491(3)(d)3. and 4., has notable constraints in this regard:

> "In its consideration of environmental factors, the Commission may not determine that the design or location or route is not in the public interest because of the impact of air pollution if the proposed facility will meet the requirements of ch. 285."

Wisconsin Stat. ch. 285 is the chapter on "Air Pollution" and is enforced by DNR. Wisconsin Admin. Code Chapters chs. NR 400–NR 499, contain the rules promulgated by the department to implement Wis. Stat. ch. 285.

- The DNR air pollution control construction permits for this project are intended to include requirements for PSD, protection from hazardous air pollutants, adherence to federal NSPS and to assure compliance with NAAQS. DNR's permits address, among other things:
- Emission limitations based on BACT for each emission unit and pollutant triggering review.
- Permit conditions to address ambient air impacts analyses and ensure the proposed project complies with NAAQS and PSD allowable concentration increments.
- Permit conditions addressing impacts to visibility, soils, and vegetation.
- Permit conditions to protect against ambient air impacts of HACs as regulated under Wis. Admin. Code ch. 445, which does not cover emissions from natural gas or ULSD combustion but would cover ammonia from emission control systems.
- NSPS for regulation of GHG emissions under federal rule, 40 CFR 60, Subpart TTTT, which would apply to the project.

The issuance of a major source construction permit under Wis. Admin. Code ch. NR 405 is considered an integrated analysis action under Wis. Admin. Code § NR 150.20(2)(a)4. Actions specified under Wis. Admin. Code § NR 150.20(2) require a WEPA compliance determination under Wis. Admin. Code § NR 150.35, but do not require a separate environmental analysis under Wis. Admin. Code ch. NR 150. The proposed project has been reviewed considering Wis. Admin. Code ch. NR 150, and DNR has determined that this type of proposal is not expected to have the potential to cause significant adverse environmental or secondary effects.

However, under WEPA, a state agency like the Commission must consider whether its actions would significantly affect the quality of the human environment. Impacts of the decision whether to issue a CPCN for a proposed power plant could easily include impacts to air quality, and these must be considered.

4.2.1.1. Description of proposed emissions units

Potential emission sources to be examined include:

- S01/P01/C01a (SCR)/C01b (oxidation catalyst) – One natural gas-fired, Siemens SGT6-8000H combined-cycle turbine with diesel fuel oil back-up [Maximum continuous rating: 3,665 MMBtu/hr HHV when combusting natural gas, 3,021 MMBtu/hr, HHV when combusting diesel fuel oil] with a 1,006 MMBtu/hr natural gas-fired duct burner
-
- S02/B02 – One 100 MMBtu/hr Natural Gas-Fired Auxiliary Boiler with ultra-low NO_X burners and FGR
- S03/P03 – 12-Cell Cooling Tower with High Efficiency Drift Eliminators
- S04/P04 and S05/P05 – Two Natural Gas-Fired 10 MMBtu/hr Heaters
- S06/P06 – One 282 hp Emergency Diesel Fire Pump
- S07/P07 – One 1,490 hp Emergency Diesel Generator

- T01 – 180,000-gallon diesel fuel day tank
- T02 – 1,700-gallon diesel fuel generator tank
- T03 – 350-gallon diesel fuel fire pump tank

4.2.1.2. Potential to emit from proposed emissions units

NO_X, CO, PM, PM_{10}, $PM_{2.5}$, SO_2, VOC, H_2SO_4, lead, and CO_{2e} are expected from the proposed project. The following table (Table 4-1) shows the PTE by emissions unit, by pollutant, and totaled compared to PSD significant emission rates as specified in Table A to Wis. Admin. Code § NR 405.02(27). Significant emission rates are used to determine whether a major modification has occurred per Wis. Admin. Code § NR 405.02(21).

Table 4-1 PTE by emission unit, by pollutant, and totaled compared to PSD significant emission rates

Pollutant	Combined-Cycle Combustion Turbine[a] (tpy)	Auxiliary Boiler (tpy)	Cooling Tower (tpy)	Natural Gas Heater #1 (tpy)	Natural Gas Heater #2 (tpy)	Emergency Diesel Fire Pump (tpy)	Emergency Diesel Generator (tpy)	Storage Tanks (tpy)	Total[b] (tpy)	PSD Significant Emission Rates (tpy)
NO_x	255.6	4.8	--	2.1	2.1	0.5	3.9	--	**269**	40
CO	1,991.1	16.2	--	3.6	3.6	0.4	2.1	--	**2,017**	100
PM	163	3.3	6.4	0.3	0.3	0.02	0.1	--	**173**	25
PM_{10}	163	3.3	2.8	0.3	0.3	0.02	0.1	--	**170**	15
$PM_{2.5}$	163	3.3	2.8	0.3	0.3	0.02	0.1	--	**170**	10
SO_2	28.2	0.3	--	0.03	0.03	0.1	4.5.E-03	--	29	40
VOC	237.3	2.4	--	0.2	0.2	0.2	0.3	0.04	**241**	40
H_2SO_4	43	0.04	--	3.9.E-03	3.9.E-03	0.02	6.9.E-04	--	**43**	7
Lead	0.01	2.1.E-04	--	4.3.E-05	4.3.E-05	--	--	--	0.01	0.6
CO_2e	2,675,731	51,289	--	5,129	5,129	80	841	--	**2,738,198**	75,000

(a) Represents worse-case emissions scenario
(b) Numbers in bold indicate the PSD significance level is exceeded

A source's PTE reflects the maximum capacity of emissions units, taking into account physical and operational limitations. For the above emissions estimates, the following assumptions were made (Table 4-2):

Table 4-2 Assumptions made for emissions estimates

Assumptions		
Unit	**Limitation**	**Units**
Turbine	8,760	Natural gas hours per year
	50	Number of natural gas cold starts per year
	150	Number of natural gas warm starts per year
	900	Number of natural gas hot/fast starts per year
	1,100	Total number of combined natural gas start-ups per year (cold/warm/hot/fast)
	1,100	Total number of natural gas shutdowns per year
	1,525.0	Hours of natural gas Startup/Shutdown per year
	500	Fuel oil hours per year with or without duct burning
	11,025,196	gallons/year fuel oil
	42	Number of fuel oil startup/shutdowns per year
	105.0	Hours of fuel oil Startup/Shutdown
Natural Gas Duct Firing	8,760	Hours per year
Auxiliary Boiler	8,760	Hours per year
Cooling Tower	8,760	Hours per year
Natural Gas Heater #1	8,760	Hours per year
Natural Gas Heater #2	8,760	Hours per year
Emergency Diesel Fire Pump	500	Hours per year
Emergency Diesel Generator	500	Hours per year
Fuel oil heating value	137,000	Btu/gal

Facility-wide federal HAPs were calculated four different ways, with the assumptions to the left in each scenario below and the highest individual federal HAP totals and all federal HAP combined totals to the right in each scenario below for comparison against the 10 tpy (individual federal HAP) and 25 tpy (combined federal HAPs) Part 70 thresholds. Emission factors are citations are within each Scenario's table (Tables 4-22 to 4-25).

Table 4-3 Scenario 1

Hours of Operation			**HAP**	**HAP**	**tpy**
Combustion Turbine Natural Gas Hours =	8760	hours per year	1st maxium -	Ethane	3.28
Combustion Turbine Fuel Oil Hours =	0	hours per year	2nd maxium -	Pentane	2.09
Duct Burner =	0	hours per year	3rd maxium -	Hexane	1.03
Auxillary Boiler =	8760	hours per year		All HAPs	9.33
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 4-4 Scenario 2

Hours of Operation			**HAP**	**HAP**	**tpy**
Combustion Turbine Natural Gas Hours =	0	hours per year	1st maxium -	Ethane	8.71
Combustion Turbine Fuel Oil Hours =	0	hours per year	2nd maxium -	Pentane	0.36
Duct Burner =	8760	hours per year	3rd maxium -	Hexane	0.02
Auxillary Boiler =	8760	hours per year		All HAPs	9.16
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 4-5 Scenario 3

Hours of Operation			HAP	HAP	tpy
Combustion Turbine Natural Gas Hours =	0	hours per year	1st maxium -	Ethane	8.26
Combustion Turbine Fuel Oil Hours =	500	hours per year	2nd maxium -	Pentane	0.60
Duct Burner =	8260	hours per year	3rd maxium -	Hexane	0.56
Auxillary Boiler =	8760	hours per year		All HAPs	9.65
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

Table 4-6 Scenario 4

Hours of Operation			HAP	HAP	tpy
Combustion Turbine Natural Gas Hours =	8260	hours per year	1st maxium -	Ethane	3.31
Combustion Turbine Fuel Oil Hours =	500	hours per year	2nd maxium -	Pentane	1.97
Duct Burner =	0	hours per year	3rd maxium -	Hexane	0.97
Auxillary Boiler =	8760	hours per year		All HAPs	9.82
Natural Gas Heater =	8760	hours per year			
Emergency Diesel Fire Pump =	500	hours per year			
Emergency Diesel Generator =	500	hours per year			

(a) Emission factors for combustion turbines from AP-42 Section 3.1, Updated 2/2000. Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

(b) Emission factors from AP-42 Section 1.4, Updated 7/1998

(c) Emission factors from AP-42 Section 3.3, Updated 10/1996

(d) Emission factors from AP-42 Section 3.4, Updated 10/1996

4.2.1.3. Air quality review

Wisconsin Stat. § 285.63(1)(b) allows the department to approve a permit application if it finds the source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment. See the Criteria for Permit Approval section later in this document. This section describes the department's finding under Wis. Stat. § 285.63(1)(b).

Emissions units P06 and P07 are intermittent sources because they do not have a set operating schedule, operate for short periods of time during the year (generally outside of the facilities' control) and do not contribute to the normal operation of the facility. These intermittent emissions units are not included in dispersion modeling analyses.

The emissions units covered by these permits would be capable of emitting VOCs. There are no ambient air quality standards specifically for VOCs. Therefore, dispersion modeling of VOC emissions from direct stationary sources is not performed.

The emissions units covered by these permits would be capable of emitting NO_X. The Air Dispersion Analysis memorandum for draft air pollution control construction permit number 18-MMC-169 assesses the impact of the proposed emissions units on 1-hour and annual NO_2 concentrations (Appendix B).

VOCs and NO_X are both precursors to ground level ozone concentrations. Ozone is a regional pollutant that is formed in the atmosphere through complex chemical reactions. U.S. EPA has established an approach for addressing the impact of single-source VOCs and NO_X emissions on ozone. The department assessed the impact of emissions on ozone concentrations as part of the review. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169 (Appendix B).

The emissions units covered by these permits would be capable of emitting PM_{10}, $PM_{2.5}$, SO_2, NO_X, and CO. The department performed dispersion modeling analyses as part of the review for these permit to predict the source's/project's potential impact on ambient concentrations of these pollutants. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169 (Appendix B).

$SO_2$and NO_X are both precursors to ambient $PM_{2.5}$ concentrations. U.S. EPA has established an approach for addressing the impact of secondarily formed $PM_{2.5}$ in combination with direct emissions of $PM_{2.5}$. The department assessed the impact of emissions on $PM_{2.5}$ ambient concentrations as part of the review. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169 (Appendix B).

The facility would be capable of emitting NH_3 with ambient air standards in column (g) of Table A at rates that exceed the thresholds in Table A of Wis. Admin. Code § NR 445.07, for the corresponding stack height category. The department performed dispersion modeling analyses as part of the review for this permit to predict the facility's potential impact on ambient concentrations of these hazardous air contaminants. See the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169 (Appendix B).

The results of the dispersion modeling are summarized in dispersion modeling memoranda dated March 15, 2019. The dispersion modeling analyses predict that the source impact will not cause or exacerbate a violation of the ambient air quality standards/ambient air increments, taking into consideration background concentrations. Assuming the emission rates and stack parameters listed in their respective tables at the end of the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169, air quality standards and increments will be attained and maintained for PM_{10}, $PM_{2.5}$, SO_2, NO_X, and CO (Appendix B).

4.2.1.4. Additional impacts analysis

Growth Impacts

The construction of NTEC would result in temporary air quality impacts but should not result in an increase in the permanent workforce in the area. The temporary increase of emissions due to construction could be minimized by performing regular maintenance on construction equipment, reducing engine idling time, and controlling release of fugitive dust. Materials transportation, equipment, and supplies would be needed, but this would not be expected to have a measurable effect on residential, commercial, or industrial growth.

Soils and Vegetation Impacts

Particulates can be detrimental to vegetation or soils in the immediate vicinity of the source, but the effect of particle deposition on a plant or soil is difficult to measure. Experimental evidence indicates that deposition of common particulate materials on leaf surfaces results in less harm to plants than absorption of phytotoxic gases. At the level of the modeled concentration, it is unlikely that the increase of emission would impact either vegetation or soils near NTEC.

Visibility Impairment Analysis

Any facility emitting SO_2, PM_{10}, and/or NO_x may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. Near the proposed project site, under certain meteorological conditions, the stacks would emit a visible steam plume that, after traveling a relatively short distance, would dissipate by dispersion and evaporation. A visible steam plume would be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed and the time required for evaporation.

4.2.1.5. Best Available Control Technology

The department has determined the BACT for each emissions unit.

For the Siemens SGT6-8000H combined-cycle turbine with diesel fuel oil back-up [Maximum continuous rating: 3,665 MMBtu/hr HHV when combusting natural gas, 3,021 MMBtu/hr, HHV when combusting diesel fuel oil] with a 1,006 MMBtu/hr natural gas-fired duct burner, the BACT determinations proposed for the draft permits include the following requirements: efficient design, emissions limitations, restrictions to only combust pipeline natural gas and fuel oil with no more than 15 ppm sulfur content, good combustion practices according to the manufacturer's recommendations, selective catalytic reduction, water injection, low-NO_X burners, a restriction on the quantity fuel oil combusted, an oxidation catalyst, time, and mass restrictions on start-up and shutdown.

For the 100 MMBtu/hr natural gas fired auxiliary boiler, the BACT determinations proposed for the draft permits include the following requirements: only combusting pipeline quality natural gas, emissions limitations, operation and maintenance according to the manufacturer's recommendations, periodic tune-ups, ultra-low NO_X burners, flue gas recirculation, and an oxidation catalyst.

For the 12-cell cooling tower, the BACT determinations proposed for the draft permits include the following requirements: limitations on total dissolved solids, drift rate, and emissions.

For the two 10 MMBtu/hr heaters, the BACT determinations proposed for the draft permits include the following requirements: operation and maintenance according to the manufacturer's recommendations, only combusting pipeline quality natural gas, emission limitations, low-NO_X burners, and periodic tune-ups.

For the 282 hp emergency diesel fire pump, the BACT determinations proposed for the draft permits include the following requirements: a restriction to only combust fuel oil with no more than 15 ppm sulfur content, operation and maintenance according to the manufacturer's recommendations, emissions limitations, a restriction to 500 hours per each 12 consecutive calendar months, and being certified by the manufacturer to EPA's criteria for Tier 3 reciprocating internal combustion engines.

For the 1,490 hp emergency diesel generator, the BACT determinations proposed for the draft permits include the following requirements: a restriction to only combust fuel oil with no more than 15 ppm sulfur content, operation and maintenance according to the manufacturer's recommendations, emissions limitations, a restriction to 500 hours per each 12 consecutive calendar months, and being certified by the manufacturer to EPA's criteria for Tier 2 reciprocating internal combustion engines.

For the diesel fuel tanks, the BACT determinations proposed for the draft permits may include the following requirements: use of fixed roof tanks and equipped with pressure relief valves, performing

submerged-filling or bottom loading only, only storing diesel fuel, and for transfers to storage tanks having greater than 1,000-gallons capacity, a permanent submerged fill pipe.

4.2.1.6. Criteria for air permit approval

Wisconsin Stat. § 285.63 sets forth the specific language for permit approval criteria. DNR finds that:

- The source will meet emission limitations.
- The source will not cause nor exacerbate a violation of an air quality standard or ambient air increment.
- The source is operating or seeks to operate under an emission reduction option. Not Applicable.
- The source will not preclude the construction or operation of another source for which an air pollution control permit application has been received.

In addition to meeting the above criteria, all major source construction or major modification located in attainment areas must meet the following criteria for permit approval. For this source, DNR finds that:

- The source will apply BACT for each applicable air contaminant.
- The effects on air quality as a result of the source and the growth associated with the source were analyzed.
- The source will not adversely affect the air quality related values of any federal Class I prevention of significant deterioration area.
- The permit applicant agrees to conduct monitoring specified by the department as necessary to determine the effect of the source on air quality, if applicable.

4.2.1.7. Greenhouse gases

GHGs would be emitted by the project during operation, as seen in Table 4-8.

GHGs would be emitted by the project during operation. Potential impacts of GHG emissions on global climate change and its potential effects are described in the reports of the Intergovernmental Panel on Climate Change, the scientific body set up by the World Meteorological Organization and the United Nations Environment Programme to provide an objective source of information about global climate change.[15] Potential impacts worldwide and in Wisconsin, including costs of mitigation, were summarized in the environmental impact statement issued in 2008 that discusses WP&L's proposed Nelson E. Dewey Generating Station Unit 3.[16] A scan of news sources shows that developments and research worldwide are identifying more and not less of the potential impacts since these publications were issued.

Global warming potentials of the various GHGs are widely different and are measured and calculated as CO_2 equivalents (CO_{2e}). For example, the global warming potential of N2O emissions is 310 times that of CO_2, so N2O emissions are also given as CO_{2e}. Table 4-7 shows the relative CO_{2e} multipliers for the variety of GHGs.

[15] For example, the website of the Intergovernmental Panel on Climate Change provides an objective source of information and reports about global climate change - https://www.ipcc.ch/.
[16] Public Service Commission of Wisconsin and Wisconsin Department of Natural Resources. *WP&L 300 MW Power Plant Final Environmental Impact Statement.* PSC docket 6680-CE-170. July 2008, pp. 135-152.

Table 4-7 Relative CO_{2e} impact multipliers for the global warming potential of GHG components

GHG Component	Multiplier
CO_2	x 1
CH_4	x 21
N_2O	x 310
Total hydrofluorocarbons	x 11,700
Perfluorocarbon gases	x 6,500
SF_6	x 23,900

CO_2 and CH_4 would comprise most of the GHGs emitted from the combined-cycle plant, and they would be emitted mostly from the CT. Maximum GHG emissions based on 100 percent full-load operation over 8,760 hours per year, are listed in Table 4-8.

Table 4-8 Estimated maximum GHG emissions from 100 percent full-load operation, in tons/year

Pollutant	CT (normal operation)	Auxiliary Boiler	Natural Gas Heater #1	Natural Gas Heater #2	Emergency Generator	Fire Pump	Total for Facility
CO_2	2,170,474	51,236	5,124	5,124	838	79.5	2,232,876
CH_4	1,177	0.97	0.10	0.10	0.034	0.0032	1,540
N_2O	1,539	0.097	0.01	0.01	0.0032	0.00064	1,177
SF_6	---	---	---	---	---	---	---
Total CO_{2e}	2,658,511	51,289	5,129	5,129	841	80	2,720,978

As with the criteria pollutants, the facility would not run at maximum capacity every hour of the year so estimated emissions based on the expected capacity factor would give a more realistic picture of the actual emissions. Table 4-9 lists estimated emissions using the expected 47.5 capacity factor.

Table 4-9 Estimated GHG emissions at 47.5 percent capacity factor, in tons/year

Pollutant	CTs (normal operation)	Auxiliary Boiler	Dew Point Heater	Emergency Generator	Fire Pump	Total for Facility
CO_2	1,451,911	50,724	7,342	797	86	1,510,860
CH_4	21.3	0.96	0.14	0.03	0.004	471
N_2O	2.1	0.10	0.01	0.006	0.0007	694
SF_6	---	---	---	---	---	16
Total CO_{2e}	1,453,017	50,773	7,349	800	87	1,512,041

Natural Gas Extraction

Indirectly, the extraction of the natural gas fuel from the earth has potential environmental impacts as well, far removed from the actual proposed power plant site. The NTEC would not be the only natural gas customer in the U.S. but would be a large one with what would be a contract for firm supply of enough natural gas to produce 550 MW of electricity.

Natural gas has mainly been, and continues to be, extracted from the earth through vertical or horizontal drilling. These techniques create impacts from the drilling and removal and storage of rock, from the industrial modification of the drilling site, and from the flaring of natural gas until the drilling and extraction are stabilized.

Natural gas supply has enjoyed a production renaissance because of the development of hydraulic fracturing, or fracking, which includes techniques to obtain natural gas from more difficult locations in shale rock by injection of pressurized water with sand and thickening agents to fracture the rock and free the gas. When the hydraulic pressure is removed from the well, the sand grains hold the fractures open. Being more complicated than simply drilling, fracking operations have a larger footprint at a well site. They also utilize

large amounts of water and of materials that could have public health implications downstream, or down-gradient in groundwater. The fractured rock also creates a potential for seismic events like small earthquakes.

More distant adverse impacts to air, lands and waters as a result of fracking to obtain natural gas would continue to be related at least indirectly to the construction and operation of any new, large natural gas consumer such as the proposed NTEC project. Adverse impacts to lands in western Wisconsin where frack sand is mined would continue to be related in a similar way to the extent that this most-preferred fracking sand was purchased. If this sand became too expensive, less perfect fracking sand would be mined elsewhere with similar impacts.

Also more indirectly, emissions of GHGs that are not countered by resequestering carbon in the necessary timeframe could contribute to the potential for more rapid and intense global climate change and its subsequent potential environmental ramifications.

The most desired sand to utilize in fracking is found in western Wisconsin because of its geological history of sea coverage. Several frac sand mines have developed on lands around the state. These mines require the removal of "overburden" including the soils and plants above the sand. The land from which the sand has been removed is also removed from any further farm or forest production.

4.2.2. Solid wastes

The project would generate solid waste during construction and operation in the form of construction debris and employee-generated waste. The applicants propose using a local landfill for disposal of such waste. Recycling pickup services are anticipated to be provided by a local disposal company. The applicants do not anticipate any of the solid waste generated from construction or operation activities to qualify as "hazardous waste" according to state or federal law. Waste handling and disposal would be the same for either proposed site alternative. The applicants do not anticipate that DNR solid waste or landfill permits would be required.

In addition, oil based wastes would be generated by the proposed NTEC plant. The oil contaminated gravity drain system would collect waste liquid which has the potential of containing quantities of oil and conveys the waste through an oil/water separator. Oil water separator effluent would be pumped through a polishing coalescing filter and discharged to water treatment building sump for reuse. The oil/water separator would be designed to remove 20 micron and larger oil droplets to concentrations of less than 10 ppm. It would be designed to store 1,000 gallons of oil. The oil/water separator would be constructed as a double walled buried tank and will have a leak monitor to detect a breech in the inner tank wall. The tank would be cathodically protected.

Any oil collected would be pumped out as required for disposal. Oil water separator effluent would be pumped through a polishing coalescing filter and discharged to water treatment building sump for reuse.

In volume II, Appendix G of the application, the applicants provided a spill prevention control and countermeasures plan for the proposed power plant site.

4.2.3. Geology

The Hill Avenue Site is located in the Lake Superior Lowland physiographic province, an area of about 1,250 square miles in northwestern Wisconsin covering portions of Douglas, Bayfield, and Ashland counties. An additional 2,400 square miles is submerged beneath the waters of Lake Superior. Its altitude ranges from less than 1,000 feet above to about 300 feet below sea level, and it rises 150 to 350 feet above

and goes 600 to 900 feet below the level of Lake Superior, which stands at 602 feet above sea level. The Lake Superior basin is now a lowland because of the downward movement of a block of the earth's crust in a rift, or graben fault. Subsequent sedimentation, erosion, and sculpting by continental ice sheets have reshaped the area and notably modified the rift valley.

Bedrock consists of Precambrian-age rock. Igneous and metamorphic types make up the bedrock that is present to the north of Superior and the Lake Superior Lowlands. Bedrock underlying Superior consists of sandstone of the Precambrian Orienta Formation of the Bayfield Group. The erosion surface of the Precambrian bedrock is overlain by unconsolidated Quaternary glacial, glaciofluvial, and alluvial deposits that consist of clay, silt, sand, and gravel, with fine-grained sediment predominating.

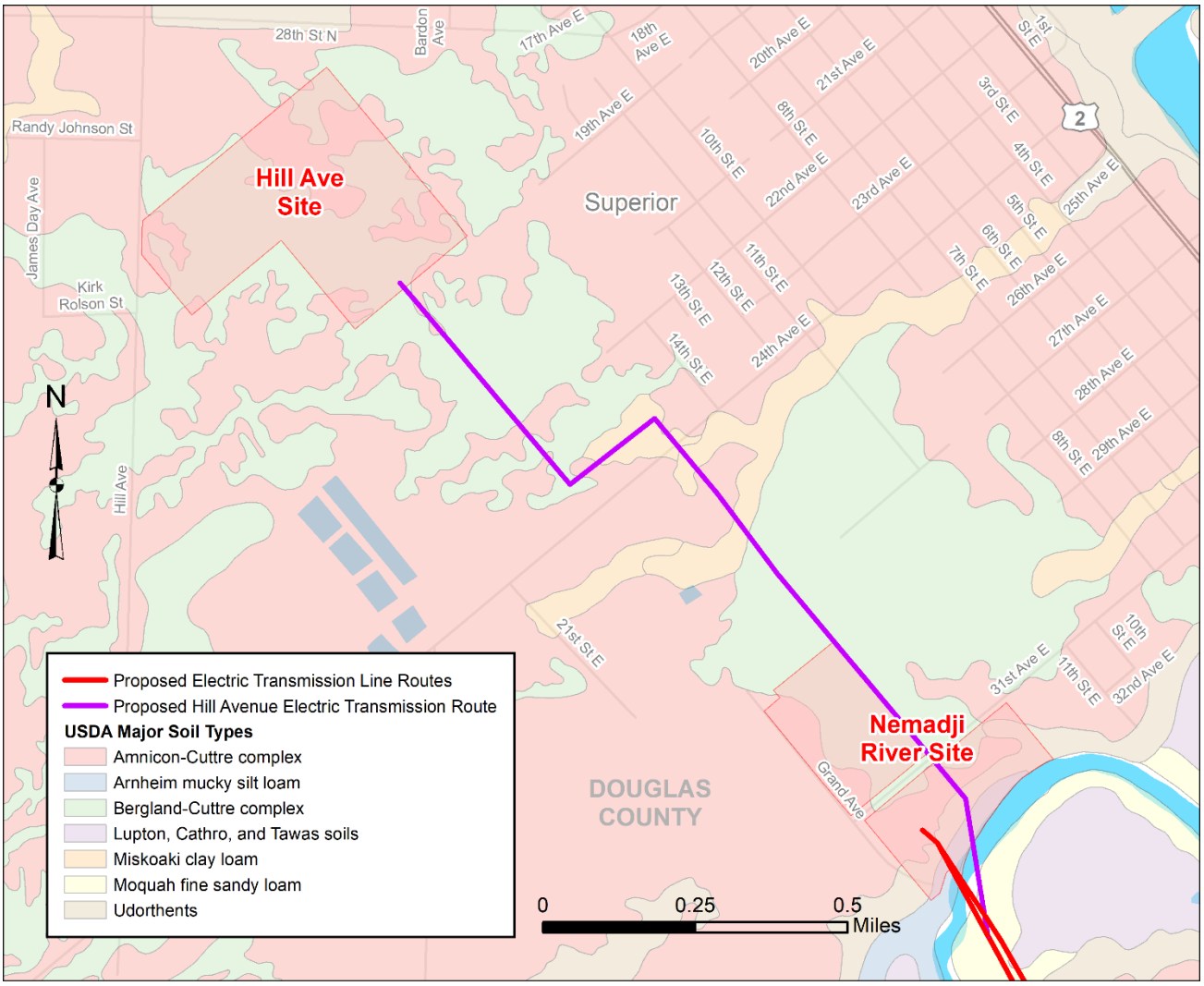
The regional aquifer near the City of Superior consists of a thick unit of glacial deposits that are comprised of clay, silt, sand, and gravel. These glacial deposits directly overlie Precambrian age sandstone bedrock. The bedrock units in Douglas County are not considered aquifers due to their low yield and mineralized water quality. The thickness of the glacial materials is variable through the county and generally increases towards Lake Superior, with a maximum thickness of over 600 feet near the St. Louis River. The maximum thickness of the glacial deposits at the Alternative Sites is approximately 280 feet.

Construction work would impact soil through earthwork and regrading of the project site. Although heavy construction equipment would be used, the applicants have stated that, based on the amount of excavation required, and the type of substrate at the site, construction of the project is not expected to affect geological formations at the Hill Avenue Site.

4.2.4. Topography and soils

According to the USDA NRCS Web Soil Survey, a total of four different soil types are mapped within the vicinity of the Hill Avenue Site. The four soils are Bergland-Cuttre complex; Amnicon-Cuttre complex; Arnheim mucky silt loam; and udorthents, ravines, and escarpments. Amnicon-Cuttre complex soils are nearly level to gently sloping, moderately well drained to somewhat poorly drained soils on glacial till plains. The water table depth for this soil is 12 inches. The soil profile consists of silty clay loam and clay. Figure 4-2 shows the soils present within and surrounding the Hill Avenue Site.

Figure 4-2 Soils present within the vicinity of the Hill Avenue Site



The elevation in the vicinity of the Hill Avenue Site ranges from approximately 600 to 650 feet above mean sea level. The land in the vicinity of the Hill Avenue Site is relatively flat, sloping slightly to the northeast.

Although the area in which the NTEC plant would be built is relatively flat, the surrounding area exhibits significantly more topographic relief. Flatter areas are poorly drained, and the red clays in the area are generally at or near 100 percent saturation. The site would be graded and grading design would change the topography to facilitate stormwater drainage patterns.

The slope leading to the Nemadji River is highly susceptible to erosion. Slopes in this region often erode due to natural forces and events. In many areas slopes can gradually recede over time. Disturbance of the vegetation on the slope or changes in stormwater drainage patterns can lead to the development of fissureson the slope face, causing loss of soil into the Nemadji River. This kind of erosion can have a negative impact on the Nemadji River and would also damage and alter plant and animal habitat down and along theslope face. Once formed, fissures can expand very quickly, especially during heavy rain fall. Because of theslope and type of soil in this area, fissures are very difficult to control and repair.

4.2.4.1. Special construction considerations due to soil conditions

Because many of the soils in the near the Nemadji River Site are very susceptible to erosion, construction in areas with steep slopes can lead to environmental impacts. Specifically, there is a high risk for impact to natural resources, including an environmental corridor located along the slopes of the Nemadji River. Construction on the Nemadji River Site could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan, such as the applicants proposed Erosion Control and Storm Water Management Plan (ECSWMP) is prepared, approved prior to construction, and rigorously followed during construction.

A preliminary geotechnical investigation report, submitted by the applicants, recommends the upper 5 feet of the proposed plant area be removed and replaced with suitable fill material. That would require approximately 499,000 cubic yards of excavation with disposal offsite and approximately 499,000 cubic yards of imported fill material. The power block area would be raised approximately 4 feet after the 5 feet of over- excavation is replaced. This would require approximately 400,000 cubic yards of imported fill material. The source of the potential fill is uncertain at this time. Importing fill from other locations could have the potential to introduce invasive species and other contaminants or pests. There would be some excavation for underground utilities and deep structures such as pump pits and the suitable material from these excavations would be used for trench backfill and site grading. The stormwater pond would require approximately 81,000 cubic yards of excavation with disposal offsite.

According to the information in the CPCN application, the Hill Avenue Site would be graded, and the topography changed to facilitate stormwater drainage patterns. For this project, the applicants have developed a planning document that addresses both erosion and stormwater control. Stormwater runoff would be collected and directed to a new stormwater detention pond located in the northeast corner of the site. The new pond would be pumped, and stormwater would be discharged at existing surface grade to the east/northeast to a stream that discharges to Superior Bay. This pond would also be used as a sediment basin during construction to remove sediment loads from stormwater runoff in accordance with Wis. Admin. Code § NR 151.11(6m)(b)2, which states that construction sites may discharge no more than 5 tons per acre per year, or to the maximum extent practicable, of the sediment load carried in runoff from initial grading to final stabilization. Following site stabilization, the pond would be cleaned out and converted to a wet detention basin, designed to reduce the total suspended solids load by at least 80 percent, based on an average annual rainfall.

BMP erosion control techniques would be used to mitigate soil impacts. Topsoil would be kept separate from subsoils and would be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked prior to final stabilization. The SWMTS from DNR would be used during construction and operation.

Additionally, the applicants must obtain, prior to initiating any land-disturbing construction activities within the boundaries and jurisdiction of the City of Superior, an Erosion Control/Grading Permit and Storm Water Management Permit from the Public Works Department. The application requirements include the permit application forms, an Erosion and Sediment Control Plan, Storm Water Management Plan, and the required fees.

4.2.4.2. Impacts during and after construction

BMP erosion control techniques would be used to mitigate soil impacts. Topsoil would be kept separate from subsoils and would be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked

prior to final stabilization. The Storm Water Management Technical Standards from DNR would be used during construction and operation.

During construction, portions of the Hill Avenue Site would be cleared, grubbed, graded, excavated, and revegetated. The applicants stat that in areas not impacted by these activities, existing vegetation would be preserved where practicable. The amount of soil exposed during construction would be minimized. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with WDNR Technical Standard 1059–Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and Wisconsin Department of Transportation (WisDOT) Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where land-disturbing activities would not be performed for a period greater than 14 days. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

During construction, steps would be taken to prevent excessive emissions of particulate matter resulting from construction activities and vehicular traffic. These steps may include compacting, seeding, covering, paving, wetting, sweeping, or otherwise controlling particulate matter emissions.

Post-construction, the areas disturbed during construction would receive final cover to eliminate dust. All exposed soil areas would be seeded to grow grass, lesser-traveled road surfaces would be graveled and compacted, and the new main roads on-site would be surfaced with asphalt. The roads would be monitored and either wetted or swept to clean any fugitive dust that may occur due to on-site wheeled traffic.

Descriptions and potential impacts to natural resources in the vicinity of the Hill Avenue Site are discussed in Sections 4.2.5 through 4.2.8..

4.2.5. Upland cover types

Upland land cover discussed in this final EIS include forests, grasslands and meadows, and agricultural lands. Although wetlands may be broadly mentioned in this section, they are discussed separately, in greater detail, in the water resources sections of this final EIS. In general, agricultural lands are not a major component of the landscape in the vicinity of the proposed NTEC location.

4.2.5.1. Upland cover types present in the vicinity of the Hill Avenue Site

The existing vegetation communities in the vicinity of the Hill Avenue Site consists almost entirely of lowland shrub/scrub wetlands. Grasslands and forested land cover is minimal within the site; thus, construction of the NTEC plant at the Hill Avenue Site is not expected to impact these resources. See Section 4.2.6.2 for further discussion regarding existing wetlands and anticipated impacts.

4.2.5.2. Applicants' proposed re-vegetation plan

The following describe the re-vegetation and site restoration plan for the proposed project.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard

1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 30 days, but vegetative cover is required for less than 1 year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been disturbed would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected at least weekly to monitor vegetative growth until final stabilization is achieved.

4.2.6. Water resources

Water resources discussed in this section include surface waters, such as wetlands, waterways, and floodplains. Other water related topics discussed in this section include the proposed supply, use, and discharge of water associated with the construction and operation of the NTEC plant at the Hill Avenue Site.

4.2.6.1. Surface waters

Surface waters included in the following sections include wetlands, waterways, and floodplains. Figure A-1 provided in Appendix A of this final EIS shows the locations of surface waters in the vicinity of the proposed NTEC plant.

Wetlands

Wetlands provide vital functions that benefit society. Wetlands detain stormwater runoff, enabling the slow recharge of groundwater resources and lowering downstream peak flood levels; filter sediments and pollutants from the air, precipitation, and upstream sources which results in higher water quality downstream; provide food, cover, and nesting habitat for many species of fish and wildlife; provide a recreational opportunity for bird watching and other wildlife viewing, hiking, and enjoying the aesthetics of the surrounding landscape. It is estimated that between one-quarter and one-third of all rare species in Wisconsin are found in wetlands.

Wetlands are a dynamic ecosystem and provide different functions depending on the type of wetland. The same wetland may even provide different functions from year to year and season to season. There are many different types of wetlands, typically characterized by the size, type of vegetation and amount of soil saturation or surface water found within them. Figure A-1 in Appendix A of this final EIS shows the wetlands present within the vicinity of the proposed NTEC plant.

Wetlands Within and Adjacent to the Site

Wetlands were identified during wetland delineations conducted in the 2016 and 2017 growing seasons. A WRAM assessment was conducted by the applicants to document the overall quality of the wetlands. However, the wetland quality data taken during the field investigations was not taken for each individual wetland, and therefore may be over-generalized.

One wetland was identified within the Hill Avenue Site, an alder thicket, which encompasses the entire site boundary. This wetland provides values of supporting habitat for rare species, birds, amphibians, and other wildlife; and flood water storage. Due to the presence of invasive species and the degraded nature due to the presence of nearby roads and industrial areas, this wetland was documented to be of low to medium quality. Wetlands also exist surrounding the site.

Wetland Impacts and Minimization

The construction of the Hill Avenue Site would permanently fill a total of 34.27 acres of wetland. The entirety of the laydown portion of the site boundary contains wetlands. The laydown area would initially be cleared of vegetation and trees, then topsoil would be removed and stockpiled, and suitable fill material placed to create a level area. Once construction is complete, the fill material would be removed, the stockpiled topsoil would be re-spread, and the area restored to pre-existing elevations and revegetated. This laydown yard would impact 34.32 acres of wetland, for a duration of up to 3.5 years. In total, 68.59 acres of wetland would be impacted by the Hill Avenue Site. Post-construction monitoring of the laydown area should be conducted to ensure the area reverts back to wetland conditions.

Section 2.1.4 discusses the regional site selection process and the local limitations that were factored into the site selection process. Despite efforts to completely avoid wetland impacts, the region is considerably dense with large wetland areas such that avoidance is not entirely feasible. If wetland fill cannot be avoided due to logistical and engineering constraints, wetland fill should be minimized as much as possible by minimizing or modifying the footprint of the site and associated components like storage and parking areas to utilize upland areas.

Construction activities, such as grading and vegetation clearing, and the creation of new impervious surfaces has the potential to impact adjacent wetlands by causing sedimentation, spreading invasive species, increasing runoff, and decreasing flood storage. Direct and secondary impacts to adjacent wetlands can be minimized by the following:

- Effective, site-specific sediment and erosion control measures and devices should be installed prior to construction activities and maintained during construction and restoration phases;
- Marking the boundary of areas to be disturbed;
- Prepare and implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project;
- Construct ponds and sediment basins as soon as possible, and ensure all permanent post-construction stormwater management practices are designed to accommodate the additional runoff from the new impervious surfaces and the loss of flood storage caused by permanently filling wetlands
- Revegetate disturbed areas and areas of exposed soil as soon as possible, and seed with a cover crop and/or native seed mix to help prevent the establishment of invasive species;

- Prepare and implement an invasive species management plan that identifies known areas of invasive species populations and addresses site restoration activities and includes equipment decontamination protocols to minimize the spread of invasive species.

Wetland Permitting

DNR is responsible for regulating the discharge of dredge and fill material into wetlands under Wis. Stat. § 281.36 and Wisconsin Administrative Code. USACE might also require a permit under Section 4040 of the Clean Water Act. The DNR and/or the USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations. Wetland compensatory mitigation would be required for unavoidable wetland impacts associated with the overall project. Compensatory mitigation involves the restoration, enhancement, creation or preservation of wetlands to compensate for unavoidable adverse impacts to wetlands from a proposed project. As part of the permitting process, DNR and USACE would review the wetland impacts to determine the appropriate compensatory mitigation credit for the project prior to the start of construction. This determination is based on the amount and type of wetland impact and is consistent with federal regulations. There are three avenues for satisfying compensatory mitigation requirements, including: (1) wetland mitigation banking, which requires the permittee to purchase bank credits from a mitigation bank sponsor approved by DNR, (2) in-lieu fee, which involves purchasing compensatory credits from DNR, and (3) permittee responsible mitigation, which requires the permittee to complete a wetland mitigation project approved by DNR.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also their own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

Waterways

The Hill Avenue Site is located approximately 1 mile from Lake Superior. Based on desktop mapping resources and field investigations conducted in 2016 and 2017, there are no waterways are located within or immediately surrounding the site. Waterways present in the vicinity of the proposed NTEC plant are shown in Figure A-1 in Appendix A of this final EIS.

Floodplains

The site is not located within mapped floodplain.

4.2.6.2. Water withdrawals

High Capacity Wells

The high capacity wells would be located in the same locations as the preferred site, approximately 1.2 miles southeast of the Nemadji River. The alternative site would include construction of five non-potable high capacity wells, each with a projected capacity of 750 GPM, for a total of 5.4 MGD from groundwater within the Lake Superior Basin. The wells would be constructed with casing that extends through the surficial clay layer, screened with the sand and gravel aquifer,, above the Precambrian sandstone. DNR reviews and issues approvals for high capacity wells under § 281.34 and Wis. Admin. Code ch. NR 812. For new withdrawals at this volume (at least 1 MGD for any 30 consecutive days) in the Great Lakes basin, the applicant would need to obtain a Water Use Individual Permit under Wis. Stat. § 281.346(5), and Wis. Admin. Code ch. NR 860.

The anticipated instantaneous water demand for NTEC would range from ,350 GPM (3.4 MGD) to 2,875 GPM (4.1 MGD). Average annual use is estimated to be 2.9 MGD—a conservative estimate based on 8,760 hours of operation, including duct firing 5 days per week, 16 hours per day.[17]

As a supplement to the high capacity well application, the applicants submitted a groundwater flow model report and a report describing a pumping test that was conducted in 2014. The groundwater flow model was developed to evaluate changes in groundwater levels during steady state conditions, using four of the five proposed wells to produce an average of 2.9 MGD. The model relies on a conceptual model that assumes a productive sand and gravel aquifer below a clay layer and above sandstone. The applicants' groundwater modeling results[18] imply no impacts to nearby groundwater wells and surface waters. Prior to developing their own conceptual model, DNR's preliminary high capacity well analysis indicated the potential for impact to reviewable resources under Wis. Stat. § 281.34. DNR used well construction reports and the results from the applicants' 2014 pumping test to develop their conceptual model. The pumping test ran for 93 hours at 1,000 GPM. The results indicate 65 feet of drawdown in the pumping well and 27 feet of drawdown at monitoring well MW-04, approximately 150 feet away. Residual drawdown was five feet in all monitoring wells after four days of recovery. Drawdown data from the pumping test show an increase in the slope of drawdown versus time, which indicates a boundary condition that DNR interpreted to be clay. There appears to be discrepancies in the conceptual model developed by the applicant, and that developed by DNR.

Specifically, DNR disagrees with the applicants' assumption that there is a thick, laterally continuous sand and gravel deposit that could supply an average of 2,000 GPM (2.9 MGD). DNR analysis of well construction reports indicate that offsite unconsolidated deposits are predominantly clay. This means that the pumping impact from the proposed wells would be isolated within the sand and gravel lens found beneath the Nemadji River site. While DNR's conceptual model suggests that it is unlikely that the proposed high capacity wells would impact existing private or municipal wells, or surface waters, it also suggests that there is not a sustainable groundwater source at either site for this proposed facility. The DNR's memorandum dated September 20, 2019, describes DNR's conceptual model and how it was developed for this project. The applicants have proposed collecting additional information in the form of additional soil borings and another pumping test with the intent of demonstrating the presence of a sustainable source of groundwater for the project.

[17] Application for Water Loss Approval for the Nemadji Trail Energy Center, Docket Number 9698-CE-100, Final, Burns and McDonnell, December 13, 2018.
[18] Id.

Water Use and Water Loss

The primary water uses for the project would include: steam cycle water, cooling tower water, NO_X, injection water, evaporative cooling water and service water. The water systems would be designed to maximize water reuse and recycling, minimize water consumptive and manage water quality within the plant systems.

The main water use would be heat rejection from the steam cycle through the cooling tower. The water from the high capacity wells would be solely for plant processes (raw makeup water) and not used for potable water supply. Raw water would be stored on-site in a new 550,000-gallon service water tank which would allow for 32 hours of service water usage.

The proposed project would consume water through evaporation and draft from the cooling tower, losses from the steam cycle and inlet air evaporative cooling. Approximately 95-96 percent of the total water loss would be from evaporation and drift.

Projects that result in water loss averaging 2 MGD over any 30-day period require a water loss approval under Wis. Stat. § 281.35. NTEC estimated average daily water loss based on monthly plant operation between 1.73 MGD and 3.97 MGD (Table 4-10).

Table 4-10 Estimated monthly average volume and rate of water loss[1]

Month	Water Loss Rate (when operating) GPM	Average Operating Hours	Average Water Loss MGD
January	2051	468	1.86
February	2158	493	2.28
March	2309	490	2.19
April	2463	351	1.73
May	2664	443	2.28
June	2814	621	3.50
July	2871	705	3.92
August	2870	714	3.97
September	2723	571	3.11
October	2540	531	2.61
November	2265	553	2.50
December	2091	485	1.96

In order to issue a water loss approval, according to Wis. Admin. Code § NR 142.06(3), DNR will need to determine the following:

(a) That no public or private water rights in navigable waters will be adversely affected;
(b) That the proposed withdrawal does not conflict with any applicable plan for future uses of the waters of the state, including plans developed under ss. 281.12 (1) and 283.83, Wis. Stats., and any water quantity resources plans prepared under s. 281.35 (8), Wis. Stats.
(c) That both the applicant's current water use, if any, and the applicant's proposed plans for withdrawal, transportation, development and use of water resources incorporate reasonable conservation practices;
(d) That the proposed withdrawal and uses will not have a significant adverse impact on the environment and ecosystem of the Great Lakes basin or the upper Mississippi river basin;
(e) That the proposed withdrawal and uses are consistent with the protection of public health, safety and welfare and will not be detrimental to the public interest; and

(f) That the proposed withdrawal will not have a significant detrimental effect on the quantity and quality of the waters of the state.

As noted in the High Capacity Well section above, based on DNR's review of the applicants' 2014 pump test data and DNR hydrogeologists' high capacity well review, the proposed withdrawal volumes and associated water loss could deplete the water-bearing portion of this aquifer. Based on these data, the proposed NTEC wells may potentially impact one private golf course well (Wisconsin Unique well Number - TJ253) and any private wells, if connected to the same sand and gravel lens. The clay deposits limit aquifer recharge, therefore withdrawing groundwater at the proposed rates could significantly impact the quantity of groundwater in this area. The applicants have proposed to complete another pumping test and additional well borings in the area to verify their conclusions of a more laterally-extensive water-bearing aquifer. However, DNR's current conceptual model suggests that this aquifer is not productive enough to sustain the withdrawals required for this project. For this reason, as part of the water loss approval application, DNR requested the applicants consider other water source alternatives.

Potable Water

Potable water would be sourced by SWL&P. Water for potable uses include: drinking fountains, washrooms, showers, eye-washing stations, toilet facilities and water for fire protection. A 6- to 8-inch diameter buried water pipeline would connect to SWL&P's existing municipal water supply system. The tie-in would occur along Hill Avenue on the west side of the site. The potable water system would provide a pressurized water supply and would be constructed to confirm to NSF/ANSI Standard 61 Drinking Water Standards.

SWL&P's water source is surface water from Lake Superior. SWL&P operates a network of well screens buried in the sand on the lake side of Minnesota Point. SWL&P can also purchase raw water from the City of Cloquet water line. The Cloquet intake extends into Lake Superior approximately two miles from the Minnesota Point shoreline.

The daily average water use for the SWLP system from 2010-2017 is summarized in Table 4-11.

Table 4-11 SWLP water use by year[19]

Year	Water Use (million gallons per day)
2010	2.94
2011	2.93
2012	3.02
2013	3.28
2014	2.86
2015	2.83
2016	2.66
2017	2.63

Based on these average daily water usage rates, the proposed project needs for potable water supply would have minimal impacts on the SWL&P water withdrawals.

[19] Source: State of Minnesota annual water use reporting information: https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html

Wastewater discharge

All wastewater, MF/UF backwash, RO reject water, and cooling tower blowdown would be piped offsite to be treated by the City of Superior's wastewater system. Wastewater discharges directly to surface water from the proposed project are not anticipated. The discharge would be sent to the City of Superior wastewater treatment plant through a new sewer lateral. The City of Superior has a Department approved Pretreatment Program and will be the "control authority" for the NTEC power plant. As such, the City of Superior is authorized to issue pretreatment permits to industrial dischargers in accordance with Chapter 114, Article II of the City of Superior, Wisconsin Code of Ordinances and Wis. Admin. Code ch. NR 211.235. The City of Superior would issue the NTEC facility an individual wastewater discharge permit which will authorize an average and/or maximum monthly flow rate and require NTEC wastewaters to comply with all categorical pretreatment standards, local limits, and prohibitions set out in Wis. Admin. Code chs. NR 211 and 290 and Section 114-26, Article II of the City of Superior, Wisconsin Code of Ordinances. Additionally, the individual wastewater discharge permit issued by the City of Superior would specify other requirements such as monitoring and sampling locations. RO reject water must be considered when establishing the sample point location as it is considered dilutional flow and could affect whether NTEC is in compliance with its specific discharge limits.

The majority of the influent flow would be evaporated in the cooling tower and as such, the concentration of impurities in the remaining water would be increased. With additional cooling cycles and cycles of concentration, impurities in the wastewater would be concentrated approximately four to five times of what they were in the water immediately after its withdrawal from the collector well source as stated by NTEC in the CPCN. Process wastewater discharged from the cooling towers, known as cooling tower blowdown, would make up the majority of all wastewater discharged to the City of Superior. Cooling tower blowdown is expected to make up approximately 95 percent of the total amount of wastewater discharged. There would also be constituents from the water filtration and treatment operations that condition influent water present in the discharge to the City of Superior.

The chemical and physical attributes of the discharged waters, excluding sanitary wastewater, are provided below in Table 4-12 and are based on five cycles of concentration and the well water quality data received during onsite test well pumping. These values have been provided by NTEC and are found in the CPCN application. Sodium bisulfite is the only treatment chemical proposed for wastewater discharges. It is used as a reducing agent to remove total residual chlorine levels. Chlorine is used to control biological growth. If other additives are used, NTEC must notify the City of the quantities used and should demonstrate that they will pose no adverse effect to the City of Superior's wastewater treatment plant at the proposed level of usage.

Table 4-12 Combined cooling tower blowdown constituent concentrations on *95.5 °F day*

Parameter	Estimated Discharge Concentration (mg/L)	Estimated Mass Discharge (lbs/day)[2]
Total Alkalinity at $CaCO_3$	<175[1]	<1460.4
Calcium, Ca	<147	<1226.7
Magnesium, Mg	<45	<375.5
Sodium, Na	<419	<3496.6
Potassium, K	<17	<141.9
Sulfates, SO_4	<599	<4998.7
Chloride, Cl	<498	<4155.8
Silica, SiO_2	<51	<425.6
Total Dissolved Solids	<1808	<15087.8
Total Alkalinity as HCO_3	<213	<1777.5

[1] "<" indicates added margin

[2] Estimated mass discharged was calculated by multiplying the estimated discharge concentration by a daily maximum flow of 1 MGD, which would occur under the operation scenario of "Fired, Evaporative Coolers ON, 95.5 °F Dry Bulb Ambient"

The temperature of process wastewater discharged to the City of Superior wuold be approximately equal to the temperature of the cooling tower blowdown. The cooling tower blowdown temperature would range from 62 °F to 64 °F in the cold winter ambient scenarios (-34°F to 15°F) to about 88°F in the maximum summer ambient scenario (95.5°F). The expected effluent temperature values provided by NTEC are below the City of Superior's maximum temperature limit. This additional thermal load is not expected to cause or contribute to an exceedance of water quality standards for temperature at the City of Superior POTW's discharge to Lake Superior.

Drains around areas that contain equipment which could be contaminated with oil will be gravity fed to an oil/water separator prior to discharge. The oil/water separator would be designed to remove 20 micron and larger oil droplets to concentrations of less than 10 ppm. Effluent from the oil/water separator would be pumped through a polishing coalescing filter and discharged to the water treatment building sump for reuse. The separator would be designed to store up to 1,000 gallons of oil for later disposal as the need arises. The oil/water separator would be constructed as a double wall buried tank and will have a leak monitor to detect a breech in the inner tank wall. The tank would also be cathodically protected. The leak monitor would help NTEC fix any potential leaks immediately after they begin. To further deter any groundwater degradation, the oil/water separator must meet the minimum separation of 5 feet between the bottom of the structure and the higher of either bedrock or groundwater level per Wis. Admin. Code ch. NR 213.08(2)(c).

NTEC provided the following estimated daily average flows of industrial wastewater from the facility, under various operational scenarios. The average flows are included in Table 4-13:

Table 4-13 Estimated daily average flows of industrial wastewater

Operational Scenario[1]	Estimated Daily, Average Discharge Flow (cfs)[2]	Estimated Daily, Average Discharge Volume (gpm)[3]
Fired, Evaporative Coolers ON, 95.5 °F Dry Bulb Ambient	1.54	693
Fired, Evaporative Coolers OFF, Annual Average Ambient	1.16	522
Unfired, Evaporative Coolers ON, Maximum Ambient	1.12	504
Unfired, Evaporative Coolers OFF, Annual Average Ambient	0.76	343

[1]Design criteria assumes two cycles of concentration in the evaporative coolers and five cycles of concentration in the cooling tower
[2]cfs = cubic feet per second
[3]gpm = gallons per minute

All discharges to the sanitary sewer from the NTEC power plant would have to meet the requirements of the individual wastewater discharge permit issued by the City of Superior. Table 4-14 outlines the City of Superior's local limits for industrial dischargers:

Table 4-14 City of Superior industrial wastewater pretreatment limits

Pollutant of Concern	Discharge Quality Limit
Biochemical Oxygen Demand (BOD)	250 mg/L
Cadmium	1.15 mg/L
Copper	10.45 mg/L
Lead	15.20 mg/L
Mercury	0.02 mg/L
Oil and Grease	150 mg/L
Phosphorus	7.0 mg/L
Total Suspended Solids (TSS)	500 mg/L
pH (acceptable range)	5.5 – 9.5
Temperature	150 °F (65 °C)

Source: Section 114-26, Article II of the City of Superior, Wisconsin Code of Ordinances

All discharges from the NTEC power plant would also have to meet the Steam Electric Power Generating categorical pretreatment standards for new sources included within 40 C.F.R. § 423.17 and within Wis. Admin. Code § NR 290.22(2). The categorical pretreatment standards for new sources are included in Table 4-15 below. Federal and Wisconsin Administrative Code also include a pretreatment requirement that there may be no discharge of wastewater pollutants from fly ash transport water for new sources. This requirement was not included in the table below because fly ash is a product of coal combustion and as a natural gas power plant, no fly ash is expected to be present at the NTEC facility. No additional wastewater treatment is expected to be necessary to meet the City of Superior's discharge quality limitations or the Steam Electric Power Generating categorical pretreatment standards for new sources.

Table 4-15 PSES and PSNS effluent limitations in mg/L

Wastewater	Copper (total) Max. for any 1 day	Chromium (total) Max. for any time	Zinc (total) Max. for any time	Other Priority Pollutants Max. for any time
Chemical metal cleaning wastes	1.0			
Cooling tower blowdown[1]		0.2	1.0	nda

[1] Except as shown for total chromium and total zinc, discharge of cooling tower blowdown shall be limited to no detectable amount for the 126 priority pollutants contained in chemicals added for cooling tower maintenance.
[2] "nda" means no detectable amount.

The Hill Avenue Site would require an extension of Superior's sewer pipeline system from the central portion of the site to the tie-in location at Manhole 050314 (92° 4' 37.283"W, 46° 42' 6.6065"N), located northwest of the site along Hill Avenue. The proposed sewer pipeline would be 10 inches in diameter and composed of high-density polyethylene. The total route distance for the proposed Nemadji River Site includes approximately 1,000 feet to the tie-in location in Hill Avenue. Potential environmental impacts that could result from the sewer installation arise from stormwater runoff and excessive sedimentation. As such, if dewatering is expected then the pit/trench dewatering general permit will be needed and all requirements must be followed. Additionally, adequate erosion control measures such as but not limited to: silt fences, stormwater inlet protection, rock dams, and entrance/exit pads must be utilized when found necessary through the sewer installation to prevent excessive off-site sedimentation and stormwater runoff.

Due to site's proximity to Husky Refinery and the use of aqueous firefighting foam containing PFAS (per- and polyfluoroalkyl substances) during the fire and explosion that occurred on April 26, 2018, DNR intends to require that any dewatering discharges be screened for PFAS. If sample results indicate that PFAS is present, DNR may evaluate whether a secondary value limitation is warranted to protect human health and the environment.

4.2.7. Protected and listed species

This section discusses the potential impacts to endangered resources that may be affected by construction or operation of the proposed project along the Hill Avenue Site.

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0 mile buffer for aquatic species.

This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, would not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are taken from existing sources within DNR, including the NHI database, as well as external sources, including landowners and surveys completed by the applicants.

For specific route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this final EIS.

4.2.7.1. Plants

There are eight rare plant species that may have suitable habitat present within the Hill Avenue Site. In addition, at least five of these plant species have been observed within or immediately adjacent to this location. Conducting surveys to determine specific locations of these species is highly encouraged. If found, the best avoidance measure is to avoid areas where known plants occur; however, given that this is a construction project, is likely not feasible. Therefore, the best way to minimize impacts is to relocate plants from out of the project area to an area where these plants will likely not be impacted, preferably on state lands where these plants will be protected.

4.2.7.2. Herptiles (reptiles and amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of this segment. The Nemadji River is a suitable waterway for this species. Therefore, all work within 300 meters of the river is required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary. There is also a state special concern herptile which prefers wetlands and associated upland habitat for nesting. By following the Broad Incidental Take Authorization for the aforementioned species, would also help to protect this state special concern species.

4.2.7.3. Fish and aquatic invertebrates

One special concern dragonfly species may to be present within the wetlands that are within and adjacent to the project area and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts. One special concern dragonfly species is known to be present within the wetlands and Nemadji River that are within and adjacent to the project area and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

4.2.7.4. Natural communities

One wetland natural community is present within the project boundary. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

4.2.7.5. Invasive species

In compliance with Wis. Admin. Code ch. NR 40 Invasive Species Identification, Classification and Control Rule, the applicants would mitigate the potential to spread invasive plant species during project activities. The applicants would control any prohibited plant species identified onsite during inspection and monitoring activities and would minimize the spread of restricted plant species beyond their known boundaries throughout the duration of the project. The applicants would identify invasive plant species locations on the construction plans and flagged on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, the applicants would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools at the project site. The Owners may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to leaving the project site to reduce the risk of spreading invasive plant species beyond the site.

Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20, seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used at the project site would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

4.3. LOCAL COMMUNITY AND IMPACTS

Both of the proposed site locations for the NTEC plant are located in the City of Superior in Douglas County, Wisconsin. Potential impacts that could affect the local community as a result of NTEC being constructed at the Hill Avenue Site are discussed in the following sections.

4.3.1. Site history

The Hill Avenue Site is currently owned by Superior Refining Company, LLC. The applicants have an option to purchase the site. The applicants would acquire ROW on an additional 24.8-acre area that covers parcels owned by Lakehead Pipeline Company LTD and Enbridge Energy during construction. ROW easements would be acquired for other aspects of the project, including transmission line easements, railroad crossings, etc. Lastly, 1.74 acres of ROW and 8.58 acres of temporary easement would be acquired by SWL&P for the new natural gas lateral pipeline.

Based on a review of city directories (1964-2014), aerial photographs (1938-2015), topographic maps (1915-2013), and The EDR Radius MapTM Report with GeoCheck®, no evidence of past industrial activities on the Hill Avenue Site were identified. Based on historical topographic maps, the site has been marsh/swamp, and no agricultural or residential use on the site was identified. The only verifiable use of the site was historical use as a road, as Grand Avenue and another unnamed parallel road were present on the site from at least 1915 until at least 1993; however, these roads became overgrown sometime between 1966 and 1975. Other paths have been identified on the Hill Avenue Site at various times, but the additional information was not discovered using the above referenced sources.

4.3.2. Nearby populations, vulnerable groups, and environmental justice issues

The demographics of the population near the Hill Avenue Site are very similar to those presented in the discussion of the Nemadji River Site in Section 3.3.2. The Hill Avenue Site is within the City of Superior, Wisconsin, which has a population composition that is nearly 92 percent white, with small percentages of black or African American, American Indian, Asian, and other races. The demographic composition of the population present within a half mile of the Hill Avenue Site is similar. The median household income levels within the same area ranged from approximately $39,000 to $63,400, and the percentage of individuals living below the poverty level ranged from approximately 10 to 20 percent. Table 4-16 provides the population statistics by race for the City of Superior and census tracts within 0.5 mile of the proposed NTEC site locations.

Table 4-16 Population Characteristics – City of Superior and Census Tracts near the Hill Avenue Site

Demographic Group	City of Superior	Census Tract 204	Census Tract 205	Census Tract 208	Census Tract 209	Census Tract 210
Total population	26,676	3,192	2,974	3,344	2,286	1,731
White	91.7	92	89	88.6	93.4	89.1
Black or African American	1.7	1.2	3.8	1.3	1.6	4.2
American Indian and Alaska Native	1.8	0.5	1.5	2.1	0.3	3
Asian	1.6	0.9	3.9	4	0	0.4
Native Hawaiian and other Pacific Islander	0	0	0	0	0	0
Some other race	0.5	0	0.3	0.2	0	0
Two or more races	2.9	5.4	1.5	3.8	4.7	3.3
Hispanic or Latino	1.6	2	1.6	0.7	0	0
Median household income	$41,030	$51,935	$63,417	$48,266	$48,409	$39,268
All people whose income in the past 12 months is below the poverty level	20.3	9.8	12.1	17	11.7	16.3

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2012-2016

The nearest hospital is the Essentia Health St. Mary's Hospital-Superior facility, located on Tower Avenue approximately 1.2 miles east of the site. The site is within 0.5 mile of two schools, Great Lakes Elementary School (700 feet to the north) and Superior Senior High School (0.5 mile to the northwest). The site is also within 0.5 mile of the Superior Children's Center, and two senior living facilities, the Villa Rita Apartments and Piedmont Apartments. Both facilities are part of the Avanti Health Systems property located northwest of the Hill Avenue Site.

4.3.3. Land use

The land use immediately surrounding the proposed generating station locations is industrial, commercial, and residential. The Hill Avenue Site has residential property to the northeast and east, with commercial property to the north and industrial property to the west and south. The site has no residences within a half mile to the west. The nearest residences are located generally to the east. The site has residential property to the northeast and east, with commercial property to the north and industrial property to the west and south.

If the Hill Avenue Site were selected for the NTEC plant, the project would require zoning changes based on current zoning and permitted uses of existing zoning districts. The 75.5-acre area zoned for suburban development within the site would need to be rezoned to heavy manufacturing (M-2). Figure A-2 in Appendix A of this final EIS shows existing land use and land cover in the vicinity of the proposed NTEC plant.

4.3.4. Local jobs

Potential employment opportunities created by the construction of the NTEC facility are anticipated to be similar for both sites. According to the applicants, the NTEC plant would employ about 25 full-time, permanent positions and create around 130 indirect jobs. Construction would create around 260 jobs at peak, drawing investment to local businesses for the up to five-year construction phase.

These jobs would include construction management staff, site superintendents, skilled craftsmen, engineers, start-up support personnel, and other miscellaneous services. The applicants, construction contractor, and sub-contractors would supply staff for management, engineering, technical, start-up, and other support staff. Contractors would be chosen from a competitive bid process and would be local whenever practical. Manufacturer's representatives would be onsite periodically, though these representatives will not significantly increase the number of workers onsite at any given time. The workforce may be sourced from different locations locally or nationwide.

Craft labor, including carpenters, heavy equipment operators, laborers, millwrights, ironworkers, masons, pipefitters, and electricians, would be required during construction. Other staff would also be onsite during construction, such as management, engineering, technical, and start-up staff. The number of workers onsite would begin at nominal levels at the beginning of construction and steadily increase over time. Skilled labor such as carpenters, heavy equipment operators, laborers, millwrights, ironworkers, insulators, painters, boilermakers, sheet metal workers, masons, pipefitters, electricians etc., would be sourced as available from sub-contractors and/or local union labor halls.

The new permanent employment positions (up to 25 full-time permanent jobs) are anticipated to include Control Room Operators; Mechanical Maintenance Technicians; and Electrical, Instrument, and Control Technicians.

4.3.5. Local road, rail, and air traffic

Construction traffic entering the project site would primarily consist of automobile traffic for craft labor, construction management staff, contractors, equipment, and vendors. Material and equipment deliveries may be made by large trucks as well as heavy haul vehicles. Onsite, traffic is anticipated to primarily consist of heavy construction equipment and material transport equipment.

The proposed construction entrance would consist of a material delivery entrance and main construction entrance. Entrances will be located off Hill Avenue. The craft parking lot would be located west of the facility. Vehicle access to the site would be controlled and site security fencing.

The nearest public use airport to the Sites is the Richard I. Bong Airport, located approximately 1.0 nautical mile southwest from the site. Other nearby air facilities include the Sky Harbor Airport and Seaplane Base, a public use airport located approximately 1.5 nautical miles northeast from the site. Due to the proximity of the Richard I. Bong Airport, the FAA was consulted regarding potential hazards posed by tall structures associated with the construction of the NTEC plant. The applicants received correspondence from the FAA staging that if the stack height of the plant were reduced to 171 feet above ground level at the Hill Avenue Site, the stacks would not create a substantial adverse effect and a favorable determination could then be issued.

The frequency of the daily workforce automobile traffic would follow the project workforce numbers onsite at a given time. The daily automobile traffic to the site would increase from approximately 25 to 50 vehicles in the initial stages of construction to approximately 200 to 260 vehicles for peak months (April through December 2023). The traffic would begin to decrease until it reaches approximately 25

vehicles near construction completion. Vehicle access to the site would be controlled by site security fencing.

Material and equipment deliveries are anticipated to average between 15 and 25 trucks per day. Bulk deliveries for materials such as crushed stone, hot asphalt paving, and redi-mix concrete may occasionally exceed 25 vehicles on a given day. When possible, bulk deliveries would be scheduled to avoid peak traffic on local roads.

A local resident who lives near the proposed power plant site and proposed access route has expressed concern over the pre-construction and construction local traffic activity that would be disturbing to local residents.

4.3.6. Communication towers

The applicants used FCC GIS data to survey the area within 0.5 mile of the Hill Avenue Site and within 0.5 mile of the proposed electric transmission line for communication towers, such as cellphone towers and television towers. No towers inside of this distance were detected for either of the proposed NTEC site locations. However, the project still has the potential to interfere with communication tower signals depending on existing tower heights and final project design. The applicants would work with the licensees near the site, and along its associated transmission line route, to minimize or mitigate potential interference as applicable.

4.3.7. Local community services

The project would be connected to the City of Superior municipal water treatment system to discharge sanitary waste. Emergency medical services would be provided by Essentia Health St. Mary's-Superior Clinic, St. Luke's Mariner Medical Clinic Urgent Care and Gold Cross Ambulance. Fire protection would be provided by the City of Superior Fire Department, which is approximately 1 mile from the site. Police protection would be provided by the City of Superior and the Wisconsin State Patrol during both construction and operations.

The project would require construction of water pipelines to connect with the municipal system. The applicants do not anticipate any change in capacity citing adequate existing municipal sewer water system capacity.

The applicants anticipate that existing healthcare facilities would be sufficient for the project during construction and operation, and do not expect that improvements to such facilities would be required. The project design, as currently proposed, includes internal fire suppression measures, which the applicants consider sufficient to meet the requirements of the project.

Preliminary engineering design include facilities for the storage of hazardous materials. This storage would require coordination activities with the city Fire Department. The applicants do not anticipate that improvements would be required in order to successfully coordinate with, or adhere to, safety measures required by the City of Superior Fire Department. As previously mentioned, police protection would be provided by the City of Superior and the Wisconsin State Patrol during both construction and operations. The applicants do not anticipate that any plant design modifications would be required in order to allow police patrols and routine law enforcement activities.

4.3.8. Recreation

No parks are located within 0.5 mile of the Hill Avenue Site. Several municipal parks and recreation areas are located within 1 mile of the site. Carl Gullo Park is located approximately 4,700 feet to the east and hosts basketball and tennis courts, public playground, and winter skating rinks. Priest Soccer Field, a municipally owned facility, is located approximately 1 mile of the site. The Nemadji Golf Course is approximately 3,500 feet northeast from the site. One mile west of the site is Heritage Park, which provides public access to pavilions, playgrounds, tennis courts, and a skatepark. Approximately 4,500 feet northeast of the site are Gouge Park, which has a playground, and Red Barn Park, which hosts a winter skating rink. Central Park is located 4,200 feet north of the site and provides public walking trails, tennis courts, and a playground. Immediately west of Central Park is the Hayes Court Complex Ball Fields consisting of five baseball and softball fields.

Approximately 0.5-mile northeast of the Hill Avenue Site is the Nemadji River fishing platform and the Nemadji Campground. The site is within 0.5 mile of two hunting areas, the Murphy Oil–5 hunting area and the Murphy Oil–6 hunting area. The proposed site would reduce the size of the Murphy Oil–5 hunting area by approximately 72 acres. This would reduce the amount of area available for hunting in the northern portion of the hunting area. Connecting facilities south of the site would also remove a portion of the Murphy Oil–5 hunting area from hunting activities. The connecting facilities extending from the site to the southeast would cross greenfield and would introduce a new utility corridor through the hunting area. Figure A-1, provided in Appendix A of this final EIS shows the location of recreation areas in the vicinity of the proposed Hill Avenue Site.

4.3.9. Property values

Several landowners provided comments during the applicants' open houses for the proposed project and some during the EIS scoping period that expressed concerns about potential effects of the project on property values. Some of the commenters voiced concerns that constructing the NTEC plant would detract from the aesthetic nature of the landscape in the immediate vicinity of the project. Other concerns included fog and noise impacts.

If noise created by the plant is significantly greater than existing levels, a slight value impact could occur. Other potential value impacts caused by the plant could include fogging and icing; phenomena sometimes associated with power plants under certain circumstances. Section 3.3.10 provides a discussion of these potential impacts, including model-based predictions specific for the NTEC plant.

Overall, property value fluctuations are caused by a complex web of desirable and undesirable aspects, including facilities, services, distances, and impacts that vary significantly from location to location. Without conducting detailed, long-term studies, it is not possible to predict or assess potential impact on property values. To date, Commission staff is not aware of any studies that have proven a clear correlation between power plant location and reduced property values. Many factors involve individual value systems and shifting cost and benefits considerations.

4.3.10. Fogging and icing

Fogging and icing impacts are anticipated to be similar amongst the proposed NTEC site locations. The applicants commissioned a third-party cooling tower plume impact analysis using the EPRI SACTI2 for the project. The model assessed the potential impact of the cooling tower plume-induced impacts on the surrounding area. The model predicts seasonal and annual impacts of visible plumes, drift, fogging, icing, and shadowing from single and multiple sources.

At the Hill Avenue Site, the location of the maximum number of ground fogging (142.6 hours per year in 2016) at any one location occurred on the proposed site plant property and was 100 meters (or roughly 328 feet) southwest of the cooling tower. The remaining years had maximum ground fog events that ranged from 116.3 hours per year to 135.8 hours per year occurring 100 meters from the cooling tower. The fogging events would be mostly isolated to the facility property. However, the neighborhood to the northeast of the Hill Avenue Site could experience fogging up to 25 hours per year, based on the 2016 model results.

The cooling tower modeling results predicted a maximum of 42.7 hours of icing for 2017 at the site, which occurred at 100 meters (about 328 feet) towards the east. The remaining years had maximum rime ice events ranging from 14.6 hours per year to 34.8 hours per year that occurred 100 meters from the cooling tower in the easterly directions (ranging from east southeast to east northeast) from the site. While the maximum location occurs onsite, north of the administration building, rime icing is expected to occur where there is shrubland; the applicants have stated that since this is not a populated area, or a location where equipment is anticipated to be located, plume rime icing is not expected to be a significant concern at the site.

The proposed Hill Avenue Site cooling tower could potentially result in some ground fog impacts. Minimal rime icing is predicted to occur and will be located off-site. Mineral deposition is insignificant both on and offsite. Elevated visible plumes are anticipated to be restricted to generally over the facility property, with a few potential off-site extended plumes. The following conclusions may be drawn from the study for the cooling tower plume-induced impacts at the site:

- An estimated 143 hours of predicted ground fog may occur in a worst-case year at the location of maximum impact onsite. The operating personnel would need to be mindful of any reduced visibility on-site during such fogging events. The cooling tower may have ground fogs that could extend northeast and may impact the neighboring residents for a small portion of the year. It is expected that neighboring residents, adjacent to the site, could experience fogging for up to 25 hours per year, based on the 2016 model results.
- It is estimated that approximately 43 hours of predicted onsite rime icing may occur in the worst-case model year (2017). The offsite rime icing occurs is in shrublands near the facility where no equipment or residences are located. The rime ice hours will be associated with fogging events, and plant personnel will need to be aware of possibly slippery walkways and exposed metal stairs during fogging conditions in sub-freezing weather. Several hours of rime ice potential may occur towards the east and southeast of the proposed cooling tower.
- The applicants expect the mineral deposition to be minimal and inconsequential due to the low deposition rate, low TDS in the circulating water, and the use of a high efficiency drift eliminator. Natural salt removal phenomena such as wind and rain would also frequently clean contaminated surfaces. The electrical equipment should not be impacted by the low amounts of mineral deposition, and mineral deposition that may occur offsite is expected to be minimal.
- The majority of the elevated visible plumes would generally be confined to the area immediately over the cooling tower and to the adjacent residential properties to the northeast. An estimated 26 hours of predicted elevated visible plumes would be expected in the worst-case model year (2017).

- During operation, mitigation measures could include posting signage along roads nearby the project to inform drivers of fogging and deposition. The applicants would coordinate with WisDOT to post signage along roads where the potential for fogging and icing could occur. Any sign installation would be completed only after coordination with and approval from WisDOT.

4.3.11. Noise

Noise is generally regarded as unwanted sound. Local governments often attempt to limit it to reasonable levels, and local populations often react to what they hear or perceive. The applicants have indicated that, according to a commissioned third-party noise modeling study, that if NTEC were to be built at the Hill Avenue Site, the project would require further mitigation to reduce sound levels below the established EPA minimums.

Modeled results for the Hill Avenue Site show a maximum predicted A-weighted sound level emitted from the project that would be in excess of the established EPA minimum for noise levels at the nearest residential property. The site would require further mitigation to reduce sound level to below the EPA guidelines. The applicants have stated in their application for the proposed project, that these minimal sound guidelines are not enforceable sound level limits and are only provided as a suggested design goal.

4.3.11.1. Local regulations

The state of Wisconsin and the City of Superior do not have noise regulations applicable to the project. As there are no specific government agency-related numeric noise limits for the project, the project has elected to follow the EPA noise guidelines. The EPA established noise guidelines in The Noise Control Act of 1972 (the Act). The Act provides sound level guidelines to "promote an environment for all Americans free from noise that jeopardizes their health or welfare." As such, the sound levels identified in the Act as those sufficient to protect public health and welfare were used as the design goal for the project. A day-night sound level (Ldn) of 55 A-weighted decibels (dBA) at the nearest residential receivers was selected as the design goal for the project.

4.3.11.2. Construction noise

During construction of the plant, the deliveries of equipment and operation of construction machinery would generate noise, mostly from diesel engine-driven systems that power most construction equipment such as bulldozers, excavators, dump trucks, cement trucks, and cranes. Additional noise may be introduced by the traffic associated with workers entering and existing the project site. The exact increase in noise from worker traffic has not been quantified; however, such traffic may produce a noticeable increase when compared to background or pre-construction levels. Noise emitted from construction equipment in projects similar to the proposed NTEC plant, are typically high intensity, intermittent, and occur in short bursts. Such bursts would be notable if they reached the nearest residential properties. Examples of construction noise are listed in Table 4-17.

Table 4-17 Estimated maximum noise levels in A-weighted decibels (dBA[20]) for typical construction equipment[21]

Construction Equipment	Maximum Noise Level (dBA) Typical Range: e=50feet
Bulldozer	85-90
Front end loader	86-90
Truck	84-87
Grader	83-86
Shovel	82-86
Portable generator	81-87
Crane	82-83
Concrete pump	78-84
Tractor	77-82

Noise impacts on local receptors, including residents, could be reduced by ensuring that appropriate engine exhaust mufflers are installed and adequately maintained on all vehicles used during the construction phase of the project. The residences nearest to the expected construction on the selected site for the NTEC plant may experience construction noise levels similar those listed in the table. Impacts to residences farther from the construction may experience slightly lower levels.

4.3.11.3. Steam blows

Before the proposed project would go into operation, occasional steam blows would have to be performed over a period of about two weeks before operation to clean out the boiler and steam path piping before it is connected to the turbine. Although steam blows can be very loud, the applicants would provide notice to nearby residents of expected timeframes for steam blow operation. During steam blows, the start-up team would install external piping and silencers to discharge the steam to the atmosphere. Noise from steam blows is mitigated using silencers and at tempering water.

4.3.11.4. Operation noise

A noise monitoring and modeling protocol for the project was completed and submitted to the PSCW in October 2017. SSE's consultant, Burns & McDonnell, developed this protocol to detail the methodology for ambient pre-construction sound level measurements and modeling predictions for future sound levels near the proposed project. The methodology employed was adapted from the requirements outlined in the PSCW Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants (November 2008). These background measurements were used in conjunction with predictive modeling to develop the basis for noise impacts of the proposed project on the surrounding areas. A project Ldn sound level of 55 dBA or below at the nearest residences is considered acceptable per the EPA guidelines. Therefore, a design goal of Ldn 55 dBA at the nearest residences has been selected for the project.

There would be several notable sources of noise at the proposed power plant. These would include but not be limited to the inlet air filters, the combustion turbines and generators in the generator building, the HRSG exhaust stacks, steam turbines, transformers, the cooling tower, and circulating water pumps, and natural gas compressor in the gas compressor building. In the noise study conducted by the applicants,

[20] A-weighting is a filter applied to measured or modeled decibels that reshapes the actual frequency spectrum to one that simulates human hearing response to different frequencies. It emphasizes higher frequencies because humans perceive higher frequencies more than lower ones. To estimate low frequency sound and vibration, a C-weighted filter is used, which communicates lower frequencies more realistically.

[21] Extracted from WPSC Weston Unit 4 Power Plant – Volume 1. Final Environmental Impact Statement, July 2004, Table 10-9, p. 250.

noise levels were modeled to estimate increases over the ambient sound that would occur during operation of the proposed NTEC plant.

Generally, according to the applicants, the plant would be run as an intermediate dispatched facility, depending on market demand, and likely during daytime hours instead of nighttime hours. But, it could be run at any time as needed.

4.3.11.5. Audible noise – dBA

The applicants provided estimated noise levels from the proposed NTEC project, as required in the Commission's Noise Protocol. A-weighted decibel levels approximate impacts to human hearing. Table 4-18 lists dBA noise estimates for the proposed NTEC project if the Hill Avenue Site were to be selected, for the property line and nearby residential areas. Measurement points (MP) are used for measuring noise levels on the land around the project, and are also used for estimating future impacts. The closest and most impacted residence to the Hill Avenue Site is located next to measurement point MP4 and additional residences are evaluated at points MP1 and MP5. If the proposed NTEC plant were to operate for a consecutive 24-hours, the calculated day-night sound level at this location would be 61.5 dBA Ldn. In order to bring project sound level impacts below 55 dBA Ldn at the neighboring residences, mitigation measures would need to be implemented at the proposed cooling tower and other sound sources onsite.

Table 4-18 Estimated A-weighted decibels sound modeling results with and without mitigation at Hill Avenue Site

Time of Day	Location	Ambient Sound Level	Baseline Modeled Sound Level		Predicted not Mitigated Sound Level	Predicted Mitigated Sound Level	
		(Leq dBA)	(Leq dBA)	(Ldn dBA)	(Leq dBA)	(Leq dBA)	(Ldn dBA)
Daytime	Res 1 (MP1)	45.9	51.9	58.3	52.9	50.0	56.4
	Res 3 (MP4)	43.8	55.1	61.5	55.4	53.3	59.7
	Res 4 (MP5)	44.2	48.5	54.9	49.9	47.8	54.2

4.3.11.6. Low frequency noise and vibration – dBC

Low-frequency noise could emanate from the generation buildings, as the combustion and steam turbine equipment generates a significant amount of low-frequency noise as, opposed to the higher-frequency noise from the cooling towers. Sound waves in the frequency range below 40 Hz, if high enough in magnitude and energy, can couple with frame building walls and windows and cause vibration. The vibration problem generally occurs with simple-cycle CT plants. CT exhaust in a simple-cycle plant is difficult to mitigate below 40 Hz. In a combined-cycle plant such as the proposed NTEC plant, however, the CT exhaust is directed into the HRSG, which is an exhaust silencer itself, and low-frequency exhaust noise is reduced to low levels that tend not to cause vibration problems. The low-frequency noise could be greater than ambient noise at either of the proposed NTEC sites.

4.3.11.7. Potential impact and mitigation possibilities

The Commission's Noise Measurement Protocol requires that measurements be taken both before and after a project is constructed. By using pre and post-construction levels, the specific impacts caused by the project can be gauged, and thus allow for the incorporation of the most appropriate mitigation strategies. Post-construction measurements are required within 12 months of the date when the project is fully

operational and within two weeks of the anniversary date of the required pre-construction ambient noise measurements.[22]

Similar to the previously discussed Nemadji River Site noise modeling scenario in Section 3.3.11, the closest and most impacted residence to the Hill Avenue Site is located next to measurement point MP4. The overall project-generated sound level at this location would be 55.1 dBA Leq, as shown in Table 4-18. If the simulated NTEC plant were to operate for a consecutive 24-hours, the calculated overall project-generated sound level at this location would be 61.5 dBA Ldn. In order to limit project sound level impacts to below 55 dBA Ldn at the neighboring residences, mitigation would need to be applied to multiple project sound sources. The Hill Avenue Site was applied the same cooling tower mitigation as the Nemadji River Site, limited to 62 dBA at 400 feet. Based on past project experience, it is anticipated that the cooling tower vendors could reasonably mitigate the cooling tower to 62 dBA at 400 feet using splash attenuation or another method of their choice. Modeling results show noise sources in addition to the cooling tower needs to be limited to 62 dBA at 400 feet in order to meet the design goal or fall below EPA recommended guidelines. Based on past project experience, it is anticipated that the cooling tower vendors could reasonably mitigate the cooling tower to 62 dBA at 400 feet using splash attenuation or another method of their choice. Enacting such mitigation measures would increase project costs if the Hill Avenue Site is selected.

4.3.12. Views, aesthetics, and lighting

Both Sites would have tree buffers between the site footprint and other land uses to lessen the visual impact of the generation plant. The project would be located near existing oil and gas infrastructure as discussed earlier in the site history and land use sections of this chapter.

At the Hill Avenue Site, the worst-case cooling tower modeling results predicted a maximum of 25.8 hours per year, to occur at 200 meters (about 656 feet) towards the northeast of the cooling tower. Visible plumes are expected to occur on nearby shrubland. The applicants have stated that since this is not a populated area, or a location in which equipment would be located, visible plumes are not expected to be a significant concern.

The Hill Avenue Site would be situated in an area that is currently undeveloped wetland. Components of the site would be visible from Hill Avenue to the west, N. 28th Street to the north, from East 12th Street to the east, and East 22nd Avenue to the south. The stack and turbine building would be visible. Existing trees would remain around the property boundary, obscuring the view of most of the site components to the north, east, south, and much of the west side of the site when the trees have leaves. The perimeter of the property will have a chain-link security fence.

Lighting impacts would be mitigated by measures such as fully shielded light fixtures, directing lighting downward, and scheduling construction activities during daylight hours when possible.

4.3.13. Historical and archeological sites

As previously discussed, in accordance with Wis. Stat. § 44.40(5), the Commission is not required to conduct a consultation with the SHPO for the proposed project since a federal agency (USDA RUS) intends to conduct the Section 106 review process as part of a separate environmental review of the proposed project. Instead, the Commission intends to act as a consulting party in the federal Section 106

[22] http://psc.wi.gov/utilityinfo/electric/construction/documents/noiseprotocol.pdf

review; which, if the project is approved, would be conducted only for the final approved project configuration.

The applicants commissioned a third party to investigate the Hill Avenue Site and for the presence of archaeological sites, potentially historic buildings, and human burial sites near the project area. The review did not reveal any historic properties or burial sites APE for the project. The review concluded that no additional investigations are recommended and that no historic properties or human burial sites are likely to be impacted by the proposed project should the Hill Avenue Site be selected for NTEC.

4.3.14. Local economics

The City of Superior and Douglas County would receive payments in lieu of taxes of around one million dollars annually (two-thirds to the city; one-third to the county) from the state of Wisconsin for hosting a generation facility. The City of Superior will also receive considerable fees from the facility for increased use of Superior's waste water treatment system. County sales tax revenues are likely to increase over time, especially during the intense construction phase. There could be a negative local budget impact due to the increased use of 31st Avenue East, which is currently a short paved road with an extended gravel portion that will need to be paved and maintained over time.

According to the applicants, regional economic benefits are estimated at around one billion dollars over 20 years. The facility would employ about 25 full-time, permanent positions and create around 130 indirect jobs. Construction would create around 260 jobs at peak, which may draw investment to local businesses for the up to five-year construction phase. The applicants have stated that they are both active in their other host communities (or communities in which they have previously constructed similar projects) and intend to continue that commitment to the City of Superior and Douglas County. For example, the applicants have co-sponsored a bike sharing program in the city for the next two years. The applicants are currently engaged in discussions with local partners to create a trail near the facility and to upgrade the canoe launch near the facility.

4.4. ELECTRIC TRANSMISSION SYSTEM

The applicants propose to connect the proposed NTEC plant to the existing electric transmission grid through the construction of a new 345kV transmission line. The applicants have proposed three routing options to achieve the connection; each would begin at the selected NTEC plant site and end at one of two proposed switching stations.

Two switching station alternatives were identified for the project, the ESS and the WSS. Figure A-1, provided in Appendix A of this final EIS shows the proposed location of each station. The ESS would be located southwest of the intersection of County Road Z and Lyman Lake Road. The ESS would be approximately 13.6 acres. If the ESS would be included in the Commission's final ordered route, ATC would be responsible for permitting and constructing the station as well as two short segments of 345 kV transmission line between it and a tap location on the existing Arrowhead to Stone Lake transmission line. The WSS would be located along 42nd Avenue East south of 18th Street East. The WSS would be approximately 14.0 acres. If the WSS would be included in the Commission's final ordered route, ATC would be responsible for permitting and constructing the station as well as two significantly longer segments of 345 kV transmission line between it and a tap location on the existing Arrowhead to Stone Lake transmission line.

4.4.1. Routing options available if Hill Avenue Site is selected for NTEC

The electric transmission routing options would provide three options for connecting the NTEC plant to the existing ATC transmission system. Further discussion about each of the three options available if the Nemadji River Site is selected for the NTEC plant are provided in the following sections.

All routing options, or alternatives, would begin at the Hill Avenue Site and end at one of the previously described switching station. The three routing options for connecting the NTEC plant to the existing electric transmission system if the Nemadji River Site is selected include:

- The Eastern Route to the ESS (approximately 3.7 miles)
- The Western Route to the ESS (approximately 5.5 miles)
- The Western Route to the WSS (approximately 1.5 miles)

In addition, if the Hill Avenue Site is the selected location for NTEC, an additional segment of line connecting the Hill Avenue Site to the common starting point of the three routing options (just south of the Nemadji River Site) would be required. This segment is referred to as the Hill Avenue Site Transmission Route, or Hill Avenue Site Route, and is approximately 1.6 miles in length. The Hill Avenue Site Route would not be required if the Nemadji River Site is selected for the NTEC plant.

4.4.2. Description of routing options

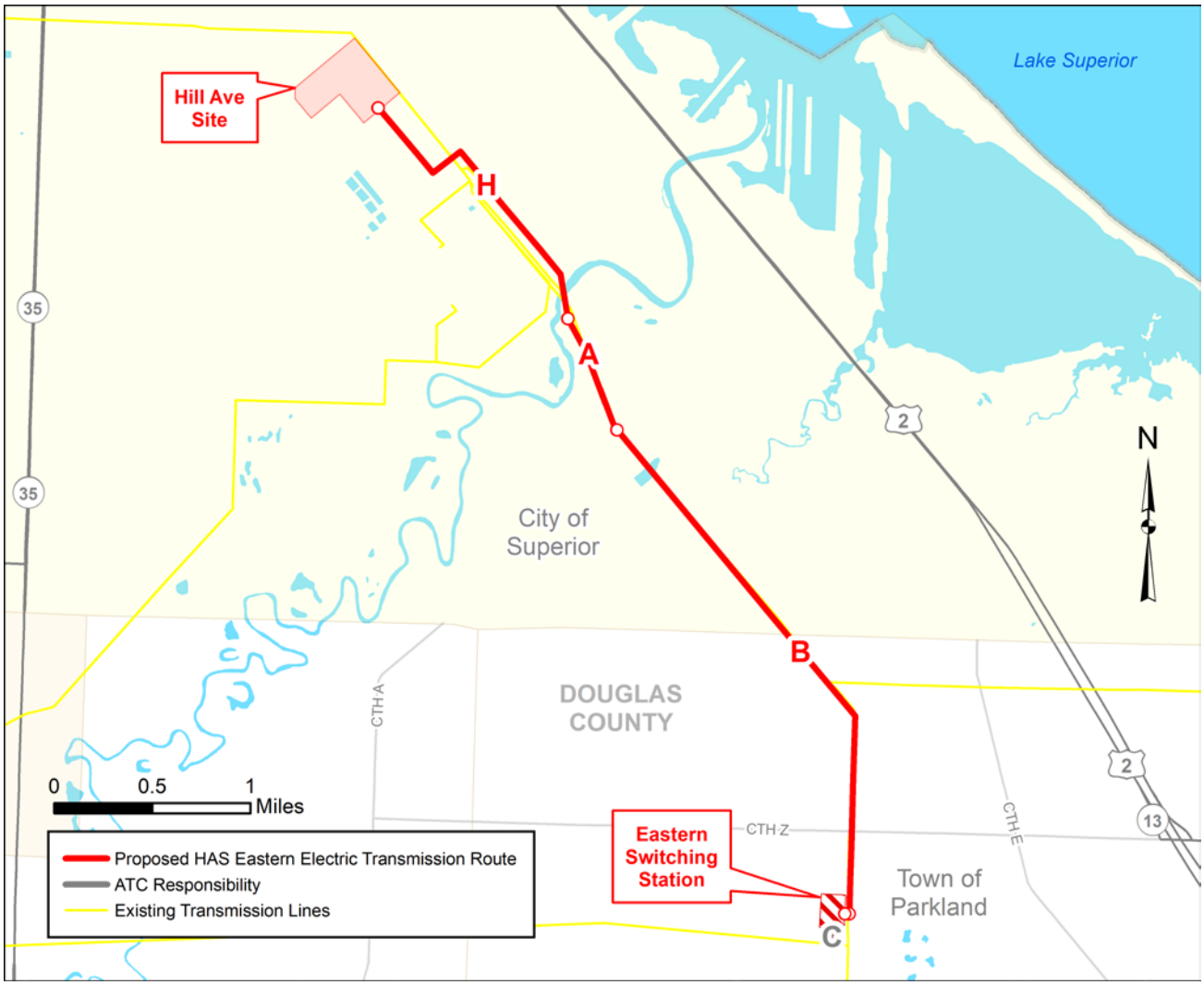
Other than the construction of the additional Hill Avenue Site Route, the same three electric transmission routing options would be available if the Hill Avenue Site were selected for the NTEC plant. Each of these options are described in additional detail in the following sections.

See Figures 4-3 through 4-5 below for illustrations of each routing option available if the Hill Avenue Site is selected for the NTEC plant.

4.4.2.1. Eastern Route to the Eastern Switching Station

The Eastern Route would extend from the western edge of the Nemadji River Site southeast, generally paralleling two existing pipelines (SWL&P natural gas and Enbridge crude oil), and three existing electric transmission lines (161 kV Line No. 160 transmission line and the 115 kV Line No. 761) across the Nemadji River. Once across the river, the Eastern Route would be built in a double circuit configuration with the existing 161 kV Line No. 160, which parallels Line No. 761, for approximately 2.0 miles until Line No. 761 transmission line extends east. The Eastern Route would parallel the existing Line No. 761 transmission line and the SWL&P natural gas pipeline across the Burlington Northern and Santa Fe (BNSF) railyard southeast and East City Limits Road. After crossing Bear Creek, the Eastern Route continues southeast before the route turns and extends south. The Eastern Route would extend along the existing SWL&P natural gas pipeline and would be built in a double circuit configuration with the 161 kV Line No. 160 transmission line, crossing County Road Z and following Lyman Lake Road to the ESS. The Eastern Route is approximately 3.7 miles long. Figure 4-1 shows the location and segments of the Eastern Electric Transmission Routing Option.

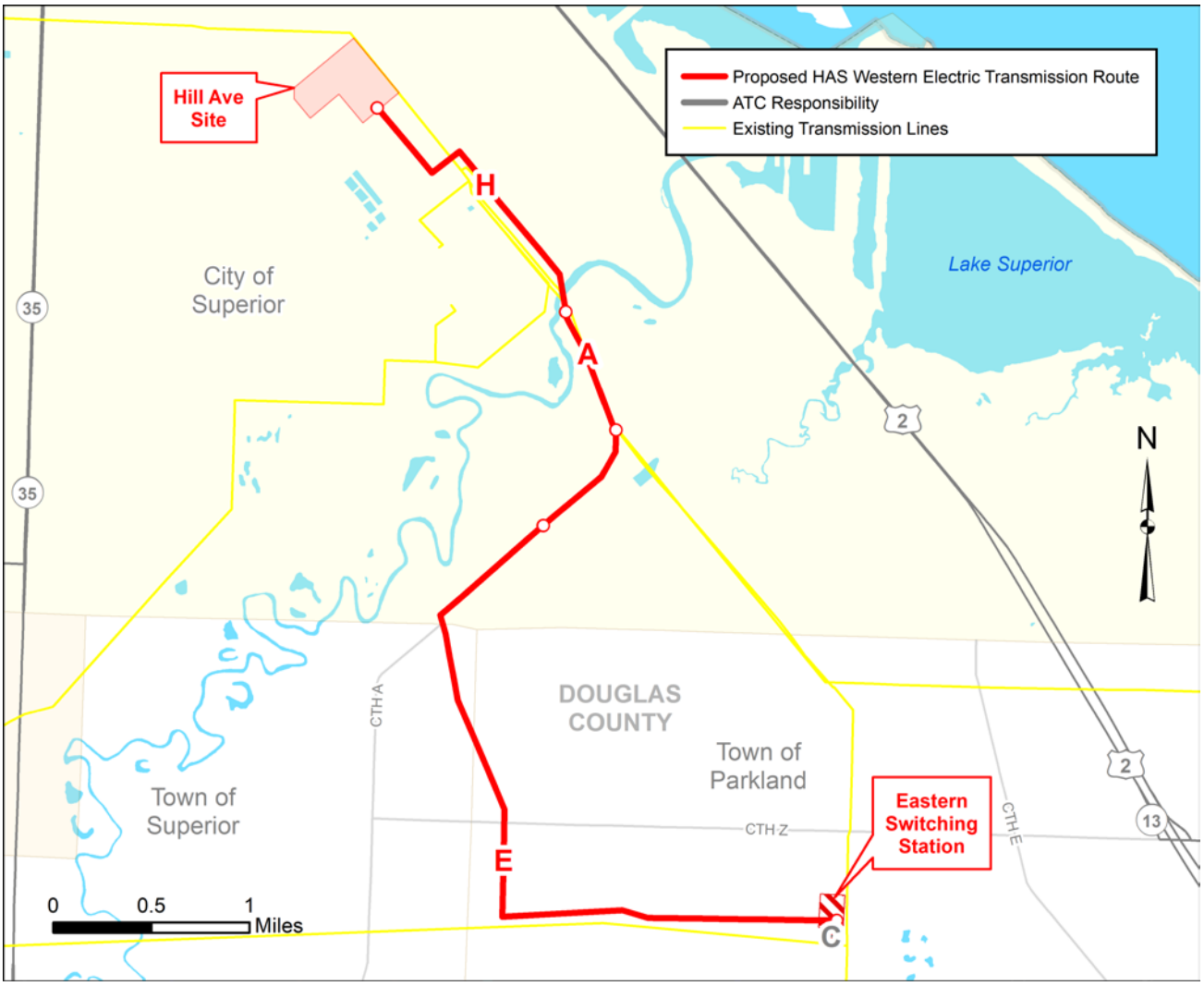
Figure 4-1 Eastern Electric Route Alternative



4.4.2.2. Western Route to the Eastern Switching Station

The Western Route would extend from the western edge of the Nemadji River Site southeast, generally paralleling two existing pipelines (SWL&P natural gas and Enbridge crude oil), the 161 kV Line No. 160 transmission line and the 115 kV Line No. 761 transmission line across the Nemadji River. The Western Route extends southeast to the existing Line No. 761 transmission line. The Western Route would be built in a double circuit configuration with the Line No. 761 transmission line for approximately 0.4 mile. The Western Route then extends from Line No. 761 near East 18th Street generally to the southwest to parallel 42nd Avenue and an existing 69 kV transmission line. The Western Route extends southeast after crossing Woodlawn Road, paralleling the existing Enbridge crude oil pipeline. The route crosses over two BNSF rail lines and County Road Z, then extends due south to the north side of a Canadian National rail line. The Western Route then extends east along the Canadian National rail line, crosses the rail line, and then continues east on the north side of the existing Arrowhead to Stone Lake 345 kV transmission line to the ESS along Lyman Lake Road. The Western Route is approximately 5.5 miles long. Figure 4-2 shows the location and segments of the Western Electric Transmission Routing Option.

Figure 4-2 Western Electric Route Alternative

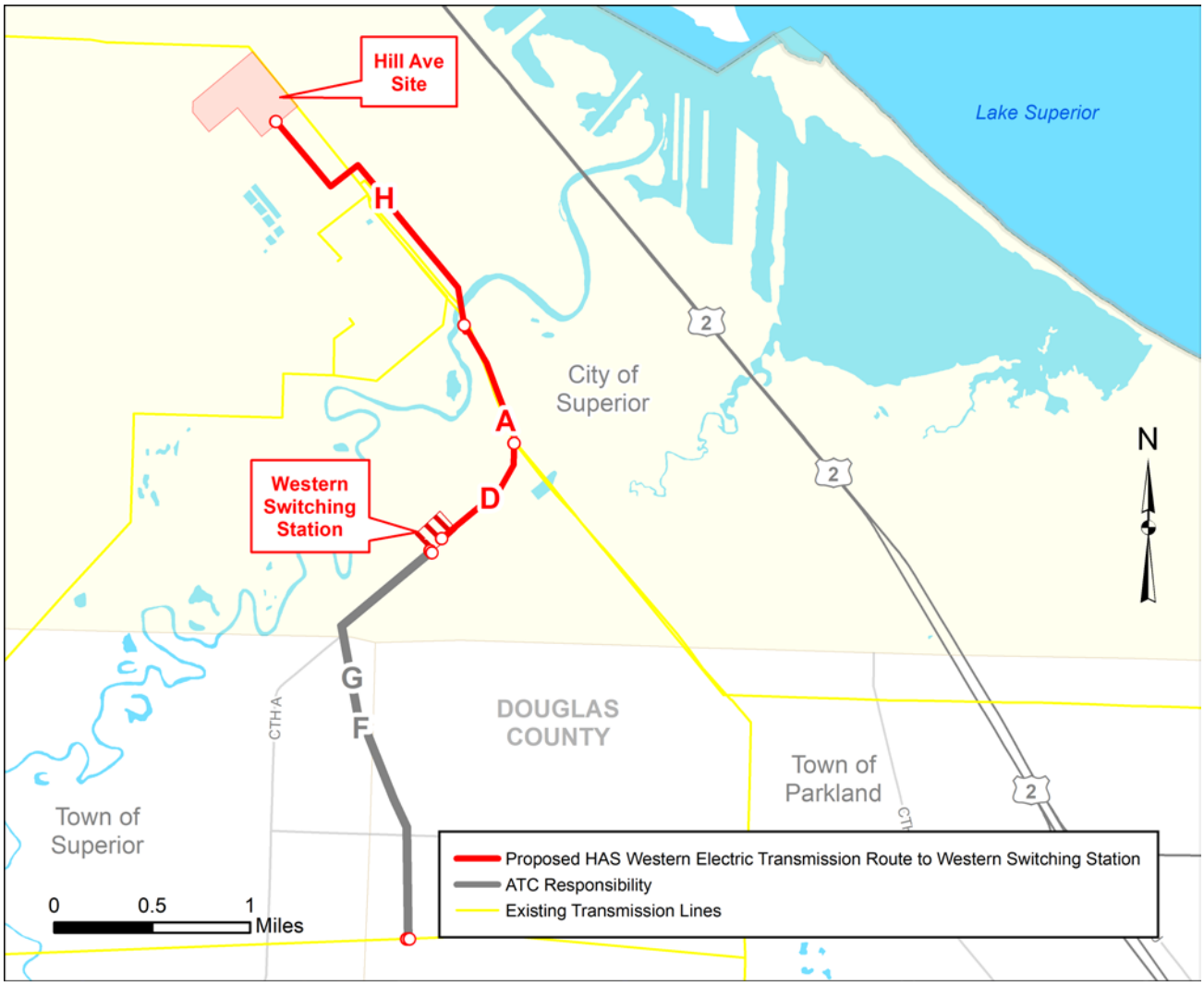


4.4.2.3. Western Route to Western Switching Station

The line would follow the Western Route from the western edge of the Nemadji River Site southeast to the WSS. If this option is selected, ATC would construct two 345 kV transmission lines from the WSS to a tap location on the existing Arrowhead to Stone Lake 345 kV transmission line. In the application for a CPCN for construction of the NTEC plant, the applicants state that these transmission lines for this alternative would be the responsibility of ATC and is therefore not part of the project or this application. However, in an attempt to provide a balanced and complete discussion of resources and potential impacts associated with the proposed project, this alternative is discussed, and analyzed to the extent practicable, in the following sections of this final EIS.

Figure 4-3 shows the location and segments of the Western Route to the WSS Alternative.

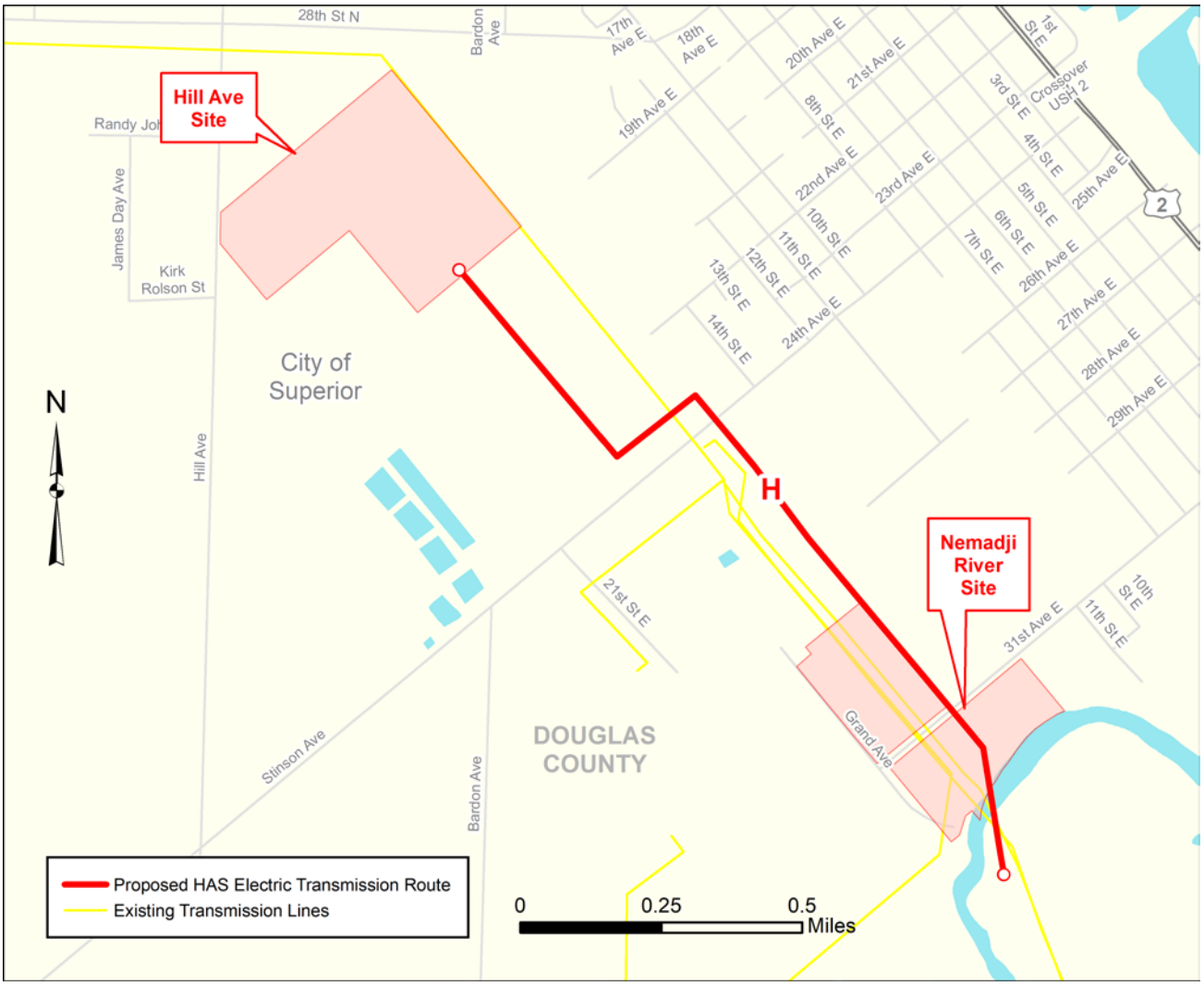
Figure 4-3 Western Route to the WSS Alternative



4.4.2.4. Hill Avenue Site Electric Transmission Route

The Hill Avenue Site Route would extend from the Hill Avenue Site southeast to the north side of 24th Avenue East, where it would parallel the road northeast for a short distance before crossing 24th Avenue East. The route would then continue southeast to the east side of the Nemadji River to the common starting point of the electric transmission routing options. Along its length, the route crosses a Canadian Pacific rail line, multiple existing pipelines, and four existing or planned transmission lines. The Hill Avenue Site Route would be approximately 1.6 miles long.

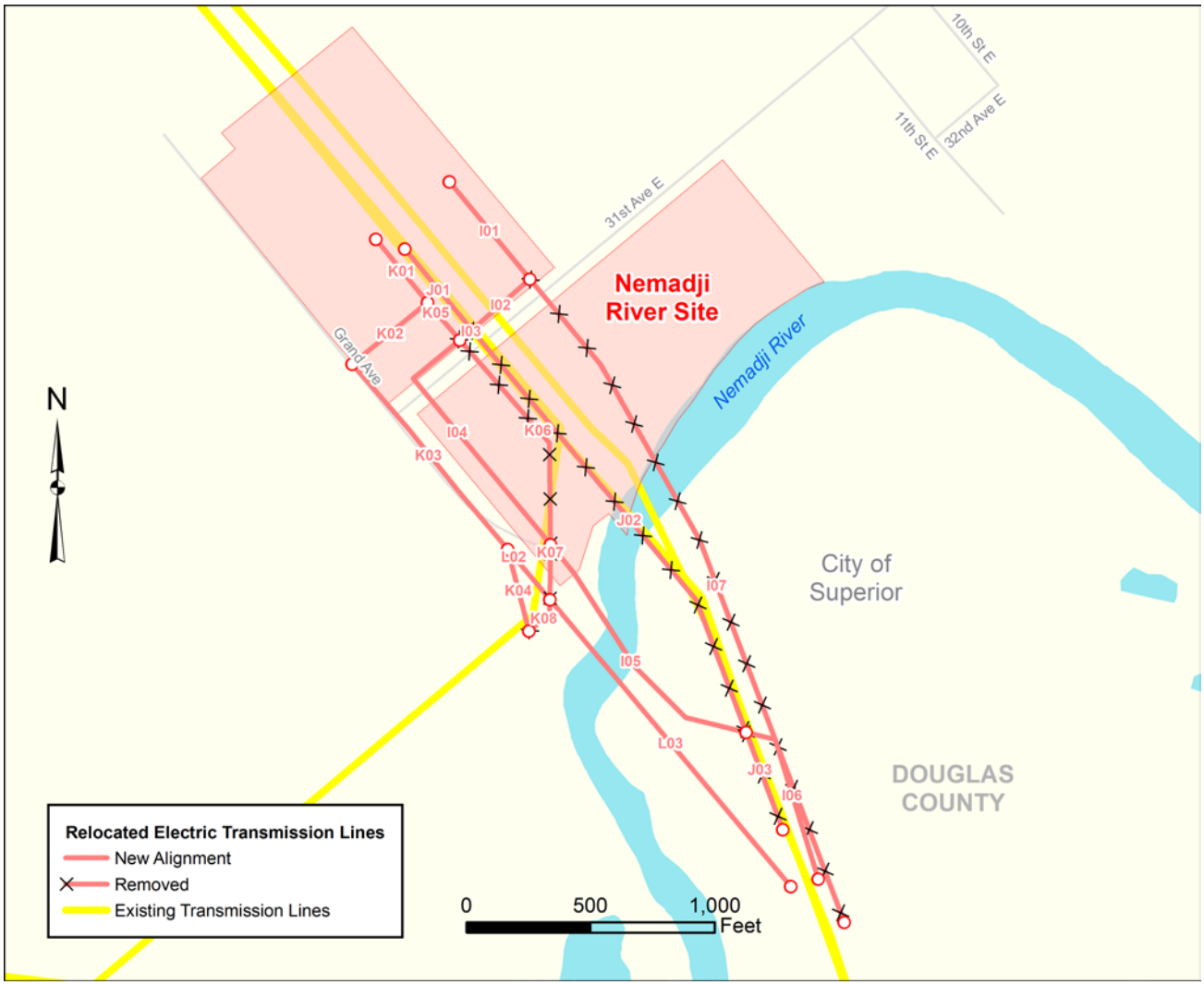
Figure 4-4 Hill Avenue Site Transmission Route Alternative



4.4.2.5. Relocation of existing electric lines near the Nemadji River Site

If the Nemadji River Site were selected, all routing options would require that several existing electric transmission lines in the vicinity of the proposed Nemadji River Site to be relocated in order to facilitate construction of the NTEC plant and transmission line. Existing electric transmission lines would be relocated to the south end of the proposed Nemadji River Site (Figure 4-7). The existing lines that would need to be relocated are 115 kV Line No. 132, 115 kV Line No. 761, and 161 kV Line No. 160. Additionally, a Great River Energy 69 kV line and a SWL&P 13.8 kV distribution line would require relocations. The relocated portions of the lines would predominately consist of steel self-supporting structures with concrete foundations. If the Hill Avenue Site were selected, these relocations would not be required.

Figure 4-5 Existing electric lines requiring relocation



4.4.3. ROW and easement requirements

In general, the ROW width for all routing options is anticipated to be 130 feet wide (65 feet either side of centerline) though the ROW width may vary along some portions of the transmission line due to structure design. The existing ROW would be used to the extent practicable where the proposed transmission line is double circuited with the existing 161 kV and 115 kV transmission lines. Some additional/new ROW along portions of the existing ROW would be required to accommodate the new transmission line. Proposed ROW for all routing options is shown on Figure A-provided in Appendix A of this final EIS.

4.4.3.1. Existing utility corridor sharing

Existing electric transmission line easements would be partially shared or expanded by portions of the proposed project. The following sections describe changes to existing electric easements along each of the three routing options. Existing electric transmission line easements would be partially shared or expanded by portions of the proposed project. The existing natural gas pipeline and electric transmission line easements that would be shared by the project are owned by SWL&P. The applicants have stated that SWL&P is aware of the need to share existing ROW with the project and have no objection. No potential problems with sharing ROW are anticipated.

The applicants have stated that ROW would be shared for a majority of the project, and that they intend to bear responsibility for acquiring additional ROW while acknowledging that the existing SWL&P ROW will remain. The applicants are discussing ROW ownership arrangements with SWL&P and will finalize once a route has been determined by the Commission.

4.4.3.2. Eastern Route to the Eastern Switching Station

This routing option would be built in a double circuit configuration for approximately 2.1 miles with the existing 161 kV Line No. 160. The existing ROW for this section is approximately 100 feet wide and would be expanded to 130 feet for this length. This would also require sharing approximately 15 feet of ROW with the existing Line No. 761 for this length as well. The route continues southeast in a double circuit configuration with Line No. 160 after Line No. 761 extends East. The route then extends due south for approximately 1.0 mile in a double circuit configuration with Line No. 160 to the ESS. Along this segment, the existing ROW is sufficient for the project.

4.4.3.3. Western Route to the Eastern Switching Station

The routing option would be built in a double circuit configuration with the existing Line No. 761 for approximately 0.4 mile, which would require sharing approximately 30 feet of ROW with the existing Line No. 160 transmission line.

4.4.3.4. Hill Avenue Site Route

The Hill Avenue Site Route would parallel the existing Line No. 160 for approximately 0.7 mile. This length of the alternative will require sharing of approximately 32 feet to 63 feet of ROW with the existing transmission line.

4.4.4. Configuration of proposed electric transmission infrastructure

The following sections provide additional detail regarding the specific proposed electric transmission line infrastructure components.

4.4.4.1. Structures and foundations

The proposed structures would predominately range in height from 120 feet to 160 feet above grade based on similar structure designs used for other projects. The proposed structures would likely be steel self-supporting structures on concrete foundations. Structures would be single-pole or H-frame.

4.4.4.2. Transmission line configuration

The routing options would consist of a mix of single-circuit and double-circuit with existing transmission lines.

4.4.4.3. Conductor information

The project would be a 345 kV transmission line. It is anticipated that the single circuit structures would support one (1) 7/16-inch EHS shield wire, one 0.646-inch OPGW and three phases of 2-bundle 954 ACSR "Cardinal" conductor. The 161 kV circuit on the double circuit portions is owned by SWL&P and the applicants anticipate that these segments would be constructed using three phases of 954 ACSR "Cardinal" conductor. Final conductor, shield wire, and OPGW selection would be determined during detailed design of the project.

4.4.4.4. Proposed sequence of construction

The applicants have stated that they intend to conduct detailed field surveys and soil borings to determine the finalize design of the project. Based on soil conditions and locations of existing buried utilities, final pole placement will be determined and staked in the field. Other project aspects would also be staked at this time, such as tree clearing limits, ROW boundaries, and existing utility locations. Once project design is finalized and ROW acquisition is completed, construction access would begin. Access routes are identified, and matting is installed where necessary. The ROW would then be cleared of vegetation. During construction access and vegetation clearing, equipment and materials would be delivered to the project area. Foundation construction would occur after vegetation clearing is complete and begins with drilling for structure foundations. The anchor bolts would be placed in the holes once drilling is complete and concrete is placed into the hole. After the structure bases are installed, the remaining structure would be assembled at each pole location by a crane. Once structures are assembled, hardware and insulators would then be installed, and conductor would be strung using a pulley system. Once the conductor has been strung, it would then be attached to the insulators and the pulley system would be removed. If necessary, bird diverters, vibration dampers, or galloping devices may also be installed at this point in the construction process. After all line construction is complete, the ROW would be restored.

4.4.5. Natural resources and impacts

4.4.5.1. Solid wastes

Generation of solid waste products during construction of the proposed electric transmission line is anticipated to be minimal; as such, no significant impacts are anticipated to occur as a result of the proposed project.

4.4.5.2. Geology

All of the electric transmission routing options are located in the Lake Superior Lowland physiographic province, an area of about 1,250 square miles in northwestern Wisconsin covering portions of Douglas, Bayfield, and Ashland counties. An additional 2,400 square miles is submerged beneath the waters of Lake Superior. Its altitude ranges from less than 1,000 feet above to about 300 feet below sea level, and it rises 150 to 350 feet above and goes 600 to 900 feet below the level of Lake Superior, which stands at 602 feet above sea level. The Lake Superior basin is now a lowland because of the downward movement of a block of the earth's crust in a rift, or graben fault. Subsequent sedimentation, erosion, and sculpting by continental ice sheets have reshaped the area and notably modified the rift valley.

4.4.5.3. Topography and soils

According to the USGS topographic data, the routing options cross areas ranging from approximately 600 to 690 feet above mean sea level. In general, the land slopes from higher elevations in the southeast to lower elevations near the Nemadji River, Bluff Creek, and Bear Creek. The land in the vicinity of the ESS gently slopes northwest from approximately 688 feet above mean sea level to 684 feet above mean sea level. The land surrounding the WSS is also relatively flat at approximately 662 feet above mean sea level.

The routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both switching stations are located within forested wetland and lowland scrub/shrub. The Richard I. Bong Airport is located west of the Hill Avenue Site Route and the Nemadji Golf Course is located west of the WSS.

During construction of the project, topsoil would be kept separate from subsoils and will be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas

disturbed by construction activities. Compacted soils would be disked prior to final stabilization. It is not anticipated that any subsoil removed for excavations will be spread in upland cropland or pasture.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 14 days, but vegetative cover is required for less than 1 year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been disturbed would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected at least weekly to monitor vegetative growth until final stabilization is achieved. Figure 4-2 shows the soils present within the proposed electric transmission routing options.

4.4.5.4. Upland land cover

Upland land cover discussed in this final EIS includes forests, grasslands and meadows, and agricultural lands. Although wetlands may be broadly mentioned in this section, they are discussed separately, in greater detail, in the water resources sections of this final EIS. In general, agricultural lands are not a major land cover component within the proposed electric transmission routing options.

Existing and Potentially Impacted Upland Land Cover within the Electric Routing Options

The electric route alternatives cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both Switching Stations are located within forested wetland and lowland scrub/shrub.

Although the electric routing options are primarily sited along existing utility corridors, construction of all routes and the associated switching station would require clearing of woody vegetation and the conversion of forested habitat to scrub-shrub or wet meadow habitat.

The Eastern Route would be constructed within an existing utility corridor that contains a natural gas pipeline and overhead electrical transmission lines; however, approximately 23.1 acres of woody vegetation would be cleared from forested lands and shrubland habitats. Woody vegetation would be removed where additional, new ROW is needed and along the edges of the exiting utility corridor.

In addition to minor impacts to forested land along the existing shared utility corridors, the Western Route would require more clearing in forested areas for new ROW. Woody vegetation clearing would occur along approximately 79.1 acres of the Western Route in forested lands and shrubland habitats. Woody vegetation would be removed where additional, new ROW is needed and along the edges of the exiting utility corridor.

The Hill Avenue Site Route would require clearing in forested areas for new ROW and along the existing shared utility corridors. Woody vegetation clearing would occur along approximately 14.3 acres of this route in forested lands and shrubland habitats.

Construction of either ESS or WSS would impact approximately 14 acres of woody vegetation in forested lands and shrubland habitats.

Grasslands within the electric routing options primarily occur in previously disturbed areas or existing, maintained utility corridors, and are dominated by reed canarygrass (*Phalaris arundinacea*). Other grassland species present include Canada goldenrod (*Solidago canadensis*) and Canada thistle (*Cirsium arvense*). Wetland grasslands typically include woolgrass (*Scirpus cyperinus*) and broadleaf cattail (*Typha latifolia*).

The applicants anticipate that most of the impacts to grasslands along the electric routing options would be temporary and occur during construction to existing grassland habitat along existing utility corridors. Some permanent impacts to grassland habitats would occur where transmission line poles and foundations would be set. No grassland habitat is present within the footprint of either switching station.

The applicants have stated that, to the practicable extent, grassland impacts would be avoided or minimized during the construction phase; and have further stated that once construction and restoration are complete, the plant and animal communities, including the grassland plant community, would return to grassland areas temporarily impacted by construction.

Applicants' Proposed Revegetation Strategy

The following describe the re-vegetation and site restoration plan for the proposed project.

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059-Seeding for Construction Site Erosion Control, Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 14 days, but vegetative cover is required for less than 1 year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent perennial vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been seeded would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected at least weekly to monitor vegetative growth until final stabilization is achieved.

4.4.5.5. Water resources

Water resources discussed in the following sections include surface waters such as wetlands and waterways.

Wetlands

Wetlands provide vital functions that benefit society. Wetlands detain stormwater runoff, enabling the slow recharge of groundwater resources and lowering downstream peak flood levels; filter sediments and pollutants from the air, precipitation, and upstream sources which results in higher water quality downstream; provide food, cover, and nesting habitat for many species of fish and wildlife; provide a recreational opportunity for bird watching and other wildlife viewing, hiking, and enjoying the aesthetics of the surrounding landscape. It is estimated that between one-quarter and one-third of all rare species in Wisconsin are found in wetlands.

Wetlands are a dynamic ecosystem and provide different functions depending on the type of wetland. The same wetland may even provide different functions from year to year and season to season. There are many different types of wetlands, typically characterized by the size, type of vegetation and amount of soil saturation or surface water found within them. Figure A-1 in Appendix A of this final EIS shows the wetlands present in the vicinity of the proposed NTEC plant.

Identifying Wetlands Within and Adjacent to the ROW

Wetlands were identified during wetland delineations conducted in the 2016 and 2017 growing seasons. Where field delineation was not possible due to access constraints, the applicants utilized available desktop mapping resources, such as the WWI, soil mapping, LIDAR contours, topographic mapping, and recent aerial imagery, to map wetland boundaries. If the project is approved and the Eastern Route selected, the desktop delineated wetland boundaries should be field confirmed prior to construction. A WRAM assessment was conducted by the applicants to document the overall quality of the wetlands. However, the wetland quality data taken during the field investigations was not taken for each individual wetland, and therefore may be over-generalized. The wetlands provide values of shoreline protection; supporting habitat for rare species, birds, amphibians, and other wildlife; and flood water storage. Due to the presence of invasive species and the degraded nature due to the presence of nearby roads and industrial areas, these wetlands were documented to be of low to medium quality. Wetlands also exist surrounding the ROW.

Potential Impacts to Wetlands

Construction and maintenance of transmission lines can impact wetland functional values or can cause wetlands to be converted into another wetland type. The degree and nature of impacts to wetlands depend on factors such as the type of wetland, quality of the wetland, ground conditions at the time of construction, and the type and duration of construction activities. Short-term wetland impacts can become long-term impacts if the construction phase is not well managed, or if restoration techniques are not properly applied.

Construction in and near wetlands can cause sedimentation intro wetlands. Sedimentation can occur even when sediment and erosion control BMP's are utilized, particularly if those BMP's are not inspected and maintained on a daily basis. Clearing of the ROW would occur in preparation for construction, including the removal of shrubs and trees. Clearing of wetlands dominated by woody vegetation results in a conversion from shrub or forested wetland into herbaceous wetland and can impact wildlife habitat, impair wetland functional values, and increase the occurrence of invasive species. The debris associated with woody clearing, including wood chips and brush, should not be left piled or spread in wetland areas as they can spread invasive species, obstruct water flow, and minimize the re-growth of vegetation if not removed from wetlands. Clearing can also lead to fragmentation of wetland complexes that may impact wildlife habitat. Removing riparian wetland vegetation may decrease shoreline protection and may lead to increased sedimentation to wetlands and waterways.

Another potential impact is the potential spread of invasive species. Invasive species provide little food and habitat for wildlife and can outcompete native vegetation. Additional information on potential impacts from the spread of invasive species as a result of utility construction has been included in Section 4.4.5.6.

Heavy machinery used for construction can crush wetland vegetation and damage wetland soils, causing soil compaction, rutting, and soil mixing, and can transport invasive species. Soil compaction reduces the water-holding capacity of the soil and may result in increased runoff. Compacted soils can result in a change in vegetation by potentially reducing plant diversity and promoting the growth of invasive species Wetland soils consist of primarily organic matter (decomposed plant material) which forms very slowly. If disturbed by digging, filling, and compaction, these soils do not readily recover and are not easily repaired. Operating equipment in wetland can endanger amphibians and other aquatic life.

Temporary impacts to hydrology (the vertical and horizontal movement of water through the soil) can occur during foundation installation and associated dewatering activities. Dewatering activities to temporarily remove water from the foundation hole could include pit-trench dewatering or the use of high-capacity wells. The specific dewatering activity will be determined pre-construction if the project is approved. Hydrologic function can be further affected if fill is deposited in the wetland from clearing activities or for the construction of roads, bridges, and structures. Some minor changes in flow in the shallow groundwater system may occur due to compaction from heavy equipment. The placement of the concrete foundation in a wetland should have no long-term effect on either infiltration of water or the natural flow of either groundwater or surface water through wetlands. Water seeking to infiltrate will likely move laterally over the top of the relatively impervious structure and continue downward along the side. Water flowing horizontally in the aquifer will likely diverge at the upgradient end of the structure and converge on the downgradient side. Dewatering of wetlands during construction may cause a temporary loss of water but these zones should refill after the cement is placed. Geotechnical boring work will occur pre-construction if the project is approved. This survey work will help identify underlaying soil and groundwater conditions, potentially the location of springs and seeps. If seeps and springs are impacted from the foundation installation, water should redirect around the foundation.

Minimization of Impacts to Wetlands

All attempts should first be made to avoid impacting wetlands. For example, impacts to wetlands can be avoided by:

- Routing the transmission line away from wetlands;
- Adjusting structure placements to span wetlands;
- Avoid equipment access in wetlands, wherever possible;
- Siting off-ROW access roads, laydown yards, and staging areas outside of wetlands.

Where complete wetland avoidance is not possible due to engineering constraints, existing infrastructure, or other factors, wetland impacts should be minimized as much as possible. Construction methods that can reduce direct and secondary impacts to wetlands include:

- Marking the boundary of wetlands prior to construction;
- Limit construction in wetlands to winter months when soils and water are frozen and vegetation is dormant;
- Using construction matting and wide-track vehicles to spread the distribution of equipment weight when crossing wetlands during the growing season or when wetlands are not stable or not frozen;
- Use adjacent roads and existing off-ROW access roads for vehicle access when possible;
- Site structures and access roads on the edges of wetlands rather than in the middle of wetland to avoid fragmenting wetland complexes;
- Reducing the construction workspace in wetlands;
- Effective, site-specific sediment and erosion control measures and devices should be installed prior to construction activities and maintained during construction and restoration phases. These devices should be inspected daily to ensure they are in working order. If they are not in working order, they should be fixed and/or replaced immediately.
- Using alternative construction methods and equipment such as helicopters, marsh buggies, and vibratory caisson foundations;
- Prepare and implement an invasive species management plan that identifies known areas of invasive species populations and addresses site restoration activities and includes equipment decontamination protocols to minimize the spread of invasive species;
- Implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project;
- Isolate all soil piles with perimeter sediment control devices, and place all soils piles in wetlands on top of construction mats to prevent soil mixing;
- Minimize the amount of vegetation clearing in wetland and conversion of wetland types;
- Remove all brush piles, wood chips, and woody debris from wetlands following clearing activities;
- Conduct surface and sub-surface assessments prior to construction, including hydrology and soil evaluations; modify the engineering plans as needed to avoid and minimize long-term impacts to surface and subsurface resources and to re-establish conditions post-construction;
- Prepare and implement dewatering practices that prevent sedimentation into wetlands;
- Schedule construction to avoid disrupting sensitive species;
- Limit the amount of time necessary to complete construction.

Site restoration consists of the activities required to return the areas impacted by the construction of an approved project back to their original condition, if not better. Restoration typically occurs in any disturbed areas within easements or ROW, temporary construction areas, staging areas or laydown yards, transportation routes, off-ROW access roads, and any other areas used for project related activities. Temporary seeding should be used in areas of exposed soils where construction has temporarily ceased. Site restoration of the disturbed areas would be completed as soon as possible following construction. During site restoration, construction mats and debris is removed, soil rutting is corrected, topography and

elevations restored to pre-existing conditions, and permanent re-vegetation activities are conducted. Seeding disturbed wetlands with a cover crop would help prevent the establishment of invasive species and would not compete with the existing seed bank. While some wetlands contain invasive species such as reed canary grass, wetlands of higher quality, dominated by native species, are also present within the project area. Wetlands not infested with invasive species pre-construction should be evaluated individually for re-vegetation with either a native seed mix or by allowing the native seed bank to re-establish naturally and potentially with the aid of a cover crop. Wetland areas infested by invasive species pre-construction should be re-vegetated with an annual cover crop. Specific restoration monitoring protocols and methods that would be used in wetlands areas are usually determined by DNR and/or USACE permit requirements. Site restoration activities and revegetation progress should be monitored, as well as all erosion control devices to ensure they are functioning properly. Once permanent erosion control measures are installed, and vegetation is re-established, temporary erosion control measures would be removed.

Proposed Wetland Crossings and Impacts

The Hill Avenue Route to the Eastern Route to the ESS Alternative is comprised of segments H01, H02, A03, B01, B02, and C01, is approximately 5.3 miles long, and would connect the Hill Avenue Site to the Eastern Route to the ESS. A total of 48 wetlands were identified within this route alternative ROW and associated laydown areas, the ESS, and off-ROW access roads. These wetlands are classified as wet prairie, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 11.83 acres due to the placement of construction matting to facilitate equipment access across wetlands. Approximately 23 pole structures would be constructed within wetlands, as well as the construction of a new Eastern Switching Station, resulting in 13.36 acres of permanent wetland fill total. A total of 25.53 acres of shrub and forested wetland would be permanently cleared for this route alternative.

The Hill Avenue Route to the Western Route to the ESS Alternative is comprised of segments H01, A05, D01, E01, and C01, is approximately 7.1 miles long, and would connect the Hill Avenue Site to the Western Route to the ESS. A total of 58 wetlands were identified within this route alternative ROW and associated laydown areas, the WSS, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 18.40 acres due to the placement of construction matting to facilitate equipment access across wetlands. Approximately 50 pole structures would be constructed within wetlands, as well as the construction of a new Eastern Switching Station, resulting in 21.09 acres of permanent wetland fill total. A total of 69.27 acres of shrub and forested wetland would be permanently cleared for this route alternative.

The Hill Avenue Route to the Western Route to the WSS Alternative is comprised of segments H01, A05, D01, F01, and G01, is approximately 1.6 miles long, and would connect the Hill Avenue Site to the Western Route to the WSS and ultimately to an existing transmission line. A total of 40 wetlands were identified within this route alternative ROW and associated laydown areas, the WSS, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Temporary wetland fill is anticipated to be 15.13 acres due to the placement of construction matting to facilitate equipment access across wetlands. It is unknown how many pole structures would be constructed within wetlands, but the construction of a new Western Switching Station would result in 14.01 acres of permanent wetland fill total. A total of 56.38 acres of shrub and forested wetland would be permanently cleared for this route.

There are 2 proposed temporary laydown yards that would be used regardless of which route alternative is selected, should the project be approved. Originally, one of the laydown yards was proposed within wetland. The revised laydown area was not field investigated but determined by the applicants to not

contain wetlands based on a review of desktop resources. If this project is approved, field investigation should occur to confirm the absence of wetlands at this laydown area.

Wetland Permitting

DNR is responsible for regulating the discharge of dredge and fill material into wetlands under Wis. Stat. § 281.36 and Wisconsin Administrative Code. USACE might also require a permit under Section 4040 of the Clean Water Act. The DNR and/or the USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations. Wetland compensatory mitigation would be required for unavoidable wetland impacts associated with the overall project. Compensatory mitigation involves the restoration, enhancement, creation or preservation of wetlands to compensate for unavoidable adverse impacts to wetlands from a proposed project. As part of the permitting process, DNR and USACE would review the wetland impacts to determine the appropriate compensatory mitigation credit for the project prior to the start of construction. This determination is based on the amount and type of wetland impact and is consistent with federal regulations. There are three avenues for satisfying compensatory mitigation requirements, including: (1) wetland mitigation banking, which requires the permittee to purchase bank credits from a mitigation bank sponsor approved by DNR, (2) in-lieu fee, which involves purchasing compensatory credits from DNR, and (3) permittee responsible mitigation, which requires the permittee to complete a wetland mitigation project approved by DNR.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also hire their own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

Waterways

Waterways include perennial and intermittent streams, creeks, rivers, channels, and other linear waterbodies. Waterways present in the vicinity of the proposed NTEC plant are shown in Figure A-1 in Appendix A of this final EIS.

Identifying Waterways Within and Adjacent to the ROW

Waterways were identified during field surveys conducted in the 2016 and 2017 growing seasons. Where field surveys were not possible due to access constraints, the applicants utilized available desktop mapping resources, such LIDAR contours, topographic mapping, and recent aerial imagery, to map waterways.

Potential Impacts to Waterways

Construction and operation of transmission lines across waterways may have both short-term and long-term impacts. Short-term impacts can become long-term impacts if the construction phase is not well managed, or if mitigation and restoration techniques are not properly applied. The type and significance of the impact is dependent on the characteristics of the waterway and the construction activities proposed. Physical features of the waterway are considered when assessing potential impacts to water quality, water quantity, habitat, recreational use, and the scenic quality of the waterway.

The use of heavy equipment on waterway banks may also cause soil compaction. Withdrawal of surface water for structure foundation construction may temporarily impact waterways. Constructing in areas with seeps and springs may temporarily alter the surface and subsurface hydrology feeding waterways. Overhead transmission lines may also have an aesthetic impact on the natural scenic beauty of the waterway. Transmission facilities may also pose a potential collision hazard for waterfowl and other large birds, especially when located in a migratory corridor. Recreational use such as sight-seeing, boating, fishing, or bird watching could be adversely affected by new transmission facilities.

Construction activities conducted near and across waterways has the potential to impact water quality and aquatic species habitat. Forested and shrub areas along waterways provide a natural corridor for wildlife movement, help maintain soil moisture levels in waterway banks, provide bank stabilization, filter nutrient-laden sediments and other runoff, maintains cooler water temperatures, and encourages a diversity of vegetation and wildlife habitats. The removal of riparian vegetation can cause water temperatures to rise and negatively affect aquatic habitats, especially cold-water systems. Removing riparian vegetation may decrease shoreline protection and may lead to increased sedimentation to waterways. Vegetation disturbance along the waterway can also lead to the infestation by invasive and nuisance species. Existing vegetative buffers should be left undisturbed whenever possible, or vegetation clearing should be kept to a minimum in riparian zones. For areas where construction impacts cannot be avoided, low-growing native tree and shrub species should be allowed to regrow and/or should be replanted so as to maintain the pre-construction condition of the banks and to minimize impacts to water quality.

Construction near waterways and access across waterways can cause sedimentation into waterways. Sedimentation can occur even when sediment and erosion control BMP's are utilized, particularly if those BMP's are not inspected and maintained on a daily basis. Access through the ROW to conduct construction activities often requires the installation of TCSBs to avoid equipment driving on the bed of waterways. TCSBs typically consist of timber mats placed across the waterway to allow equipment traffic to cross waterways. TCSBs should be located to avoid unique or sensitive portions of these waterways, (*e.g.*, riffles, pools, spawning beds, etc.). They span from top-of-bank to top-of-bank, above the ordinary high water mark, and do not require a support structure on the bed of the waterway. Potential impacts can include disturbance to the bank of the waterway, cutting of riparian vegetation, disruption to the invertebrates, fish and wildlife associated with the waterway, sedimentation into the waterway, and public access limitations. If improperly installed or maintained, TCSBs may be overtopped or dislodged, and back up water. To avoid sedimentation into waterways, appropriate sediment control BMPs should be installed under and on the sides of the TCSB during the installation, use, and removal of TCSBs, and those BMPs must be regularly inspected and maintained throughout the project.

Mitigation of Impacts to Waterways

All attempts should first be made to avoid impacting waterways. Where complete waterway avoidance is not possible, the following practices should be followed to minimize direct and secondary impacts to waterways:

- Marking the locations of waterways prior to construction;
- Using alternative equipment access, including off-ROW access roads, and installation methods to avoid needing to cross waterways with equipment;
- Effective, site-specific sediment and erosion control measures and devices should be installed prior to any construction activity and maintained during construction and restoration phases. These devices should be inspected daily to ensure they are in working order. If they are not in working order, they should be fixed and/or replaced immediately;
- Implement a construction sequencing plan that minimizes the amount of land disturbed or exposed (susceptible to erosion) at one given time across the project;
- Isolate all soil piles from waterways with perimetererosion control BMPs;
- Existing vegetative buffers should be left undisturbed whenever possible, or vegetation clearing should be kept to a minimum in riparian zones. For areas where construction impacts cannot be avoided, low-growing native tree and shrub buffers along these streams should be allowed to regrow and/or should be replanted to maintain the pre-construction water quality in the streams;
- Revegetate disturbed areas and areas of exposed soil as soon as possible;
- Avoiding the use of herbicides near waterways, or utilizing herbicides approved for use in aquatic environments;
- Conducting surface and sub-surface assessments prior to construction, including hydrology and soil evaluations; modify the engineering plans as needed to avoid and minimize long-term impacts to surface and subsurface resources and to re-establish conditions post-construction;
- Preparing and implementing dewatering practices to prevent sedimentation into waterways;
- Avoiding the withdrawal of water from surface waters;
- Schedule construction to avoid disrupting sensitive species;
- Limit the amount of time necessary to complete construction;
- Marking TCSBs to alert navigators;
- Restoring waterway banks to pre-existing conditions;
- Checking equipment for fluid leaks before crossing TCSBs;
- Anchor TCSBs to prevent them washing away during high flow conditions;
- Monitor TCSBs daily for debris and remove debris as necessary;
- TCSBs should be located to avoid unique or sensitive portions of these waterways, (*e.g.*, riffles, pools, spawning beds, etc.);
- To avoid sedimentation into waterways, appropriate sediment control BMPs should be installed under and on the sides of the TCSB during the installation, use, and removal of TCSBs, and those BMPs must be regularly inspected and maintained throughout the project.

Under Wis. Admin. Code § NR 320.04(1), a five-foot clearance must be maintained between the water and TCSB, unless the requirements in NR 320.04(3) can be met, including providing portage for anyone navigating the waterway.

In order to protect fish spawning habitat, TCSBs cannot be installed and/or removed during the fish spawning timing restriction period (March 1–June 15 for non-trout waters and September 15–May 15 for trout waters), unless the local DNR Fisheries Biologist reviews the proposal and determines that these timing restrictions can be waived.

Proposed Waterway Crossings and Impacts

The Hill Avenue Route to the Eastern Route to the ESS Alternative is comprised of segments H01, H02, A03, B01, B02, and C01, is approximately 5.3 miles long, and would connect the Hill Avenue Site to the Eastern Route to the ESS. A total of 14 waterways are present along this route alternative, which are the Nemadji River, Newton Creek, and unnamed tributaries to the Nemadji River, Bluff Creek, and Bear Creek. Two of these waterways, Newton Creek and an unnamed tributary to Bluff Creek, are designated ASNRI waterways. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of five TCSBs are proposed to be installed across waterways for equipment access, two of which will be the ASNRI waterways. The remaining waterways would be crossed during wire pulling activities and would not require equipment crossing.

The Hill Avenue Route to the Western Route to the ESS Alternative is comprised of segments H01, A05, D01, E01, and C01, is approximately 7.1 miles long, and would connect the Hill Avenue Site to the Western Route to the ESS. A total of nine waterways are present along this route alternative, which are the Nemadji River, Bluff Creek, Newton Creek, and unnamed tributaries to the Nemadji River. Two of these waterways, Bluff Creek and Newton Creek, are designated ASNRI waterways. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of seven TCSBs are proposed to be installed across waterways for equipment access, two of which will be the ASNRI waterways. The remaining waterways would be crossed during wire pulling activities and would not require equipment crossing.

The Hill Avenue Route to the Western Route to the WSS Alternative is comprised of segments H01, A05, D01, F01, and G01, is approximately 1.6 miles long, and would connect the Hill Avenue Site to the Western Route to the WSS and ultimately to an existing transmission line. A total of eight waterways are present along this route alternative, which are the Nemadji River, Bluff Creek, Newton Creek, and unnamed tributaries to the Nemadji River. Two of these waterways, Bluff Creek and Newton Creek, are designated ASNRI waterways. Pole structures would completely span the Nemadji River and the waterway would also not be crossed by vehicles or equipment. A total of seven TCSBs are proposed to be installed across waterways for equipment access, two of which will be the ASNRI waterways. The remaining waterway would be crossed during wire pulling activities and would not require equipment crossing.

Waterway Permitting

DNR is responsible for regulating impacts to navigable waterways and waterbodies under Wis. Stat. ch. 30 and Wisconsin Administrative Code. Some of the state legal protections and permitting requirements for activities affecting public waterways include, but are not limited to:

- Wis. Stat. § 30.12 and Wis. Admin. Code ch. NR 329 require permits for structures placed on the bed of navigable waters;
- Wis. Stat. § 30.123 and Wis. Admin. Code ch. NR 320 require permits for bridges placed over public waters and culverts placed within navigable waters;
- Wis. Stat. § 30.19 and Wis. Admin. Code ch. NR 341 require permits for grading on the banks of navigable waters;

- Wis. Stat. § 30.195 requires permits for channel relocation of navigable waters;
- Wis. Stat. § 30.20 and Wis. Admin. Code ch. NR 345, require permits for removing material from the bed of navigable waters;
- Wis. Stat. § 30.29 prohibits the operation of motor vehicles in navigable waters unless it qualifies under one of the exemptions or is approved through a permit authorization.

USACE and/or USFWS might also require additional permits and approvals. Some of the federal legal protections and permitting requirements for activities affecting waters include, but are not limited to:

- 33 USC § 403 Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable waters of the U.S.
- 16 USC §§ 1271-1287 prohibit federal agencies from authorizing a water resources project that would have a direct and adverse effect on the values for which a river protected by the Wild and Scenic Rivers Act was established.

The DNR and/or the USACE can require many or all of the minimization measures listed in the section above as required conditions of its permit authorizations.

CPCNs granted by the Commission are often contingent upon an applicant's ability to secure all necessary permits from state and federal agencies. Likewise, any permit granted by DNR or USACE could be contingent on the implementation of all mitigation procedures ordered by the Commission in its CPCN authorization.

In addition to the protections for water resources provided by law that are described above, the Commission has the authority, in its final order, to require avoidance of specific streams or wetlands, mitigation procedures for specific streams or wetlands, and independent monitoring of construction in all or specific streams and wetlands. IEM are sometimes are required by the Commission in its Order to monitor construction of an approved project. The IEM typically reports directly to Commission and DNR staff rather than the applicants or construction subcontractors. The applicants may also hire their own environmental monitor, separate from the IEM, who reports directly to the applicants. Construction activities subject to monitoring and reporting by the IEM could include activities that would affect wetlands, waterways, habitats and occurrences of protected species, archaeological sites, agricultural fields, state and federal properties, and/or private properties with specific issues such as organic farming practices or the disposition of cleared trees. The IEM is responsible for reporting incidents or stopping work, when appropriate, when construction practices violate any applicable permit, approval, order condition, or agreement with regulatory agencies, or are likely to cause unanticipated impacts to the environment or private properties.

4.4.5.6. Protected and listed species

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0-mile buffer for aquatic species.

This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, will not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are

taken from existing sources within DNR, including the NHI database, as well as external sources, including landowners and surveys completed by the applicants.

For specific route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this final EIS.

Plants

There are ten rare plant species that may have suitable habitat present within the Eastern and Western Routes. In addition, at least four of these plant species have been observed within or immediately adjacent to the Eastern Route while at least five of these plant species have been observed within or immediately adjacent to the Western Route. Additional surveys and avoidance/minimization measures for rare plant species are encouraged and recommended. Potential avoidance measures may include conducting plant surveys to determine presence/absence and/or avoiding areas where known plants occur. Other measures, such as winter construction, use of mats to limit direct disturbance, or relocation, can minimize losses. DNR would also recommend that the applicants and landowners with rare species on their property develop a plan to protect these species.

Herptiles (Reptiles and Amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of the Eastern and Western Routes. The Nemadji River, Bluff Creek, and Bear Creek (Eastern Route only) all appear to be suitable waterways for this species. Therefore, all work within 300m of these waterways are required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary.

Fish and Aquatic Invertebrates

A special concern fish species may be present within the Nemadji River. Although it does not spawn here, it is recommended that strong erosion and siltation measures be implemented to avoid impacts.

One special concern dragonfly species is known to be present within the wetlands and waterways that are within and adjacent to both routes and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

Natural Communities

One wetland natural community may be present within and/or adjacent to the common portion of the Eastern and Western Routes. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

Mammals

An NLEB maternity roost record is crossed by the Eastern Route and within the vicinity of the Western Route. As this is a federally listed species, the applicants will be required to follow the 4(d) rule and not cut trees within 150 feet of known roost trees from June 1–July 31). Surveys may be required in order to determine where known roost trees are located. The NLEB is also state-listed and the applicants should

follow the Cave Bat Broad Incidental Take Authorization and limit tree clearing throughout the project area from June 1–August 15.

Summary

The Eastern and Western Routes are nearly identical to each other in terms of rare species potential impacts. While there are subtle differences between the two, from a known rare species standpoint, no one route is anticipated to be significantly more impactful than the other. However, the Western Route would create more new right of way which may negatively impact birds and other species that need large contiguous habitats to survive.

4.4.5.7. Invasive species

The applicants have submitted an invasive species survey and identified invasive plant species along the routing options including near the proposed switching stations. The review was completed in September 2016 and October 2017 during wetland delineation field surveys. The only invasive plant species observed was reed canary grass, which is listed as a nonregulated wetland invasive species by DNR. DNR has also indicated that emerald ash borer was detected in Douglas County in 2013.

In compliance with Wis. Admin. Code ch. NR 40 Invasive Species Identification, Classification and Control Rule, the applicants would mitigate the potential to spread invasive plant species during project activities. The applicants would identify invasive plant species locations on the construction plans and flagged on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, the applicants would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools along the project. The applicants may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to leaving the project ROW to reduce the risk of spreading invasive plant species beyond the ROW.

Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20, seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used in the project ROW would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

4.4.6. Local community and impacts

All of the routing options are located in the City of Superior in Douglas County, Wisconsin. Potential impacts that could affect the local community as a result of constructing the proposed electric transmission line within the routing options are discussed in the following sections.

4.4.6.1. Site history

Site history of the area within the proposed routing options is similar to that discussed in Section 4.3.1 for the Hill Avenue Site.

4.4.6.2. Nearby populations, vulnerable groups, and environmental justice issues

The area and population present within the vicinity of the three routing options is covered within scope of the discussion and analysis provided in Section 4.3.2.

4.4.6.3. Land use

All routing options cross areas of agricultural land, forest land, grassland, open water, urban/developed areas, and wetland. Both proposed switching stations are located within forested wetland and lowland scrub/shrub. The Richard I. Bong Airport is located west of the Alternative Site Route and the Nemadji Golf Course is located west of the Alternate Switching Station Site. Figure A-2 in Appendix A of this final EIS shows existing land use and land cover in the vicinity of the proposed NTEC plant..

In the City of Superior the routing options extend through areas currently zoned for manufacturing, suburban, and apartment residential. The WSS is within apartment residential zoning. The future land uses in the City of Superior for the routing options are industrial/manufacturing and open space/undeveloped. The existing land use crossed by the routing options in the Town of Parkland is forest and agricultural. The future use for the forested land is to remain forest land. The future use for the agricultural area is mitigated wetland. The Eastern Routing Option is within an existing transmission line corridor along this length and does not require additional ROW, however. The Western Route extends through forested areas, the majority of which would remain forest land. The future land use for a portion of the forested area near the preferred switching station site is agricultural and medium density residential, however. The existing land use at the preferred switching station site is forest with a future land use of medium density residential.

4.4.6.4. Local jobs

The working population and specific statistical data regarding local jobs is covered within scope of the discussion and analysis provided in Section 4.3.4.

4.4.6.5. Local road, rail, and air traffic

Local Roads

Construction traffic and any road closures would be temporary in nature and cease after construction is complete. Traffic during operation would primarily include maintenance vehicles. Traffic during operation of the project would increase vehicles on nearby roads but is not anticipated to significantly increase traffic due to the occasional nature of maintenance. The applicants do not anticipate permanent damage to roads. As a precautionary measure, the applicants would video-document the condition of all roads on the construction vehicle routes to document the road condition prior to the start of construction. Any documented adverse impacts to the roads incurred due to the construction of the project would be addressed through consultation with applicable road authorities regarding the applicants' responsibility for repairing the adversely impacted roads.

The closest scenic byway to the routing options is the Skyline Parkway Scenic Byway, a Minnesota State Byway located along West Skyline Parkway in Duluth, Minnesota, and the Veterans Evergreen Memorial Drive along Highway 23 in Carlton County, Minnesota, and Douglas County, Wisconsin. The routing options are over 6.0 miles southeast of the Skyline Parkway Scenic Byway. Veterans Evergreen Memorial Drive is the only scenic byway in Douglas County, Wisconsin. It is a Minnesota State Scenic Byway that crosses approximately 0.5 mile of Douglas County over 6.8 miles west of the routing options. Due to the distance from these scenic byways, it is anticipated that the project would not significantly impact any scenic roads in the area.

The applicants have stated that based on the design of the project and the proposed mitigation measures no permanent impacts to roads is anticipated. Roads, railways, and airports in the vicinity of the proposed NTEC plant are shown in Figure A-1 provided in Appendix A of this final EIS.

Rail Lines

Several rail lines are crossed by the routing options; all of which are active rail lines. All routing options cross BNSF and Canadian National lines.

In addition, some of the proposed off-ROW access roads would be required in the vicinity of existing railroad ROW. The off-ROW access roads near the BNSF railroad would be required to access the area during the construction phase of the project. The off-ROW access road north of the Canadian National railroad would be required to access the area between the railroad and Bear Creek for construction. The off-ROW access road south of this railroad would be required to access the area south the railroad and Bear Creek. The three short segments along Lyman Lake Road would be required to access the Eastern Route, east of the road.

Local Airports and Air Traffic

The nearest public use airport to the all three routing options is the Richard I. Bong Airport, located approximately 1-2 miles west of the routing options, depending on the option. Other nearby air facilities include the Sky Harbor Airport and Seaplane Base, a public use airport located approximately 1-2 miles north of the routing options; and the Carlson Airport, a private use airstrip located from 1-4 miles southwest of the routing options. The St. Mary's Hospital and St. Luke's Hospital heliports are private use facilities located approximately 6-7 miles north of the routing options. The Duluth International Airport is located between 10 and 11 miles northwest of the routing options. There may be other private use facilities in the area that are not registered with the FAA. Because the locations of such facilities cannot be confirmed, they were not included in the report.

An aeronautical study was completed by the FAA for the structures along each routing options, and NPH were issued for three structures on July 24, 2018. The NPH letters stated that if the structure heights were reduced, these three structures would not create a substantial adverse effect and a favorable determination could then be issued. The applicants responded to the FAA on August 3, 2018, stating that the structure heights would be lowered as to not exceed the maximum heights provided by the FAA. The FAA subsequently issued a DNE letter for all the structures that were studied, including these three, on October 2, 2018.

Additionally, the applicants consulted with the WisDOT Bureau of Aeronautics and the City of Superior regarding proposed project structure heights. The WisDOT Bureau of Aeronautics indicated that they do have a permit process for tall structures but would not have jurisdiction over the portion of the project that was within the jurisdiction of the City of Superior. All but a small section of structures associated with the project were determined to be under the authority of the City of Superior. The City stated that the FAA determinations were sufficient for their purposes and they would not require additional tall structure permits. The remaining sections of the project that are outside the authority of the City of Superior but do not meet the WisDOT High Structure Permit criteria.

4.4.6.6. Communication towers

The applicants used the FCC GIS data to identify communication towers, such as cellphone towers and TV towers, within 0.5 mile of each routing options. No towers are located within the ROW of any routing option. Although no towers were detected within the actual proposed ROW of the routing options, there is still potential that the project would interfere with nearby communication tower signals, depending on

existing tower heights and final project design. The applicants have stated that they intend to work with the licensees along the project to mitigate any potential interference as applicable.

4.4.6.7. Local community services

Refer to Section 4.3.7 for an overview of potential interactions and impacts to local services including local law enforcement, emergency services, and healthcare facilities.

4.4.6.8. Recreation

No parks are within 0.5 mile of the routing options. Both Eastern and Western Routes would cross several recreation areas near the Nemadji River near the 18th Street fishing access and boat launch. These routes would also cross the Nemadji River near the Nemadji River Canoe Launch, and cross the Allouez Area Parcel 1 hunting area on the east bank of the Nemadji River.

The Eastern Route would cross two additional hunting areas: the Itasca Area hunting area and the Annex hunting area. The Western Route would cross the Allouez Area Parcel 2 hunting area as well as a small area of the Nemadji Sled Hill property. The Western Route would cross the Murphy Oil–5 hunting area and the Orange Trail. The Orange Trail is used by snowmobiles and ATVs.

The applicants have stated that the nearest municipal park to any routing area is over 0.5 mile away, and therefore impacts to any of the parks are expected to be nominal. The Nemadji Sled Hill property would be crossed by a small area of the Western Route ROW. This area is currently wooded, however, and it is not anticipated that the Western Route would impact sledding activities in the remaining property.

The fishing access and boat launch at 18th Street as well as the Nemadji River Canoe Launch would be near both Eastern and Western Routes. Though not directly crossed, the access may be impacted during construction of facilities through temporary road closures and temporary increased noise associated with construction. During operations there would be slightly increased traffic and noise near the fishing access at 18th Street during maintenance. Traffic during operation of the project will increase vehicles on nearby roads but the applicants do not anticipate a significant increase in traffic citing the infrequent nature of maintenance.

All routing options cross hunting areas. The Eastern and Western Routes cross the Allouez Area Parcel 1 hunting area in an existing utility corridor, generally paralleling existing transmission lines and gas pipelines. The Eastern Route extends through the Itasca Area hunting area within an existing utility corridor as a double circuit transmission line with an existing 161 kV line. The Eastern Route would not require new ROW within the Annex hunting area as the route would be double circuited with an existing transmission line in this area. The Western Route would cross the Allouez Area Parcel 2 hunting area parallel to County Road A and near an existing Enbridge crude oil pipeline. The applicants have stated that by paralleling, or sharing, existing utility or transportation infrastructure through these areas, the amount of new ROW required for the project in hunting areas and would be eliminated. The Hill Avenue Site Route would require clearing a new corridor within the Murphy Oil–5 hunting area. This area would need to be cleared of vegetation in the ROW.

Construction of the Western Route may impact visitors to the Orange Trail. Impacts could include increased traffic crossing the trail or temporary closures during project construction, as well as slightly increased traffic crossing the trail during project maintenance activities. Construction traffic and any road closures would be temporary in nature and cease after construction is complete.

Recreation areas in the vicinity of the proposed NTEC plant are shown in Figure A-1 provided in Appendix A of this final EIS.

4.4.6.9. Property values

Although no specific surveys or studies were conducted regarding potential impacts to property values as a result of constricting the proposed transmission line, a general summary of this issue is provided below.

The potential change in property values due to the proximity to a new transmission line has been studied since the 1950s by appraisers, utility consultants, and academic researchers. Studies have been conducted mostly on residential or undeveloped properties and not commercial properties. It is very difficult to predict how a specific transmission line will affect the value of a specific property. A power line may change an individual's perception of a property's worth.

The studies that cover this subject can be difficult to generalize and must be judged on the quality of the study design and analyses of the data. Surveys and research tends to show persistent adverse perceptions of the impact of transmission lines. Most respondents believe that the presence of a transmission line would result in lower property values, or respond that they would pay less for a property encumbered by or near to a transmission line.

It is important to note that the proposed transmission lines for this project would be located in areas that already contain existing transmission lines and natural gas pipelines in many areas, and other adjacent infrastructure.

4.4.6.10. Noise

Sound levels would be expected to increase during the construction regardless of the selected routing options. In the daytime hours noise may be associated with the operation of construction equipment, if construction occurs during the nighttime hours, sound levels could also increase. At this time, the applicants do not anticipate that nighttime construction would regularly occur. The applicants anticipate that, once constructed, the project would add minimal additional noise and noise levels would be comparable to typical current ambient levels.

4.4.6.11. Views, aesthetics, and lighting activity

The aesthetics of the surrounding area would be altered by the project. The proposed structures would predominately range in height from 120 feet to 160 feet above grade based on similar structure designs used for other projects. The proposed structures would likely be steel self-supporting structures on concrete foundations. All routing options would be visible from multiple viewpoints throughout the area; most of the route is within undeveloped forested areas along existing utilities.

The routing options would be located within industrial or wooded and undeveloped areas for the majority of their length. A significant portion of the Eastern and Western Routes would be located parallel to or double circuited with existing transmission infrastructure.

Although the applicants state that no concerns regarding the aesthetics of the transmission line were recorded at the public open houses, it is possible that some nearby residents may find the appearance of the project aesthetically displeasing. The applicants cited the lack of public comment regarding the degradation of aesthetics as reason to not conduct photo simulations depicting post-construction transmission infrastructure.

4.4.6.12. Historical and archeological sites

As discussed in Section 4.3.13, in accordance with Wis. Stat. § 44.40(5), the Commission is not required to conduct a consultation with the SHPO for the proposed project since a federal agency (USDA RUS) intends to conduct the Section 106 review process as part of a separate environmental review of the proposed project. Instead, the Commission intends to act as a consulting party in the federal Section 106 review; which, if the project is approved, would be conducted only for the final approved project configuration.

The applicants commissioned a third party to investigate the project in the area of the routing options for the presence of archaeological sites, potentially historic buildings, and human burial sites near the project area. The following sections discuss the findings for each of the routing options.

Eastern Route

The applicants identified and reviewed archaeological sites, potentially historic buildings, and human burial sites near the Eastern Route. One archaeological site is located within the area of potential effect (APE). The finding site consists of an abandoned railroad grade, associated facilities, and scattered artifacts dating from the late 19th to mid-20th century , associated with the Iron River to Superior DSS&A Railway. The site has poor integrity, with removed hardware and overgrown grade, but contains *in situ* artifacts. The site is not recommended eligible for NRHP listing. The investigation concluded and SHPO concurred that no additional investigations are recommended and no that there is a low likelihood that historic properties or burial sites would be effected by the proposed project within the Eastern Route.

Western Route

The applicants identified and reviewed archaeological sites, potentially historic buildings, and human burial sites near the Western Route. One archaeological site is located within the APE, a residential building from the 1940s. The project would affect the remains of a gravel driveway associated with the residence. The site would not be considered historically significant and would not be recommended eligible for NRHP listing. The review stated that no additional investigations are recommended, and no historic properties or burial sites are anticipated to be impacted by the proposed project within the Western Route.

4.4.6.13. Local economics

The discussion of potential project impacts to local economics provided in Section 4.3.14 is inclusive of the segment of the population potentially impacted by the proposed routing options associated with the project.

4.4.6.14. Electromagnetic fields

Concerns over exposure to EMF are often raised during transmission line construction cases. Electric and magnetic fields occur whenever and wherever we use electricity. A magnetic field is created when electric current flows through any conductor such as a power line or the electrical wiring in a home. Other sources of magnetic fields include electric blankets, fluorescent lights, appliances, and electric baseboard heating. Because there are so many common sources of EMF, we are exposed to a wide variety of magnetic fields every day. Magnetic fields are measured or estimated in units of Gauss or mG (a mG is equal to 1/1000 of a Gauss). Measurements of power line EMF are always reported in mG.

Scientists have found only weak and inconsistent epidemiological associations between exposure to power frequency EMF and human health. Several epidemiological studies have shown a statistical association between the risk of childhood leukemia and the kind of electric wires outside the home. However, many epidemiological studies have found no link to leukemia. Cellular studies and studies exposing test animals

to EMF have shown no link between EMF and disease. Taken as a whole, the biological studies conducted over the last 25 years have not been able to establish a cause-and-effect relationship between exposure to EMF and human health effects. In addition, there have been no plausible biological mechanisms discovered by which exposure to power frequency EMF might cause human disease.

There may be some circumstances where exposure to the electric field produced by a line may result in inappropriate pacing for pacemakers or inappropriate operation of defibrillators.

For more information on EMF and human health you may wish to obtain a free publication produced by the Public Service Commission of Wisconsin entitled EMF - Electric & Magnetic Fields. This publication is also available on the PSCW web site at psc.wi.gov.

Magnetic fields produced by transmission lines decrease with distance from the line. For this project, the estimation of EMF for the new 345-161 kV single pole double circuit configuration is complex because the magnetic fields from the adjacent lines affect the magnetic fields of the new line.

Magnetic fields would increase significantly to the west of the existing transmission line ROW when the generator is on .There are not any schools, daycare centers or hospitals within 300 feet of the Hill Avenue Site Electric Route or the Eastern and Western Routes. There is one residence within 300 feet of the Hill Avenue Site Route, and one residence within 300 feet of the Western Route. There are two residences within 300 feet of the Eastern Route.

Table 4-19 below, shows estimated EMF levels for the proposed transmission line at distances from 0 to 300 feet from the centerline.

Table 4-19 Estimated magnetic fields data associated with the proposed electric transmission line

	Existing Operation (project involves existing line)		First Year of Operation 345kV		Year Ten of Operation 345kV	
	80% of Peak Load	100% of Peak Load	80% of Peak Load	100% of Peak Load	80% of Peak Load	100% of Peak Load
Current (amps)			706	883	706	883
Distance from Centerline (ft)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)	Magnetic Field (mG)
-300	2.02	2.74	2.21	2.09	2.21	2.09
-200	9.59	12.48	8.12	7.97	8.12	7.97
-150	41.66	52.86	31.77	31.38	31.77	31.38
-100	242.16	300.95	179.25	177.05	179.25	177.05
-50	49.06	58.61	44.17	45.3	44.17	45.3
-25	111.16	117.32	86.82	93.81	86.82	93.81
0	173.26	176.02	129.47	142.32	129.47	142.32
25	109.66	111.2	94.67	107.6	94.67	107.6
50	46.06	46.38	59.86	72.87	59.86	72.87
100	16.99	16.55	16.54	17.04	16.54	17.04
150	3.82	3.62	4.4	4.87	4.4	4.87
200	1.54	1.46	1.85	2.21	1.85	2.21
300	0.5	0.49	0.75	0.83	0.75	0.83

CHAPTER

5

5. Overview of the Proposal and Required Decisions

5.1. APPROVAL, DENIAL, OR MODIFICATION OF PROPOSED POWER PLANT

The Commission has the obligation to approve, deny, or modify the applicants' proposal to build the plant, and to issue an order to that effect with appropriate conditions added. Wis. Stat. § 196.491(3) requires the Commission to make the following determinations before approving construction of the NTEC project as a wholesale merchant plant:

1. Under Wis. Stat. § 196.491(3)(d)(3), the plant must have a design and location that is in the public interest considering:

    a. Alternative locations
    b. Individual hardships
    c. Safety
    d. Reliability
    e. Environmental factors

2. Under Wis. Stat. § 196.491(3)(d)(4), the plant must not have undue adverse impact on other environmental values such as, but not limited to:

    a. Ecological balance
    b. Public health and welfare
    c. Historic sites
    d. Geological formations
    e. Aesthetics of land and water
    f. Recreational use

3. Under Wis. Stat. § 196.491(3)(d)(6), the plant must not unreasonably interfere with the orderly land use and development plans for the area involved.

4. Under Wis. Stat. § 196.491(3)(d)(7), the plant must not have a material adverse impact on competition in the relevant wholesale electric service market.

All of the items listed above have been considered and described at least to some extent in this final EIS. Since the proposal is a wholesale merchant plant, the Commission may not consider the effects of alternative sources of supply, engineering or economic factors, or the applicants' profitability. The Commission may need to discuss the potential effects of the project on Wisconsin's energy supply.

Economics may need to be considered to determine direct or indirect impacts on safety, reliability, ecological balance, public health and welfare, orderly land use and development, and effects on competition. As such, these direct and indirect impacts have also been discussed in this final EIS.

5.1.1. Alternative power plant locations

Two alternative locations have been proposed, and the process used by the applicants for narrowing its choices has been described. Both sites address, to varying degrees, the public interest, environmental values, and consistency with orderly local development. However, the Commission must decide whether either does this adequately. Site selection is discussed further below.

5.1.2. Alternative technologies or actions

5.1.2.1. No Action alternative

Taking no action on this application, by denying the application, would result in no change in the number of power plants in the state. Electricity providers would have the same sources of electricity available as they have currently.

Taking no action on this application, by not making a final commission decision, would result in automatically granting a CPCN to the applicants under Wis. Stat. § 196.491(3)(g). The applicant would then have the option of constructing the plant at either of the two proposed sites.

5.1.2.2. Technology alternatives

As discussed in Chapter 2, Wis. Stat. §§ 1.12 and 196.025 require the Commission to give priority to specific methods of meeting energy demands, to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

1. Energy conservation and efficiency.
2. Noncombustible renewable energy resources.
3. Combustible renewable energy resources.
4. Nonrenewable combustible energy resources, again in the order listed.
    a. Natural gas.
    b. Oil or coal with a sulfur content of less than one percent.
    c. All other carbon-based fuels.

If the Commission identifies an option to the proposed power plant that as is cost-effective and technically feasible, it could reject the NTEC project as proposed.

5.1.3. Market power

Wisconsin Stat. § 196.491(3)(d)7. requires the Commission, before issuing a CPCN, to find that the proposed wholesale merchant power plant facility "will not have a material adverse impact on competition in the relevant wholesale electric service market." The Commission must decide whether to issue a declaratory ruling, finding that the NTEC project would not have a material adverse competitive impact on wholesale electricity markets in Wisconsin

5.2. SELECTION OF THE SITE FOR THE PLANT

5.2.1. Commission site selection

Two alternative sites for the plant have been proposed by the applicants. If the Commission determines that both sites are reasonable and viable, it will select one of them as part of the approval of the plant. The two sites, the Nemadji River Site, and the Hill Avenue Site, are discussed in detail in Chapters 3 and 4 respectively. The selected NTEC plant site will determine which route options are available for the proposed electric transmission line.

5.2.2. Air permit

Wisconsin Stat. ch. 285 is the chapter on "Air Pollution" and is enforced by DNR. Wisconsin Admin. Code chs. NR 400–NR 499 contain the rules promulgated by DNR to implement Wis. Stat. ch. 285. The DNR air pollution control construction permits for this project are intended to include requirements for PSD, protection from hazardous air pollutants, adherence to federal NSPS, and to assure compliance with NAAQS.

Wisconsin Stat. § 285.63(1)(b) allows DNR to approve a permit application if it finds the source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment. See the Criteria for Permit Approval section later in this document. This section describes DNR's finding under Wis. Stat. § 285.63(1)(b).

The issuance of a major source construction permit under Wis. Admin. Code ch. NR 405 is considered an integrated analysis action under Wis. Admin. Code § NR 150.20(2)(a)4. Actions specified under Wis. Admin. Code § NR 150.20(2) require a WEPA compliance determination under Wis. Admin. Code § NR 150.35, but do not require a separate environmental analysis under Wis. Admin. Code ch. NR 150. The proposed project has been reviewed considering Wis. Admin. Code ch. NR 150, and DNR has determined that this type of proposal is not expected to have the potential to cause significant adverse environmental or secondary effects.

However, under WEPA, a state agency like the Commission must consider whether its actions would significantly affect the quality of the human environment. Impacts of the decision whether to issue a CPCN for a proposed power plant could easily include impacts to air quality, and these must be considered.

As discussed throughout the document, an approved air permit is necessary from DNR before construction may begin at either site. If a site cannot be permitted, the project may not move forward.

The results of the dispersion modeling are summarized in Appendix E–Air Emission Modeling Results for the Nemadji River Site and Hill Avenue Site. The dispersion modeling analyses predict that the source impact will not cause or exacerbate a violation of the ambient air quality standards/ambient air increments, taking into consideration background concentrations. Assuming the emission rates and stack parameters listed in their respective tables at the end of the Air Dispersion Analysis memoranda for draft air pollution control construction permit numbers 18-MMC-168 and 18-MMC-169, air quality standards and increments will be attained and maintained for PM_{10}, $PM_{2.5}$, SO_2, NO_X, and CO.

DNR has also recommended best available control technology for each of the emission units. Additional detail regarding these technologies can be found in Sections 3.2.1.5. and 4.2.1.5. for the Nemadji River Site and the Hill Avenue Site, respectively.

5.2.3. Noise

Both of the proposed sites for the NTEC plant were analyzed for noise impacts at the closest residential properties. Results of the analysis indicate that, without further mitigation, construction of the NTEC plant on either of the proposed sites would result in an exceedance of EPA noise guidelines (which the applicants have selected as their goal for project design) at the nearest residential properties. As such, the applicants have self-implemented a level of mitigation capable of reducing sound levels in the surrounding communities. With mitigation applied to the cooling tower, the NTEC plant at Nemadji River Site would be able to limit sound levels below the EPA recommended guidelines. However, the NTEC plant at Hill Avenue Site would still exceed the EPA guidelines with this level of mitigation applied and would need further mitigation in order to limit sound levels below the EPA guidelines. This would increase the project costs for the Hill Avenue Site.

5.2.4. Stormwater discharge permit

Because many of the soils in the vicinity of the proposed NTEC plant locations are very susceptible to erosion, construction in areas with steep slopes can lead to environmental impacts. Specifically, there is a high risk for impact to natural resources, including an environmental corridor located along the slopes of the Nemadji River. Construction of the NTEC plant could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan, such as the plan that has been developed and proposed by the applicants, is prepared, approved prior to construction, and rigorously followed during construction.

The applicants' proposed erosion control and stormwater management plan is needed in order to protect the long term viability and stability of either site and to protect local surface waters and wetlands from erosion impacts associated with construction and operation of the proposed project. The applicants state that this plan was formatted and designed to meet or exceed compliance with the erosion control and stormwater management technical standards and the construction and post-construction performance standards identified by DNR in Wis. Admin. Code chs. NR 151 and 216, as well as the City of Superior's Site Erosion Control Ordinance and Long-Term Stormwater Management Ordinance.

5.2.5. Special construction issues

As mentioned in the preceding section, the soils in the vicinity of the sites proposed for the NTEC plant contain steep slopes and are very susceptible to erosion. Construction in erosion-prone areas with steep slopes can lead to environmental impacts. Therefore, construction activities at the either of the proposed sites could carry a high risk of impact to natural resources situated along the steep slopes leading to the Nemadji River, an important regional environmental corridor.

5.2.6. Sensitive species

Endangered resources include rare or declining species, high quality or rare natural communities, and unique or significant natural features. For the purposes of this final EIS, rare species are defined as federal- or state-listed threatened and endangered species, federal candidate and proposed species, and state special concern species.

- Endangered – species are any species whose continued existence is in jeopardy.
- Threatened – species are those that are likely to become endangered.

Special concern species are those about which some problem of abundance or distribution is suspected but not yet proved. The purpose of this category is to focus attention on certain species before they

become threatened or endangered. Special concern species are not covered by Wisconsin's Endangered Species Law, but they may be protected by other state and federal laws.

Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The proposed NTEC plant project area evaluation consists of a buffer of 1.0 mile for terrestrial and wetland species and a 2.0 mile buffer for aquatic species. Results of the endangered resources review for both proposed locations are listed below.

5.2.6.1. Proposed Nemadji River Site

Habitat for ten rare plant species (including at least three known species occurrences), a state threatened herptile, a special concern fish species, and a special concern dragonfly species where identified within the survey area. Additional findings include one bald eagle occurrence and two sensitive wetland communities.

5.2.6.2. Proposed Hill Avenue Site

Habitat for eight rare plant species (including five known species occurrences), and a special concern dragonfly species where identified within the survey area. Additional findings include one bald eagle occurrence and one sensitive wetland natural communities.

5.2.6.3. Eastern and Western Electric Transmission Routes

Habitat for ten rare plant species (including four known species occurrences), a state threatened herptile, a special concern fish species, and a special concern dragonfly species where identified within the survey area. Additional findings include one northern long-eared bat maternity roost, one bald eagle occurrence and one sensitive wetland community.

The proposed Eastern and Western Electric Transmission Routes are nearly identical to each other in terms of rare species impacts. While there are subtle differences between the two, from a known rare species standpoint, no one route is significantly different from the other. However, the Western route would create more new ROW, which may negatively impact birds and other species that need large contiguous habitats to survive.

5.2.7. Wetlands

Wetland impacts are among the top environmental concerns associated with the proposed construction of the NTEC plant and its associated infrastructure. Constructing the plant at the Nemadji River Site would require the permanent destruction of 4.36 acres of wetlands, with an associated 14.82 acres of wetland impact for the laydown area. Constructing the plant at the Hill Avenue Site would require the permanent destruction of 34.27 acres of wetlands, with an associated 34.32 acres of wetland impact for the laydown area. Wetland loss is a serious environmental concern. To a certain extent, wetland loss can be mitigated by creating wetlands (in similar habitat) to replace those destroyed by the proposed project.

Table 6-1 Comparisons between the two proposed power plant sites for public interest and environmental values

Siting Factor	Nemadji River Site	Hill Avenue Site
Air	Impacts and associated permits appear to be similar for both proposed sites.	Impacts and associated permits appear to be similar for both proposed sites.
Wetlands	Construction of plant would result in permanent loss of 4.36 acres of wetland. Construction of the associated laydown area would result in 14.82 acres of wetland impact, for a total wetland impact of 19.18 acres.	Construction of the plant would result in the permanent loss of 34.27 acres of wetland. Construction of the associated laydown area would result in 34.32 acres of wetland impact, for a total wetland impact of 68.59 acres.
Land use	Site is located in an existing industrial area. Site is crossed by electric transmission lines and pipelines.	Site is largely undeveloped. Would require zoning change to M-2 (heavy manufacturing).
Roads	Increase in local traffic congestion likely from construction and operation of plant. Construction entrances located off 31st Avenue East. Craft employees would park on the north side of 31st Avenue East and proceed southeast to the site entrance.	Increase in local traffic congestion from construction and operation of plant is likely. Entrance would be constructed off Hill Avenue Parking area would be constructed west of plant.
Noise potential	Pending final DNR air modeling review, appears permittable if mitigation applied.	Pending final DNR air modeling review- appears permittable if mitigation applied. More mitigation would be required than the Nemadji River Site, resulting in increased cost.
Visual impacts	The stack and turbine building would be visible from the north and east, along 31st Avenue East, 11th Street, and the St. Francis Cemetery. Greatest visual impacts would be seen from the Nemadji River. Increase in lighting impacts.	The stack and turbine building would be visible from Hill Avenue to the west, N. 28th Street to the north, from East 12th Street to the east, and East 22nd Avenue to the south. Increase in lighting impacts.
Historic sites	No adverse impacts expected.	No adverse impacts expected.
Nearby residences	Concerns exist regarding increased noise levels, traffic congestion, and possible visual impacts.	Concerns exist regarding increased noise levels, traffic congestion, and possible visual impacts.
Stormwater discharge erosion control	An adequate stormwater and construction site erosion control plan is required for this site.	An adequate stormwater and construction site erosion control plan is required for this site.
Wastewater discharge	The applicants have not applied for Commission approval to construct any water infrastructure for the NTEC facility. Applicants anticipate that wastewater from the generation process and from employee domestic use would be discharged to the existing city of Superior Wastewater Treatment plant.	The applicants have not applied for Commission approval to construct any water infrastructure for the NTEC facility. Applicants anticipate that wastewater from the generation process and from employee domestic use would be discharged to the existing city of Superior Wastewater Treatment plant.
Soils	Concerns exist that construction and operation activities may cause shifts in the underlying clay soil, potentially affecting the Nemadji River and nearby natural resources.	Concerns exist that construction and operation activities on steep and erosion prone soils could impact nearby natural resources.
Special construction issues	Concerns exist that impacts to nearby natural resources, including the Nemadji River and associated environmental corridor could occur from construction activities on the steeper erosion-prone soils.	Concerns exist that impacts to nearby natural resources could occur as a result of construction activities on the steeper erosion-prone soils.

5.3. ELECTRIC TRANSMISSION LINE (PSC DOCKET 9698-CE-101)

As discussed in Chapters 1-4, the project would require connection to the existing electric transmission system via a new 345 kV transmission line, from the selected site alternative to one of two proposed locations on the existing 345 kV Arrowhead to Stone Lake to existing Substation. The voltage, length, and

required ROW of the transmission line component require CPCN approval from the Commission. The applicants have provided information regarding the electric transmission line routes as part of their application to construct a new 345kV electric transmission line. The new transmission line would be paid for by the applicants as a part of the cost of the project.

The applicants have stated that it would be the responsibility of ATC to permit and construct several major components of the electric transmission infrastructure. These components include the selected switching station (including purchase of required land), the 345 kV transmission line connecting the selected switching station to the existing Arrowhead to Stone Lake line. Additionally, ATC would be responsible for the construction of a tap/substation at the interconnect with the existing Arrowhead to Stone Lake line.

5.4. SUMMARY

The Commission has a CPCN application before it for a wholesale merchant electric power plant. It must issue an order on whether to approve the plant, and under what conditions. Unless granted a time extension by the circuit court, it must issue an order by February 10, 2020, 360 days after the Commission declared the application to be complete (including the 180-day extension granted on April 4, 2019). If the plant is approved, the Commission must also approve either the Nemadji River Site or the Hill Avenue Site.

In addition, the Commission has two CA applications under review, one for a natural gas pipeline to fuel a new facility, and one for relocating an existing natural gas pipeline, that would apply only if the Nemadji River Site was selected for the power plant. Those applications are being reviewed in dockets 5820-CG-105 and 5820-CG-106, respectively.

Cumulative impacts discussed in this final EIS include impacts that could result from reasonably foreseeable actions or projects that would occur in the near future, and in the immediate vicinity of the proposed project. Moreover, this discussion focuses on actions that, when considered alongside the proposed project, could result in incremental and additive impacts separate from those already discussed in this document. Specific actions and impacts considered in this discussion are related to the construction of additional natural gas, water, and electric infrastructure components that would be required for the daily operation of the proposed NTEC plant. It is anticipated that the largest and most direct cumulative impact to natural resources would be habitat loss resulting from vegetation clearing construction activities. Notable cumulative impacts to the local community may include an increase in traffic congestion on local roads, as well an increase in the overall level and duration of noise levels during the construction phase(s) of other nearby projects.

A natural gas lateral, to be constructed and operated by SWL&P, would provide a fuel source for the NTEC plant. The new 16-inch lateral would be approximately 7-10 miles long, depending on the route selected, and extend from the proposed NTEC facility to a tap point on the GLGT pipeline. Some segments of the proposed pipeline would require new ROW, while the remainder would be constructed in an existing utility corridor. The largest direct impact to natural resources would be the habitat loss caused by the clearing of vegetation during the construction phase of the project. Specific impacts to natural resources that could occur as a result of constructing the proposed pipeline include:

- Clearing of both upland and wetland habitats, including up to 20 acres of upland, and 30 acres of wetland habitat.
- Up to approximately 20 waterways, including several with ASNRI designation, would be crossed by either HDD or open trench construction.

- Several state-listed species are either known, or thought to occur, within the proposed pipeline routes; including ten plant species, one species of herpitile, one fish species, one species of dragonfly. In addition, one northern long-eared bat maternity roost is known to occur within 0.5 mile of the proposed pipeline routes.
- Increased risk of invasive species introduction and spread during clearing and construction activities.

Additional impacts that may be experienced by the local community could include an overall increase in the intensity and duration of noise levels during the construction phase of the new gas lateral. The types of noises produced however, is anticipated to be similar to those listed in the discussion of impacts for the construction of the proposed electric transmission line; such as noise generated from worker traffic to and from the project site, as well as noise produced by construction vehicles while onsite. To a lesser degree, there may be an increase in the overall level of fugitive dust particles during the construction phase of other nearby projects. Specifically, there could be an increase in the level of dust emanating from worker traffic, and from ground disturbing construction activities at the project site. [23]

A new 6-8-inch water main, to be constructed and operated by SWL&P, would likely be constructed to provide a source of drinking and potable water for the NTEC plant. The Commission has not received an application for construction this project; thus, specific impacts to natural resources are not known or discussed. However, it is anticipated that cumulative impacts associated with constructing the water main would be commensurate with the location and length of the main. In other words, if construction would occur within existing and maintained corridors, fewer new impacts to natural resources would be expected than if new ROW would be needed.. Although the exact degree to which impacts would increase is not known, it is expected that the types of impacts resulting from construction of a new water pipeline would be similar to those mentioned in the impacts discussion of the proposed natural gas pipeline; most notably, habitat loss resulting from the clearing of upland and wetland habitats. Similarly, additional impacts to the local community may include an increase in noise and dust levels during construction activities.

It is anticipated that operation of the NTEC plant would require the construction of a new substation in the vicinity of the interconnection point of the proposed electric transmission line and the existing 345 kV Arrowhead to Stone Lake Transmission Line. The Commission has not received an application for construction of a new substation, therefore, specific cumulative impacts are not known at this time and not discussed in detail in this final EIS. However, as mentioned above in the discussion of the anticipated new water and gas pipelines, the largest anticipated direct impact to natural resources would be habitat loss resulting from vegetation clearing in both upland and wetland habitats. Additional impacts to the local community would be expected to be similar to those associated with construction of the anticipated water and gas pipelines, and may include an increase in noise and dust levels during construction activities.

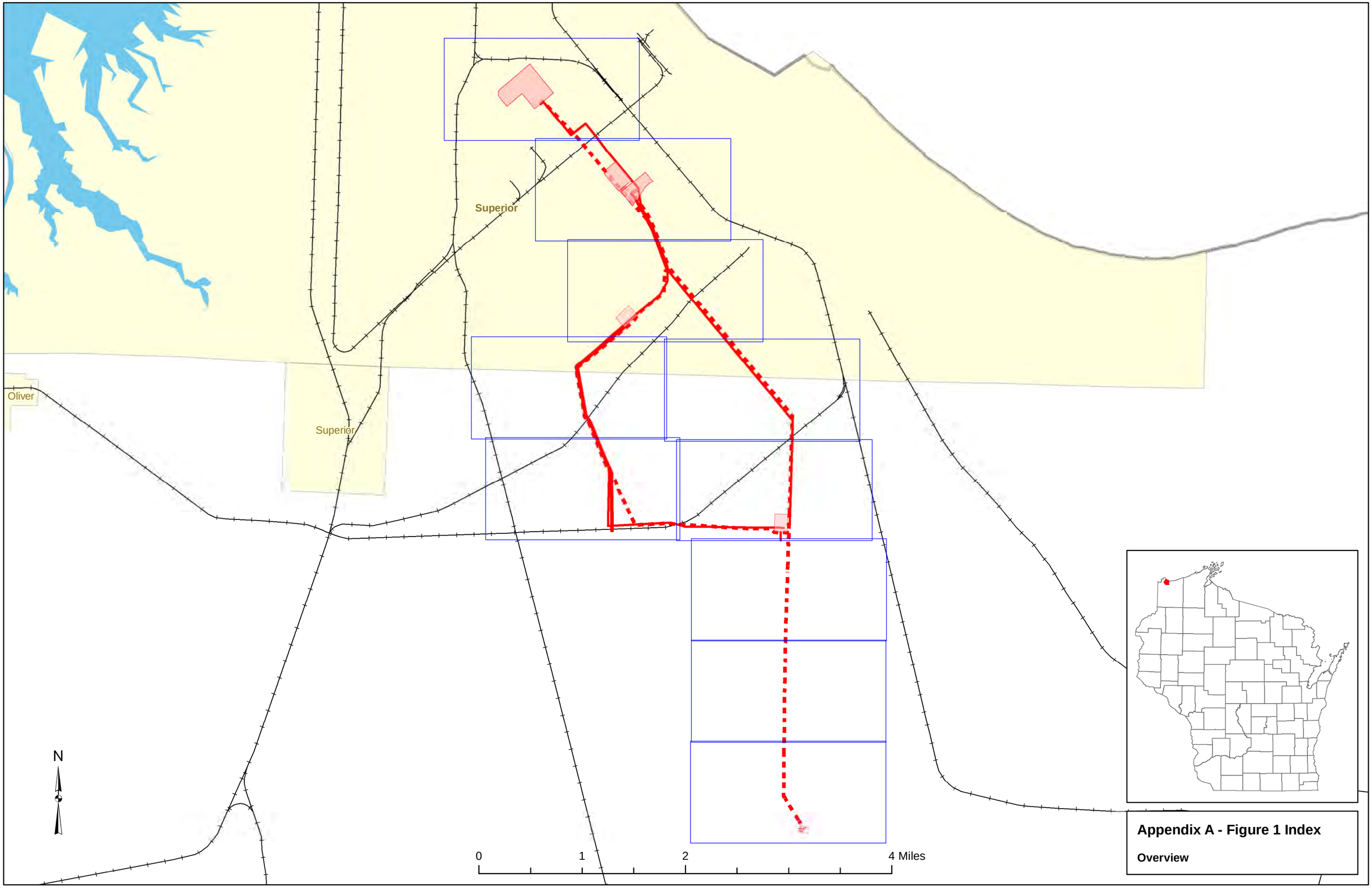
[23] Though the draft EIS complied and this final EIS complies with WEPA and the Wisconsin Administrative Code by providing a description of the cumulative impacts of the project, for the convenience of the parties a summary of some analysis specific to the projects under consideration in Docket Nos. 5820-CG-105 and 5820-CG-106, that is being developed in those separate dockets, is provided for reference and for the convenience of the parties, as Appendix C.

Acronyms

Abbreviation or Acronym	Definition
º	Degrees
%	Percent
§	Section
Act	The Noise Control Act of 1972
ALLETE	ALLETE, Inc.
APE	Area of potential effect
ASNRI	Area of Special Natural Resources Interest
ATC	American Transmission Company LLC
BACT	Best Available Control Technology
BMP	Best management practices
Btu	British thermal units
CA	Certificate of Authority
CFR	Code of Federal Regulations
ch.	Chapter
CO	Carbon monoxide
Commission or PSC	Public Service Commission of Wisconsin
CPCN	Certificate of Public Convenience and Necessity
CTH	County Trunk Highway
DATCP	Department of Agriculture, Trade and Consumer Protection
dBA	A-weighted decibels
DNE	Determination of No Hazard/Does Not Exceed
DNR	Department of Natural Resources
DPC	Dairyland Power Cooperative
DSM	Demand-side management
dth	Dekatherm
EFOR	Equivalent forced outage rates
e.g.	*exempli gratia,* for example
EIS	Environmental impact statement
EMF	Electric and magnetic fields
EPA	U.S. Environmental Protection Agency
EPOR	Equivalent planned outage rates
EPRI	Electric Power Research Institute
ESS	Eastern Switching Station
F	Fahrenheit
FAA	Federal Aviation Administration
FGR	Flue gas recirculation
G	Gauss
GADS	Generating Availability Data System
GHG	Greenhouse gas
GIS	Geographic Information System
GLGT	Great Lakes Gas Transmission
GPM	Gallons per minute
GTG	Gas turbine generator
HAC	Hazardous air containment
HAP	Hazardous air pollutants
HDD	Horizontal directional drill
HHV	Higher heating value
HP	High-pressure
HRSG	Heat recovery steam generator
i.e.	*id est,* that is
IP	Intermediate-pressure
kV	Kilovolt – 1,000 volts
kW	Kilowatt
kWh	Kilowatt-hour

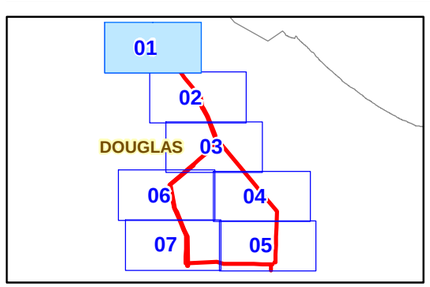
Abbreviation or Acronym	Definition
Ldn	Day-night sound level
LIDAR	Light Detection and Ranging
LP	Low-pressure
mG	Milligauss
MGD	Millions of gallons per day
MISO	Midwest Independent Transmission System Operator, Inc.
MP	Minnesota Power
MW	Megawatt
N/A	Not available or not applicable
NO_X	Nitrogen oxide
NTEC	Nemadji Trail Energy Center
NAAQS	National Ambient Air Quality Standards
NLEB	Northern Long-eared Bat
NHI	Natural Heritage Inventory
NHPA	National Historic Preservation Act
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
OPGW	Optical ground wire
PFAS	Per- and polyfluoroalkyl substances
POTW	Publicly owned treatment works
PSC or Commission	Public Service Commission of Wisconsin
PSD	Prevention of Significant Deterioration
PTE	Potential to emit
RO	Reverse osmosis
ROW	Right-of-way
rpm	Revolutions per minute
RUS	Rural Utilities Service
SCF	Standard cubic feet
SCR	Selective catalytic reduction
SHPO	State Historic Preservation Office
SSE	South Shore Energy, LLC
STG	Steam turbine generator
SWL&P	Superior Water, Light and Power Company
TCSB	Temporary clear-span bridges
ULSD	Ultra-low sulfur diesel
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USH	U.S. Highway
VOC	Volatile organic compounds
WEPA	Wisconsin Environmental Policy Act
WHS	Wisconsin Historical Society
Wis. Admin. Code	Wisconsin Administrative Code
WisDOT	Department of Transportation
Wis. Stat.	Wisconsin Statutes
WRAM	Wetland Rapid Assessment Methodology
WWI	Wisconsin Wetland Inventory

Appendix A. Project Maps



Appendix A - Figure 1 Index

Overview



Legend

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Notes:
- Aerial photos data source: NAIP, 2013
- Wetlands are shown based on the Wisconsin Wetland Inventory (WWI). Wetlands impacts described in Volume 1 are calculated based on field wetland delineations and other sources.
- Rights-of-way width for existing transmission lines are not to scale.
- Boundaries for USFWS managed lands are approximate.

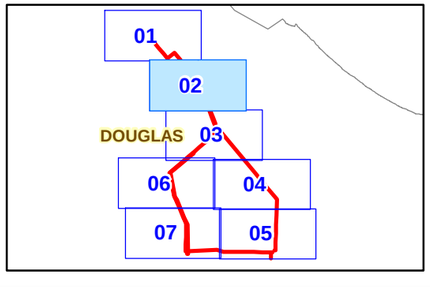
N

1 Inch = 625 Feet

Feet
0 500 1,000

Appendix A - Figure 1.01

Hill Avenue Site



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N

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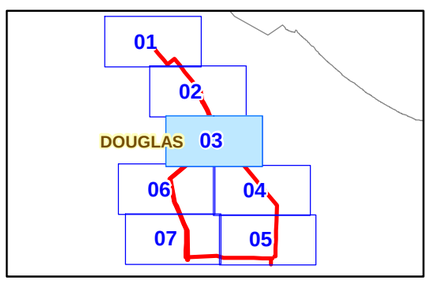
Feet

0 500 1,000

Appendix A - Figure 1.02

Nemadji River Site



Legend

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N

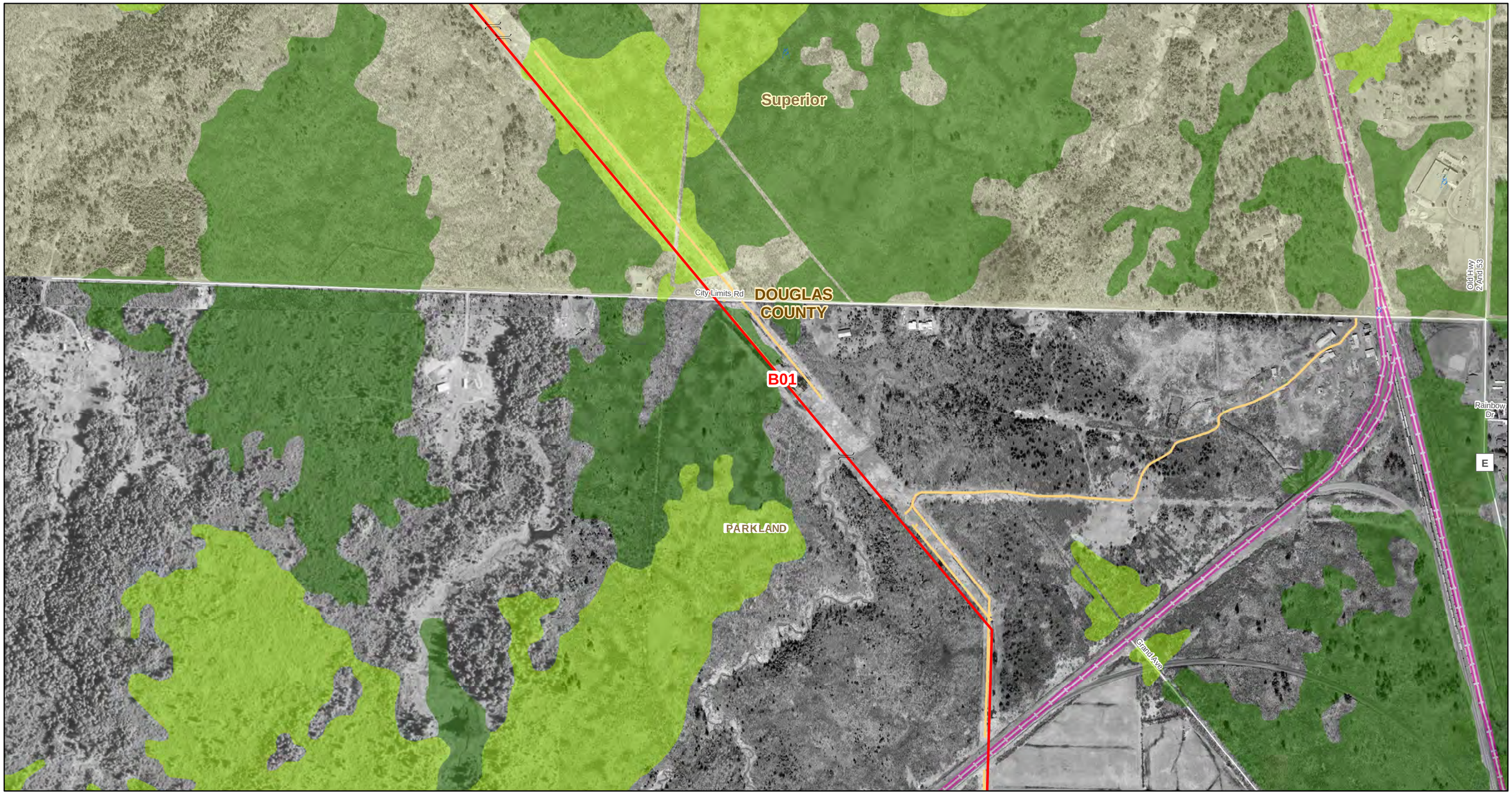
1 Inch = 625 Feet

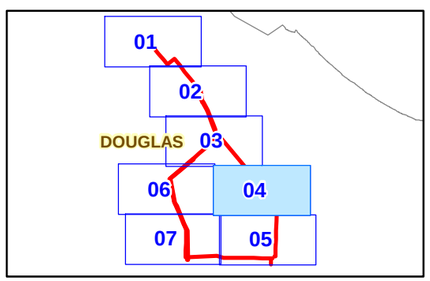
Feet

0 500 1,000

Appendix A - Figure 1.03

Western Switching Station





Legend

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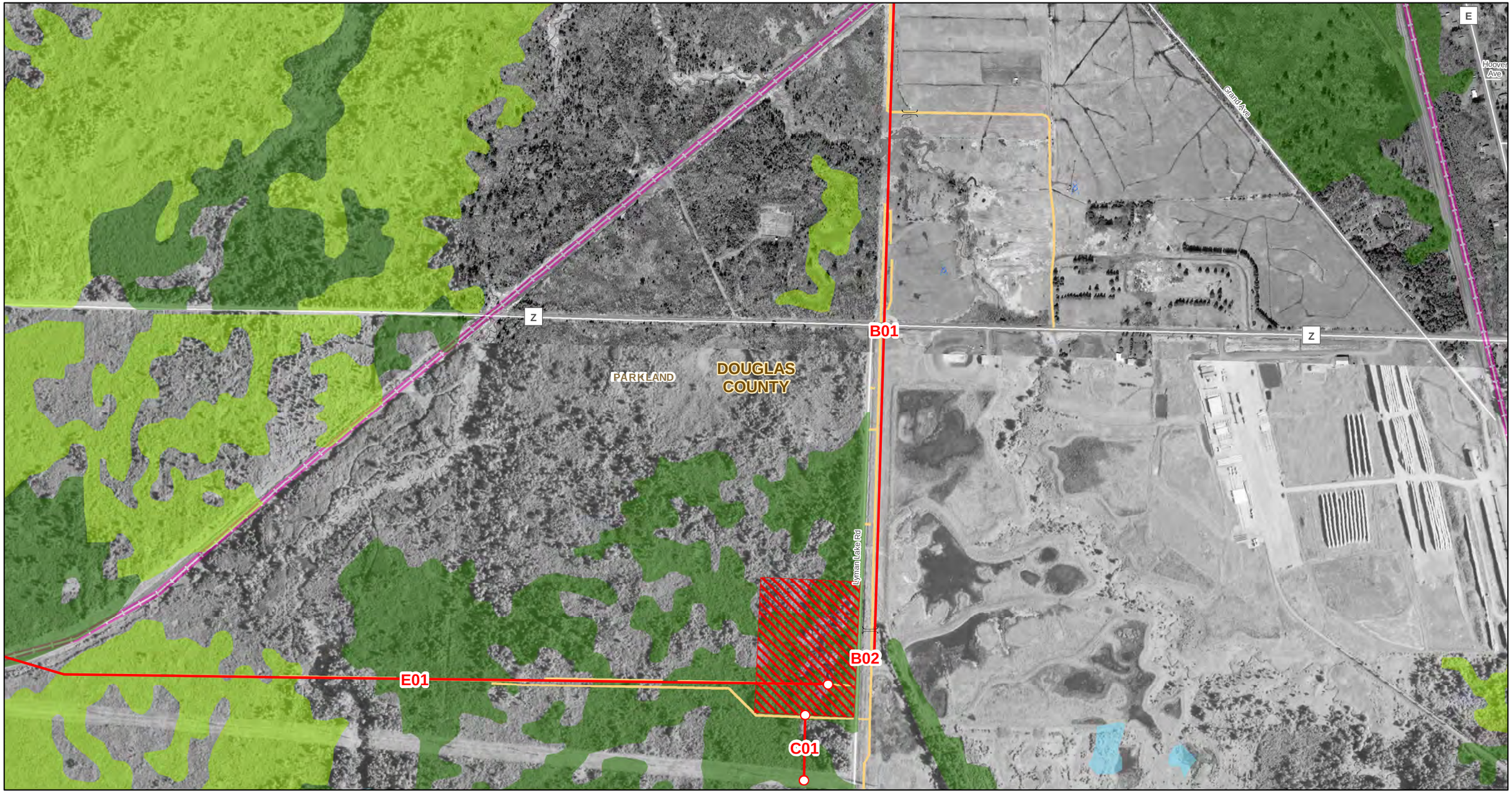
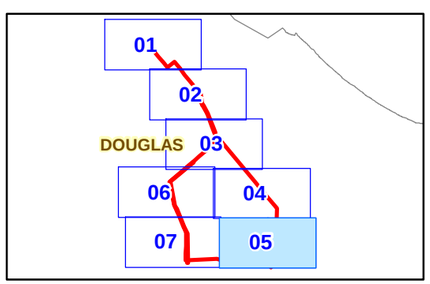
Feet

0 500 1,000

Appendix A - Figure 1.04

Eastern Routes





Legend

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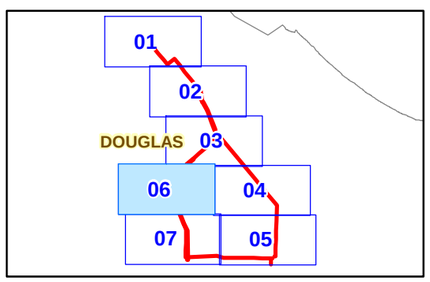
N

1 Inch = 625 Feet

Feet
0 500 1,000

Appendix A - Figure 1.05

Eastern Switching Station



Legend

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N

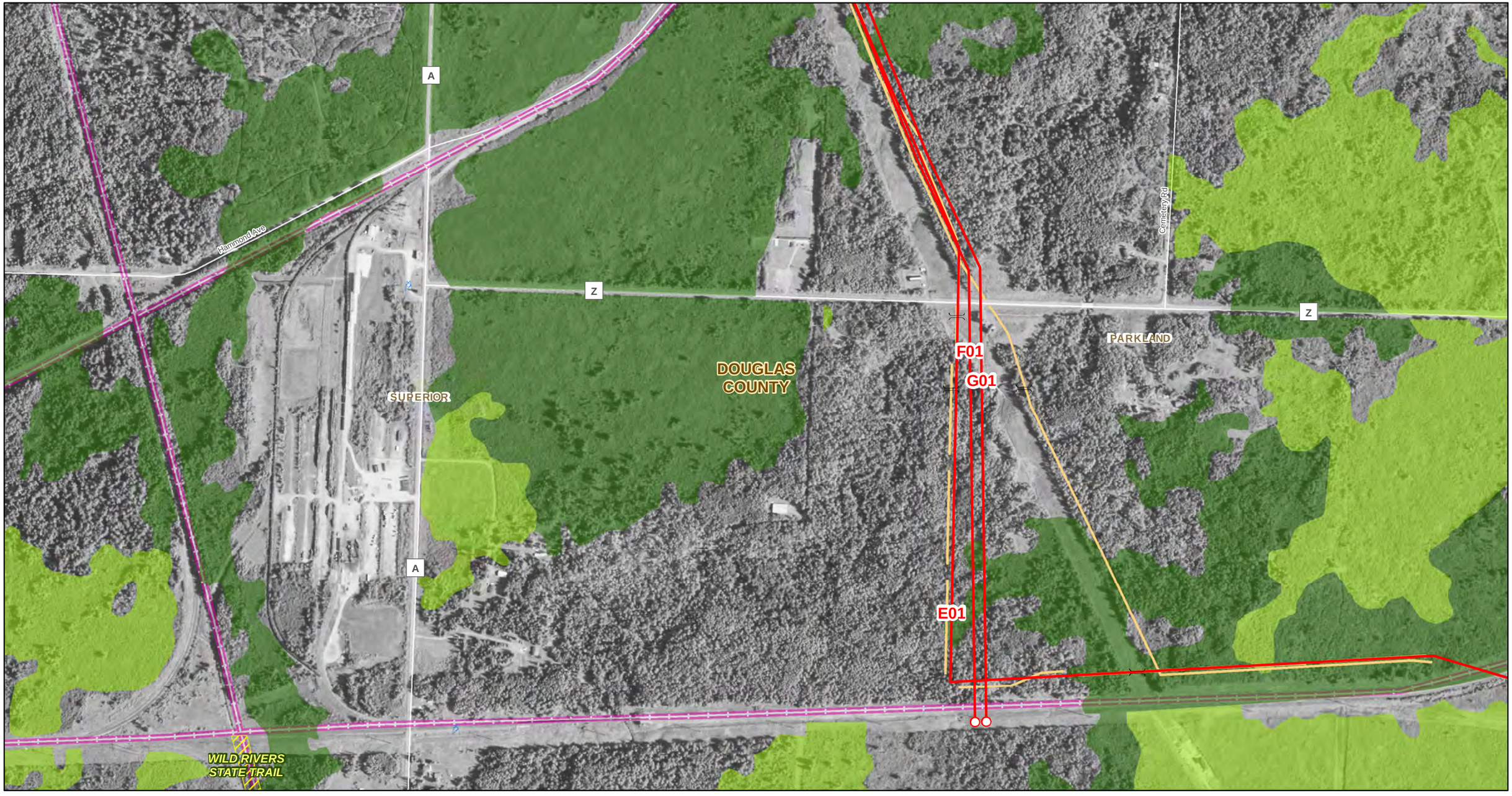
1 Inch = 625 Feet

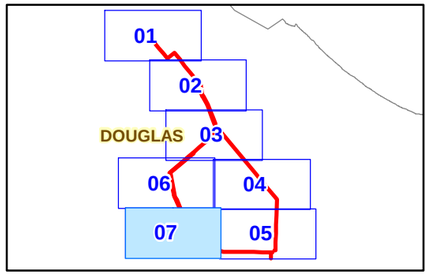
Feet

0 500 1,000

Appendix A - Figure 1.06

Western Routes





Legend

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- Wetlands are shown based on the Wisconsin Wetland Inventory (WWI). Wetlands impacts described in Volume 1 are calculated based on field wetland delineations and other sources.
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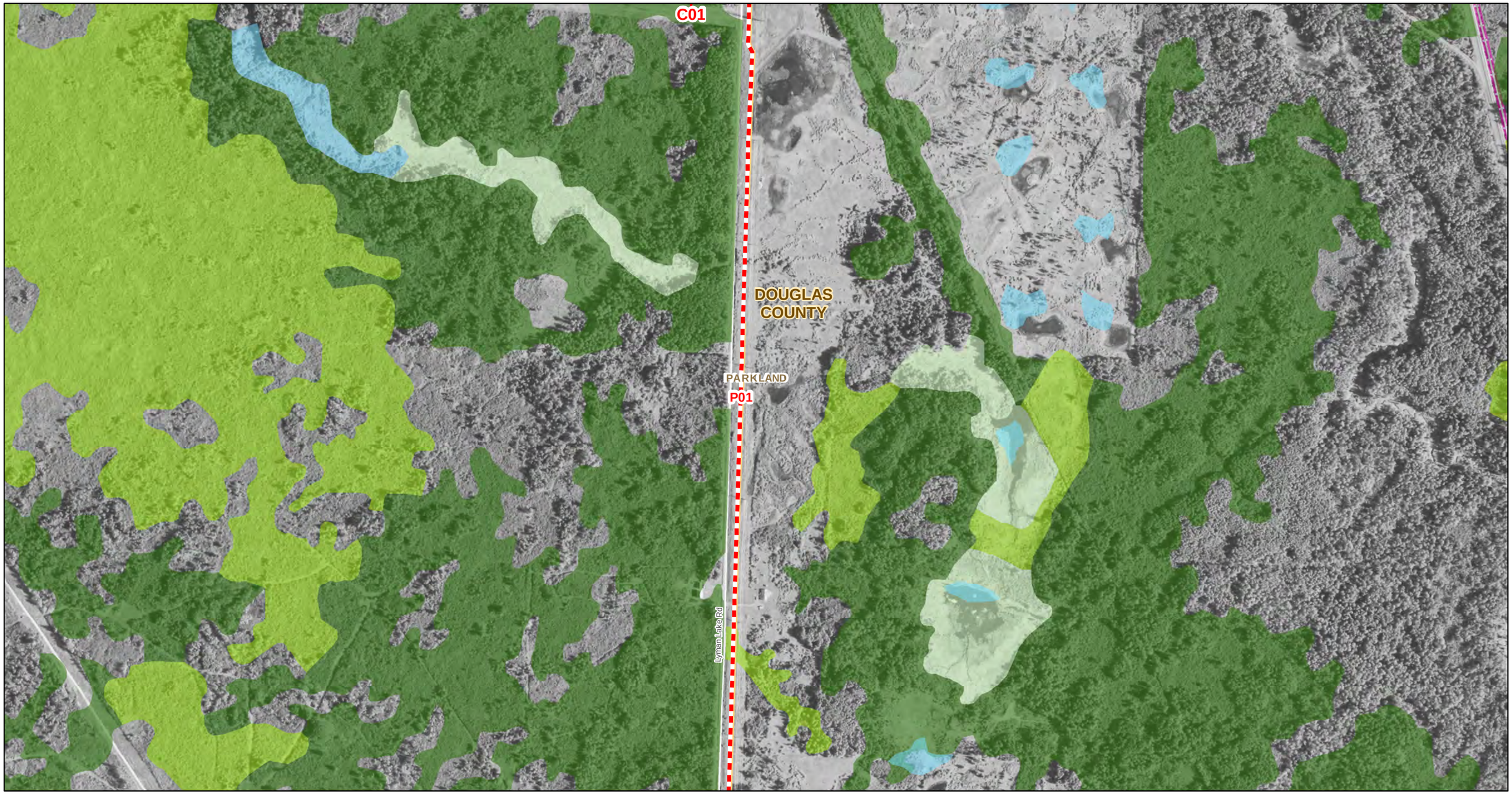
N

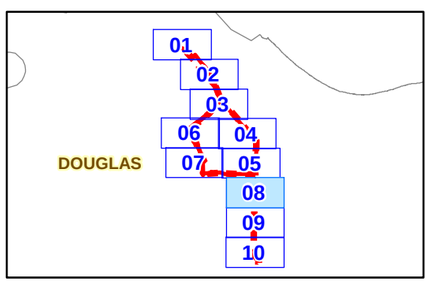
1 Inch = 625 Feet

Feet
0 500 1,000

Appendix A - Figure 1.07

Western Routes





Legend

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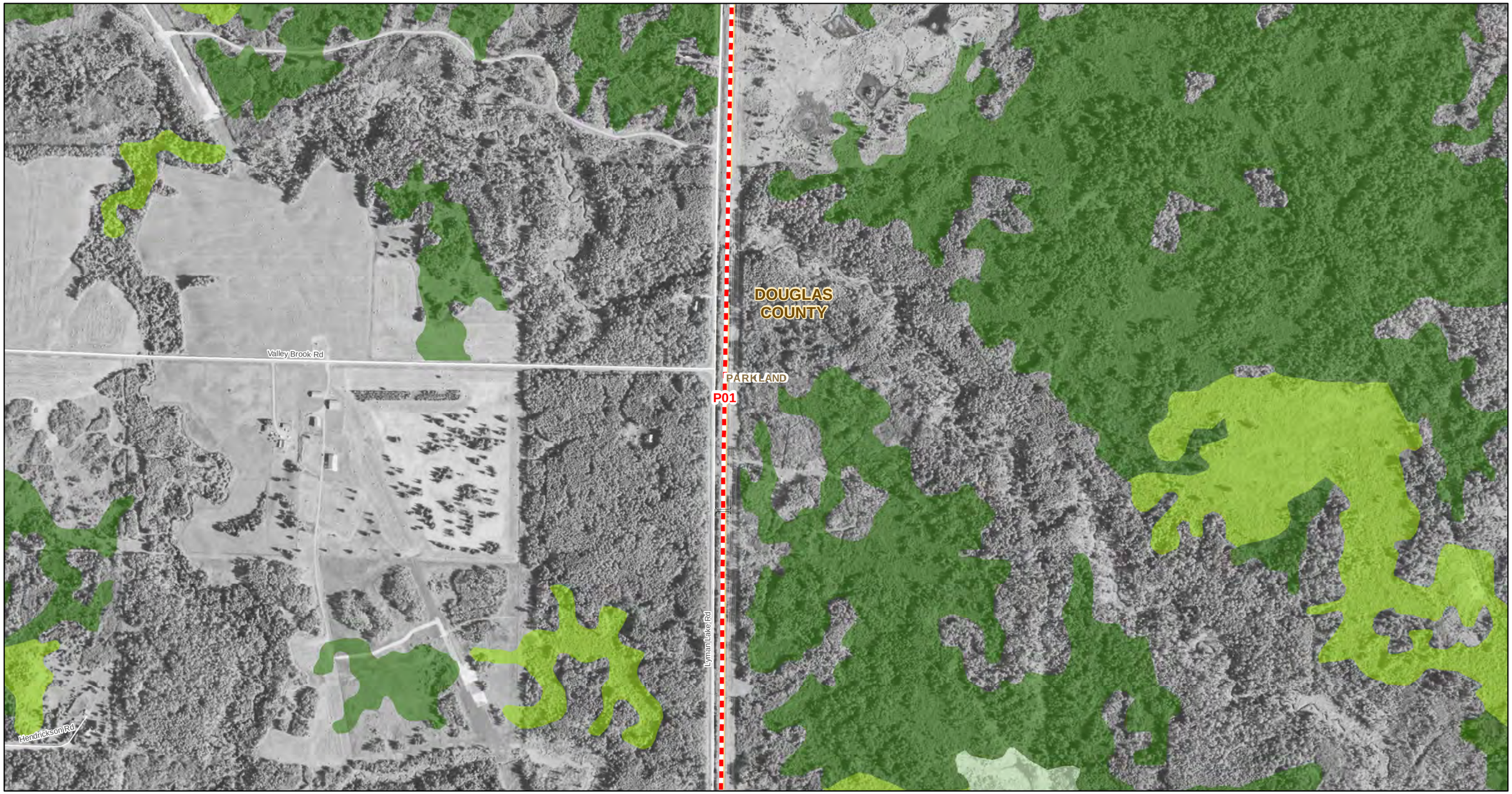
N

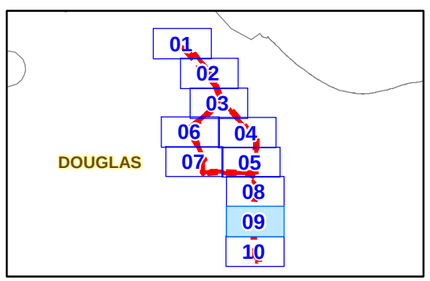
1 Inch = 625 Feet

Feet
0 500 1,000

Appendix A - Figure 1.08

Natural Gas Route





Legend

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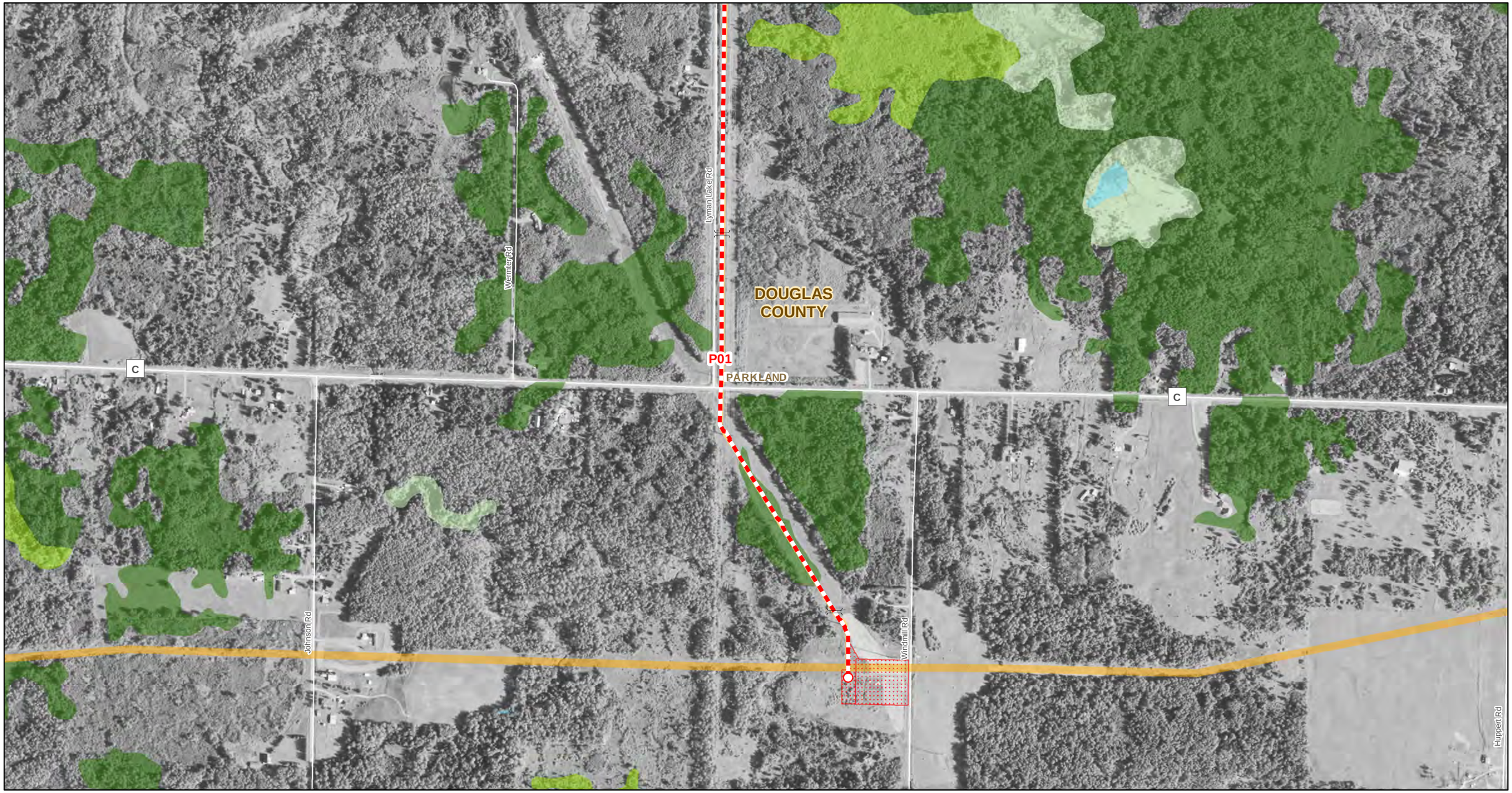
1 Inch = 625 Feet

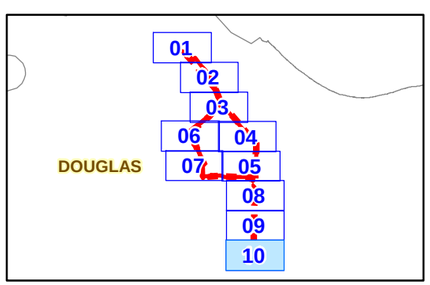
Feet

0 500 1,000

Appendix A - Figure 1.09

Natural Gas Route





Legend

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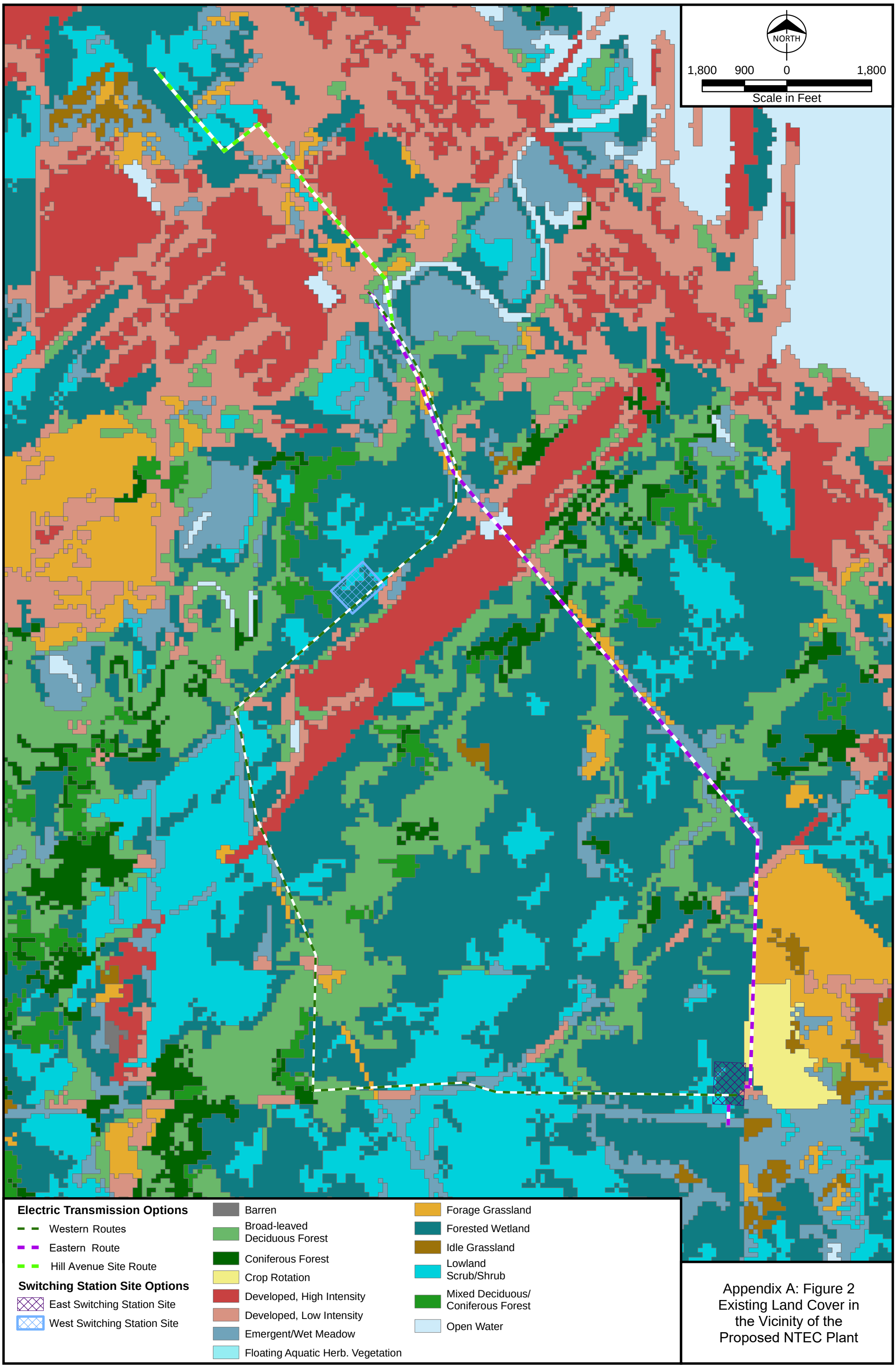
Feet

0 500 1,000

Appendix A - Figure 1.10

Natural Gas Route



Appendix A: Figure 2
Existing Land Cover in the Vicinity of the Proposed NTEC Plant

Appendix B. WDNR Air Emissions Modeling Results

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: March 15, 2019

FID: 816127840
Permit: 18-MMC-168

TO: Megan Corrado – AM/7

FROM: John Roth – AM/7

SUBJECT: Air Dispersion Analysis for a PSD Permit for Nemadji Trail Energy Center (Preferred Site) – Superior (Douglas County), Wisconsin

A. INTRODUCTION

South Shore Energy LLC, a subsidiary of ALLETE, and Dairyland Power Cooperative have submitted to the Wisconsin Department of Natural Resources (WDNR) a Prevention of Significant Deterioration (PSD) permit application. South Shore and Dairyland are proposing to construct a combined cycle combustion turbine at the Nemadji Trail Energy Center (NTEC) project, to be located in Superior, Wisconsin. Based on applicable regulations, PSD review is applicable to project emissions of particulate matter (PM_{10}), fine particulate ($PM_{2.5}$), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC).

B. RECOMMENDATION

Assuming the emission rates and stack parameters listed in their respective tables at the end of the memorandum, air quality standards and increments will be attained and maintained for PM_{10}, $PM_{2.5}$, SO_2, NO_x, and CO.

C. LOCATION

The preferred site for NTEC is east of the existing Enbridge Energy facility in Superior, adjacent to the Nemadji River in Douglas County, Wisconsin. The area is currently in attainment for criteria pollutants, and the minor source PSD baselines for PM_{10}, $PM_{2.5}$, SO_2, and NO_x were established in 1993, 2017, 1993, and 1993, respectively.

D. MODELING ANALYSIS

- South Shore Energy LLC and Dairyland Power Cooperative, via a report from Burns and McDonnell Engineering Company, provided the stack parameters, emission rates, and building dimensions used in this analysis. Air Management Program staff verified the data, with the data in the tables reflecting the WDNR analysis.

- The proposed turbine was analyzed for five different operating conditions or loads (startup/shutdown, low, 75 percent, 100 percent, and 100 percent with duct firing) and for both natural gas and fuel oil combustion. While all of the scenarios were modeled, only the highest modeled values are presented in the result tables.

- Building downwash information was derived from the Building Profile Input Program (BPIP-PRIME) using measurements taken on plot plans provided with the application.

- Five years (2011-2015) of preprocessed meteorological data was used in this analysis. The surface data was collected at the Duluth Sky Harbor Airport (DYT), and the upper air meteorological data originated in Minneapolis.

- The AERMIC Model (AERMOD v18081) was used in the analysis. The model used rural dispersion coefficients with the regulatory default options. These allow for missing and calm wind correction, buoyancy induced dispersion, and building downwash including cavity effects.

- Regional background concentrations included in the analysis can be found at the following link: http://dnr.wi.gov/topic/AirPermits/documents/AQBackgroundConcentrationGuidance.pdf

- The receptors used in this analysis were placed every 25-meters along the fence line extending to 500 meters, surrounded by 50-meter spaced points extending 1000 meters. 100-meter spaced points extending 2 kilometers, 250-meter spaced points extending 5 kilometers, and 500-meter spaced points extending 10 kilometers from the fence line. Additional receptors were placed in the high terrain 5-15 kilometers northwest of NTEC, northwest of the City of Duluth. Receptor elevations were derived from AERMAP using NED tiles.

- Due to the industrial nature of this proposed NTEC location, two separate analyses were performed. In the first analysis, the proposed NTEC sources were modeled with all receptors except those not considered ambient air relative to NTEC (11056 points). In the second analysis, the NTEC sources and all other nearby sources were modeled with all receptors except those not considered ambient air relative to each facility (9050 points). The higher modeled value from either analysis is presented in the result tables.

E. PSD PRECONSTRUCTION MONITORING

The modeling analysis predicts that the impact of NTEC will not exceed the significant monitoring concentration (SMC) for PM_{10} or NO_x, but modeled concentrations are over the SMC for $PM_{2.5}$ and CO.

The Duluth North Central Avenue monitor 27-137-7554 is located approximately 9 kilometers northwest of NTEC and is the closest operating $PM_{2.5}$ monitor. The land use around the monitor is similar to the land use around NTEC and both are affected by similar meteorological conditions. The 2015-2017 design values of 16 $\mu g/m^3$ (24 hour) and 5.3 ug/m3 (annual) can serve to estimate pre-construction air quality.

Table 1 demonstrates that the use of $PM_{2.5}$ SIL is justified for this area as the difference between the NAAQS and the location's design value would allow for an increase of impact comparable to the SIL.

Table 1
DULTUH (N. CENTRAL AVE.) $PM_{2.5}$ MONITOR (27-137-7554)
(All Concentrations in $\mu g/m^3$)

	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual
2015-2017 Design Value	16	5.3
NAAQS	35	12.0
Difference NAAQS-DV	19.0	6.7
PSD Class II $PM_{2.5}$ SIL	1.2	0.2

The Anoka monitor 27-003-1002 is located in the northern suburbs of Minneapolis and is the closest operating CO monitor. The 2017 second highest values of 1466 µg/m^3 (1 hour) and 920 ug/m3 (8 hour) can serve to estimate pre-construction air quality.

F. NONATTAINMENT AREA ANALYSIS

NTEC will be located in an area that is currently in attainment for criteria pollutants.

G. SIGNIFICANT IMPACT ANALYSIS

The proposed facility was modeled to determine if the PSD Significant Impact Levels (SIL) were exceeded. The results for $PM_{2.5}$, PM_{10}, NO_2, and CO were above SIL, so an increment and NAAQS analysis was performed for those emissions. Refer to Section H for a discussion of the increment analysis and Section I for a discussion of the NAAQS analysis. The source parameters and emission rates are listed in their respective tables at the end of the memorandum. Highest modeled impacts occur assuming the 100% load, duct firing, natural gas operating condition. No further analysis was performed for SO_2 as the impacts were below SIL, as shown in Table 1.

Table 2
NTEC Preferred Site - Superior (Douglas County)
Project Level (SIL) Analysis Results
(All Concentrations in µg/m^3)

	SO_2 1 hour	SO_2 3 hour	SO_2 24 hour	SO_2 Annual
Project Impact	2.44	2.69	1.93	0.0639
PSD SIL	7.8	25.0	5.0	1.0

H. PSD INCREMENT ANALYSIS

The modeled impact of this proposed NTEC location is above the SIL for $PM_{2.5}$, NO_2, and PM_{10}, so an increment analysis was performed for these pollutants (increment does not apply to CO). There are several nearby increment consuming sources that were included in the analysis. The source parameters and emission rates used are listed in their respective tables at the end of the memorandum. The results in Table 2 show that the impact of the increment consuming sources is less than the PSD Class II increment. Highest modeled impacts for particulate occur assuming low load, fuel oil operating conditions and for NO_2 occur assuming startup/shutdown conditions.

Table 3
NTEC Preferred Site - Superior (Douglas County)
PSD Increment Analysis Results
(All Concentrations in µg/m^3)

	PM_{10} 24 Hour	PM_{10} Annual	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual	NO_2 Annual
Facility Impact	8.52	1.40	8.52	1.40	13.2
PSD Class II Increment	30.0	17.0	9.0	4.0	25.0
% Increment Consumed	28.4	8.2	94.7	35.0	52.8

***Note:** The USEPA and WDNR Ambient Ratio Method 2 was applied to convert NO_x emissions into NO_2

I. NAAQS ANALYSIS

The modeled impact of this proposed NTEC location is above the $PM_{2.5}$, NO_2, CO, and PM_{10} SIL, so an analysis of those emissions in comparison to NAAQS was performed. There are several nearby sources included in the analysis. The source parameters and emission rates used are listed in their respective tables at the end of the memorandum. The results in Table 3 show that the impact of the sources plus background is less than the respective NAAQS. Highest modeled impacts for particulate occur assuming low load, fuel oil operating conditions and for both CO and NO_2 occur assuming startup/shutdown conditions.

Table 4
NTEC Preferred Site - Superior (Douglas County)
NAAQS Analysis Results
(All Concentrations in µg/m^3)

	PM_{10} 24 Hour	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual	CO 1 Hour	CO 8 Hour	NO_2 1 Hour	NO_2 Annual
Total Impact (facility plus background)	89.4	31.5	10.7	6,356	4,061	176.8	62.1
NAAQS	150.0	35.0	12.0	40,000	10,000	188.0	100.0
% NAAQS	59.6	90.0	89.2	15.9	40.6	94.0	62.1

***Note:** The USEPA and WDNR Ambient Ratio Method 2 was applied to convert NO_x emissions into NO_2

J. WISCONSIN HAZARDOUS POLLUTANT ANALYSIS

The estimated emissions of NH_3 exceed the thresholds listed in Chapter NR 445 of the Wisconsin Administrative Code, so an analysis of those emissions in comparison to the Wisconsin air standard was performed. The source parameters and emission rates are listed in their respective tables at the end of the memorandum. The results in Table 4 show that the impact of the sources is less than the air standard.

Table 5
NTEC Preferred Site - Superior (Douglas County)
Chapter NR 445 Pollutant Analysis

	NH_3 – 24 Hour	NH_3 – Annual
Facility Impact	27.0	1.3
NR 445 Standard	418.0	100.0
% Standard	6.5	1.3

K. OZONE ANALYSIS

The United States Environmental Protection Agency (U.S. EPA) established a two-tiered approach for addressing impacts of single-source emissions on ozone (O_3). The first tier involves the use of appropriate and technically credible relationships between emissions and ambient impacts. The second tier involves use of chemical transport modeling to obtain single-source impacts.

In December 2016, U.S. EPA published a draft document, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tools for Ozone and $PM_{2.5}$ under the PSD Permitting Program". The term MERP is used to describe an emission rate of a precursor that is expected to result in a change in ambient O_3 or $PM_{2.5}$ concentration that would not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS). Separate MERPs are developed for each precursor and each pollutant. Projected increases in the O_3 precursor pollutants NO_x and VOC that are below the MERP are part of a demonstration that the facility will not cause or contribute to violation of the O_3 NAAQS.

The guidance was examined to refine the value of the NO_x and VOC MERP. Of the sources examined by U.S. EPA, a low-level emitting source in Marquette, Michigan was included. NTEC will be in a similar climatological environment, i.e. similar latitude near Lake Superior, and the atmospheric chemistry is similar. Using the modeled concentration for the Marquette source, an emission rate equivalent to a 1.0 parts per billion impact was computed for NO_x and VOC. NTEC emissions are below these MERPs, but the contributions should be considered together to determine if the facility would cause or contribute to a violation of NAAQS. The ratio of emissions to the MERP for each precursor were calculated and then added together. Since the sum of the ratio is not above 1.0, as shown in Table 8, the combined impact of NO_x and VOC emissions would not cause or contribute to a violation of NAAQS.

Table 6 NTEC Preferred Site - Superior (Douglas County) Ozone Analysis			
Precursor	MERP (tons)	NTEC Emissions (tons)	Ratio NTEC / MERP
VOC	1562	241	0.154
NO_x	350	269	0.769
Total	-	-	0.923

L. FINE PARTICLE ANALYSIS

The U.S. EPA also has established a two-tiered approach for addressing impacts of single-source emissions on secondary fine particles ($PM_{2.5}$). As with O_3, the first tier involves the use of appropriate and technically credible relationships between emissions and ambient impacts and the second tier involves use of chemical transport modeling to obtain single-source impacts. The December 2016 MERP guidance was used to describe the emission rates for NO_x and SO_2 that are part of the demonstration that the facility will not cause or contribute to violation of the $PM_{2.5}$ NAAQS. The Marquette, Michigan source was used to calculate an emission rate equivalent to SIL impact for both NO_x and SO_2.

The NTEC emissions are below their respective MERP, but the contributions should be considered together along with the impact of direct emissions to determine if the facility would cause or contribute to a violation of NAAQS. As the impact of the direct $PM_{2.5}$ emissions is above the $PM_{2.5}$ SIL, and presuming that emissions equal to MERP represent a significant impact, the precursor emissions were converted to concentrations then added to the impact of direct $PM_{2.5}$ emissions and the background concentration. The total impact is less than $PM_{2.5}$ NAAQS, as shown in Tables 7 and 8, therefore the combined impact of $PM_{2.5}$, SO_2, and NO_x emissions would not cause or contribute to a violation of NAAQS.

Table 7 NTEC Preferred Site - Superior (Douglas County) Daily Fine Particle ($PM_{2.5}$) Analysis			
Component	MERP (tons)	NTEC Emissions (tons)	Concentration $\mu g/m^3$
SO_2	1621	29	0.0179
NO_x	15000	269	0.0179
Direct Modeled	-	-	7.93
Background	-	-	23.6
Total	-	-	31.6
NAAQS	-	-	35.0

Table 8 NTEC Preferred Site - Superior (Douglas County) Annual Fine Particle ($PM_{2.5}$) Analysis			
Component	MERP (tons)	NTEC Emissions (tons)	Concentration $\mu g/m^3$
SO_2	10000	29	0.0029
NO_x	33333	269	0.0081
Direct Modeled	-	-	1.34
Background	-	-	9.4
Total	-	-	10.8
NAAQS	-	-	12.0

M. ADDITIONAL IMPACTS ANALYSIS

- Growth Impacts

  The construction of NTEC will result in temporary air quality impacts but should not result in an increase in the permanent workforce in the area. The temporary increase of emissions due to construction will be minimized by performing regular maintenance on construction equipment, reducing engine idling time, and controlling release of fugitive dust. Materials transportation, equipment, and supplies will be needed, but this is not expected to have a measurable effect on residential, commercial, or industrial growth.

- Soils and Vegetation Impacts

  Particulates can be detrimental to vegetation or soils in the immediate vicinity of the source, but the effect of particle deposition on a plant or soil is difficult to measure. Experimental evidence indicates that deposition of common particulate materials on leaf surfaces results in less harm to plants than absorption of phytotoxic gases. At the level of the modeled concentration, it is unlikely that the increase of emission would impact either vegetation or soils near NTEC.

- Visibility Impairment Analysis

  Any facility emitting SO_2, PM_{10}, and/or NO_x may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. Near the proposed project site, under certain meteorological conditions, the stacks will emit a visible steam plume that, after traveling a relatively short distance, will dissipate by dispersion and evaporation. A visible steam plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed and the time required for evaporation.

N. PSD CLASS I ANALYSIS

NTEC will be located approximately 62 kilometers from the Rainbow Lake Wilderness Area Federal Class I area located in Bayfield County, and 126 kilometers from Boundary Waters Wilderness, 181 km from Voyageurs, and 238 km from Isle Royale Class I areas. NTEC will be located approximately 277 km from the Forest County Potawatomi Community (FCPC) non-Federal Class I area. Following the Federal Land Managers Air Quality Related Values work group (FLAG), and agreements between FCPC and WDNR, the ratio of emissions to distance (Q/D) was computed and compared to threshold ratio. For this exercise, the net change in emissions from the project is 467 tons (269 NO_x, 29 SO_2, 169 PM_{10}), and the table shows the Q/D for each Class I area. The results show that the Q/D for each Class I area is less than 10, so no specific Air Quality Related Value (AQRV) analysis was performed.

Table 9
NTEC Preferred Site - Superior (Douglas County)
PSD Class I Screening Analysis
(All Concentrations in µg/m^3)

Class I Area	D (kilometers)	Q/D
Rainbow Lake Wilderness	62	7.5
Boundary Waters Wilderness	126	3.7
Voyageurs National Park	181	2.6
Isle Royale National Park	238	2.0
FCPC Non-Federal Class I	277	1.7

To assess the impact of the modification on PSD Class I increment at the closest Class I area in any direction, an arc of receptors was placed every 1º at 50 km from NTEC, extending from radial 295º to 165º, and concentrations from AERMOD calculated for PM_{10}, $PM_{2.5}$, and NO_2. The results in the table include $PM_{2.5}$ secondary formation and demonstrate that the impact of the increase of emission from NTEC will not have an impact above Class I SIL for any pollutant.

Table 10
NTEC Preferred Site - Superior (Douglas County)
PSD Class I Increment (SIL) Analysis Results
(All Concentrations in µg/m^3)

	$PM_{2.5}$ 24 hr	$PM_{2.5}$ Ann	PM_{10} 24 hr	PM_{10} Ann	NO_2 Ann
Project Impact	0.252	0.030	0.277	0.0223	0.0263
PSD Class I SIL	0.27	0.05	0.3	0.2	0.1

Notes:

- Annualized NO_x emissions of 269 tons were used along with the lowest turbine exit gas velocity and ARM2 to estimate NO_2 impact
- PSD Class I SIL for $PM_{2.5}$ taken from "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program", USEPA 2018

O. CONCLUSIONS

Assuming the emission rates and stack parameters listed, the impact of the proposed NTEC facility in Superior, Wisconsin will not cause or exacerbate an exceedance of the PSD Class I increment, PSD Class II increments or State or Federal ambient air quality standards.

Source Parameter Table[1] NTEC Preferred Site - Superior (Douglas County)						
ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
S01_DBNG	572812, 5171006	57.91	190.0	346.2	19.507	6.4861
S01_100NG	572812, 5171006	57.91	190.0	348.2	19.449	6.4861
S01_75NG	572812, 5171006	57.91	190.0	347.0	14.899	6.4861
S01_LWNG	572812, 5171006	57.91	190.0	347.0	11.223	6.4861
S01_SSNG	572812, 5171006	57.91	190.0	348.1	18.763	6.4861
S01_DFFO	572812, 5171006	57.91	190.0	353.5	21.933	6.4861
S01_100FO	572812, 5171006	57.91	190.0	353.5	21.699	6.4861
S01_75FO	572812, 5171006	57.91	190.0	349.4	17.602	6.4861
S01_LWFO	572812, 5171006	57.91	190.0	347.0	13.253	6.4861
S01_SSFO	572812, 5171006	57.91	190.0	353.0	20.995	6.4861
Each stack S01 condition and fuel (Natural Gas or Fuel Oil) was included in a group with all other sources DB/DF corresponds to duct burning, only applicable at 100% load 100 corresponds to 100% load without duct firing 75 corresponds to 75% load LW corresponds to minimum emissions compliance load SS corresponds to startup/shutdown conditions						
S02_AUXB	572733, 5171021	33.53	110.0	416.5	14.630	1.0668
S03_CT1	572865, 5171050	16.49	54.1	309.8	7.919	10.6680
S03_CT2	572876, 5171060	16.49	54.1	309.8	7.919	10.6680
S03_CT3	572886, 5171070	16.49	54.1	309.8	7.919	10.6680
S03_CT4	572897, 5171080	16.49	54.1	309.8	7.919	10.6680
S03_CT5	572908, 5171091	16.49	54.1	309.8	7.919	10.6680
S03_CT6	572918, 5171101	16.49	54.1	309.8	7.919	10.6680
S03_CT7	572875, 5171039	16.49	54.1	309.8	7.919	10.6680
S03_CT8	572886, 5171050	16.49	54.1	309.8	7.919	10.6680
S03_CT9	572896, 5171060	16.49	54.1	309.8	7.919	10.6680
S03_CT10	572907, 5171070	16.49	54.1	309.8	7.919	10.6680
S03_CT11	572918, 5171080	16.49	54.1	309.8	7.919	10.6680
S03_CT12	572928, 5171090	16.49	54.1	309.8	7.919	10.6680
S04_DPH1	572808, 5170928	4.57	15.0	672.0	7.620	0.5090
S05_DPT2	572786, 5170907	4.57	15.0	672.0	7.620	0.5090
University of Wisconsin – Superior						
N_UW16	570077, 5173535	68.58	225.0	449.7	1.380	2.2900
Specialty Minerals						
N_SMIS20	570395, 5175575	35.05	115.0	293.7	10.690	0.9140
Graymont						

[1] The source parameters in the table were used for modeling purposes, based on conversion from English units. Refer to the permit application forms for the original English unit parameters.

Source Parameter Table[1]
NTEC Preferred Site - Superior (Douglas County)

ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_G50A	570450, 5175671	60.66	199.0	434.3	11.890	1.9200
N_G10	570505, 5175719	38.10	125.0	566.5	25.030	1.2200
N_G11	570488, 5175705	38.10	125.0	537.0	19.780	1.2200
N_G14	570567, 5175672	38.10	125.0	548.7	26.990	1.5200
N_G40	570547, 5175750	45.72	150.0	548.7	27.860	1.4900
Enbridge Energy						
N_ENB01	571742, 5171150	31.85	104.5	588.6	2.682	1.8290
Plains Midstream						
N_PLAIN02	572052, 5171258	20.42	67.0	533.0	*3.860*	1.1700
N_PLAIN03	572115, 5171237	30.48	100.0	1273.0	20.000	0.2290
Superior Refinery						
N_CT1_A	570858, 5171156	14.54	47.7	292.5	8.440	6.7056
N_CT1_B	570866, 5171162	14.54	47.7	292.5	8.440	6.7056
N_CT2_A	571092, 5171234	16.52	54.2	292.9	8.840	6.0960
N_CT2_B	571085, 5171241	16.52	54.2	292.9	8.840	6.0960
N_CT2_C	571079, 5171249	16.52	54.2	292.9	8.840	6.0960
N_S12	570748, 5171082	54.72	179.5	962.6	20.000	0.7925
N_S14	571102, 5171175	45.72	150.0	901.4	14.970	0.5486
N_S15	570954, 5171054	64.01	210.0	510.9	16.080	1.2192
N_S16	571187, 5171288	13.90	45.6	505.2	19.400	1.8288
N_S17	571180, 5171186	64.92	213.0	548.7	5.980	1.9812
N_S18	571048, 5171100	20.27	66.5	522.5	9.880	0.8230
N_S19	570986, 5171161	29.60	97.1	574.2	2.730	2.6518
N_S21	571043, 5171135	35.17	115.4	463.1	7.540	1.0058
N_S22A	570997, 5171186	22.01	72.2	600.2	2.710	1.0668
N_S23	571011, 5171197	24.93	81.8	635.9	2.910	1.1582
N_S24	571102, 5171127	38.10	125.0	503.1	2.430	2.3470
N_S25	571093, 5171121	38.10	125.0	558.7	2.560	0.9754
N_S26	571056, 5171160	18.07	59.3	560.8	3.400	0.9144
N_S27A	570997, 5171191	33.53	110.0	643.6	5.160	0.6096
N_S27	571002, 5171190	23.70	77.8	585.2	1.620	1.2192
N_S30	571024, 5171206	18.29	60.0	593.0	2.650	0.7315
N_S32A	570878, 5171277	35.05	115.0	716.4	10.990	0.6706
N_S32B	570868, 5171268	35.05	115.0	977.5	7.870	1.2192
N_S33A	570973, 5171155	18.44	60.5	541.4	10.380	0.9144
N_S33B	570976, 5171152	18.44	60.5	541.4	10.380	0.9144
N_S37	570993, 5171188	33.77	110.8	477.4	1.060	1.0668
N_S98	570819, 5170737	9.14	30.0	519.1	5.100	1.3716
N_S34	571399, 5171526	11.58	38.0	922.0	12.700	0.4877
N_06_H1	570973, 5171020	6.68	21.9	560.9	7.100	0.8382

Source Parameter Table[1]
NTEC Preferred Site - Superior (Douglas County)

ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_86_1	571030, 5171052	11.00	36.1	477.6	*6.460*	0.3048
N_86_2	571025, 5171061	11.00	36.1	477.6	*6.460*	0.3048
N_87_1	571001, 5171042	10.70	35.1	477.6	*6.460*	0.3048
N_87_2	570989, 5171029	10.49	34.4	477.6	*6.460*	0.3048
N_88_1	570948, 5171003	13.75	45.1	477.6	*6.460*	0.3048
N_88_2	570956, 5171006	14.97	49.1	477.6	*6.460*	0.3048
N_88_3	570944, 5170996	14.02	46.0	477.6	*6.460*	0.3048
N_90_1	570895, 5170959	14.45	47.4	477.6	*6.460*	0.3048
N_90_2	570915, 5170948	14.33	47.0	477.6	*6.460*	0.3048
N_91_1	570945, 5170972	14.26	46.8	477.6	*6.460*	0.3048
N_91_2	570926, 5170958	14.60	47.9	477.6	*6.460*	0.3048
N_99_1	570899, 5171016	13.87	45.5	477.6	*6.460*	0.3048
N_99_2	570903, 5171007	13.75	45.1	477.6	*6.460*	0.3048
N_99_3	570900, 5170997	13.81	45.3	477.6	*6.460*	0.3048
N_100_1	570876, 5171027	13.75	45.1	477.6	*6.460*	0.3048
N_100_2	570859, 5171023	13.84	45.4	477.6	*6.460*	0.3048
N_100_3	570853, 5171027	13.87	45.5	477.6	*6.460*	0.3048
N_101_1	570896, 5171050	13.81	45.3	477.6	*6.460*	0.3048
N_101_2	570881, 5171058	13.84	45.4	477.6	*6.460*	0.3048
N_103_1	570831, 5171083	13.69	44.9	477.6	*6.460*	0.3048
N_103_2	570842, 5171083	13.78	45.2	477.6	*6.460*	0.3048
N_103_3	570852, 5171074	13.66	44.8	477.6	*6.460*	0.3048
N_104_1	570870, 5171079	13.75	45.1	477.6	*6.460*	0.3048
N_104_2	570854, 5171089	13.35	43.8	477.6	*6.460*	0.3048
N_105_2	570812, 5171058	14.45	47.4	477.6	*6.460*	0.3048
N_105_3	570821, 5171047	14.78	48.5	477.6	*6.460*	0.3048
N_105_4	570820, 5171036	14.45	47.4	477.6	*6.460*	0.3048
N_106_1	570732, 5170998	14.26	46.8	477.6	*6.460*	0.3048
N_106_2	570751, 5170995	14.23	46.7	477.6	*6.460*	0.3048
N_106_3	570761, 5170981	14.23	46.7	477.6	*6.460*	0.3048
N_106_4	570757, 5170962	14.11	46.3	477.6	*6.460*	0.3048
N_106_5	570739, 5170952	14.17	46.5	477.6	*6.460*	0.3048
N_106_6	570717, 5170985	14.17	46.5	477.6	*6.460*	0.3048
N_112_1	570776, 5170944	13.44	44.1	477.6	*6.460*	0.3048
N_112_2	570791, 5170942	13.35	43.8	477.6	*6.460*	0.3048
N_112_3	570803, 5170924	13.35	43.8	477.6	*6.460*	0.3048
N_112_4	570797, 5170907	13.32	43.7	477.6	*6.460*	0.3048
N_112_5	570780, 5170900	13.41	44.0	477.6	*6.460*	0.3048
N_112_6	570762, 5170933	13.50	44.3	477.6	*6.460*	0.3048
N_114_1	570826, 5170895	16.43	53.9	477.6	*6.460*	0.3048

Source Parameter Table[1] NTEC Preferred Site - Superior (Douglas County)						
ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_114_2	570845, 5170888	16.37	53.7	477.6	*6.460*	0.3048
N_114_3	570850, 5170862	16.34	53.6	477.6	*6.460*	0.3048
N_114_4	570825, 5170848	16.34	53.6	477.6	*6.460*	0.3048
N_114_5	570806, 5170866	16.40	53.8	477.6	*6.460*	0.3048
N_114_6	570808, 5170883	16.43	53.9	477.6	*6.460*	0.3048
Additional Duluth, MN Sources						
DLSSV001	568929, 5181745	73.20	240.2	516.0	7.281	3.9599
HIBSV001	564773, 5176129	100.89	331.0	465.4	26.520	4.2672

Stacks N_PLAIN02 and N_86_1 to N_114_6 are non-vertical releases modeled as POINTHOR src type

Emission Rate Table NTEC Preferred Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
S01_DBNG	36.310	36.310	6.400	33.46	15.28	62.0
S01_100NG	21.797	21.797	5.100	26.55	12.12	62.0
S01_75NG	16.809	16.809	4.000	20.56	9.39	62.0
S01_LWNG	12.939	12.939	2.400	12.44	5.68	62.0
S01_SSNG	21.797	21.797	5.100	200.00	7190.0	62.0
S01_DFFO	54.510	54.510	6.100	72.68	11.06	62.0
S01_100FO	39.448	39.448	4.600	51.55	7.85	62.0
S01_75FO	37.503	37.503	3.600	41.04	6.25	62.0
S01_LWFO	35.684	35.684	2.800	31.10	15.75	62.0
S01_SSFO	39.448	39.448	4.600	510.0	16860.0	62.0
S02_AUXB	0.745	0.745	0.060	1.100	3.700	-
S03_CT1	0.053	0.053	-	-	-	-
S03_CT2	0.053	0.053	-	-	-	-
S03_CT3	0.053	0.053	-	-	-	-
S03_CT4	0.053	0.053	-	-	-	-
S03_CT5	0.053	0.053	-	-	-	-
S03_CT6	0.053	0.053	-	-	-	-
S03_CT7	0.053	0.053	-	-	-	-
S03_CT8	0.053	0.053	-	-	-	-
S03_CT9	0.053	0.053	-	-	-	-
S03_CT10	0.053	0.053	-	-	-	-
S03_CT11	0.053	0.053	-	-	-	-
S03_CT12	0.053	0.053	-	-	-	-
S04_DPH1	0.070	0.070	0.006	0.491	0.820	-
S05_DPT2	0.070	0.070	0.006	0.491	0.820	-
N_UW16	37.70	37.70	n/a	45.00	91.00	n/a
N_SMIS20	0.880	0.880	n/a	43.50	100.00	n/a
N_G50A	25.000	25.000	n/a	98.80	292.00	n/a
N_G10	22.600	22.600	n/a	65.00	27.500	n/a
N_G11	19.370	19.370	n/a	35.00	22.000	n/a
N_G14	15.000	15.000	n/a	70.00	44.00	n/a
N_G40	4.800	4.800	n/a	56.00	44.00	n/a
N_ENB01	0.026	0.026	n/a	5.060	3.380	n/a
N_PLAIN02	0.011	0.011	n/a	1.300	2.210	n/a
N_PLAIN03	0.001	0.001	n/a	0.120	0.630	n/a
N_CT1_A	0.068	0.068	n/a	-	-	n/a
N_CT1_B	0.068	0.068	n/a	-	-	n/a
N_CT2_A	0.015	0.015	n/a	-	-	n/a
N_CT2_B	0.015	0.015	n/a	-	-	n/a

Emission Rate Table NTEC Preferred Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
N_CT2_C	0.015	0.015	n/a	-	-	n/a
N_S12	13.120	13.120	n/a	37.799	66.60	n/a
N_S14	1.047	1.047	n/a	0.349	0.600	n/a
N_S15	12.800	12.800	n/a	68.898	70.30	n/a
N_S16	0.404	0.404	n/a	5.314	8.400	n/a
N_S17	3.200	3.200	n/a	7.000	14.800	n/a
N_S18	0.180	0.180	n/a	2.068	1.730	n/a
N_S19	0.910	0.910	n/a	4.151	10.100	n/a
N_S21	0.310	0.310	n/a	3.489	2.930	n/a
N_S22A	0.265	0.265	n/a	2.863	2.380	n/a
N_S23	0.400	0.400	n/a	4.608	2.460	n/a
N_S24	1.213	1.213	n/a	15.960	13.410	n/a
N_S25	0.160	0.160	n/a	2.108	1.770	n/a
N_S26	0.159	0.159	n/a	2.088	1.900	n/a
N_S27A	0.142	0.142	n/a	0.760	1.560	n/a
N_S27	0.170	0.170	n/a	2.000	1.650	n/a
N_S30	0.062	0.062	n/a	0.415	0.700	n/a
N_S32A	0.080	0.080	n/a	1.058	1.140	n/a
N_S32B	0.257	0.257	n/a	3.382	3.650	n/a
N_S33A	0.180	0.180	n/a	0.823	2.200	n/a
N_S33B	0.180	0.180	n/a	0.823	2.200	n/a
N_S37	0.230	0.230	n/a	1.096	2.260	n/a
N_S98	0.088	0.088	n/a	2.136	6.100	n/a
N_S34	0.080	0.080	n/a	0.078	0.000	n/a
N_06_H1	0.156	0.156	n/a	2.059	3.100	n/a
N_86_1	0.019	0.019	n/a	0.245	0.370	n/a
N_86_2	0.019	0.019	n/a	0.245	0.370	n/a
N_87_1	0.019	0.019	n/a	0.245	0.370	n/a
N_87_2	0.019	0.019	n/a	0.245	0.370	n/a
N_88_1	0.019	0.019	n/a	0.245	0.370	n/a
N_88_2	0.019	0.019	n/a	0.245	0.370	n/a
N_88_3	0.019	0.019	n/a	0.245	0.370	n/a
N_90_1	0.019	0.019	n/a	0.245	0.370	n/a
N_90_2	0.019	0.019	n/a	0.245	0.370	n/a
N_91_1	0.019	0.019	n/a	0.245	0.370	n/a
N_91_2	0.019	0.019	n/a	0.245	0.370	n/a
N_99_1	0.019	0.019	n/a	0.245	0.370	n/a
N_99_2	0.019	0.019	n/a	0.245	0.370	n/a
N_99_3	0.019	0.019	n/a	0.245	0.370	n/a

Emission Rate Table NTEC Preferred Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
N_100_1	0.019	0.019	n/a	0.245	0.370	n/a
N_100_2	0.019	0.019	n/a	0.245	0.370	n/a
N_100_3	0.019	0.019	n/a	0.245	0.370	n/a
N_101_1	0.019	0.019	n/a	0.245	0.370	n/a
N_101_2	0.019	0.019	n/a	0.245	0.370	n/a
N_103_1	0.019	0.019	n/a	0.245	0.370	n/a
N_103_2	0.019	0.019	n/a	0.245	0.370	n/a
N_103_3	0.019	0.019	n/a	0.245	0.370	n/a
N_104_1	0.019	0.019	n/a	0.245	0.370	n/a
N_104_2	0.019	0.019	n/a	0.245	0.370	n/a
N_105_2	0.019	0.019	n/a	0.245	0.370	n/a
N_105_3	0.019	0.019	n/a	0.245	0.370	n/a
N_105_4	0.019	0.019	n/a	0.245	0.370	n/a
N_106_1	0.019	0.019	n/a	0.245	0.370	n/a
N_106_2	0.019	0.019	n/a	0.245	0.370	n/a
N_106_3	0.019	0.019	n/a	0.245	0.370	n/a
N_106_4	0.019	0.019	n/a	0.245	0.370	n/a
N_106_5	0.019	0.019	n/a	0.245	0.370	n/a
N_106_6	0.019	0.019	n/a	0.245	0.370	n/a
N_112_1	0.019	0.019	n/a	0.245	0.370	n/a
N_112_2	0.019	0.019	n/a	0.245	0.370	n/a
N_112_3	0.019	0.019	n/a	0.245	0.370	n/a
N_112_4	0.019	0.019	n/a	0.245	0.370	n/a
N_112_5	0.019	0.019	n/a	0.245	0.370	n/a
N_112_6	0.019	0.019	n/a	0.245	0.370	n/a
N_114_1	0.019	0.019	n/a	0.245	0.370	n/a
N_114_2	0.019	0.019	n/a	0.245	0.370	n/a
N_114_3	0.019	0.019	n/a	0.245	0.370	n/a
N_114_4	0.019	0.019	n/a	0.245	0.370	n/a
N_114_5	0.019	0.019	n/a	0.245	0.370	n/a
N_114_6	0.019	0.019	n/a	0.245	0.370	n/a
DLSSV001	0.000	0.000	n/a	73.031	0.000	n/a
HIBSV001	42.027	42.027	n/a	532.00	571.68	n/a

All sources consume PM_{10}, $PM_{2.5}$, and NO_2 increment, EXCEPT:

- N_UW16
- N_G10
- N_G11
- N_G14
- NPLAIN02
- NPLAIN03
- DLSSV001

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: March 15, 2019

FID: 816121350
Permit: 18-MMC-169

TO: Megan Corrado – AM/7

FROM: John Roth – AM/7

SUBJECT: Air Dispersion Analysis for a PSD Permit for Nemadji Trail Energy Center (Alternate Site) – Superior (Douglas County), Wisconsin

A. INTRODUCTION

South Shore Energy LLC, a subsidiary of ALLETE, and Dairyland Power Cooperative have submitted to the Wisconsin Department of Natural Resources (WDNR) a Prevention of Significant Deterioration (PSD) permit application. South Shore and Dairyland are proposing to construct a combined cycle combustion turbine at the Nemadji Trail Energy Center (NTEC) project, to be located in Superior, Wisconsin. Based on applicable regulations, PSD review is applicable to project emissions of particulate matter (PM_{10}), fine particulate ($PM_{2.5}$), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC).

B. RECOMMENDATION

Assuming the emission rates and stack parameters listed in their respective tables at the end of the memorandum, air quality standards and increments will be attained and maintained for PM_{10}, $PM_{2.5}$, SO_2, NO_x, and CO.

C. LOCATION

The alternate site for NTEC is north of the existing Superior Refinery facility in Superior, Douglas County, Wisconsin. The area is currently in attainment for criteria pollutants, and the minor source PSD baselines for PM_{10}, $PM_{2.5}$, SO_2, and NO_x were established in 1993, 2017, 1993, and 1993, respectively.

D. MODELING ANALYSIS

- South Shore Energy LLC and Dairyland Power Cooperative, via a report from Burns and McDonnell Engineering Company, provided the stack parameters, emission rates, and building dimensions used in this analysis. Air Management Program staff verified the data, with the data in the tables reflecting the WDNR analysis.

- The proposed turbine was analyzed for five different operating conditions or loads (startup/shutdown, low, 75 percent, 100 percent, and 100 percent with duct firing) and for both natural gas and fuel oil combustion. While all of the scenarios were modeled, only the highest modeled values are presented in the result tables.

- Building downwash information was derived from the Building Profile Input Program (BPIP-PRIME) using measurements taken on plot plans provided with the application.

- Five years (2011-2015) of preprocessed meteorological data was used in this analysis. The surface data was collected at the Duluth Sky Harbor Airport (DYT), and the upper air meteorological data originated in Minneapolis.

- The AERMIC Model (AERMOD v18081) was used in the analysis. The model used rural dispersion coefficients with the regulatory default options. These allow for missing and calm wind correction, buoyancy induced dispersion, and building downwash including cavity effects.

- Regional background concentrations included in the analysis can be found at the following link: http://dnr.wi.gov/topic/AirPermits/documents/AQBackgroundConcentrationGuidance.pdf

- The receptors used in this analysis were placed every 25-meters along the fence line extending to 500 meters, surrounded by 50-meter spaced points extending 1000 meters. 100-meter spaced points extending 2 kilometers, 250-meter spaced points extending 5 kilometers, and 500-meter spaced points extending 10 kilometers from the fence line. Additional receptors were placed in the high terrain 5-15 kilometers northwest of NTEC, northwest of the City of Duluth. Receptor elevations were derived from AERMAP using NED tiles.

- Due to the industrial nature of this proposed NTEC location, two separate analyses were performed. In the first analysis, the proposed NTEC sources were modeled with all receptors except those not considered ambient air relative to NTEC (13018 points). In the second analysis, the NTEC sources and all other nearby sources were modeled with all receptors except those not considered ambient air relative to each facility (12159 points). The higher modeled value from either analysis is presented in the result tables.

E. PSD PRECONSTRUCTION MONITORING

The modeling analysis predicts that the impact of NTEC will not exceed the significant monitoring concentration (SMC) for PM_{10} or NO_x, but modeled concentrations are over the SMC for $PM_{2.5}$ and CO.

The Duluth North Central Avenue monitor 27-137-7554 is located approximately 9 kilometers northwest of NTEC and is the closest operating $PM_{2.5}$ monitor. The land use around the monitor is similar to the land use around NTEC and both are affected by similar meteorological conditions. The 2015-2017 design values of 16 $\mu g/m^3$ (24 hour) and 5.3 ug/m3 (annual) can serve to estimate pre-construction air quality.

Table 1 demonstrates that the use of $PM_{2.5}$ SIL is justified for this area as the difference between the NAAQS and the location's design value would allow for an increase of impact comparable to the SIL.

Table 1
DULTUH (N. CENTRAL AVE.) $PM_{2.5}$ MONITOR (27-137-7554)
(All Concentrations in $\mu g/m^3$)

	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual
2015-2017 Design Value	16	5.3
NAAQS	35	12.0
Difference NAAQS-DV	19.0	6.7
PSD Class II $PM_{2.5}$ SIL	1.2	0.2

The Anoka monitor 27-003-1002 is located in the northern suburbs of Minneapolis and is the closest operating CO monitor. The 2017 second highest values of 1466 $\mu g/m^3$ (1 hour) and 920 ug/m3 (8 hour) can serve to estimate pre-construction air quality.

F. NONATTAINMENT AREA ANALYSIS

NTEC will be located in an area that is currently in attainment for criteria pollutants.

G. SIGNIFICANT IMPACT ANALYSIS

The proposed facility was modeled to determine if the PSD Significant Impact Levels (SIL) were exceeded. The results for $PM_{2.5}$, PM_{10}, NO_2, and CO were above SIL, so an increment and NAAQS analysis was performed for those emissions. Refer to Section H for a discussion of the increment analysis and Section I for a discussion of the NAAQS analysis. The source parameters and emission rates are listed in their respective tables at the end of the memorandum. Highest modeled impacts occur assuming the 100% load, duct firing, natural gas operating condition. No further analysis was performed for SO_2 as the impacts were below SIL, as shown in Table 1.

Table 2
NTEC Alternate Site - Superior (Douglas County)
Project Level (SIL) Analysis Results
(All Concentrations in $\mu g/m^3$)

	SO_2 1 hour	SO_2 3 hour	SO_2 24 hour	SO_2 Annual
Project Impact	2.08	2.04	1.21	0.0449
PSD SIL	7.8	25.0	5.0	1.0

H. PSD INCREMENT ANALYSIS

The modeled impact of this proposed NTEC location is above the SIL for $PM_{2.5}$, NO_2, and PM_{10}, so an increment analysis was performed for these pollutants (increment does not apply to CO). There are several nearby increment consuming sources that were included in the analysis. The source parameters and emission rates used are listed in their respective tables at the end of the memorandum. The results in Table 2 show that the impact of the increment consuming sources is less than the PSD Class II increment. Highest modeled impacts for particulate occur assuming low load, fuel oil operating conditions and for NO_2 occur assuming startup/shutdown conditions.

Table 3
NTEC Alternate Site - Superior (Douglas County)
PSD Increment Analysis Results
(All Concentrations in µg/m^3)

	PM_{10} 24 Hour	PM_{10} Annual	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual	NO_2 Annual
Facility Impact	8.55	1.42	8.55	1.42	13.1
PSD Class II Increment	30.0	17.0	9.0	4.0	25.0
% Increment Consumed	28.5	8.4	95.0	35.5	52.4

***Note:** The USEPA and WDNR Ambient Ratio Method 2 was applied to convert NO_x emissions into NO_2

I. NAAQS ANALYSIS

The modeled impact of this proposed NTEC location is above the $PM_{2.5}$, NO_2, CO, and PM_{10} SIL, so an analysis of those emissions in comparison to NAAQS was performed. There are several nearby sources included in the analysis. The source parameters and emission rates used are listed in their respective tables at the end of the memorandum. The results in Table 3 show that the impact of the sources plus background is less than the respective NAAQS. Highest modeled impacts for particulate occur assuming low load, fuel oil operating conditions and for both CO and NO_2 occur assuming startup/shutdown conditions.

Table 4
NTEC Alternate Site - Superior (Douglas County)
NAAQS Analysis Results
(All Concentrations in µg/m^3)

	PM_{10} 24 Hour	$PM_{2.5}$ 24 Hour	$PM_{2.5}$ Annual	CO 1 Hour	CO 8 Hour	NO_2 1 Hour	NO_2 Annual
Total Impact (facility plus background)	89.4	31.5	10.7	6,250	3,471	179.1	61.7
NAAQS	150.0	35.0	12.0	40,000	10,000	188.0	100.0
% NAAQS	59.6	90.0	89.2	15.6	40.6	95.3	61.7

***Note:** The USEPA and WDNR Ambient Ratio Method 2 was applied to convert NO_x emissions into NO_2

J. WISCONSIN HAZARDOUS POLLUTANT ANALYSIS

The estimated emissions of NH_3 exceed the thresholds listed in Chapter NR 445 of the Wisconsin Administrative Code, so an analysis of those emissions in comparison to the Wisconsin air standard was performed. The source parameters and emission rates are listed in their respective tables at the end of the memorandum. The results in Table 4 show that the impact of the sources is less than the air standard.

Table 5
NTEC Alternate Site - Superior (Douglas County)
Chapter NR 445 Pollutant Analysis

	NH_3 – 24 Hour	NH_3 – Annual
Facility Impact	16.2	0.81
NR 445 Standard	418.0	100.0
% Standard	3.9	0.8

K. OZONE ANALYSIS

The United States Environmental Protection Agency (U.S. EPA) established a two-tiered approach for addressing impacts of single-source emissions on ozone (O_3). The first tier involves the use of appropriate and technically credible relationships between emissions and ambient impacts. The second tier involves use of chemical transport modeling to obtain single-source impacts.

In December 2016, U.S. EPA published a draft document, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tools for Ozone and $PM_{2.5}$ under the PSD Permitting Program". The term MERP is used to describe an emission rate of a precursor that is expected to result in a change in ambient O_3 or $PM_{2.5}$ concentration that would not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS). Separate MERPs are developed for each precursor and each pollutant. Projected increases in the O_3 precursor pollutants NO_x and VOC that are below the MERP are part of a demonstration that the facility will not cause or contribute to violation of the O_3 NAAQS.

The guidance was examined to refine the value of the NO_x and VOC MERP. Of the sources examined by U.S. EPA, a low-level emitting source in Marquette, Michigan was included. NTEC will be in a similar climatological environment, i.e. similar latitude near Lake Superior, and the atmospheric chemistry is similar. Using the modeled concentration for the Marquette source, an emission rate equivalent to a 1.0 parts per billion impact was computed for NO_x and VOC. NTEC emissions are below these MERPs, but the contributions should be considered together to determine if the facility would cause or contribute to a violation of NAAQS. The ratio of emissions to the MERP for each precursor were calculated and then added together. Since the sum of the ratio is not above 1.0, as shown in Table 8, the combined impact of NO_x and VOC emissions would not cause or contribute to a violation of NAAQS.

Table 6 NTEC Alternate Site - Superior (Douglas County) Ozone Analysis			
Precursor	MERP (tons)	NTEC Emissions (tons)	Ratio NTEC / MERP
VOC	1562	241	0.154
NO_x	350	269	0.769
Total	-	-	0.923

L. FINE PARTICLE ANALYSIS

The U.S. EPA also has established a two-tiered approach for addressing impacts of single-source emissions on secondary fine particles ($PM_{2.5}$). As with O_3, the first tier involves the use of appropriate and technically credible relationships between emissions and ambient impacts and the second tier involves use of chemical transport modeling to obtain single-source impacts. The December 2016 MERP guidance was used to describe the emission rates for NO_x and SO_2 that are part of the demonstration that the facility will not cause or contribute to violation of the $PM_{2.5}$ NAAQS. The Marquette, Michigan source was used to calculate an emission rate equivalent to SIL impact for both NO_x and SO_2.

The NTEC emissions are below their respective MERP, but the contributions should be considered together along with the impact of direct emissions to determine if the facility would cause or contribute to a violation of NAAQS. As the impact of the direct $PM_{2.5}$ emissions is above the $PM_{2.5}$ SIL, and presuming that emissions equal to MERP represent a significant impact, the precursor emissions were converted to concentrations then added to the impact of direct $PM_{2.5}$ emissions and the background concentration. The total impact is less than $PM_{2.5}$ NAAQS, as shown in Tables 7 and 8, therefore the combined impact of $PM_{2.5}$, SO_2, and NO_x emissions would not cause or contribute to a violation of NAAQS.

Table 7 NTEC Alternate Site - Superior (Douglas County) Daily Fine Particle ($PM_{2.5}$) Analysis			
Component	MERP (tons)	NTEC Emissions (tons)	Concentration $\mu g/m^3$
SO_2	1621	29	0.0179
NO_x	15000	269	0.0179
Direct Modeled	-	-	7.93
Background	-	-	23.6
Total	-	-	31.6
NAAQS	-	-	35.0

Table 8 NTEC Alternate Site - Superior (Douglas County) Annual Fine Particle ($PM_{2.5}$) Analysis			
Component	MERP (tons)	NTEC Emissions (tons)	Concentration $\mu g/m^3$
SO_2	10000	29	0.0029
NO_x	33333	269	0.0081
Direct Modeled	-	-	1.34
Background	-	-	9.4
Total	-	-	10.8
NAAQS	-	-	12.0

M. ADDITIONAL IMPACTS ANALYSIS

- Growth Impacts

  The construction of NTEC will result in temporary air quality impacts but should not result in an increase in the permanent workforce in the area. The temporary increase of emissions due to construction will be minimized by performing regular maintenance on construction equipment, reducing engine idling time, and controlling release of fugitive dust. Materials transportation, equipment, and supplies will be needed, but this is not expected to have a measurable effect on residential, commercial, or industrial growth.

- Soils and Vegetation Impacts

  Particulates can be detrimental to vegetation or soils in the immediate vicinity of the source, but the effect of particle deposition on a plant or soil is difficult to measure. Experimental evidence indicates that deposition of common particulate materials on leaf surfaces results in less harm to plants than absorption of phytotoxic gases. At the level of the modeled concentration, it is unlikely that the increase of emission would impact either vegetation or soils near NTEC.

- Visibility Impairment Analysis

  Any facility emitting SO_2, PM_{10}, and/or NO_x may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. Near the proposed project site, under certain meteorological conditions, the stacks will emit a visible steam plume that, after traveling a relatively short distance, will dissipate by dispersion and evaporation. A visible steam plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed and the time required for evaporation.

N. PSD CLASS I ANALYSIS

NTEC will be located approximately 62 kilometers from the Rainbow Lake Wilderness Area Federal Class I area located in Bayfield County, and 126 kilometers from Boundary Waters Wilderness, 181 km from Voyageurs, and 238 km from Isle Royale Class I areas. NTEC will be located approximately 277 km from the Forest County Potawatomi Community (FCPC) non-Federal Class I area. Following the Federal Land Managers Air Quality Related Values work group (FLAG), and agreements between FCPC and WDNR, the ratio of emissions to distance (Q/D) was computed and compared to threshold ratio. For this exercise, the net change in emissions from the project is 467 tons (269 NO_x, 29 SO_2, 169 PM_{10}), and the table shows the Q/D for each Class I area. The results show that the Q/D for each Class I area is less than 10, so no specific Air Quality Related Value (AQRV) analysis was performed.

Table 9
NTEC Alternate Site - Superior (Douglas County)
PSD Class I Screening Analysis
(All Concentrations in µg/m^3)

Class I Area	D (kilometers)	Q/D
Rainbow Lake Wilderness	62	7.5
Boundary Waters Wilderness	126	3.7
Voyageurs National Park	181	2.6
Isle Royale National Park	238	2.0
FCPC Non-Federal Class I	277	1.7

To assess the impact of the modification on PSD Class I increment at the closest Class I area in any direction, an arc of receptors was placed every 1º at 50 km from NTEC, extending from radial 295º to 165º, and concentrations from AERMOD calculated for PM_{10}, $PM_{2.5}$, and NO_2. The results in the table include $PM_{2.5}$ secondary formation and demonstrate that the impact of the increase of emission from NTEC will not have an impact above Class I SIL for any pollutant.

Table 10
NTEC Alternate Site - Superior (Douglas County)
PSD Class I Increment (SIL) Analysis Results
(All Concentrations in µg/m^3)

	$PM_{2.5}$ 24 hr	$PM_{2.5}$ Ann	PM_{10} 24 hr	PM_{10} Ann	NO_2 Ann
Project Impact	0.269	0.030	0.288	0.0223	0.0254
PSD Class I SIL	0.27	0.05	0.3	0.2	0.1

Notes:

- Annualized NO_x emissions of 269 tons were used along with the lowest turbine exit gas velocity and ARM2 to estimate NO_2 impact
- PSD Class I SIL for $PM_{2.5}$ taken from "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program", USEPA 2018

O. CONCLUSIONS

Assuming the emission rates and stack parameters listed, the impact of the proposed NTEC facility in Superior, Wisconsin will not cause or exacerbate an exceedance of the PSD Class I increment, PSD Class II increments or State or Federal ambient air quality standards.

Source Parameter Table[1] NTEC Alternate Site - Superior (Douglas County)						
ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
S01_DBNG	571376, 5172394	52.12	171.0	346.2	19.507	6.4861
S01_100NG	571376, 5172394	52.12	171.0	348.2	19.449	6.4861
S01_75NG	571376, 5172394	52.12	171.0	347.0	14.899	6.4861
S01_LWNG	571376, 5172394	52.12	171.0	347.0	11.223	6.4861
S01_SSNG	571376, 5172394	52.12	171.0	348.1	18.763	6.4861
S01_DFFO	571376, 5172394	52.12	171.0	353.5	21.933	6.4861
S01_100FO	571376, 5172394	52.12	171.0	353.5	21.699	6.4861
S01_75FO	571376, 5172394	52.12	171.0	349.4	17.602	6.4861
S01_LWFO	571376, 5172394	52.12	171.0	347.0	13.253	6.4861
S01_SSFO	571376, 5172394	52.12	171.0	353.0	20.995	6.4861
Each stack S01 condition and fuel (Natural Gas or Fuel Oil) was included in a group with all other sources DB/DF corresponds to duct burning, only applicable at 100% load 100 corresponds to 100% load without duct firing 75 corresponds to 75% load LW corresponds to minimum emissions compliance load SS corresponds to startup/shutdown conditions						
S02_AUXB	571291, 5172407	42.67	140.0	416.5	14.630	1.0668
S03_CT1	571212, 5172451	16.49	54.1	309.8	7.919	10.6680
S03_CT2	571223, 5172460	16.49	54.1	309.8	7.919	10.6680
S03_CT3	571234, 5172470	16.49	54.1	309.8	7.919	10.6680
S03_CT4	571245, 5172480	16.49	54.1	309.8	7.919	10.6680
S03_CT5	571256, 5172490	16.49	54.1	309.8	7.919	10.6680
S03_CT6	571267, 5172499	16.49	54.1	309.8	7.919	10.6680
S03_CT7	571222, 5172440	16.49	54.1	309.8	7.919	10.6680
S03_CT8	571232, 5172450	16.49	54.1	309.8	7.919	10.6680
S03_CT9	571244, 5172459	16.49	54.1	309.8	7.919	10.6680
S03_CT10	571254, 5172469	16.49	54.1	309.8	7.919	10.6680
S03_CT11	571266, 5172478	16.49	54.1	309.8	7.919	10.6680
S03_CT12	571276, 5172489	16.49	54.1	309.8	7.919	10.6680
S04_DPH1	571149, 5172184	4.57	15.0	672.0	7.620	0.5090
S05_DPT2	571129, 5172207	4.57	15.0	672.0	7.620	0.5090
University of Wisconsin – Superior						
N_UW16	570077, 5173535	68.58	225.0	449.7	1.380	2.2900
Specialty Minerals						
N_SMIS20	570395, 5175575	35.05	115.0	293.7	10.690	0.9140
Graymont						

[1] The source parameters in the table were used for modeling purposes, based on conversion from English units. Refer to the permit application forms for the original English unit parameters.

Source Parameter Table[1]
NTEC Alternate Site - Superior (Douglas County)

ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_G50A	570450, 5175671	60.66	199.0	434.3	11.890	1.9200
N_G10	570505, 5175719	38.10	125.0	566.5	25.030	1.2200
N_G11	570488, 5175705	38.10	125.0	537.0	19.780	1.2200
N_G14	570567, 5175672	38.10	125.0	548.7	26.990	1.5200
N_G40	570547, 5175750	45.72	150.0	548.7	27.860	1.4900
Enbridge Energy						
N_ENB01	571742, 5171150	31.85	104.5	588.6	2.682	1.8290
Plains Midstream						
N_PLAIN02	572052, 5171258	20.42	67.0	533.0	*3.860*	1.1700
N_PLAIN03	572115, 5171237	30.48	100.0	1273.0	20.000	0.2290
Superior Refinery						
N_CT1_A	570858, 5171156	14.54	47.7	292.5	8.440	6.7056
N_CT1_B	570866, 5171162	14.54	47.7	292.5	8.440	6.7056
N_CT2_A	571092, 5171234	16.52	54.2	292.9	8.840	6.0960
N_CT2_B	571085, 5171241	16.52	54.2	292.9	8.840	6.0960
N_CT2_C	571079, 5171249	16.52	54.2	292.9	8.840	6.0960
N_S12	570748, 5171082	54.72	179.5	962.6	20.000	0.7925
N_S14	571102, 5171175	45.72	150.0	901.4	14.970	0.5486
N_S15	570954, 5171054	64.01	210.0	510.9	16.080	1.2192
N_S16	571187, 5171288	13.90	45.6	505.2	19.400	1.8288
N_S17	571180, 5171186	64.92	213.0	548.7	5.980	1.9812
N_S18	571048, 5171100	20.27	66.5	522.5	9.880	0.8230
N_S19	570986, 5171161	29.60	97.1	574.2	2.730	2.6518
N_S21	571043, 5171135	35.17	115.4	463.1	7.540	1.0058
N_S22A	570997, 5171186	22.01	72.2	600.2	2.710	1.0668
N_S23	571011, 5171197	24.93	81.8	635.9	2.910	1.1582
N_S24	571102, 5171127	38.10	125.0	503.1	2.430	2.3470
N_S25	571093, 5171121	38.10	125.0	558.7	2.560	0.9754
N_S26	571056, 5171160	18.07	59.3	560.8	3.400	0.9144
N_S27A	570997, 5171191	33.53	110.0	643.6	5.160	0.6096
N_S27	571002, 5171190	23.70	77.8	585.2	1.620	1.2192
N_S30	571024, 5171206	18.29	60.0	593.0	2.650	0.7315
N_S32A	570878, 5171277	35.05	115.0	716.4	10.990	0.6706
N_S32B	570868, 5171268	35.05	115.0	977.5	7.870	1.2192
N_S33A	570973, 5171155	18.44	60.5	541.4	10.380	0.9144
N_S33B	570976, 5171152	18.44	60.5	541.4	10.380	0.9144
N_S37	570993, 5171188	33.77	110.8	477.4	1.060	1.0668
N_S98	570819, 5170737	9.14	30.0	519.1	5.100	1.3716
N_S34	571399, 5171526	11.58	38.0	922.0	12.700	0.4877
N_06_H1	570973, 5171020	6.68	21.9	560.9	7.100	0.8382

Source Parameter Table[1]
NTEC Alternate Site - Superior (Douglas County)

ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_86_1	571030, 5171052	11.00	36.1	477.6	*6.460*	0.3048
N_86_2	571025, 5171061	11.00	36.1	477.6	*6.460*	0.3048
N_87_1	571001, 5171042	10.70	35.1	477.6	*6.460*	0.3048
N_87_2	570989, 5171029	10.49	34.4	477.6	*6.460*	0.3048
N_88_1	570948, 5171003	13.75	45.1	477.6	*6.460*	0.3048
N_88_2	570956, 5171006	14.97	49.1	477.6	*6.460*	0.3048
N_88_3	570944, 5170996	14.02	46.0	477.6	*6.460*	0.3048
N_90_1	570895, 5170959	14.45	47.4	477.6	*6.460*	0.3048
N_90_2	570915, 5170948	14.33	47.0	477.6	*6.460*	0.3048
N_91_1	570945, 5170972	14.26	46.8	477.6	*6.460*	0.3048
N_91_2	570926, 5170958	14.60	47.9	477.6	*6.460*	0.3048
N_99_1	570899, 5171016	13.87	45.5	477.6	*6.460*	0.3048
N_99_2	570903, 5171007	13.75	45.1	477.6	*6.460*	0.3048
N_99_3	570900, 5170997	13.81	45.3	477.6	*6.460*	0.3048
N_100_1	570876, 5171027	13.75	45.1	477.6	*6.460*	0.3048
N_100_2	570859, 5171023	13.84	45.4	477.6	*6.460*	0.3048
N_100_3	570853, 5171027	13.87	45.5	477.6	*6.460*	0.3048
N_101_1	570896, 5171050	13.81	45.3	477.6	*6.460*	0.3048
N_101_2	570881, 5171058	13.84	45.4	477.6	*6.460*	0.3048
N_103_1	570831, 5171083	13.69	44.9	477.6	*6.460*	0.3048
N_103_2	570842, 5171083	13.78	45.2	477.6	*6.460*	0.3048
N_103_3	570852, 5171074	13.66	44.8	477.6	*6.460*	0.3048
N_104_1	570870, 5171079	13.75	45.1	477.6	*6.460*	0.3048
N_104_2	570854, 5171089	13.35	43.8	477.6	*6.460*	0.3048
N_105_2	570812, 5171058	14.45	47.4	477.6	*6.460*	0.3048
N_105_3	570821, 5171047	14.78	48.5	477.6	*6.460*	0.3048
N_105_4	570820, 5171036	14.45	47.4	477.6	*6.460*	0.3048
N_106_1	570732, 5170998	14.26	46.8	477.6	*6.460*	0.3048
N_106_2	570751, 5170995	14.23	46.7	477.6	*6.460*	0.3048
N_106_3	570761, 5170981	14.23	46.7	477.6	*6.460*	0.3048
N_106_4	570757, 5170962	14.11	46.3	477.6	*6.460*	0.3048
N_106_5	570739, 5170952	14.17	46.5	477.6	*6.460*	0.3048
N_106_6	570717, 5170985	14.17	46.5	477.6	*6.460*	0.3048
N_112_1	570776, 5170944	13.44	44.1	477.6	*6.460*	0.3048
N_112_2	570791, 5170942	13.35	43.8	477.6	*6.460*	0.3048
N_112_3	570803, 5170924	13.35	43.8	477.6	*6.460*	0.3048
N_112_4	570797, 5170907	13.32	43.7	477.6	*6.460*	0.3048
N_112_5	570780, 5170900	13.41	44.0	477.6	*6.460*	0.3048
N_112_6	570762, 5170933	13.50	44.3	477.6	*6.460*	0.3048
N_114_1	570826, 5170895	16.43	53.9	477.6	*6.460*	0.3048

Source Parameter Table[1] NTEC Alternate Site - Superior (Douglas County)						
ID	LOCATION (UTM83)	HEIGHT (M)	HEIGHT (ft)	TEMP (K)	VELOCITY (M/S)	DIAM (M)
N_114_2	570845, 5170888	16.37	53.7	477.6	*6.460*	0.3048
N_114_3	570850, 5170862	16.34	53.6	477.6	*6.460*	0.3048
N_114_4	570825, 5170848	16.34	53.6	477.6	*6.460*	0.3048
N_114_5	570806, 5170866	16.40	53.8	477.6	*6.460*	0.3048
N_114_6	570808, 5170883	16.43	53.9	477.6	*6.460*	0.3048
Additional Duluth, MN Sources						
DLSSV001	568929, 5181745	73.20	240.2	516.0	7.281	3.9599
HIBSV001	564773, 5176129	100.89	331.0	465.4	26.520	4.2672

Stacks N_PLAIN02 and N_86_1 to N_114_6 are non-vertical releases modeled as POINTHOR src type

Emission Rate Table NTEC Alternate Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
S01_DBNG	36.310	36.310	6.400	33.46	15.28	62.0
S01_100NG	21.797	21.797	5.100	26.55	12.12	62.0
S01_75NG	16.809	16.809	4.000	20.56	9.39	62.0
S01_LWNG	12.939	12.939	2.400	12.44	5.68	62.0
S01_SSNG	21.797	21.797	5.100	200.00	7190.0	62.0
S01_DFFO	54.510	54.510	6.100	72.68	11.06	62.0
S01_100FO	39.448	39.448	4.600	51.55	7.85	62.0
S01_75FO	37.503	37.503	3.600	41.04	6.25	62.0
S01_LWFO	35.684	35.684	2.800	31.10	15.75	62.0
S01_SSFO	39.448	39.448	4.600	510.0	16860.0	62.0
S02_AUXB	0.745	0.745	0.060	1.100	3.700	-
S03_CT1	0.053	0.053	-	-	-	-
S03_CT2	0.053	0.053	-	-	-	-
S03_CT3	0.053	0.053	-	-	-	-
S03_CT4	0.053	0.053	-	-	-	-
S03_CT5	0.053	0.053	-	-	-	-
S03_CT6	0.053	0.053	-	-	-	-
S03_CT7	0.053	0.053	-	-	-	-
S03_CT8	0.053	0.053	-	-	-	-
S03_CT9	0.053	0.053	-	-	-	-
S03_CT10	0.053	0.053	-	-	-	-
S03_CT11	0.053	0.053	-	-	-	-
S03_CT12	0.053	0.053	-	-	-	-
S04_DPH1	0.070	0.070	0.006	0.491	0.820	-
S05_DPT2	0.070	0.070	0.006	0.491	0.820	-
N_UW16	37.70	37.70	n/a	45.00	91.00	n/a
N_SMIS20	0.880	0.880	n/a	43.50	100.00	n/a
N_G50A	25.000	25.000	n/a	98.80	292.00	n/a
N_G10	22.600	22.600	n/a	65.00	27.500	n/a
N_G11	19.370	19.370	n/a	35.00	22.000	n/a
N_G14	15.000	15.000	n/a	70.00	44.00	n/a
N_G40	4.800	4.800	n/a	56.00	44.00	n/a
N_ENB01	0.026	0.026	n/a	5.060	3.380	n/a
N_PLAIN02	0.011	0.011	n/a	1.300	2.210	n/a
N_PLAIN03	0.001	0.001	n/a	0.120	0.630	n/a
N_CT1_A	0.068	0.068	n/a	-	-	n/a
N_CT1_B	0.068	0.068	n/a	-	-	n/a
N_CT2_A	0.015	0.015	n/a	-	-	n/a
N_CT2_B	0.015	0.015	n/a	-	-	n/a

Emission Rate Table NTEC Alternate Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
N_CT2_C	0.015	0.015	n/a	-	-	n/a
N_S12	13.120	13.120	n/a	37.799	66.60	n/a
N_S14	1.047	1.047	n/a	0.349	0.600	n/a
N_S15	12.800	12.800	n/a	68.898	70.30	n/a
N_S16	0.404	0.404	n/a	5.314	8.400	n/a
N_S17	3.200	3.200	n/a	7.000	14.800	n/a
N_S18	0.180	0.180	n/a	2.068	1.730	n/a
N_S19	0.910	0.910	n/a	4.151	10.100	n/a
N_S21	0.310	0.310	n/a	3.489	2.930	n/a
N_S22A	0.265	0.265	n/a	2.863	2.380	n/a
N_S23	0.400	0.400	n/a	4.608	2.460	n/a
N_S24	1.213	1.213	n/a	15.960	13.410	n/a
N_S25	0.160	0.160	n/a	2.108	1.770	n/a
N_S26	0.159	0.159	n/a	2.088	1.900	n/a
N_S27A	0.142	0.142	n/a	0.760	1.560	n/a
N_S27	0.170	0.170	n/a	2.000	1.650	n/a
N_S30	0.062	0.062	n/a	0.415	0.700	n/a
N_S32A	0.080	0.080	n/a	1.058	1.140	n/a
N_S32B	0.257	0.257	n/a	3.382	3.650	n/a
N_S33A	0.180	0.180	n/a	0.823	2.200	n/a
N_S33B	0.180	0.180	n/a	0.823	2.200	n/a
N_S37	0.230	0.230	n/a	1.096	2.260	n/a
N_S98	0.088	0.088	n/a	2.136	6.100	n/a
N_S34	0.080	0.080	n/a	0.078	0.000	n/a
N_06_H1	0.156	0.156	n/a	2.059	3.100	n/a
N_86_1	0.019	0.019	n/a	0.245	0.370	n/a
N_86_2	0.019	0.019	n/a	0.245	0.370	n/a
N_87_1	0.019	0.019	n/a	0.245	0.370	n/a
N_87_2	0.019	0.019	n/a	0.245	0.370	n/a
N_88_1	0.019	0.019	n/a	0.245	0.370	n/a
N_88_2	0.019	0.019	n/a	0.245	0.370	n/a
N_88_3	0.019	0.019	n/a	0.245	0.370	n/a
N_90_1	0.019	0.019	n/a	0.245	0.370	n/a
N_90_2	0.019	0.019	n/a	0.245	0.370	n/a
N_91_1	0.019	0.019	n/a	0.245	0.370	n/a
N_91_2	0.019	0.019	n/a	0.245	0.370	n/a
N_99_1	0.019	0.019	n/a	0.245	0.370	n/a
N_99_2	0.019	0.019	n/a	0.245	0.370	n/a
N_99_3	0.019	0.019	n/a	0.245	0.370	n/a

Emission Rate Table NTEC Alternate Site - Superior (Douglas County)						
ID	PM_{10} Rate (LB/HR)	$PM_{2.5}$ Rate (LB/HR)	SO_2 Rate (LB/HR)	NO_x Rate (LB/HR)	CO Rate (LB/HR)	NH_3 Rate (LB/HR)
N_100_1	0.019	0.019	n/a	0.245	0.370	n/a
N_100_2	0.019	0.019	n/a	0.245	0.370	n/a
N_100_3	0.019	0.019	n/a	0.245	0.370	n/a
N_101_1	0.019	0.019	n/a	0.245	0.370	n/a
N_101_2	0.019	0.019	n/a	0.245	0.370	n/a
N_103_1	0.019	0.019	n/a	0.245	0.370	n/a
N_103_2	0.019	0.019	n/a	0.245	0.370	n/a
N_103_3	0.019	0.019	n/a	0.245	0.370	n/a
N_104_1	0.019	0.019	n/a	0.245	0.370	n/a
N_104_2	0.019	0.019	n/a	0.245	0.370	n/a
N_105_2	0.019	0.019	n/a	0.245	0.370	n/a
N_105_3	0.019	0.019	n/a	0.245	0.370	n/a
N_105_4	0.019	0.019	n/a	0.245	0.370	n/a
N_106_1	0.019	0.019	n/a	0.245	0.370	n/a
N_106_2	0.019	0.019	n/a	0.245	0.370	n/a
N_106_3	0.019	0.019	n/a	0.245	0.370	n/a
N_106_4	0.019	0.019	n/a	0.245	0.370	n/a
N_106_5	0.019	0.019	n/a	0.245	0.370	n/a
N_106_6	0.019	0.019	n/a	0.245	0.370	n/a
N_112_1	0.019	0.019	n/a	0.245	0.370	n/a
N_112_2	0.019	0.019	n/a	0.245	0.370	n/a
N_112_3	0.019	0.019	n/a	0.245	0.370	n/a
N_112_4	0.019	0.019	n/a	0.245	0.370	n/a
N_112_5	0.019	0.019	n/a	0.245	0.370	n/a
N_112_6	0.019	0.019	n/a	0.245	0.370	n/a
N_114_1	0.019	0.019	n/a	0.245	0.370	n/a
N_114_2	0.019	0.019	n/a	0.245	0.370	n/a
N_114_3	0.019	0.019	n/a	0.245	0.370	n/a
N_114_4	0.019	0.019	n/a	0.245	0.370	n/a
N_114_5	0.019	0.019	n/a	0.245	0.370	n/a
N_114_6	0.019	0.019	n/a	0.245	0.370	n/a
DLSSV001	0.000	0.000	n/a	73.031	0.000	n/a
HIBSV001	42.027	42.027	n/a	532.00	571.68	n/a

All sources consume PM_{10}, $PM_{2.5}$, and NO_2 increment, EXCEPT:

- N_UW16
- N_G10
- N_G11
- N_G14
- NPLAIN02
- NPLAIN03
- DLSSV001

Appendix C – Summary of Dockets 5820-CG-105 and 5820-CG-106

Docket 5820-CG-105

Summary of Potential Impacts

There would be potential impacts from constructing and from operating the new facilities. Construction activities are anticipated to last around 2 years, with an anticipated start in September of 2021, and a projected completion date in November of 2023. Expected outdoor construction activities would include site preparation, grading, and pipe installation.

A number of potentially adverse impacts could result from construction and operation of the new pipeline; some of which would require mitigation.

The following is a description of potential wetland impact by each available route.

Potential Wetland Impacts

Nemadji River Site to the Eastern Route

The Eastern Natural Gas Route is approximately 6.7 miles long, and would connect the Nemadji River Site to the existing natural gas system. A total of 55 wetlands were identified within this route ROW and associated laydown areas, temporary workplaces, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Along this route, the pipeline would be installed using the HDD method across 8 of these wetlands; 15 wetlands would be open-cut trenched; 10 wetlands would be installed across via a combination of HDD and trench; 15 wetlands will be impacted by the placement of construction matting only; and 7 wetlands would be avoided by all construction activities. Temporary wetland fill due to the placement of constructing matting to facilitate equipment access across wetlands and from excavation and backfill for trench installation is anticipated to be a total of 14.84 acres. No permanent wetland fill is proposed for this route. A total of 8.22 acres of shrub and forested wetland would be permanently cleared for this route.

Nemadji River Site to the Western Route

The Western Natural Gas Route would connect the Nemadji River Site to the existing natural gas system. A total of 60 wetlands were identified within this route ROW and associated laydown areas, temporary workplaces, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Along this route, the pipeline would be installed using the HDD method across 9 of these wetlands, 34 wetlands would be open-cut trenched, 8 wetlands would be installed across via a combination of HDD and trench, 7 wetlands would be impacted by the placement of construction matting only, and 2 would be avoided by all construction activities. Temporary wetland fill due to the placement of constructing matting to facilitate equipment access across wetlands and from excavation and backfill for trench installation is anticipated to be 23.01 acres. No permanent wetland fill is proposed for this route. A total of 31.38 acres of shrub and forested wetland would be permanently cleared for this route.

Hill Avenue Route to the Eastern Route

The Hill Avenue Natural Gas Route to the Eastern Natural Gas Route would connect the Hill Avenue site to the existing natural gas system. A total of 71 wetlands were identified within this route ROW and associated laydown areas, temporary workplaces, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Along this route, the pipeline would be installed using the HDD method across 16 of these wetlands; 16 wetlands would be open-cut trenched; 13 wetlands would be installed across via a combination of HDD and trench; 17 wetlands would be impacted by the placement of construction matting only; and 9 wetlands would be avoided by all construction activities. Temporary wetland fill due to the placement of constructing matting to facilitate equipment access across wetlands and from excavation and backfill for trench installation is anticipated to be a total of 18.77 acres. No permanent wetland fill is proposed for this route. A total of 14.19 acres of shrub and forested wetland would be permanently cleared for this route.

Hill Avenue Route to the Western Route

The Hill Avenue Natural Gas Route to the Western Natural Gas Route is approximately 9.7 miles long, and would connect the Hill Avenue site to the existing natural gas system. A total of 76 wetlands were identified within this route ROW and associated laydown areas, temporary workplaces, and off-ROW access roads. These wetlands are classified as wet prairie, submergent marsh, alder thicket, and hardwood swamp. Along this route, the pipeline would be installed using the HDD method across 17 of these wetlands; 35 wetlands would be open-cut trenched; 11 wetlands would be installed across via a combination of HDD and trench; 9 wetlands would be impacted by the placement of construction matting only; and 4 wetlands would be avoided by all construction activities. Temporary wetland fill due to the placement of constructing matting to facilitate equipment access across wetlands and from excavation and backfill for trench installation is anticipated to be a total of 26.94 acres. No permanent wetland fill is proposed for this route. A total of 37.34 acres of shrub and forested wetland would be permanently cleared for this route.

There are 2 proposed temporary laydown yards that would be used regardless of which route is selected, should the project be approved. One of the laydown yards contains a wetland, which would be cleared of shrubs and trees and matted.

Potential Waterway Impacts

Nemadji River Site to the Eastern Route

The Eastern Natural Gas Route is approximately 6.7 miles long and would connect the Nemadji River Site to the existing natural gas system. A total of 17 waterways are present along this route, which are the Nemadji River, Birch Creek, Bear Creek, Bluff Creek, and unnamed tributaries to these waterways. Five of these waterways, an unnamed tributary to Bluff Creek, Birch Creek, an unnamed tributary to Bear Creek, Bear Creek, and Bluff Creek, are designated ASNRI waterways. Along this route, the pipeline would be installed using the HDD method across 10 of these waterways, including all of the ASNRI waterways. The remaining 7 waterways would be open-cut trenched to install the pipeline. TCSBs would be required at the 7 waterways to be trenched, while the waterways that will be directionally bored do not need to be crossed with equipment.

Nemadji River Site to the Western Route

The Western Natural Gas Route is approximately 8.3 miles long and would connect the Nemadji River Site to the existing natural gas system. A total of 13 waterways are present along this route, which are the Nemadji River, Birch Creek, Bluff Creek, and unnamed tributaries to these waterways and unnamed tributaries to Bear Creek. Four of these waterways, an unnamed tributary to Bluff Creek, Birch Creek, an unnamed tributary to Bear Creek, and Bluff Creek, are designated ASNRI waterways. Along this route, the pipeline would be installed using the HDD method across 4 of these waterways, including 3 of the ASNRI waterways. The remaining 9 waterways would be open-cut trenched to install the pipeline, including one of the ASNRI waterways. TCSBs would be required at the 9 waterways to be trenched, while the waterways that would be directionally bored do not need to be crossed with equipment.

Hill Avenue Site to the Eastern Route

The Hill Avenue Natural Gas Route to the Eastern Natural Gas Route is approximately 8.1 miles long and would connect the Hill Avenue Site to the existing natural gas system. A total of 18 waterways are present along this route, which are the Nemadji River, Birch Creek, Bear Creek, Bluff Creek, Newton Creek, and unnamed tributaries to these waterways. Six of these waterways, an unnamed tributary to Bluff Creek, Birch Creek, an unnamed tributary to Bear Creek, Bear Creek, Bluff Creek, and Newton Creek, are designated ASNRI waterways. Along this route, the pipeline would be installed using the HDD method across 11 of these waterways, including all of the ASNRI waterways. The remaining 7 waterways would be open-cut trenched to install the pipeline. TCSBs would be required at the 7 waterways to be trenched, while the waterways that would be directionally bored do not need to be crossed with equipment.

Hill Avenue Site to the Western Route

The Hill Avenue Natural Gas Route to the Western Natural Gas Route is approximately 9.7 miles long and would connect the Hill Avenue Site to the existing natural gas system. A total of 14 waterways are present along this route, which are the Nemadji River, Birch Creek, Bluff Creek, Newton Creek, and unnamed tributaries to these waterways and unnamed tributaries to Bear Creek. Five of these waterways, an unnamed tributary to Bluff Creek, Birch Creek, an unnamed tributary to Bear Creek, Newton Creek, and Bluff Creek, are designated ASNRI waterways. Along this route, the pipeline would be installed using the HDD method across 5 of these waterways, including 4 of the ASNRI waterways. The remaining 9 waterways would be open-cut trenched to install the pipeline, including one of the ASNRI waterways. TCSBs would be required at the 9 waterways to be trenched, while the waterways that would be directionally bored do not need to be crossed with equipment.

Forested Land

The applicant anticipates that construction of the Eastern Route would have minor impacts to forested land. The Eastern Route would be constructed within an existing utility corridor that contains a natural gas line and overhead electrical transmission lines. Approximately 2.2 acres of forested land would be impacted by woody vegetation removal along the edges of the exiting utility corridor and from open cut trenching and wetland matting along the route.

The applicant anticipates that construction of the Western Route would have impacts to forested land as well along the existing utility corridors. In addition, the proposed Western

Route would require tree clearing along an approximately 5-mile-long new construction corridor. Approximately 12.4 acres of forest dominated by quaking aspen (*Populus tremuloides*) and black willow (*Salix nigra*) is present along the approximately 5-mile-long new construction corridor. The quaking aspen and black willow trees are typically up to 20 to 30 feet tall and less than 12 inches diameter at breast height.

The applicant has stated that construction of the Hill Avenue Site Gas Route would have minor impacts to forested land. The route would be constructed within previously disturbed areas associated with an existing tank farm and along existing utility corridors that contain a natural gas line and overhead electrical transmission lines. Approximately 1.1 acres of forested land would be impacted by woody vegetation removal along the edges of the exiting utility corridor and from open cut trenching and wetland matting along the route.

Grasslands

Grasslands occur within previously disturbed areas or existing, maintained utility corridors. These areas are typically dominated by reed canarygrass (*Phalaris arundinacea*). Other species present within the upland grasslands include Canada goldenrod (*Solidago canadensis*) and Canada thistle (*Cirsium arvense*). Wetland grasslands typically include woolgrass (*Scirpus cyperinus*) and broadleaf cattail (*Typha latifolia*).

Both eastern and western routes would be constructed within an existing utility corridor that contains a natural gas pipeline, overhead electrical transmission lines, and is maintained as grassland habitat.

The applicants anticipate that construction of either natural gas route would have temporary impacts to grasslands, primarily from open cut trenching and wetland matting for construction; and that once construction is complete, the selected natural gas route would be maintained as grassland areas. They have also indicated that construction of the Hill Avenue Site Gas Route would have minor impacts to grasslands because the Route would be constructed within previously disturbed areas associated with an existing tank farm and along existing utility corridors that contain a natural gas line and overhead electrical transmission lines.

Invasive Species

The invasive plant species, reed canarygrass, was identified along all portions of both eastern and western routes during the wetland delineation field surveys that occurred in September 2016 and October 2017.

In compliance with Wis. Admin. Code ch. NR 40 Invasive Species Identification, Classification and Control Rule, SWL&P has stated that it would mitigate the potential to spread invasive plant species during project activities. SWL&P would identify invasive plant species locations on the construction plans and flagged on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, SWL&P would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools at the project construction site. SWL&P may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to

leaving the construction area to reduce the risk of spreading invasive plant species beyond the site. Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20, seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used for the project would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

Special Construction Consideration due to Soil Conditions

Because many of the soils in the vicinity of the proposed project are very susceptible to erosion, construction in areas with steep slopes can lead to environmental impacts. Specifically, there is a high risk for impact to natural resources, including an environmental corridor located along the slopes of the Nemadji River. Construction on the Nemadji River Site could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan (CMP) is prepared, approved prior to construction, and rigorously followed during construction. Although the land within the eastern and western routing options does not exhibit the same degree of erosion prone slopes, similar impacts could occur.

For this project, the applicants have developed a planning document that addresses both erosion and stormwater control. The Erosion Control and Storm Water Management Plan (ECSWMP) describes the methods that would be employed to reduce and mitigate impacts during and after construction of the proposed project. This plan was formatted and designed to meet or exceed compliance with the erosion control and storm water management technical standards and the construction and post-construction performance standards identified in Wis. Admin. Code chs. NR 151 and 216 as well as the city of Superior's Site Erosion Control Ordinance and Long-Term Stormwater Management Ordinance. The ECSWMP would address both the control of sediment and pollutants during construction until site stabilization is complete and the storm water management practices that would be installed during the construction phase to address the discharge of total suspended solids, control peak flow, provide for infiltration, and maintain protective areas during facility operation. Site-specific plans would be developed during the final design phase of the project and provided to DNR and the city of Superior for review and approval prior to commencement of construction.

Best management practice (BMP) erosion control techniques would be used to mitigate soil impacts. Topsoil would be kept separate from subsoils and would be stockpiled in a different location than subsoils. This topsoil would be used after construction to resurface areas disturbed by construction activities. Compacted soils would be disked prior to final stabilization. The Storm Water Management Technical Standards (SWMTS) from DNR would be used during construction and operation.

Additionally, the applicant must obtain, prior to initiating any land-disturbing construction activities within the boundaries and jurisdiction of the city of Superior, an Erosion Control/Grading Permit and Storm Water Management Permit from the Public Works Department. The application requirements include the permit application forms, an Erosion and Sediment Control Plan, Storm Water Management Plan, and the required fees.

Historic and Archaeological Sites

The Wisconsin Historical Society (WHS) is responsible for preserving human burials under the state burial sites preservation program as described in Wis. Admin. Code § HS 2 and Wis. Stat. § 157.70. Burial sites are defined as any place where human remains are buried, which may be any part of the body of a deceased person in any stage of decomposition in a context indicating substantial evidence for burial. Burial sites are often indicated by stone monuments, spirit houses, wooden crosses, or Native American mounds. No person may intentionally cause or permit the disturbance of a burial site; therefore, any proposed activities that may disturb burial sites must receive a Burial Site Disturbance Authorization/Permit from WHS. For the proposed project, the applicants have reviewed the project area for known burial sites and would obtain permits if the project is approved as appropriate.

Specifically, SWL&P commissioned a survey to investigate the presence of archaeological sites, potentially historic buildings, and human burial sites within the proposed natural gas routing options. The survey revealed the presence of two archeological sites; one along the Eastern Route and one along the Western Route.

The archaeological site found along the Eastern Route option consists of abandoned railroad grade, associated facilities, and scattered artifacts from the late 19th to mid-20th century that functioned as part of the Iron River to Superior DSS&A Railway. Although some artifacts from the time when this site was active are present, the survey indicated that the site is of poor integrity, with removed hardware and overgrown grade. The site is not recommended eligible for NRHP listing, and the survey concluded that no additional investigations are recommended.

No historic properties or burial sites would be impacted if the Eastern Route is selected for construction of the proposed natural gas pipeline.

The other archeological site was discovered along the Western Route. This site consists of the remains of a residential building from the 1940s. Construction of the natural gas pipeline would impact the remains of a gravel driveway associated with the residence; however, the survey indicated that the site is not considered historically significant and concluded that additional investigations are not recommended.

No historic properties or burial sites would be impacted if the Western Route is selected for construction of the proposed natural gas pipeline.

Protected and Listed Species

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0 mile buffer for aquatic species. This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, would not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are taken from existing sources within DNR, including the

NHI database, as well as external sources, including landowners and surveys completed by the applicants.
For specific route sub segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments.

Plants

There are ten rare plant species that may have suitable habitat present within the Eastern and Western Routes. In addition, at least four of these plant species have been observed within or immediately adjacent to the Eastern Route while at least five of these plant species have been observed within or immediately adjacent to the Western Route. Additional surveys and avoidance/minimization measures for rare plant species are encouraged and recommended. Potential avoidance measures may include conducting plant surveys to determine presence/absence and/or avoiding areas where known plants occur. Other measures, such as winter construction, use of mats to limit direct disturbance, or relocation, can minimize losses. DNR would also recommend that the applicants and landowners with rare species on their property develop a plan to protect these species.

Herptiles (Reptiles and Amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of the Eastern and Western Routes. The Nemadji River, Bluff Creek, and Bear Creek (Eastern Route only) all appear to be suitable waterways for this species. Therefore, all work within 300 meters of these waterways are required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization will be necessary.

Fish and Aquatic Invertebrates

A special concern fish species may be present within the Nemadji River. Although it does not spawn here, it is recommended that strong erosion and siltation measures be implemented to avoid impacts. One special concern dragonfly species is known to be present within the wetlands and waterways that are within and adjacent to both routes and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

Natural Communities

One wetland natural community may be present within and/or adjacent to the northern common portion of the Eastern and Western Routes. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

Mammals

A northern long-eared bat maternity roost record is crossed by the proposed Eastern Route and is within the vicinity of the proposed Western Route. As this is a federally listed species, the applicants would be required to follow the 4(d) rule and not cut trees within 150 feet of known roost trees from June 1–July 31. Surveys may be required in order to determine where known roost trees are located. This is also state-listed and the applicant should follow the Cave Bat Broad Incidental Take Authorization and limit tree clearing throughout the project area from June 1–August 15.

Protected and listed species summary

The Eastern and Western Routes are nearly identical to each other in terms of rare species impacts. While there are subtle differences between the two, from a known rare species standpoint, there aren't significant differences between the routes. However, the Western Route does create more new right of way, which may negatively impact birds and other species that need large contiguous habitats to survive.

Local Community Impacts

Residents in the immediate vicinity of the proposed project may experience some, primarily temporary, impacts such as an increase in traffic congestion on local roads, increased noise levels, and an increase in fugitive dust particles caused by construction vehicle traffic and other ground disturbing activities.

The applicants state that construction ahead, as well as road closed signs would be erected in advance of the work areas as needed. SWL&P would work with the road authorities regarding any road closures or access limitations and the construction work would be planned and coordinated such as to limit the time of these disruptions. Any excavations that would remain open overnight would be properly fenced off. Property owners would be notified in advance of the construction. Any property owners who have a driveway or other access would be communicated with in advance of any construction work that would impact their access.

Local traffic congestion

Construction traffic entering the main project site would primarily consist of automobile traffic for craft labor, construction management staff, contractors, equipment, and vendors. Material and equipment deliveries may be made by large trucks as well as heavy haul vehicles. Onsite, traffic is anticipated to primarily consist of heavy construction equipment and material transport equipment.

The proposed construction entrance would consist of a material delivery entrance and main construction entrances located off 31st Avenue East. Craft employees would park on the north side of 31st Avenue East and proceed southeast to the site entrance. Vehicle access to either site would be controlled by site security fencing.

The frequency of the daily workforce automobile traffic would follow the project workforce numbers onsite at a given time. The daily automobile traffic to the site would increase from approximately 25 to 50 vehicles in the initial stages of construction to approximately 200 to 260 vehicles for peak months (April through December 2023). The traffic would begin to decrease until it reaches approximately 25 vehicles near construction completion.

Material and equipment deliveries are anticipated to average between 15 and 25 trucks per day. Bulk deliveries for materials such as crushed stone, hot asphalt paving, and redi-mix concrete may occasionally exceed 25 vehicles on a given day. When possible, bulk deliveries would be scheduled to avoid peak traffic on local roads. The applicants have proposed construction of pull over areas for material delivery trucks to reduce congestion.

Noise impacts

The types of noise generated from the project may include worker traffic to and from the project site, as well as noise produced by construction vehicles while onsite. To a lesser degree, there may be an increase in the overall level of fugitive dust particles during the construction phase of other nearby projects. Specifically, there could be an increase in the level of dust emanating from worker traffic, and from ground disturbing construction activities at the project site.

During construction, the deliveries of equipment and operation of construction machinery would generate noise, mostly from diesel engine-driven systems that power most construction equipment such as bulldozers, excavators, dump trucks, cement trucks, and cranes. Additional noise may be introduced by the traffic associated with workers entering and exiting the project site. The exact increase in noise from worker traffic has not been quantified; however, such traffic may produce a noticeable increase when compared to background or pre-construction levels. Noise emitted from construction equipment in projects similar to the proposed project, are typically high intensity, intermittent, and occur in short bursts. Such bursts would be notable if they reached the nearest residential properties.

Noise impacts on local receptors, including residents, could be reduced by ensuring that appropriate engine exhaust mufflers are installed and adequately maintained on all vehicles used during the construction phase of the project. The residences nearest to the expected construction may experience construction noise levels similar those listed in the table. Impacts to residences farther from the construction may experience slightly lower levels.

Table 5. Generalized noise levels associated with common construction equipment

Construction Equipment	Maximum Noise Level (dBA) Typical Range: e=50
Bulldozer	85-90
Front end loader	86-90
Truck	84-87
Grader	83-86
Shovel	82-86
Portable generator	81-87
Crane	82-83
Concrete pump	78-84
Tractor	77-82

Fugitive dust

Fugitive dust refers to particulate matter that becomes airborne from activities such as construction and other ground disturbing activities on exposed soil. Local residents may experience an increase in airborne dust particles during the construction phase of the project. Increased worker traffic to and from the project site and construction vehicles onsite would be

the biggest anticipated source of dust particle emission. To reduce and mitigate the amount of dust emanating from these sources, the applicant would follow BMPs as outlined in their application. Such measures may include spraying or misting water in areas where the soil has been exposed.

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I. Potential impacts to natural resources and local community

It is anticipated that the largest and most direct cumulative impact to natural resources would be habitat loss associated resulting from vegetation clearing construction activities. Notable cumulative impacts to the local community may include an increase in traffic congestion on local roads, as well an increase in the overall level and duration of noise levels during the construction phase(s) of other nearby projects.

Although the relocation project is primarily sited along existing transportation corridors and previously disturbed areas, the relocation corridor would require some clearing of woody vegetation and the conversion of scrub-shrub to wet meadow habitat. The relocated route would be constructed along existing transportation corridors and previously disturbed areas. Approximately 0.25 acre of forested and shrub land habitat would be impacted by woody vegetation removal along the relocated natural gas line corridor from open cut trenching and wetland matting.

The applicants have stated that, to the extent practicable, the project would minimize the amount of forest clearing associated with construction. No properties enrolled in Managed Forest Law (MFL) or Forest Crop Law (FCL) programs are crossed by the route alternatives or their ROWs. No impacts to MFL or FCL properties are anticipated.

Natural gas pipeline relocation would be constructed along an existing transportation and utility corridor which consists of previously disturbed areas that contain maintained grassland habitat. The applicants anticipate that grassland habitat would be expanded along the project corridor by approximately 0.25 acre due to woody vegetation removal along the relocated natural gas line route and the conversion of forested areas to grassland habitat. Impacts to these grasslands would occur primarily from open cut trenching and matting of the wetlands interspersed within the grassland. The applicants have stated that, once construction is complete, the area in which the pipeline was relocated would be maintained as grassland areas.

SWL&P has stated that, to the extent practicable, the project would minimize the amount of grassland impact associated with construction. Once construction and restoration are complete, the plant and animal communities, including the grassland plant community, would return.

Applicant's proposed revegetation strategy

Construction activities would include clearing, grubbing, grading, excavation, infrastructure construction, and re-vegetation. The amount of soil exposed during construction would be minimized and existing vegetation would be preserved where practicable. Seed mixtures would be selected to produce dense vegetation based on soil and site conditions, along with intended final use. In areas were restoration is required, seeding and mulching would be completed in accordance with DNR Technical Standard 1059 Seeding for Construction Site Erosion Control,

Wis. Admin. Code ch. DATCP 20 regarding noxious weed seed content and labeling, and WisDOT Mix 75–Erosion Control Native Mix.

Temporary seeding would be applied to areas of exposed soil where the establishment of vegetation is desired, but the areas have not been brought to final grade or on which land-disturbing activities would not be performed for a period greater than 30 days, but vegetative cover is required for less than one year. Areas needing protection during periods when permanent seeding is not applied, must be seeded with annual species.

Final stabilization would be achieved when all soil-disturbing activities along the route have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetation cover with a density of 70 percent of the native background vegetative cover has been established on all unpaved areas or areas not covered by permanent structures or with alternative surfacing, such as riprap or crushed rock.

During construction, areas that have been seeded would be inspected by a qualified person at least once every 7 days and within 24 hours after every precipitation event that produces 0.5 inch of rain or more during a 24-hour period. Where areas of concern are identified, the area would be re-seeded and watered, and fertilizer would be applied, if applicable. Following the completion of construction and stabilization activities, the site would be inspected at least once per month to monitor vegetative growth until final stabilization is achieved.

Wetland impacts

A total of three wetlands were identified within this route ROW and associated laydown areas and temporary workplaces. These wetlands are classified as wet prairie and hardwood swamp. One wetland would be impacted for temporary workspace. Temporary wetland fill due to the placement of constructing matting is anticipated to be 0.01 acres. No permanent wetland fill is proposed for this route. This wetland would also be cleared of shrubs and trees.

Waterways

Based on desktop mapping resources and field investigations conducted in 2016 and 2017, there are no waterways are located within or immediately surrounding the pipeline relocation or removal areas.

Protected and listed species

Endangered resources include rare or declining species, high quality or rare natural communities, and animal concentration sites. Endangered resources are tracked via the state's NHI database which is maintained by the DNR Bureau of Natural Heritage Conservation. The project area evaluation consists of both the specific route and a buffer of 1.0 mile for terrestrial and wetland species and a 2.0 mile buffer for aquatic species.

This section identifies the endangered resources that could be present, the project's potential impacts on these resources, and the avoidance measures that should be implemented. It does not cover endangered resources that while may be present in the area, will not be impacted by this project. Rare species are discussed individually or as taxa groups if there is a high level of concern. This list and information are taken from existing sources within DNR, including the

NHI database, as well as external sources, including landowners and surveys completed by the applicants.

For specific route segments, an incidental take of state threatened or endangered animal species may occur as defined by Wis. Stat. § 29.604. Should this happen, an Incidental Take Authorization would be required for construction to proceed on those segments. Instances where existing information indicates that additional assessment or consultation for incidental take would be needed are described in this EIS.

Plants

There are eight rare plant species that may have suitable habitat present within this project site. In addition, at least two of these plant species have been observed within or immediately adjacent to this location. Conducting surveys to determine specific locations of these species is highly encouraged. If found, the best avoidance measure is to avoid areas where known plants occur; however, given that this is a construction project, is likely not feasible. Therefore, the best way to minimize impacts is to relocate plants from out of the project area to an area where these plants will likely not be impacted, preferably on state lands where these plants will be protected.

Herptiles (reptiles and amphibians)

A state threatened herptile which prefers clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests is known to occur within the vicinity of this segment. The Nemadji River is a suitable waterway for this species. Therefore, all work within 300m of the river would be required to follow the measures in the species' Broad Incidental Take Authorization. If these measures cannot be implemented, an individual Incidental Take Authorization would be necessary. There is also a state special concern herptile which prefers wetlands and associated upland habitat for nesting. By following the Broad Incidental Take Authorization for the aforementioned species, would also help to protect this state special concern species.

Fish and aquatic invertebrates

A special concern fish species may be present within the Nemadji River. Although it does not spawn here, it is recommended that strong erosion and siltation measures be implemented to avoid impacts. One special concern dragonfly species is known to be present within the wetlands and Nemadji River that are within and adjacent to the project area and may be impacted by project activities. Therefore, strong erosion and siltation control measures are encouraged to minimize impacts.

Natural communities

One wetland natural community may be present within the project boundary. Natural communities may contain rare or declining species and protection of these communities should be incorporated into the project design as much as possible. Given that this is a construction project with permanent impacts, it is recommended that work within these natural communities be minimized to the extent practicable as well as implementing strict invasive species BMPs, and/or using a native prairie seed mix during the restoration process.

Invasive species

An invasive species survey was completed on behalf of the applicant. The survey identified invasive plant species along the proposed relocated natural gas line route. The review was completed in September 2016 and October 2017 during wetland delineation field surveys. The only invasive plant species observed was reed canarygrass, which is listed as a nonregulated wetland invasive species by the WDNR.

In compliance with W.A.C. Chapter NR 40 Invasive Species Identification, Classification and Control Rule, SWL&P has stated that it will mitigate the potential to spread invasive plant species during the project activities. SWL&P intends to identify invasive plant species locations on the construction plans and flag them on-site to avoid during construction, where feasible. In areas where impacts to the invasive plant species are unavoidable, SWL&P would require that equipment be cleaned prior to moving from an infested area to a non-infested area.

Equipment cleaning would primarily be conducted by brush, broom, or other hand tools at the project site. SWL&P may periodically require equipment to be cleaned by compressed air. Equipment used during ground disturbing activities would be cleaned prior to leaving the project site to reduce the risk of spreading invasive plant species beyond the site.

Construction equipment brought on-site would be required to be free of muck and invasive species. In accordance with Wis. Admin. Code ch. DATCP 20, seed mixtures that contain potentially invasive species or species that may be harmful to native plant communities would be avoided. Seed used at the relocation project site would be tested for purity, germination, and noxious weed seed content, and would meet the minimum requirements prescribed in the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

Special construction considerations due to soil conditions

The soils in the vicinity of the sites proposed for the NTEC plant contain steep slopes and are very susceptible to erosion. Construction in erosion-prone areas with steep slopes can lead to environmental impacts. Therefore, construction activities at the either of the proposed sites could carry a high risk of impact to natural resources situated along the steep slopes leading to the Nemadji River, an important regional environmental corridor. Construction within the vicinity of the Nemadji River Site could be accomplished with limited impact if a carefully designed Construction and Mitigation Plan (CMP), such as the applicant's proposed Storm Water and Erosion Mitigation Plan, is prepared, approved prior to construction, and rigorously followed during construction.