6.2.1.1.2 Displacement

Residences or other buildings are typically not allowed within the transmission line ROW for electrical safety code and maintenance reasons. Any residences or other buildings located within a proposed ROW are generally removed or displaced.

There are no permanent residences, churches, childcare centers, or schools located within the ROW for applicants' proposed route. However, there is one non-residential building (storage shed, agricultural outbuildings, etc.) located within the 150-foot ROW of the applicants' proposed route (Map Book 5A).

This non-residential building may or may not be displaced as a result of the project. Though buildings are generally not allowed within the transmission line ROW, there are instances where the activities taking place in such a building are compatible with the safe operation of the line (e.g., storage, animal production, etc.). The applicants would need to conduct a site-specific analysis to determine if the building would need to be displaced.

6.2.1.1.3 Socioeconomics and Environmental Justice

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures indicate how societies progress, stagnate, or regress because of the actions and interactions within and between the local, regional, or global economic scale. Transmission line projects can contribute to growth and progress at the local economic level over time, but generally do not have a significant long-term socioeconomic impact.

The project would improve the socioeconomics of the region through job creation, generation of tax revenue, and providing more reliable electrical service to the surrounding communities. The applicants' proposed route intersects with Macville Township, Wildwood Township, and Little Pine Township; each of which have been identified as communities with EJCs (Chapter 5.3.9). No adverse or permanent impacts to the identified communities with EJCs are anticipated. While the applicants' proposed route does intersect communities with EJCs, these communities are not anticipated to experience disproportionately adverse project impacts, particularly because the project would parallel existing transmission line ROW through these EJCs.

6.2.1.2 Land-Based Economies

As discussed in Chapter 5.8, impacts on land-based economies are assessed by considering four elements: agriculture, forestry, mining, and recreation and tourism. For some of the land-based economy elements considered in the Hill City to Little Pine region, project impacts are anticipated to be minimal. There are no active mining operations within the project ROW in this region. Thus, for the Hill City to Little Pine region, agriculture, forestry, and recreation and tourism are the only land-based economy elements for which impacts are anticipated to be non-minimal.

6.2.1.2.1 Agriculture

Project impacts to agriculture within the Hill City to Little Pine region were evaluated through land use and soil types within the 150-foot ROW of the applicants proposed route and proposed alternatives (Chapter 5.7.1). Map Book 5C provides an overview of land cover types crossed by the applicants' proposed route. Approximately 70 acres of the applicants' proposed route ROW in this region consists of agricultural land comprised of cultivated crops and hay/pasture lands.

According to the MDA Organic Farm Directory, no registered organic producers are located within the 150-foot ROW (reference (105)) of the applicants' proposed route. Additionally, there are no apiaries located within the ROW according to the Minnesota Apiary Registry (reference (106)). Lastly, no agricultural lands within the applicants' preferred alternative ROW are enrolled in the USDA FSA CREP program (reference (107)).

Potential construction and operation-related impacts to agricultural land are summarized in Chapter 5.8.1. Several measures could be implemented to avoid, minimize, or mitigate impacts to agricultural land, as described in Chapter 5.8.1.1.

6.2.1.2.2 Forestry

Forestry impacts within the Hill City to Little Pine region were primarily assessed by evaluating the designated forestry resources within the 150-foot ROW (Chapter 5.8.2). Approximately 658 acres of the ROW of the applicants' proposed route consists of forested land (reference (108)) comprised of deciduous forest, evergreen forest, mixed forest, and forested wetlands within this region (Map Book 5C).

As shown in Table 6-17, the designated forestry resources consist of DNR state forests, Minnesota School Trust Land, Forest for the Future land, and SFIA land.

Table 6-17 Designated Forestry Resources within the 150-foot ROW of the Applicants' Proposed Route

Forestry Resources	Applicants' Proposed Route
Acres of DNR state forest within 150-foot ROW	424
Acres of Minnesota School Trust Land[1] within 150-foot ROW	96
Acres of Forest for the Future[2] land within 150-foot ROW	14
Acres of Sustainable Forest Incentive Act[3] land within 150-foot ROW	19

In some cases, multiple state land classifications are located within the same section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
Data Sources: references (3); (4)

1 Minnesota School Trust Lands are DNR-administered lands that are set aside to provide a continual source of funding for public education (reference (4).
2 Minnesota's Forests for the Future Program is a conservation program administered by the DNR to encourage the protection of privately-owned forest lands through conservation easements or land purchases (reference (5)).
3 Minnesota's Sustainable Forest Incentive Act is a conservation program administered by the DNR that provides annual incentive payments to encourage private landowners to keep their wooded areas undeveloped (reference (109)).

There are potential impacts to designated forestry resources within the applicants' proposed route ROW. The applicants' proposed route would cross Golden Anniversary State Forest, but it would parallel an existing transmission line through this forest. Vegetation clearing would include permanently removing trees from the ROW before construction.

Designated forestry resource impacts may result in negative financial impacts to state-owned forest lands and privately-owned commercial forest lands. As noted in Chapter 5.8.2.1, designated forestry resource impacts could be mitigated by prudent routing and staging area siting. Where these areas cannot be

avoided, commercial foresters and private landowners would be compensated for loss of timber from ROW clearing.

6.2.1.2.3 Recreation and Tourism

Recreation and tourism activities within the Hill City to Little Pine region include outdoor recreational activities and camping opportunities on state managed lands, trails, and scenic byways. Impacts to recreation and tourism from the applicants' proposed route are expected to be minimal where the project parallels existing ROWs.

The applicants' proposed route crosses two scenic byways, three state forests, two WMAs, 11 off-road vehicle use trails, six snowmobile trails, and one water trail (Map Book 5E). All of the recreation and tourism impacts from the applicants' proposed route occur in areas where the 150-foot ROW parallels existing transmission lines, thus, permanent impacts to resources in this area would be minimal due to existing disturbance from and presence of transmission lines.

Temporary impacts because of the applicants' proposed route could include temporary trail closings during construction and temporary interruptions in recreational opportunities within the Birchdale WMA, Crow Wing State Forest, Golden Anniversary State Forest, Hill River State Forest, and Moose Willow WMA (Chapter 5.8.4.1). Although temporary impacts would occur because of this route, they are expected to have a minimal long-term impact on recreation.

6.2.1.3 Archaeological and Historic Resources

Archaeological and historic architectural resource impacts are assessed by determining the presence of these resources within the project route width (Chapter 5.1.1). Map Book 5F provides an overview of archaeological and historic architectural resources in the Hill City to Little Pine region.

There are two archeological resources and nine documented historic architectural resources within the applicants' proposed route width (1,000 ft) in the Hill City to Little Pine region (Table). As discussed in Chapter 5.9.3, impacts to these resources would mainly consists of changes in the resource's setting due to the location of the transmission line placement.

Table 6-18 Cultural Resources within the Route Width of the Applicants' Proposed Route, Hill City to Little Pine Region

Resource Number	Resource Type	NRHP Eligibility
21AK0136	Post-contact artifact scatter, structural ruin	Not evaluated
21AK0137	Precontact single artifact	Not evaluated
AK-MCV-00011	Boyd's Ranch Inn	Not evaluated
IC-BLK-00005	Blackberry Pump Station	Not evaluated
IC-BLK-00008	Eastern Railway/GN/BN/BNSF	Not evaluated
CA-UOG-00088	Soo Line ATV Trail	Not evaluated
XX-ROD-00044	Current TH 169	Not eligible
XX-ROD-00052	Trunk Highway 6	Not eligible
XX-ROD-00176	Trunk Highway 2	Not evaluated
XX-ROD-00181	Trunk Highway 200 / TH 34, TH 81, TH 85, TH 92, TH 116	Not eligible
XX-ROD-00182	Trunk Highway 31 / TH 200, TH 81, TH 85, TH 92, TH 116	Not eligible

The applicants' proposed route would cross resources CA-UOG-00088, XX-ROD-00044, XX-ROD-00052, XX-ROD-00176, XX-ROD-00181, and XX-ROD-00182 within an existing transmission line ROW. Since this transmission line ROW already exists, the project is not expected to alter the resource setting. Therefore, the project will not have an adverse effect on these resources. In the vicinity of IC-BLK-00005 and IC-BLK-00008, the applicants' proposed route follows an existing transmission line ROW. Consequently, no changes in resource setting are anticipated as a result of the project. The applicants' proposed route does not follow an existing transmission line ROW in the vicinity of resources 21AK0136, 21AK0137, and AK-MCV-00011. Ground disturbing activities and the change in setting resulting from the project have the potential to impact these resources if they cannot be avoided. No other cultural resources are present within the route width.

6.2.1.4 Natural Environment

6.2.1.4.1 Water Resources

Potential project impacts on water resources are examined by evaluating locations and conditions of watercourses and waterbodies, floodplains, wetlands, and groundwater. Project proximity to water bodies, watercourses, floodplains, wetlands, and groundwater wells and the necessity of crossing these features are the primary indicators of potential water resource impacts. Impacts to water resource features, floodplains and groundwater, are anticipated to be minimal.

There are two water resource features for which impacts could be non-minimal: watercourses and waterbodies, and wetlands. This discussion focuses on those features located within the ROW or are crossed by the routing alternatives. The number of surface water and wetland crossings is an important consideration when evaluating routes, even though there may be no direct impacts associated with these crossings. The crossings are important because of the potential indirect impacts associated with them (i.e., clearing of vegetation, soil movement). The amount of forested wetland within the ROW is also an

important consideration when evaluating routes. Since large-growing woody vegetation would be cleared from the ROW, forested wetlands would be converted to other wetland types, resulting in permanent impacts.

6.2.1.4.1.1 Watercourses and Waterbodies

According to the NHD, the applicants' proposed route would cross 28 watercourses in the Hill City to Little Pine region. Fifteen of these watercourses are classified as public waters, and four of them are classified as impaired, including the Mississippi River, Moose River, an unnamed ditch, and Willow River. The applicants' proposed route would also cross one unnamed NHD waterbody and three public water basins.

It is anticipated that the watercourse and waterbodies are small enough that they would be spanned. Since no structures are anticipated to be placed within waterbodies and watercourses, no direct impacts to these resources are anticipated. Indirect impacts to these resources, such as increases in turbidity, could be minimized by using BMPs and by choosing a route alternative that has relatively fewer crossings of waterbodies and watercourses.

6.2.1.4.1.2 Wetlands

The applicants' proposed route cross approximately 351 acres of NWI. These NWI wetlands consist mainly of forested wetlands (137 acres), emergent wetlands (105 acres), and shrub-dominated wetlands (97 acres). There is one PWI wetland along the applicants' proposed route in the Hill City to Little Pine region.

Although wetlands would be spanned to the extent possible, the applicants' proposed route would cross wetland areas wider than 1,000 feet, which may require one or more structures to be placed in a wetland. Placement of structures in a wetland would result in permanent impacts to that wetland. Permanent impacts to wetlands could also occur if wetlands if the ROW are forested. Forested wetlands would be converted to non-forested wetland types, as trees are not allowed within transmission line rights-of-way. Impacts associated with converting forested wetlands to non-forested wetland types could be minimized by selecting a routing alternative with fewer forested wetlands in the ROW.

6.2.1.4.2 Vegetation

Vegetation impacts were evaluated by examining vegetative landcover within the 150-foot ROW (Chapter 5.10.4.1). Map Book 5C provides an overview of landcover types across the Hill City to Little Pine region, and Table 6-19 summarizes the landcover types within the 150-foot ROW of the applicants' proposed route within this region. The dominant vegetative landcover in the applicants' proposed route 150-foot ROW consists of forest, which represents approximately 67 percent of the ROW. Forest types include forested wetlands and upland deciduous, coniferous, and mixed forest communities.

Table 6-19 Landcover Types in the 150-foot ROW of the Applicants' Proposed Route in the Hill City to Little Pine Region

Landcover Type	Acres in ROW	Percent of ROW[1]
Forested (upland and wetland)	658	67
Herbaceous (upland and wetland)	213	22
Agricultural (cultivated crops and hay/pasture)	70	7
Shrub/Scrub	27	3
Developed (low-high intensity; open space)	13	1
Open Water	5	<1

Source: reference (110).
1 Totals may not sum to 100 percent due to rounding.

As discussed in Chapter 5.10.4.1, the applicants would clear forested vegetation from the ROW during construction, and the ROW would be maintained with low-growing vegetation to minimize potential transmission line interference. Approximately 97 percent of the applicants' proposed route in the Hill City to Little Pine region would parallel an existing transmission line ROW where the forested areas have already been fragmented, thereby minimizing new impacts to large areas of contiguous forest.

Potential construction and operation-related impacts to vegetation are summarized in Chapter 5.10.4.1. Several measures could be implemented to avoid, minimize, or mitigate impacts to vegetation, as described in Chapter 5.10.4.1. Potential impacts to agricultural vegetation and wetlands are discussed Chapters 5.8.1 and 5.10.1.3, respectively.

6.2.1.4.3 Wildlife

Wildlife impacts are evaluated through the presence of wildlife habitat, including areas that are publicly preserved or managed for wildlife habitat, within the ROW (Chapter 5.10.5.1 and 5.10.5.2). The applicants' proposed route in the Hill City to Little Pine region would parallel an existing transmission line ROW for 97 percent of its length. Because of this, the ROW of the applicants' proposed route would occur adjacent to an area where wildlife habitat has been previously disturbed, thereby minimizing potential impacts associated with habitat fragmentation. In addition, the potential for impacts to avian species would be minimized by paralleling this existing transmission line ROW.

The applicants' proposed route would traverse approximately 14 acres of two WMAs, including the Moose Willow WMA and the Birchdale WMA. As shown on Map Book 5H, the applicants' proposed route would traverse the edges of these WMAs and would do so while paralleling an existing transmission line ROW, thereby minimizing new impacts to these WMAs.

Potential construction and operation-related impacts to wildlife are summarized in Chapter 5.10.5. Several measures could be implemented to avoid, minimize, or mitigate impacts to wildlife, as described in Chapter 5.10.5.

6.2.1.5 Rare and Unique Natural Resources

Impacts to rare and unique natural resources are primarily assessed by evaluating the presence of federal- and state-protected species within a 1-mile radius of the anticipated alignments and the presence

of sensitive ecological resources within the 150-foot ROW (Chapter 5.10). Map Book 5I provides an overview of sensitive ecological resources within the Hill City to Little Pine region. Please note that in order to protect federally and state-protected species from exploitation or destruction, documented locations of these species are not identified on any maps.

6.2.1.5.1 Protected Species

Using the NHIS database, it was determined that one federal and five state-protected species have been documented within 1 mile of the applicants' proposed route in the Hill City to Little Pine region, as summarized in Table 6-20. In addition, several state special concern species have been documented within 1 mile of the applicants' proposed route in this region (Appendix N).

Table 6-20 Federal- or State-Protected Species Documented in the Natural Heritage Information System Database – Applicants' Proposed Route in the Hill City to Little Pine Region

Scientific Name	Common Name	Type	State Status	Documented Records within ROW, Route Width, or 1 Mile
Utricularia purpurea	Purple-flowered bladderwort	Vascular plant	Endangered	1 Mile
Botrychium angustisegmentum	Narrow triangle moonwort	Vascular plant	Threatened	1 Mile
Botrychium oneidense	Blunt-lobed grapefern	Vascular plant	Threatened	1 Mile
Cardamine pratensis	Cuckoo flower	Vascular plant	Threatened	Route width
Poa paludigena	Bog bluegrass	Vascular plant	Threatened	Route width
Myotis septentrionalis	Northern long-eared bat	Bat	Special concern (federally endangered)	1 Mile

None of the federally or state protected species identified in Table 6-20 have been documented within the applicants' proposed route ROW; however, two state threatened vascular plant species have been documented within the 1,000-foot route width. Formal protected species surveys have not been conducted for the project; as such, it is possible that these species or additional protected species could be present where suitable habitat is available within the ROW. In addition, although not tracked in the NHIS database, it is possible that, given the forested landcover in this region, federally threatened gray wolves and Canada lynx could inhabit areas near the applicants' proposed route. Potential protected species impacts could occur should they be present within or near the ROW. While more mobile species would leave the area for nearby comparable habitats, non-mobile organisms, such as vascular plants or nesting birds, could be directly impacted.

Potential construction and operation-related impacts to protected species are summarized in Chapter 5.11.1.3. Several measures could be implemented to avoid, minimize, or mitigate impacts to protected species, as described in Chapter 5.11.1.3. In addition, the applicants may be required to conduct field surveys for protected species in coordination with the USFWS and/or DNR prior to construction.

6.2.1.5.2 Sensitive Ecological Resources

The applicants' proposed route ROW in the Hill City to Little Pine region would traverse several sensitive ecological resources, including approximately 714 acres of SBS, 254 acres of native plant communities, and 124 acres of High Conservation Value Forest (Table 6-21; Map Book 5I). As shown on Map Book 5I, with the exception of one SBS ranked moderate in the central part of the region, the applicants' proposed route ROW in the Hill City to Little Pine region would cross these sensitive ecological resources while paralleling an existing transmission line ROW. As a result, new impacts associated with forest/habitat fragmentation would be minimized. However, several of these sensitive ecological resources are too large to span and would therefore require the placement of transmission line structures within them.

Table 6-21 Sensitive Ecological Resources in the ROW of the Applicants' Proposed Route – Hill City to Little Pine Region

Sensitive Ecological Resource	Area within ROW of Applicants' Proposed Route
Sites of Biodiversity Significance	714 total acres; 400 acres ranked high; 256 acres ranked moderate; 58 acres ranked below
Native Plant Communities	254 total acres; 2 acres have a conservation status of S1 or S2; conservation status of remaining acres is S3-S5
High Conservation Value Forest	124 acres

Potential construction and operation-related impacts to sensitive ecological resources are summarized in Chapter 5.11.2.15.11.1.3. Several measures could be implemented to avoid, minimize, or mitigate impacts to sensitive ecological resources, as described in Chapter 5.11.2.1. In addition, the applicants may be required to conduct field surveys in coordination with the USFWS and/or DNR for the potential presence of protected species within sensitive ecological resources that cannot be avoided.

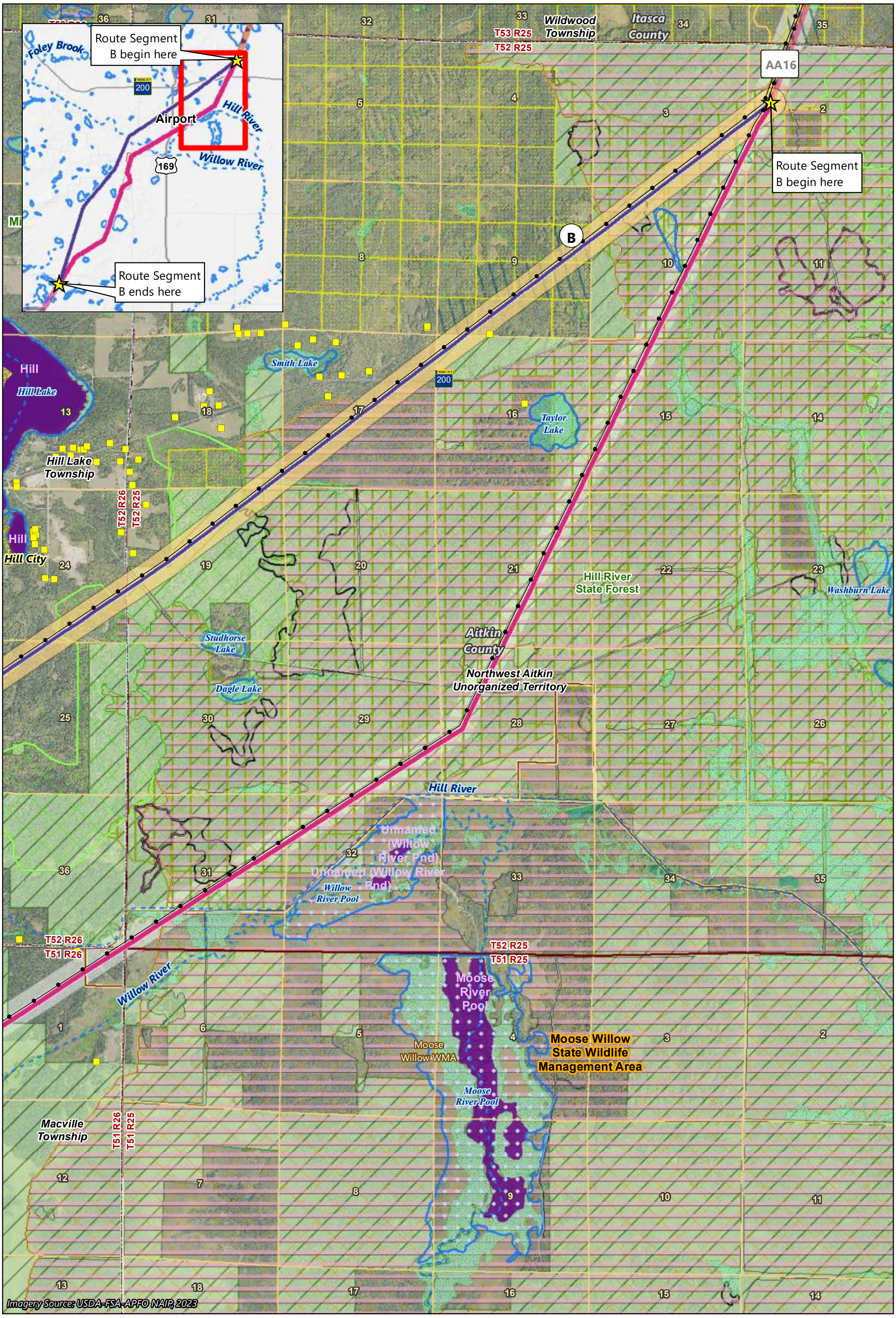
6.2.2 Route Alternative B – Hill City to Little Pine Region

Route alternative B provides an alternative to the applicants' proposed route in the central part of the Hill City to Little Pine region. Route alternative B shifts west from the applicants' proposed route in an effort to reduce impacts to natural resources. Route alternative B would parallel an existing transmission line ROW for its entire length. A portion of route alternative B is adjacent to the Hill City/Quadna Mountain Airport. Potential impacts of route alternative B and the applicants' equivalent are summarized in Table 6-22 and shown on Map 6-3 through Map 6-6.

Table 6-22 Human and Environmental Impacts – Route Alternative B, Hill City to Little Pine Region

Resource	Element	Route Alternative B	Applicants' Equivalent
Length (miles)		26.4	27.0
Human Settlement	Residences within 0-75 feet (count)	0	0
	Residences within 75-250 feet (count)	1	3
	Residences within 250-500 feet (count)	14	2
	Residences within 500–1,000 feet (count)	14	18
Transportation	Airports within 1 mile (count)	1	0
Land-Based Economies	Agricultural land in 150-foot ROW (acres)	7	29
Water Resources	Total wetlands in 150-foot ROW (acres)	190	150
	Forested wetlands in 150-foot ROW (acres)	104	56
Vegetation	Forested landcover in 150-foot ROW (acres)	376	349
Wildlife	Wildlife Management Area in 150-foot ROW (acres)	0	13
Sensitive Ecological Resources	Sites of Biodiversity Significance in 150-foot ROW (acres)	199	308
	Native Plant Communities in 150-foot ROW (acres)	145	139
	High Conservation Value Forest in 150-foot ROW (acres)	32	123
	Candidate Old Growth Stand in 150-foot ROW (acres)	9	0
	Federal- or state-protected species documented in 150-foot ROW (count)	0	0
ROW Sharing and Paralleling	Transmission line (miles, percent)	26.4 (100)	25.4 (94)
	Roadway (miles, percent)	0 (0)	0 (0)
	Field, parcel, or section lines (miles, percent)	0 (0)	0 (0)
	Total ROW sharing and paralleling (miles, percent)	26.4 (100)	25.4 (94)
Reliability	Crossing of existing transmission lines (count)	0	0
Estimated Cost	Total estimated cost (2022 dollars in millions)	$146.4[1]	$149.9

1 Significant engineering would be needed to develop the specialty structures required near the Hill City-Quadna Airport to lower structure heights to less than 80 feet as well as the specific ROW needs to accommodate the lower structures. At this time there is no way to estimate these structure costs.



Route Segment B
Applicants' Route B Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence
PWI Watercourse
PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
High Conservation Value Forest
Forests of the Future Easement
Wildlife Management Area
State Forest
Other DNR Land
Municipal Boundary

Lakes of Biological Significance
Outstanding Significance

Wetlands
Non-Forested Wetland
Forested Wetland

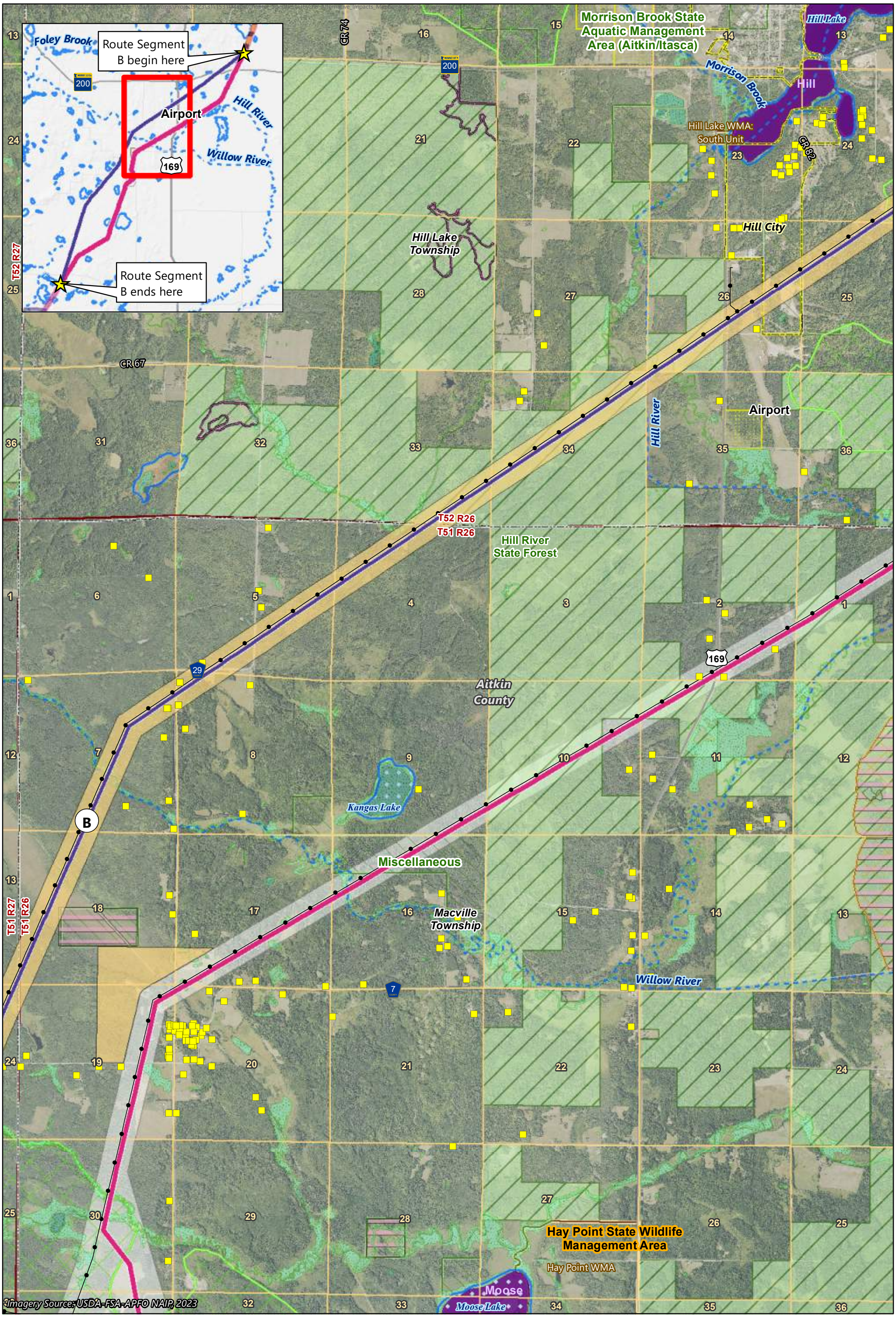
Forest Inventory Old Growth
Designated Old Growth
Candidate Old Growth

Site of Biodiversity Significance
High Significance
Moderate Significance

Feet
0 1,500 3,000

Map 6-3

ROUTE ALTERNATIVE B (PART 1)
Hill City to Little Pine Region
Northland Reliability Project



Route Segment B
Applicants' Route B Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence
PWI Watercourse
PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
Wildlife Management Area
State Forest
Aquatic Management Area
Other DNR Land
Municipal Boundary

Lakes of Biological Significance
Outstanding Significance

Wetlands
Non-Forested Wetland
Forested Wetland

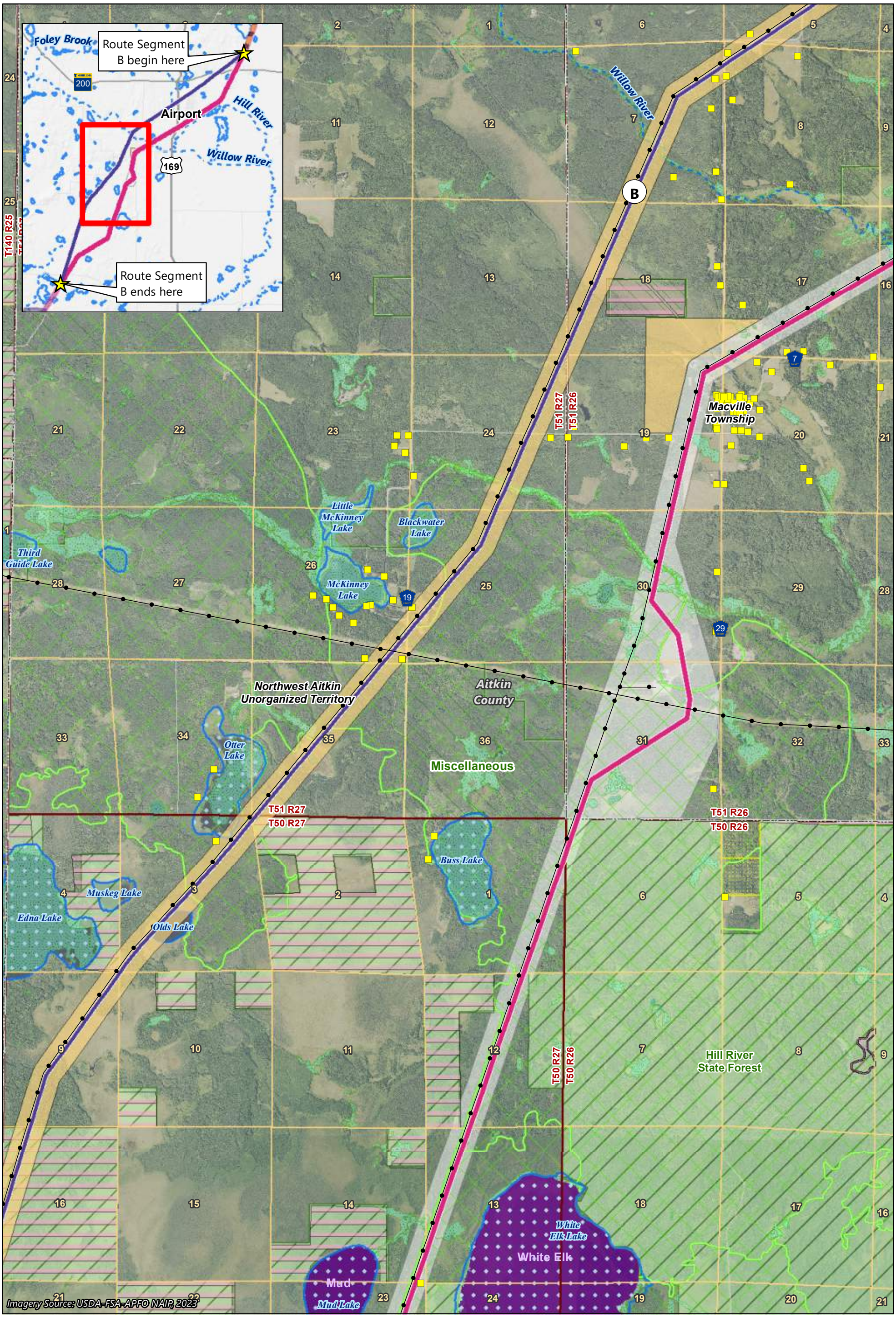
Forest Inventory Old Growth
Designated Old Growth

Site of Biodiversity Significance
High Significance
Moderate Significance

Feet
0 1,500 3,000

Map 6-4

ROUTE ALTERNATIVE B (PART 2)
Hill City to Little Pine Region
Northland Reliability Project



Route Segment B
Applicants' Route B Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence
PWI Watercourse

PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
State Forest
Other DNR Land

Lakes of Biological Significance
Outstanding Significance

Wetlands
Non-Forested Wetland
Forested Wetland

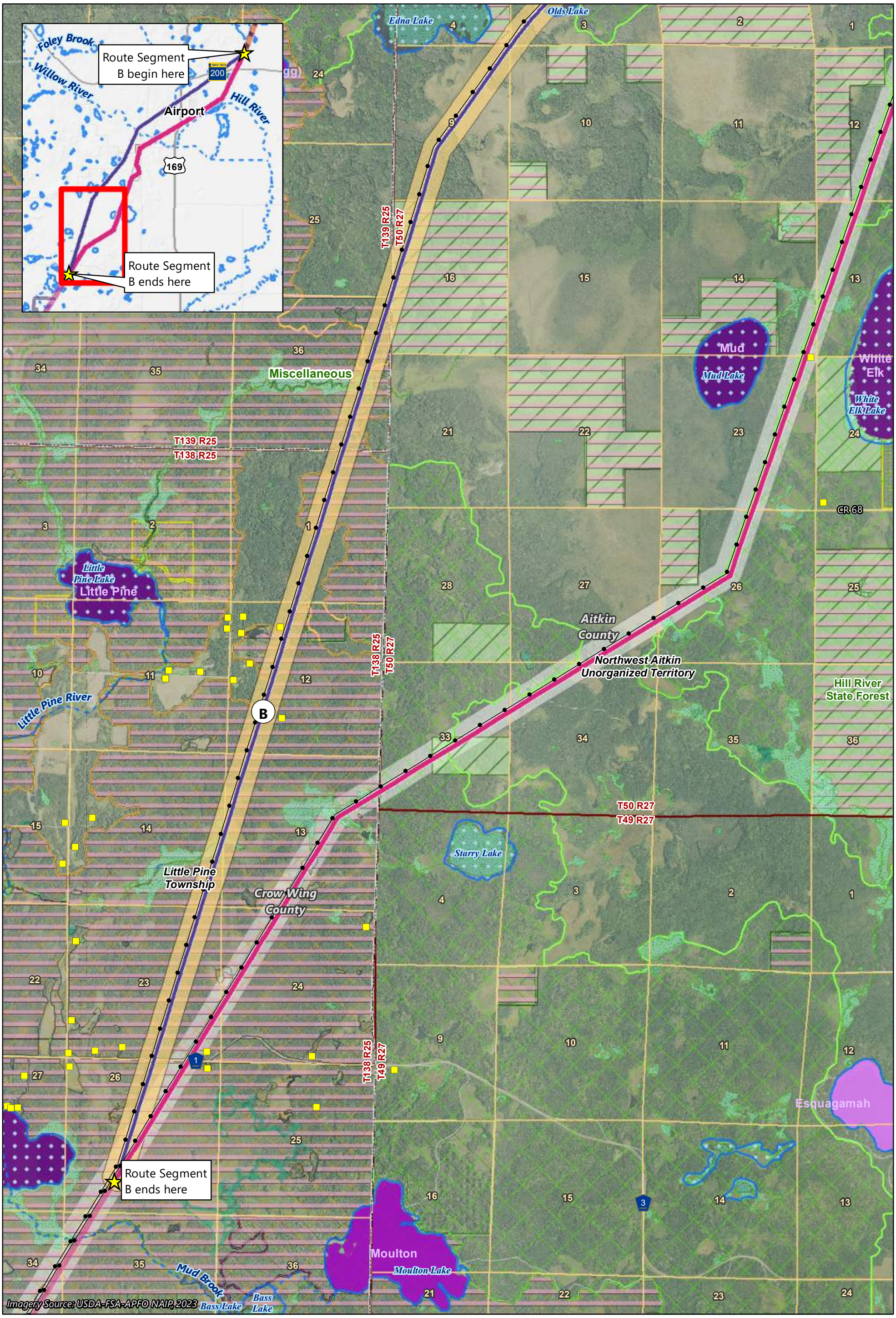
Forest Inventory Old Growth
Designated Old Growth

Site of Biodiversity Significance
Moderate Significance

Feet
0 1,500 3,000

Map 6-5

ROUTE ALTERNATIVE B (PART 3)
Hill City to Little Pine Region
Northland Reliability Project



Route Segment B
Applicants' Route B Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence
PWI Watercourse

PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
State Conservation Easement
State Forest
Other DNR Land

Lakes of Biological Significance
Outstanding Significance
High Significance
Moderate Significance

Wetlands
Non-Forested Wetland
Forested Wetland

Forest Inventory Old Growth
Designated Old Growth

Site of Biodiversity Significance
High Significance
Moderate Significance

Feet
0 1,500 3,000

Map 6-6

ROUTE ALTERNATIVE B (PART 4)
Hill City to Little Pine Region
Northland Reliability Project

6.2.2.1 Human Settlements

Potential project impacts on human settlements are assessed through an evaluation of several elements. For some of the human settlement elements, project impacts are anticipated to be minimal and independent of the route selected and therefore are not discussed in this Chapter. These resources, which are discussed in Chapter 5.3, include cultural values, displacement, electronic interference, noise, property values, and zoning and land use.

6.2.2.1.1 Aesthetics

Aesthetic impacts differ by routing alternative. Aesthetic impacts can be minimized by placing the transmission line away from residences and by following existing infrastructure and ROW. Proximity of residences to route alternative B is shown in Table 6-23, while ROW paralleling and sharing are shown in Table 6-24.

While the applicants' equivalent has fewer residences within 500 feet, both route alternative B and the applicants' equivalent would follow a similar amount of existing infrastructure ROW. Route alternative B would parallel an existing transmission line for the entirety of its alignment while the applicants' equivalent would parallel existing transmission line ROW for most (94 percent) of its alignment. Overall, the route alternatives would have similar aesthetic impacts to the area.

Table 6-23 Hill City to Little Pine Region Proximity of Residences to Route Alternative B

Residences, Distance from Anticipated Alignment	Route Alternative B	Applicants' Equivalent
Residences within 0-75 feet	0	0
Residences within 75-250 feet	1	3
Residences within 250-500 feet	14	2
Residences within 500-1,000 feet	14	18
Total Residences within 1,000 feet	29	23

Table 6-24 Hill City to Little Pine Region ROW Sharing and Paralleling of Route Alternative B

Infrastructure	Route Alternative B miles (percent)	Applicants' Equivalent miles (percent)
Follows Existing Railroad	0.0. (0)	0.0. (0)
Follows Existing Roads	0.0. (0)	0.0. (0)
Follows Existing Transmission Line	26.4 (100)	25.4 (94)
Total – Follows Transmission Line, Road, or Railroad	26.4 (100)	25.4 (94)
Follows Field, Parcel, or Section Lines	0.0. (0)	0.0. (0)
Total – ROW Paralleling and Sharing	26.4 (100)	25.4 (94)
Total Length of Route Alternative	26.4	27.0

Portions may share or parallel more than one type of infrastructure ROW or division/boundary line and therefore the sum may be greater than 100 percent.

6.2.2.1.2 Socioeconomics and Environmental Justice

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures indicate how societies progress, stagnate, or regress because of the actions and interactions within and between the local, regional, and global economic scale. Transmission line projects can contribute to growth and progress at the local level over time, but generally do not have a significant long-term socioeconomic impact.

The project would improve the socioeconomics of the region through the creation of jobs, generation of tax revenue, and providing more reliable electrical service to the surrounding communities. Route alternative B intersects with Macville Township, Beulah Township, Little Pine Township, and the city limits of Hill City; all of which have been identified as communities with EJCs. No adverse or permanent impacts to the identified communities with EJCs are anticipated. While route alternative B does intersect communities with EJCs, these communities are not anticipated to experience disproportionately adverse impacts from the project, particularly because the project would parallel existing transmission line ROW in these communities.

6.2.2.2 Transportation

Potential transportation impacts are assessed by looking at various elements of transportation and public services as outlined in Chapter 5.4. In general, impacts to transportation services are anticipated to be minimal and independent of the route selected.

6.2.2.2.1 Airports

One public airport is located within 1 mile of route alternative B. The northern end of the Hill City/Quadna Mountain Airport runway is approximately 1,300 feet southeast of route alternative B and is therefore located within safety zone C. However, in this area, route alternative B parallels an existing transmission line that is also located within safety zone A. Route alternative B would need to be constructed with specialty structures no more than 80 feet in height in the vicinity (0.5 to 1 mile) of the Hill City/Quadna Mountain Airport to meet the public airport clearance requirements. It is assumed that structures placed in

the vicinity of the airport would match the height of the structures located along the existing transmission line that is also adjacent to the airport.

6.2.2.3 Land-Based Economies

Potential project impacts to land-based economies are assessed through an evaluation of several elements, summarized in Chapter 6.1.1. There are no active mining operations within the ROW's of either route alternative B or the applicants' equivalent. Therefore, potential project impacts to mining would be minimal and independent of the route selected.

6.2.2.3.1 Agriculture

Agricultural land impacts differ between the 150-foot ROW of route alternative B and the applicants' equivalent. Route alternative B has 7 acres of agricultural land in its ROW, while the applicants' equivalent has 29 acres of agricultural land in its ROW (Map Book 5C).

According to the USDA FSA (reference (107)), MDA Organic Farm Directory (reference (105)), and MDA Apiary Registry (reference (106)), there are no CREP enrolled lands, registered organic producers, or apiaries within the 150-foot ROW of the route alternative or the applicants' equivalent.

6.2.2.3.2 Forestry

Forestry impacts within the Hill City to Little Pine region were primarily assessed by evaluating the designated forestry resources within the 150-foot ROW of each route alternative (Chapter 5.8.2). Approximately 376 acres of the route alternative B ROW consists of forested land while 349 acres of the applicants' equivalent ROW consists of forested land (reference (108)) comprised of deciduous forest, evergreen forest, mixed forest, and forested wetlands within this region (Map Book 5C).

As shown in Table 6-25, the designated forestry resources consist of DNR state forests, Minnesota School Trust Land, Forest for the Future land, and SFIA land.

Table 6-25 Designated Forestry Resources within the 150-foot ROW of Route Alternative B

Forestry Resource	Route Alternative B	Applicants' Equivalent
Acres of DNR state forest within 150-foot ROW	207	329
Acres of Minnesota School Trust Land[1] within 150-foot ROW	54	59
Acres of Forests for the Future[2] land within 150-foot ROW	13	0
Acres of Sustainable Forest Incentive Act[3] land within 150-foot ROW	22	0

In some cases, multiple state land classifications are located within the same section. Therefore, features may be duplicated, and the analysis results may over-represent potential impacts.
Data Sources: references (3); (4)

1 Minnesota School Trust Lands are DNR-administered lands that are set aside to provide a continual source of funding for public education (reference (4).
2 Minnesota's Forests for the Future Program is a conservation program administered by the DNR to encourage the protection of privately-owned forest lands through conservation easements or land purchases (reference (5)).
3 Minnesota's Sustainable Forest Incentive Act is a conservation program administered by the DNR that provides annual incentive payments to encourage private landowners to keep their wooded areas undeveloped (reference (109)).

Both route alternative B and the applicants' equivalent could impact designated forestry resources, including land within Hill River State Forest, within their respective 150-foot ROW; however, route alternative B encompasses fewer acres of forested lands within its ROW. Forestry resource impacts would include permanent tree removal from the ROW before construction.

6.2.2.3.3 Recreation and Tourism

Recreation and tourism activities within the Hill City to Little Pine region include recreational and camping opportunities on state managed lands, trails, and scenic byways. Recreation and tourism impact from the applicants' equivalent are expected to be minimal where it parallels existing ROWs.

Route alternative B crosses one state forest, three off-road vehicle use trails and, five snowmobile trails. The applicants' equivalent crosses one WMA, one state forest, nine off-road vehicle use trails, and five snowmobile trails (Map Book 5E). Recreation and tourism resource impacts for both route alternative B and the applicants' equivalent occur where the routes parallel existing transmission lines. Consequently, permanent impacts on these resources in these areas would be minimal.

Temporary impacts could include temporary trail closings during construction and temporary interruptions in recreational opportunities within Hill River State Forest and Moose Willow WMA (Chapter 5.8.4.1). Although route alternative B and the applicants' equivalent will have temporary impacts on recreation, they are expected to be minimal.

6.2.2.4 Archaeological and Historic Resources

Five previously documented historic architectural resources and archaeological sites are located within the 1,000-foot route width of route alternative B and seven are within the applicants' equivalent (Table 6-26). As shown on Map Book 5F, some of the same historic architectural resources are located within the route width for both route alternative B and the applicants' equivalent.

Table 6-26 Cultural Resources within the Route Width of Alternative B and the Applicants' Equivalent

Resource Number	Resource Type	NRHP Eligibility	Location
21AK0136	Post-contact artifact scatter, structural ruin	Not evaluated	applicants' equivalent
21AK0137	Precontact single artifact	Not evaluated	applicants' equivalent
AK-MCV-00011	Boyd's Ranch Inn	Not evaluated	applicants' equivalent
AK-UOG-00015	ca. 1982 residence	Not eligible	route alternative B
CA-UOG-00088	Soo Line ATV Trail	Not evaluated	route alternative B, applicants' equivalent
XX-ROD-00044	Current TH 169	Not eligible	route alternative B, applicants' equivalent
XX-ROD-00181	Trunk Highway 200 / TH 34, TH 81, TH 85, TH 92, TH 116	Not eligible	route alternative B, applicants' equivalent
XX-ROD-00182	Trunk Highway 31 / TH 200, TH 81, TH 85, TH 92, TH 116	Not eligible	route alternative B, applicants' equivalent

The applicants' equivalent route and route alternative B would have similar and minimal to no affect to resources CA-UOG-00088, XX-ROD-00044, XX-ROD-00181, XX-ROD-00182, which each represent linear resources crossed by existing transmission lines. Route alternative B has the potential to affect historic architectural resource AK-UOG-00015. However, a thick tree line appears to visually shield this resource from the route, and it has previously been determined ineligible for the NRHP. The applicants' equivalent route may affect resources 21AK0136, 21AK0137, AK-MCV-00011 as described and discussed in Chapter 6.2.1.3.

The primary means to minimize archaeological and historic architectural resource impacts is prudent routing or structure placement (i.e., avoiding known archaeological and historic resources). If they cannot be avoided, impacts to these resources could be mitigated by measures developed in consultation with the SHPO prior to construction. Analysis indicates that the applicants' equivalent route has the potential to impact more cultural resources than route alternative B.

6.2.2.5 Natural Environment

6.2.2.5.1 Water Resources

Impacts to floodplains and groundwater are anticipated to be minimal and independent of the route selected for the project, as described in Chapter 6.2.1.4.1. This route alternative comparison discussion addresses watercourses and waterbodies, and wetlands. Map 6-3 through Map 6-6 shows the water resources along route alternative B.

6.2.2.5.1.1 Watercourses and Waterbodies

Table 6-27 identifies the number of watercourses and waterbodies crossed by route alternative B and the applicants' equivalent. The applicants' equivalent would cross more NHD streams and one more PWI stream than route alternative B. In addition, all of route alternative B and most of the applicants' equivalent would follow an existing transmission line ROW; due to this, neither would require new watercourse or waterbody crossings.

Table 6-27 Watercourses and Waterbodies Crossed by Route Alternative B and the Applicants' Equivalent

Resources	Route Alternative B	Applicants' Equivalent
Number of NHD streams crossings	11	14
Number of impaired streams crossings	3	3
Number PWI stream crossings	6	7
Number of NHD lake crossings	1	1
Number of impaired lake crossings	0	0
Number of PWI basin crossings	1	0
Number of PWI wetland crossings	0	0

6.2.2.5.1.2 Wetlands

Table 6-22 identifies the amount of wetlands present within the ROW for both route alternative B and the applicants' equivalent. Route alternative B would cross more acres of forested wetland than the applicants' equivalent. However, the applicants' equivalent would cross more acres of non-forested wetland. The route alternative B would also have 14 wetland crossings over 1,000 feet whereas the applicants' equivalent would have 12 wetland crossings over 1,000 feet. Crossings longer than 1,000 feet generally cannot be spanned and require placement of one or more poles in wetland area.

6.2.2.5.2 Vegetation

The ROW of both route alternative B and the applicants' equivalent would impact forested vegetation, with route alternative B impacting slightly more forested vegetation (376 acres) than the applicants' equivalent (349 acres). Both route alternatives would minimize impacts associated with forested fragmentation by paralleling an existing transmission line ROW, with route alternative B paralleling one for its entire length and the applicants' equivalent paralleling one for 94 percent of its length. Forested vegetation impacts from the two route alternatives would be relatively similar.

6.2.2.5.3 Wildlife

Wildlife habitat impacts would occur for both route alternative B and the applicants' equivalent because of forested habitat removal within each of the respective rights-of-way. Wildlife habitat impacts would be relatively similar for both route alternatives, with the applicants' equivalent impacting less forested habitat and route alternative B paralleling an existing transmission line ROW for slightly more of its length. The applicants' equivalent ROW would traverse the edge of the Moose Willow WMA, while route alternate B would avoid the WMA (Map 6-3 through Map 6-6). However, impacts to the WMA from the applicants' equivalent would be minimized by paralleling an existing transmission line ROW in this area. The potential impacts to wildlife and associated habitat from route alternative B and the applicants' equivalent would be relatively similar.

6.2.2.6 Rare and Unique Natural Resources

According to the NHIS database, one federal and three state protected species have been documented within 1 mile of route alternative B and the applicants' equivalent; however, none of these species have been documented within the ROW of either route alternative (Appendix N). Several state special concern species have been documented within 1 mile of route alternative B and the applicants' equivalent, two of which have been documented within the ROW of the applicants' equivalent; state special concern species are summarized in Appendix N. In general, habitat is comparable between route alternative B and the applicants' equivalent; as such, it is anticipated that potential impacts to protected species would be comparable.

The route alternative B and the applicants' equivalent rights-of-way would traverse several sensitive ecological resources (Map 6-3 through Map 6-6). The ROW of both route alternatives would intersect SBS ranked high and moderate, with the ROW of the applicants' equivalent intersecting the most SBS acreage (Table 6-28). The ROW of both route alternatives would intersect native plant communities, with alternative B intersecting slightly more acreage, including native plant communities that have a conservation status of S1 or S2 (Table 6-28). The ROW of both route alternatives would intersect areas designated as High Conservation Value Forest, with the applicants' equivalent intersecting significantly more acreage than route alternative B. However, the ROW of route alternative B would intersect two parts

of the High Conservation Value Forest that are designated candidate old growth stands, while the applicants' equivalent would not intersect any candidate old growth stands.

Table 6-28 Sensitive Ecological Resources in the ROW of Route Alternative B and the Applicants' Equivalent

Sensitive Ecological Resource	Area within ROW of Route Alternative B	Area within ROW of Applicants' Equivalent
Sites of Biodiversity Significance	199 total acres; 135 acres ranked high; 64 acres ranked moderate	308 total acres; 181 acres ranked high; 127 acres ranked moderate
Native Plant Communities	145 total acres; 10 acres have a conservation status of S1 or S2; conservation status of remaining acres is S3-S5	139 acres - conservation status S3-S5
High Conservation Value Forest	32 acres	123 acres
Candidate Old Growth Stand	9 acres	0 acres

As noted above, route alternative B would parallel an existing transmission line ROW for its entire length and the applicants' equivalent would parallel an existing transmission line ROW for 94 percent of its length. Except for a portion of one SBS ranked moderate, which the applicants' equivalent would traverse in a new ROW, both route alternatives would traverse sensitive ecological resources within or adjacent to areas that have been previously disturbed by transmission line rights-of-way, which would minimize impacts to these resources.

6.2.2.7 Reliability

When one transmission line crosses another, reliability risks increase because the failure of one line can unexpectedly de-energize the other. Additionally, there is increased risk that if one transmission line falls, it can bring down the other transmission line, resulting in two, rather than one, line failures. Furthermore, performing maintenance at the transmission line crossing creates a safety risk, as under normal operating conditions one line must remain energized while work is occurring on the other line. Therefore, where practical, new lines are typically designed to minimize transmission line crossings.

No transmission line crossings are required for these route alternatives.

6.2.2.8 Cost

Costs of the route alternatives are generally proportional to length and take into account the need for specialty and heavy-angle structures, which are more expensive than standard and/or tangent structures (Table 6-22). Costs are similar between route alternative B ($146 million) and the applicants' equivalent ($149 million). Route alternative B may require additional engineering to develop the specialty structures needed to keep structure heights to less than 80 feet in proximity of the Hill City/Quadna Mountain Airport. Each circuit may need a separate structure, thereby increasing the overall ROW width in proximity of the airport.

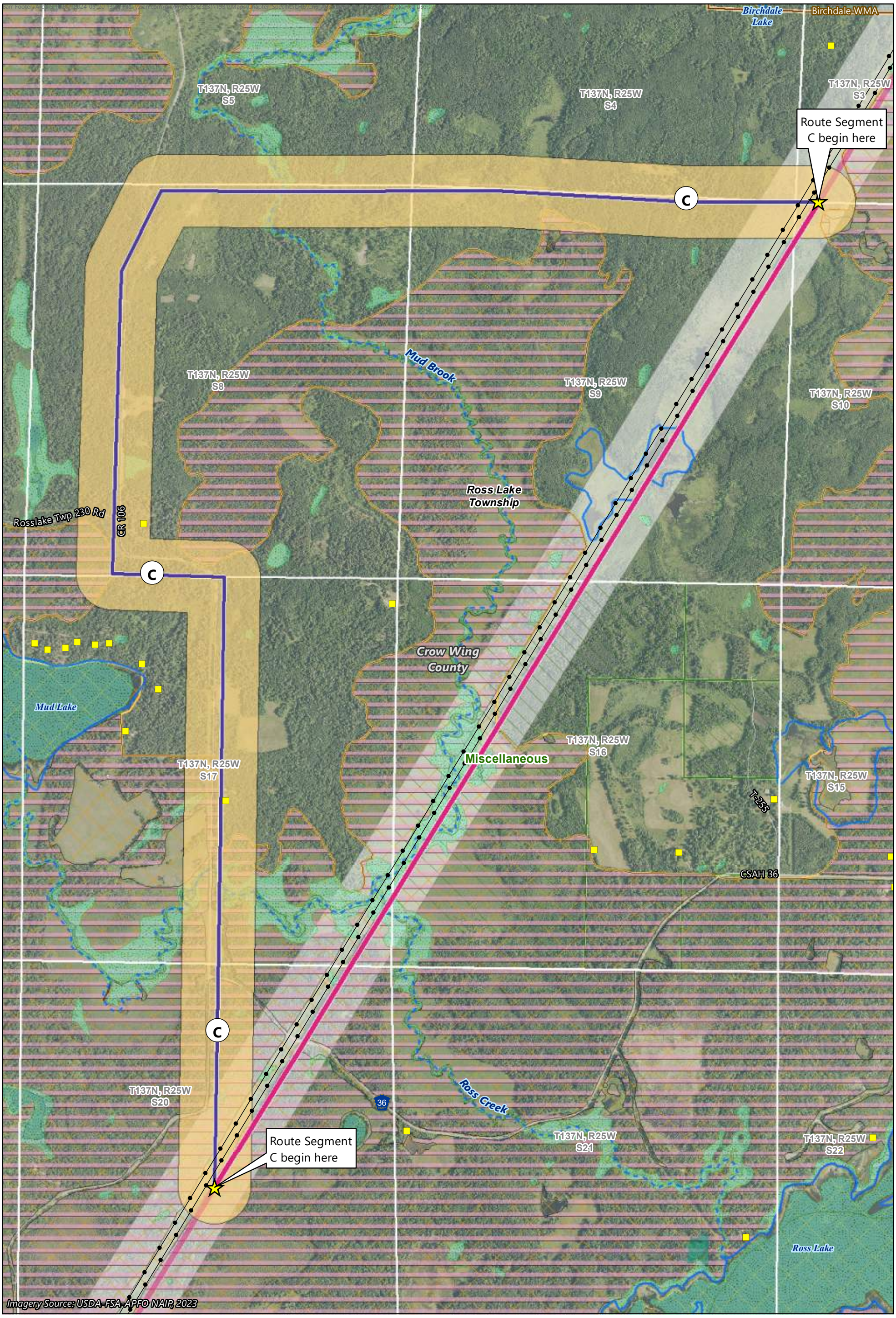
6.2.3 Route Alternative C – Hill City to Little Pine Region

Route alternative C provides a different option to the applicants' equivalent in the southwestern part of the Hill City to Little Pine region. Route alternative C shifts west from the applicants' equivalent to reduce public water crossings. Route alternative C does not include any transmission line ROW sharing or paralleling, or double-circuiting. Potential impacts of route alternative C and the applicants' equivalent are summarized in Table 6-29 and shown on Map 6-7.

Table 6-29 Human and Environmental Impacts – Route Alternative C, Hill City to Little Pine Region

Resource	Element	Route Alternative C	Applicants' Equivalent
Length (miles)		4.6	3.0
Human Settlement	Residences within 0-75 feet (count)	1	0
	Residences within 75-250 feet (count)	0	0
	Residences within 250-500 feet (count)	1	0
	Residences within 500–1,000 feet (count)	2	0
Land-Based Economies	Agricultural land in 150-foot ROW (acres)	5	1
Water Resources	Total wetlands in 150-foot ROW (acres)	11	28
	Forested wetlands in 150-foot ROW (acres)	6	6
Vegetation	Forested landcover in 150-foot ROW (acres)	57	29
Rare and Unique Natural Resources	Sites of Biodiversity Significance in 150-foot ROW (acres)	18	26
	Native Plant Communities in 150-foot ROW (acres)	13	18
	Federal- or state-protected species documented in 150-foot ROW (count)	0	0
ROW Sharing and Paralleling	Transmission line (miles, percent)	0.0. (0)	3.0 (100)
	Roadway (miles, percent)	4.3 (93)	0.0. (0)
	Field, parcel, or section lines (miles, percent)	4.6 (100)	0.0. (0)
	Total ROW sharing and paralleling (miles, percent)	4.6 (100)	3.0 (100)
Reliability	Crossing of existing transmission lines (count)	2	0
Estimated Cost	Total estimated cost (2022 dollars in millions)	$31.8[1]	$16.7

1 Two specialty structures would be needed to cross an existing transmission line for an estimated additional cost of approximately $4 million. In addition, three heavy-angle structures would be needed for an additional cost of approximately $740,000 per structure ($24.9 million base cost).



Route Segment C
Applicants' Route C Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence

PWI Watercourse
PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
Wildlife Management Area
Other DNR Land

Wetlands
Non-Forested Wetland
Forested Wetland

Site of Biodiversity Significance
High Significance

N

Feet
0 600 1,200

Map 6-7

ROUTE ALTERNATIVE C
Hill City to Little Pine Region
Northland Reliability Project

6.2.3.1 Human Settlements

Potential project impacts on human settlements are assessed through an evaluation of several elements. For some aspects of the project, impacts on human settlement are expected to be minimal and independent of the selected route. Therefore, these elements are not discussed in this Chapter. These resources, which are discussed exclusively in Chapter 5.3, include cultural values, electronic interference, noise, property values, socioeconomics and EJCs, and zoning and land use.

6.2.3.1.1 Aesthetics

Aesthetic impacts differ by routing alternative. Aesthetic impacts can be minimized by placing the transmission line away from residences and by following existing infrastructure and ROW. Proximity of residences to route alternative C is shown in Table 6-30, while ROW paralleling and sharing are shown in Table 6-31.

No residences are located within 1,000 feet of the applicants' equivalent, while four residences are located within 1,000 feet of route alternative C. The applicants' equivalent also follows slightly more infrastructure ROW than route alternative C. Thus, on whole, the applicants' equivalent best minimizes aesthetic impacts in this area of the project.

Table 6-30 Hill City to Little Pine Region Proximity of Residences to Route Alternative C

Residences, Distance from Anticipated Alignment	Route Alternative C	Applicants' Equivalent
Residences within 0-75 feet	1	0
Residences within 75-250 feet	0	0
Residences within 250-500 feet	1	0
Residences within 500-1,000 feet	2	0
Total Residences within 1,000 feet	4	0

Table 6-31 Hill City to Little Pine Region ROW Sharing and Paralleling of Route Alternative C

Infrastructure	Route Alternative C miles (percent)	Applicants' Equivalent miles (percent)
Follows Existing Railroad	0.0. (0)	0.0. (0)
Follows Existing Roads	4.3 (93)	0 (0)
Follows Existing Transmission Line	0 (0)	3.0 (100)
Total – Follows Transmission Line, Road, or Railroad	4.3 (93)	3.0 (100)
Follows Field, Parcel, or Section Lines	4.6 (100)	0 (0)
Total – ROW Paralleling and Sharing	4.6 (100)	3.0 (100)
Total Length of Route Alternative	4.6	3.0

Portions may share or parallel more than one type of infrastructure ROW or division/boundary line and therefore the sum may be greater than 100 percent.

6.2.3.1.2 Displacement

Residences or other buildings are typically not allowed within the transmission line ROW, for safety code and maintenance reasons. Any residences or other buildings located within a proposed ROW are generally removed or displaced.

There are no churches, childcare centers, or schools located within the 150-foot ROW of route alternative C or the applicants' equivalent. However, there is one permanent residence and two non-residential buildings (storage shed, agricultural outbuildings, etc.) located within the 150-foot ROW of the route alternative C.

The one residential building and the two non-residential buildings in route alternative C may or may not be displaced by the project. Though buildings are generally not allowed within the 150-foot transmission line ROW, there are instances where the activities taking place in these buildings are compatible with the safe operation of the line (e.g., animal production). For each of the buildings noted here, the applicants would need to conduct a site-specific analysis to determine if the building would need to be displaced.

6.2.3.2 Land-Based Economies

Potential project impacts to land-based economies are assessed through an evaluation of several elements, summarized in Chapter 6.1.1. There are no active mining operations within either the route alternative C or the applicants' equivalent rights-of-way. Therefore, potential project impacts to mining would be minimal and independent of the route selected.

6.2.3.2.1 Agriculture

Agricultural land impacts in the 150-foot ROW of both route alternative C and the applicants' equivalent differ. The route alternative C ROW would impact the most amount agricultural land (5 acres) while the applicants' equivalent ROW would impact the least agricultural land (less than 1 acre).

According to the USDA FSA (reference (107)), MDA Organic Farm Directory (reference (105)), and MDA Apiary Registry (reference (106)), there are no CREP enrolled lands, registered organic producers, or apiaries within the 150-foot ROW of route alternative C or the applicants' equivalent.

6.2.3.2.2 Forestry

Forestry impacts within the Hill City to Little Pine region were primarily assessed by evaluating the designated forestry resources within the 150-foot ROW (Chapter 5.8.2). Approximately 57 acres of the route alternative C ROW consist of forested land, while 29 acres of the applicants' equivalent ROW consist of forested land (reference (108)) comprised of deciduous forest, evergreen forest, mixed forest, and forested wetlands within this region (Map Book 5C).

The only designated forestry resources in this area are Minnesota School Trust Lands. There are 18 acres of Minnesota School Trust Lands within the applicants' equivalent route ROW; there are no designated forestry resources within the route alternative C ROW.

Only the applicants' equivalent route would have potential impacts to designated forestry resources within the 150-foot ROW. Therefore, route alternative C would minimize impacts to designated forestry resources. Forestry resource impacts would include permanently removing trees from the ROW before construction.

6.2.3.2.3 Recreation and Tourism

Recreation and tourism activities within the Hill City to Little Pine region include outdoor recreation activities and camping opportunities on state managed lands, trails, and scenic byways. Since project transmission line construction and operation generally has minimal permanent and temporary impacts to trails, recreation and tourism in this region, overall impacts are expected to be minimal where the project parallels existing ROWs.

Route alternative C does not contain any recreational resources within its ROW but does border an off-road vehicle use trail for a portion of the route. The applicants' equivalent likewise does not have any recreational resources within its ROW. Route Alternative C would result in permanent and temporary impacts which would include increased noise from construction and reduced aesthetic value. Although permanent and temporary impacts would occur because of this route, they are expected to have minimal recreation impact.

6.2.3.3 Archaeological and Historic Resources

There are no documented archaeological or historic architectural resources within the alternative C or the applicants' equivalent route width. As a result, cultural resource impacts are anticipated to be minimal and independent of the route selected.

6.2.3.4 Natural Environment

6.2.3.4.1 Water Resources

Impacts to floodplains and groundwater are anticipated to be minimal and independent of the route selected for the project. This routing alternative comparison discussion addresses watercourses and waterbodies and wetlands. Map 6-7 shows the water resources along route alternative C.

6.2.3.4.1.1 Watercourses and Waterbodies

Table 6-32 identifies the number of watercourses and waterbodies crossed by route alternative C and the applicants' equivalent respectively. The applicants' equivalent would cross more NHD streams and PWI streams than route alternative C. Route alternative C would parallel an existing roadway for majority of the route length which would reduce the impact associated with new crossings.

Table 6-32 Waterbodies and Watercourses Crossed by Route Alternative C and Applicants' Equivalent

Resources	Route Alternative C	Applicants' Equivalent
Number of NHD streams crossings	2	5
Number of impaired streams crossings	0	0
Number PWI stream crossings	2	3
Number of NHD lake crossings	0	0
Number of impaired lake crossings	0	0
Number of PWI basin crossings	0	0

6.2.3.4.1.2 Wetlands

Table 6-29 identifies the acreage of wetlands located within the rights-of-way for both route alternative C and the applicants' equivalent, respectively. Route alternative C and the applicants' equivalent would cross nearly the same amount of forested wetlands; however, the applicants' equivalent would cross more non-forested wetlands. The route alternative C would not have any wetland crossing over 1,000 feet, and the applicants' equivalent would have three wetland crossings over 1,000 feet.

6.2.3.4.2 Vegetation

The ROW of both route alternative C and the applicants' equivalent would impact forested vegetation, with route alternative C impacting almost twice as much (57 acres) as the applicants' equivalent (29 acres). Both route alternatives would minimize impacts to forest fragmentation by paralleling existing rights-of-way; with the applicants' equivalent paralleling an existing transmission line ROW for its entire length and route alternative C paralleling an existing road corridor for approximately 93 percent of its length. The applicants' equivalent would minimize impacts to forested vegetation.

6.2.3.4.3 Wildlife

Wildlife habitat impacts would occur for route alternative C and the applicants' equivalent as a result of removal of forested habitat in the ROW; however, neither route alternative would traverse areas that are managed or preserved for wildlife. By impacting less forested vegetation and paralleling an existing transmission line ROW for its entire length, the applicants' equivalent would have less impact on wildlife habitat than route alternative C. Route alternative C would also minimize the potential habitat fragmentation impacts by paralleling an existing road corridor for approximately 93 percent of its length. Route alternative C would increase impact potential to avian species by establishing a new transmission line ROW. However, as discussed in Chapter 5.10.5.2, avian impacts can be minimized through use of bird flight diverters. The potential wildlife habitat impacts would be greater for route alternative C than the applicants' equivalent.

6.2.3.5 Rare and Unique Natural Resources

Using the NHIS database, it was determined that no federal- or state-protected species have been documented within 1 mile of route alternative C or the applicants' equivalent. Two state special concern species have been documented within 1 mile of route alternative C, while no state special concern species have been documented within 1 mile of the applicants' equivalent; state special concern species are summarized in Appendix M. In general, habitat is comparable between route alternative C and the applicants' equivalent; as such, it is anticipated that potential protected species impacts would be comparable with the exception of avian species. While the applicants' equivalent parallels an existing transmission line ROW for its entire length, route alternative C parallels a road corridor for 93 percent of its length but does not parallel an existing transmission line ROW. As a result, route alternative C could pose an increased threat to federally or state protected avian species by establishing a new transmission line ROW. As discussed in Chapter 5.10.5.2, these impacts can be minimized through use of bird flight diverters.

The ROW of route alternative C and the applicants' equivalent would traverse several sensitive ecological resources (Map 6-7). The ROW of both route alternatives would intersect SBS ranked high and native plant communities, with the ROW of the applicants' equivalent intersecting slightly more acres of both (Table 6-33). The applicants' equivalent would parallel an existing transmission line through these

sensitive ecological resources, while route alternative C follows a road corridor for 93 percent of its length and may require establishing a new ROW through a portion of these resources.

Table 6-33 Sensitive Ecological Resources in the 150-foot ROW of Route Alternative C and the Applicants' Equivalent

Sensitive Ecological Resource	Area within ROW of Route Alternative C	Area within ROW of Applicants' Equivalent
Sites of Biodiversity Significance	18 acres - ranked high	26 acres - ranked high
Native Plant Communities	13 total acres; 0.5 acres have a conservation status of S1 or S2; conservation status of remaining acres is S3-S5	18 acres - conservation status S3-S5

6.2.3.6 Reliability

When one transmission line crosses another, reliability risks increase because the failure of one line can unexpectedly de-energize the other. Additionally, there is increased risk that if one transmission line falls, it can bring down the other transmission line, resulting in two, rather than one, line failures. Furthermore, performing maintenance at the transmission line crossing creates a safety risk, as under normal operating conditions one line must remain energized while work is occurring on the other line. Therefore, where practical, new lines are typically designed to minimize transmission line crossings.

Route alternative C would require two transmission line crossings, thereby introducing an increased reliability concern. The applicants' equivalent would require no transmission line crossings.

6.2.3.7 Cost

Costs of the route alternatives are generally proportional to length and take into account the need for specialty and heavy-angle structures, which are more expensive than standard and/or tangent structures (Table 6-29). Route alternative C would require two specialty structures to cross an existing transmission line in two separate locations. It would also require three heavy-angle structures, which cost more than three times that of a tangent structure. As a result, route alternative C costs nearly twice as much (approximately $32 million) as the applicants' equivalent (approximately $17 million).

6.2.4 Alignment Alternatives AA1 and AA2 – Hill City to Little Pine Region

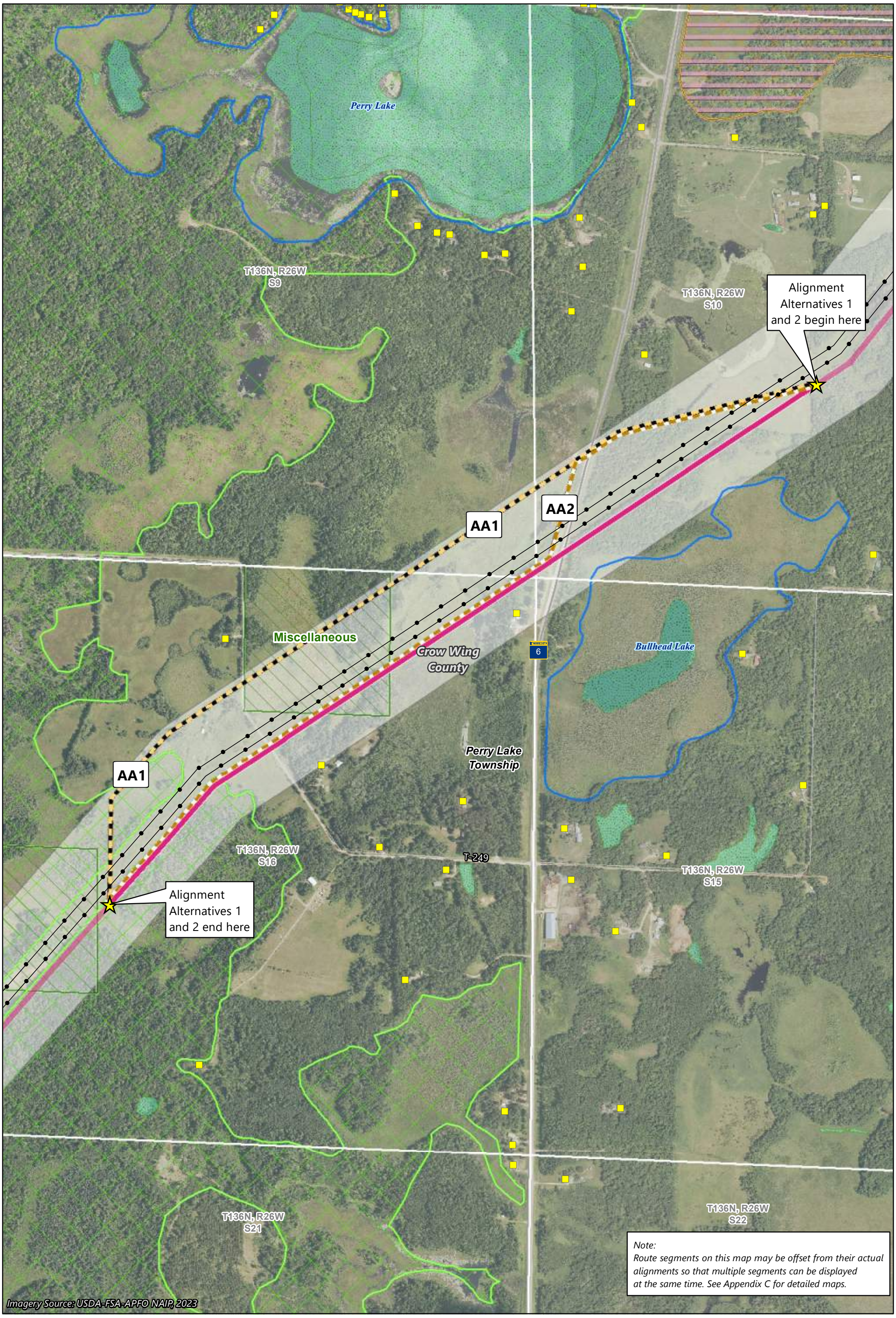
Alignment alternative AA1 and AA2 provide an alternative placement to the applicants' proposed alignment in the southwest part of the Hill City to Little Pine region. Both alignment alternatives are shifted west to avoid private property. These alignment alternatives do not include any transmission line ROW sharing, paralleling, or double-circuiting. Potential impacts of alignment alternative AA1, AA2, and the applicants' equivalent are summarized in Table 6-34 and shown on Map 6-8.

Table 6-34 Human and Environmental Impacts – Alignment Alternatives AA1 and AA2, Hill City to Little Pine Region

Resource	Element	Alignment Alternative AA1	Alignment Alternative AA2	Applicants' Equivalent
Length (miles)		1.6	1.6	1.5
Human Settlement	Residences within 0-75 feet (count)	0	0	0
	Residences within 75-250 feet (count)	0	1	1
	Residences within 250-500 feet (count)	1	1	1
	Residences within 500–1,000 feet (count)	2	1	0
Land-Based Economies	Agricultural land in 150-foot ROW (acres)	7	7	6
Water Resources	Total wetlands in 150-foot ROW (acres)	16	12	11
	Forested wetlands in 150-foot ROW (acres)	2	4	3
Vegetation	Forested landcover in 150-foot ROW (acres)	10	12	12
Rare and Unique Natural Resources	Sites of Biodiversity Significance in 150-foot ROW (acres)	3	4	4
	Federal- or state-protected species documented in 150-foot ROW (count)	0	0	0
ROW Sharing and Paralleling	Transmission line (miles, percent)	0 (0)	1 (61)	1.5 (100)
	Roadway (miles, percent)	0 (0)	0.2 (11)	0 (0)
	Field, parcel, or section lines (miles, percent)	0.2 (11)	0.2 (11)	0 (0)
	Total ROW sharing and paralleling (miles, percent)	0.2 (11)	1.2 (72)	1.5 (100)
Reliability	Crossing of existing transmission lines (count)	2	2	0
Estimated Cost	Total estimated cost (2022 dollars in millions)	$14.5[1]	$14.4[2]	$8.5

1 Two specialty structures would be needed to cross an existing transmission line for an estimated additional cost of approximately $4 million. In addition, two heavy-angle structures would be needed for an additional cost of approximately $740,000 per structure ($8.8 million base cost).

2 Two specialty structures would be needed to cross an existing transmission line for an estimated additional cost of approximately $4 million. In addition, two heavy-angle structures would be needed for an additional cost of approximately $740,000 per structure ($8.6 million base cost).



Alignment Alternative 1
Alignment Alternative 2
Applicants' AA1-2 Equivalent
Route Width
Route Alternative Width

Existing Transmission Line
Residence
PWI Waterbody
Native Plant Community
Other DNR Land

Wetlands
Non-Forested Wetland

Site of Biodiversity Significance
High Significance
Moderate Significance

Feet
0 400 800

Map 6-8

ALIGNMENT ALTERNATIVES AA1 AND AA2
Hill City to Little Pine Region
Northland Reliability Project

6.2.4.1 Human Settlements

Potential project impacts on human settlements are assessed through an evaluation of several elements. For some of the human settlement elements, project impacts are anticipated to be minimal and independent of the route selected and therefore are not discussed in this Chapter. These resources, which are discussed solely in Chapter 5.3, include cultural values, displacement, electronic interference, noise, property values, socioeconomics and EJCs, and zoning and land use.

6.2.4.1.1 Aesthetics

Aesthetic impacts differ among the routing alternatives. Aesthetic impacts can be minimized by placing the transmission line away from residences and by following existing infrastructure and ROW. Proximity of residences to route alternatives AA1, AA2, and the applicants' equivalent are shown in Table 6-35, while ROW paralleling and sharing are shown in Table 6-36.

A similar number of residences are located within 1,000 feet of alignment alternatives AA1, AA2, and the applicants' equivalent. Alignment alternative AA1 does not parallel any existing infrastructure and, therefore, would have the greatest aesthetic impact. The applicants' equivalent would minimize aesthetic impacts more than the other alignment alternatives by paralleling more existing infrastructure ROW.

Table 6-35 Hill City to Little Pine Region Proximity of Residences to Alignment Alternatives AA1 and AA2

Residences, Distance from Anticipated Alignment	Alignment Alternative AA1	Alignment Alternative AA2	Applicants' Equivalent
Residences within 0-75 feet	0	0	0
Residences within 75-250 feet	0	1	1
Residences within 250-500 feet	1	1	1
Residences within 500-1,000 feet	2	1	0
Total Residences within 1,000 feet	3	3	2

Table 6-36 Hill City to Little Pine Region ROW Sharing and Paralleling of Alignment Alternatives AA1 and AA2

Infrastructure	Alignment Alternative AA1 miles (percent)	Alignment Alternative AA2 miles (percent)	Applicants' Equivalent miles (percent)
Follows Existing Railroad	0 (0)	0 (0)	0 (0)
Follows Existing Roads	0 (0)	0.2 (11)	0 (0)
Follows Existing Transmission Line	0 (0)	1 (61)	1.5 (100)
Total – Follows Transmission Line, Road, or Railroad	0 (0)	1.2 (72)	1.5 (100)
Follows Field, Parcel, or Section Lines	0.2 (11)	0.2 (11)	0 (0)
Total – ROW Paralleling and Sharing	0.2 (11)	1.2 (72)	1.5 (100)
Total Alignment of Route Alternative	1.6	1.6	1.5

Portions may share or parallel more than one type of infrastructure ROW or division/boundary line, and therefore, the sum may be greater than 100 percent.

6.2.4.2 Land-Based Economies

Potential project impacts to land-based economies are assessed through an evaluation of several elements, summarized in Chapter 6.1.1. There are no active mining operations or recreation and tourism opportunities within the rights-of-way of alignment alternative AA1 or AA2 or the applicants' equivalent. Therefore, potential project impacts to mining and recreation and tourism would be minimal and independent of the route selected.

6.2.4.2.1 Agriculture

Agricultural land impacts within the 150-foot ROW of alignment alternatives AA1 and AA2 and the applicants' equivalent are similar. The applicants' equivalent has the least amount of agricultural land in its ROW (6 acres). Alignment alternative AA1 and AA2 impact a similar amount of agricultural lands within their rights-of-way, totaling approximately 7 acres each.

According to the USDA FSA (reference (107)), MDA Organic Farm Directory (reference (105)), and MDA Apiary Registry (reference (106)), there are no CREP enrolled lands, registered organic producers, or apiaries within the 150-foot ROW of the alignment alternatives or the applicants' equivalent.

6.2.4.2.2 Forestry

Forestry impacts within the Hill City to Little Pine region were primarily assessed by evaluating the designated forestry resources within the 150-foot ROW (Chapter 5.8.2). Forested land comprises approximately 10 acres of the ROW of alignment alternative AA1, 12 acres of the ROW of alignment alternative AA2, and 12 acres of the ROW of the applicants' equivalent (reference (108)). The forested land is comprised of deciduous forest, evergreen forest, mixed forest, and forested wetlands within this region (Map Book 5C).

As shown in Table 6-37, designated forestry resources within the 150-foot ROW of the route alternatives only consist of Minnesota School Trust Land.

Table 6-37 Designated Forestry Resources within the 150-foot ROW of Alignment Alternatives AA1 and AA2

Forestry Resources	Alignment Alternative AA1	Alignment Alternative AA2	Applicants' Equivalent
Acres of DNR state forest within 150-foot ROW	0	0	0
Acres of Minnesota School Trust Land[1] within 150-foot ROW	6	3	3
Acres of Forest for the Future[2] land within 150-foot ROW	0	0	0

In some cases, multiple state land classifications are located within the same section. Therefore, features may be duplicated, and the analysis results may over-represent potential impacts.
Data Sources: references (3); (4)
1 Minnesota School Trust Lands are DNR-administered lands that are set aside to provide a continual source of funding for public education (reference (4).
2 Minnesota's Forests for the Future Program is a conservation program administered by the DNR to encourage the protection of privately-owned forest lands through conservation easements or land purchases (reference (5)).

All of the routing alternatives would have potential impacts to designated forestry resources within the 150-foot ROW, although, alignment alternative AA2 and the applicants' equivalent would minimize impacts to forestry resources compared to alignment alternative AA1. Impacts to forestry resources would include permanently removing trees from the ROW before construction.

6.2.4.3 Archaeological and Historic Resources

One previously documented historic architectural resource is located within the 1,000-foot route width of alignment alternatives AA1, AA2, and the applicants' equivalent (Table 6-38; Map Book 5F).

Table 6-38 Cultural Resources within the Route Width of Alternative Alignment AA1, AA2, and the Applicants' Equivalent

Resource Number	Resource Type	NRHP Eligibility	Location
XX-ROD-00052	Trunk Highway 6	Not eligible	alternative alignment AA1, alternative alignment AA2, applicants' equivalent

The applicants' equivalent and alignment alternatives AA1 and AA2 would each cross historic architectural resource XX-ROD-00052 (Trunk Highway 6). The applicants' equivalent would cross this resource within an existing transmission line ROW; therefore, no changes in setting or affects to the resource are anticipated. Alignment alternative AA1 would cross resource XX-ROD-00052 in a new location, thereby introducing a new visual impact to the resource. Alignment alternative AA2 would parallel resource XX-ROD-00052, which would also introduce a new visual impact to the resource. However, as resource XX-ROD-00052 has been previously determined not eligible for the NRHP, impacts to this resource are anticipated to be minimal and independent of the route selected.

6.2.4.4 Natural Environment

6.2.4.4.1 Water Resources

Impacts to floodplains and groundwater are anticipated to be minimal and independent of the project route selected. This routing alternative comparison discussion addresses watercourses and waterbodies, and wetlands. Map 6-8 shows the water resources along alternative alignment AA1, AA2 and the applicants' equivalent.

6.2.4.4.1.1 Watercourses and Waterbodies

Alignment alternative AA1, alignment alternative AA2, and the applicant's equivalent would not cross any watercourses or waterbodies.

6.2.4.4.1.2 Wetlands

Table 6-34 identifies the acreage of wetlands crossed by alternative alignment AA1, AA2, and the applicants' equivalent. Alternative alignment AA1 would cross more non-forested wetland than alternative alignment AA2 and applicants' equivalent. However, alternative alignment AA2 would cross more forested wetlands than alternative alignment AA1 and the applicants' equivalent. Alignment alternative AA1 would have two wetland crossings over 1,000 feet. Alternative alignment AA2 and the applicants' equivalent does not have any wetland crossings over 1,000 feet.

6.2.4.4.2 Vegetation

The ROW of alignment alternatives AA1, AA2, and the applicants' equivalent would all impact similar amounts of forested vegetation (10 to 12 acres). The applicants' equivalent would minimize impacts associated with forest fragmentation because it would parallel an existing transmission line ROW for its entire length.

6.2.4.4.3 Wildlife

Wildlife habitat impacts would occur for alignment alternatives AA1, AA2, and the applicants' equivalent as a result of removal of forested habitat in the ROW; however, neither alignment alternative or the applicants' equivalent would traverse areas that are managed or preserved for wildlife. Alignment alternatives AA1 and AA2 would fragment wildlife habitat and would also require establishing a small segment of new transmission line that would run perpendicular to the existing transmission line, thereby increasing the potential for avian species impacts. By paralleling an existing transmission line ROW for its entire length, the applicants' equivalent would have the least amount of impact on wildlife habitat.

6.2.4.5 Rare and Unique Natural Resources

From the NHIS database, no federal- or state-protected species or state special concern species have been documented within 1 mile of alignment alternatives AA1, AA2, or the applicants' equivalent. Both alignment alternatives AA1 and AA2 could pose an increased threat to federally or state protected avian species as a result of establishing a new transmission line rights-of-way and/or a new perpendicular transmission line alignment.

The ROW of alignment alternatives AA1, AA2, and the applicants' equivalent would all intersect an SBS ranked moderate (Map 6-8). Alignment alternative AA1 would impact approximately 3 acres of the SBS, while AA2 and the applicants' equivalent would intersect approximately 4 acres of SBS. Alignment

alternative AA2 and the applicants' equivalent would intersect the SBS while paralleling a previously disturbed transmission line ROW, while AA1 would require a new ROW through the SBS (Map 6-8).

6.2.4.6 Reliability

When one transmission line crosses another, reliability risks increase because the failure of one line can unexpectedly de-energize the other. Additionally, there is increased risk that if one transmission line falls, it can bring down the other transmission line, resulting in two, rather than one, line failures. Furthermore, performing maintenance at the transmission line crossing creates a safety risk, as under normal operating conditions one line must remain energized while work is occurring on the other line. Therefore, where practical, new lines are typically designed to minimize transmission line crossings.

Alignment alternatives AA1 and AA2 would each require two transmission line crossings, thereby introducing an increased reliability concern for these two alignment alternatives. The applicants' equivalent would require no transmission line crossings.

6.2.4.7 Cost

Costs of the route alternatives are generally proportional to length and take into account the need for specialty and heavy-angle structures, which are more expensive than standard and/or tangent structures (Table 6-34). Alignment alternatives AA1 and AA2 would each require two specialty structures to cross an existing transmission line in two separate locations. They would also each require two heavy-angle structures, which cost more than three times that of a tangent structure. As a result, the applicants' equivalent (approximately $8 million) is less expensive than both alignment alternatives AA1 and AA2 (approximately $14 million).

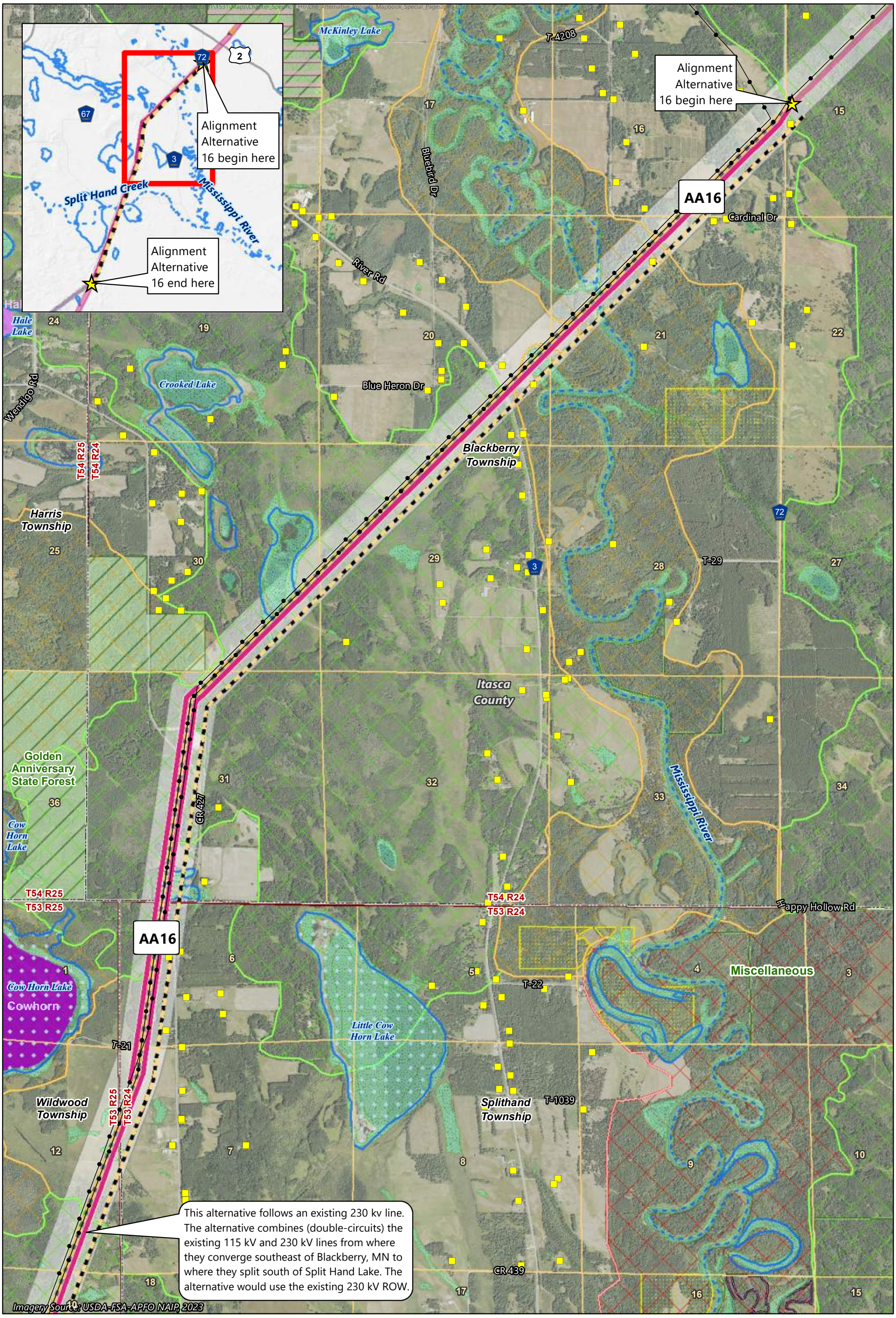
6.2.5 Alignment Alternative AA16 – Hill City to Little Pine Region

Alignment alternative AA16 provides an alternative placement of the applicants' proposed alignment in the northeastern corner of the Hill City to Little Pine region. Alignment alternative AA16 would consist of double-circuiting two existing transmission lines to allow alignment alternative AA16 to use that existing ROW. Potential impacts of alignment alternative AA16 and the applicants' equivalent are summarized in Table 6-39 and shown on Map 6-9 and Map 6-10.

Table 6-39 Human and Environmental Impacts – Alignment Alternative AA16, Hill City to Little Pine Region

Resource	Element	Alignment Alternative AA16	Applicants' Equivalent
Length (miles)		11.0	12.7
Human Settlement	Residences within 0-75 feet (count)	0	0
	Residences within 75-250 feet (count)	1	4
	Residences within 250-500 feet (count)	8	5
	Residences within 500–1,000 feet (count)	14	17
Land-Based Economies	Agricultural land in 150-foot ROW (acres)	26	20
Water Resources	Total wetlands in 150-foot ROW (acres)	94	87
	Forested wetlands in 150-foot ROW (acres)	43	8
Vegetation	Forested landcover in 150-foot ROW (acres)	70[1]	151
Sensitive Ecological Resources	Sites of Biodiversity Significance in 150-foot ROW (acres)	195	227
	Native Plant Communities in 150-foot ROW (acres)	2	9
	High Conservation Value Forest in 150-foot ROW (acres)	5	5
	Federal- or state-protected species documented in 150-foot ROW (count)	0	0
ROW Sharing and Paralleling	Transmission line (miles, percent)	11.0 (100)	12.7 (100)
	Roadway (miles, percent)	0 (0)	0 (0)
	Field, parcel, or section lines (miles, percent)	0 (0)	0 (0)
	Total ROW sharing and paralleling (miles, percent)	11.0 (100)	12.7 (100)
Reliability	Crossing of existing transmission lines (count)	0	0
Estimated Cost	Total estimated cost (2022 dollars in millions)	$106-$119[2]	$70.6

1 The NLCD indicates forested vegetation is in the ROW; however, the ROW is an existing transmission line ROW that has been cleared and is routinely maintained.
2 Double-circuiting the existing transmission lines in order to place the proposed route within existing ROW would add between $45-$58 million to alignment alternative AA16 (base cost of $59.3 million)



Alignment Alternative 16
Applicants' AA16 Equivalent
Route Width
Route Alternative Width
Existing Transmission Line
Residence

PWI Watercourse
PWI Waterbody
Shallow Wildlife Lake
Native Plant Community
State Conservation Easement
State Forest

Other DNR Land

Lakes of Biological Significance
High Significance
Moderate Significance

Wetlands
Non-Forested Wetland

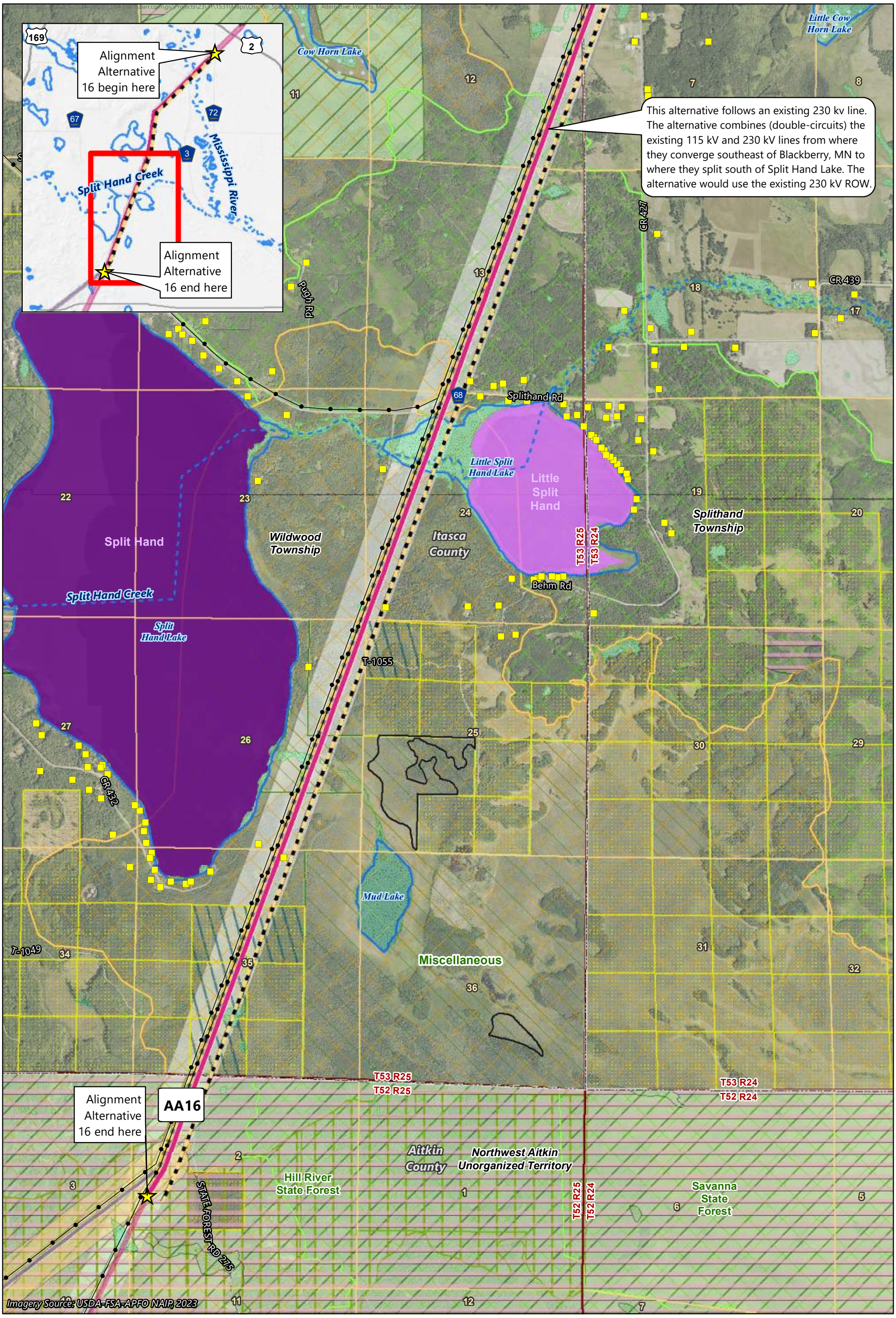
Forest Inventory Old Growth
Designated Old Growth

Site of Biodiversity Significance
Outstanding Significance
High Significance
Moderate Significance

Feet
0 1,000 2,000

Map 6-9

ALIGNMENT ALTERNATIVE AA16 (PART 1)
Hill City to Little Pine Region
Northland Reliability Project



Map 6-10

ALIGNMENT ALTERNATIVE AA16 (PART 2)
Hill City to Little Pine Region
Northland Reliability Project

6.2.5.1 Human Settlements

Potential project impacts on human settlements are assessed through an evaluation of several elements. For some of the human settlement elements, project impacts are anticipated to be minimal and independent of the route selected and therefore are not discussed in this Chapter. These resources, discussed exclusively in Chapter 5.3, include cultural values, electronic interference, noise, property values, and zoning and land use.

6.2.5.1.1 Aesthetics

Aesthetic impacts differ among the routing alternatives. Aesthetic impacts can be minimized by placing the transmission line away from residences and by following existing infrastructure and ROW. Proximity of residences to alignment alternative AA16 are shown in Table 6-40, while ROW paralleling and sharing are shown in Table 6-41.

Alignment alternative AA16 would consist of double-circuiting two existing transmission lines to allow the proposed route to use that existing ROW, while the applicants' equivalent would parallel existing transmission line ROW. The applicants' equivalent has slightly more homes in proximity than alignment alternative AA16. Alignment alternative AA16 and the applicants' equivalent both follow existing transmission lines for their entire length. Alignment alternative AA16 and the applicants' equivalent would have similar aesthetic impacts.

Table 6-40 Hill City to Little Pine Region Proximity of Residences to Alignment Alternative AA16

Residences, Distance from Anticipated Alignment	Alignment Alternative AA16	Applicants' Equivalent
Residences within 0-75 feet	0	0
Residences within 75-250 feet	1	4
Residences within 250-500 feet	8	5
Residences within 500-1,000 feet	14	17
Total Residences within 1,000 feet	23	26

Table 6-41 Hill City to Little Pine Region ROW Sharing and Paralleling of Alignment Alternative AA16

Infrastructure	Alignment Alternative AA16 miles (percent)	Applicants' Equivalent miles (percent)
Follows Existing Railroad	0 (0)	0 (0)
Follows Existing Roads	0 (0)	0 (0)
Follows Existing Transmission Line	11.0 (100)	12.7 (100)
Total – Follows Transmission Line, Road, or Railroad	11.0 (100)	12.7 (100)
Follows Field, Parcel, or Section Lines	0 (0)	0 (0)
Total – ROW Paralleling and Sharing	11.0 (100)	12.7 (100)
Total Length of Alignment Alternative	11.0	12.7

Portions may share or parallel more than one type of infrastructure ROW or division/boundary line and therefore the sum may be greater than 100 percent.

6.2.5.1.2 Displacement

For electrical safety code and maintenance reasons, residences or other buildings are typically not allowed within the transmission line ROW due to electrical safety code and maintenance reasons. Any residences or other buildings located within a proposed ROW are generally removed or displaced.

There are no permanent residences, churches, childcare centers, or schools located within the 150-foot ROW of alignment alternative AA16. However, two non-residential buildings (storage shed, agricultural outbuildings, etc.) are located within the 150-foot ROW of the applicants' equivalent.

These non-residential buildings may or may not be displaced because of the applicants' equivalent. Though buildings are generally not allowed with the transmission line ROW, there are instances where the activities taking place in these buildings are compatible with the safe operation of the line (e.g., storage, animal production, etc.). For each of the buildings noted here, the applicants would need to conduct a site-specific analysis to determine if the building would need to be displaced.

6.2.5.1.3 Socioeconomics and Environmental Justice

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures indicate how societies progress, stagnate, or regress because of the actions and interaction within and between the local, regional, or global economic scale. Transmission line projects can contribute to growth and progress at the local level over time, but generally do not have a significant long-term socioeconomic impact.

The project would improve the socioeconomics of the region through the creation of jobs, generation of tax revenue, and providing more reliable electrical service to the surrounding communities. Alignment alternative AA16 intersects with Wildwood Township, which has been identified as a community with EJCs; however, no adverse or permanent impacts to this area are anticipated. While alignment alternative AA16 does intersect a community with EJCs, this community is not anticipated to experience disproportionately adverse impacts as a result of the project, particularly because the project would parallel an existing transmission line for its entire length near this community.

6.2.5.2 Land-Based Economies

Potential project impacts to land-based economies are assessed through an evaluation of several elements, summarized in Chapter 6.1.1. There are no active mining operations within either of the alignment alternative AA16 or the applicants' equivalent rights-of-way. Therefore, potential project impacts to mining would be minimal and independent of the route selected.

6.2.5.2.1 Agriculture

Agricultural land impacts differ between alternative alignment AA16 and the applicants' equivalent. Alignment alternative AA16's ROW would impact no new agricultural land; though AA16 crosses agricultural land, it would be located within an existing transmission ROW. The applicants' equivalent would impact 20 acres of agricultural land within its ROW.

According to the USDA FSA (reference (107)), MDA Organic Farm Directory (reference (105)), and MDA Apiary Registry (reference (106)), there are no CREP enrolled lands, registered organic producers, or apiaries within the 150-foot ROW of alignment alternative AA16 or the applicants' equivalent.

6.2.5.2.2 Forestry

Forestry impacts within the Hill City to Little Pine region were primarily assessed by evaluating the forestry resources within the 150-foot ROW (Chapter 5.8.2) of each route alternative. Forested land comprises approximately 70 acres of the ROW of alignment alternative AA16 and 151 acres of the ROW of the applicants' equivalent (reference (108)). The forested land is comprised of deciduous forest, evergreen forest, mixed forest, and forested wetlands within this region (Map Book 5C). However, it is important to note that while the NLCD indicates forested vegetation is in the alignment alternative AA16 ROW, this ROW consists of an existing transmission line ROW that has been cleared and is routinely maintained.

As shown in Table 6-42, the designated forestry resources within the 150-foot ROW of the alignment alternatives consist of DNR state forest land, Minnesota School Trust land, Forests for the Future program land, and SFIA land.

Table 6-42 Designated Forestry Resources within the 150-foot ROW of Alignment Alternative AA16

Forestry Resources	Alignment Alternative AA16	Applicants' Equivalent
Acres of DNR state forest within 150-foot ROW	82	98
Acres of Minnesota School Trust Land[1] within 150-foot ROW	5	5
Acres of Forests for the Future[2] land within 150-foot ROW	14	14
Acres of Sustainable Forest Incentive Act[3] land within 150-foot ROW	20	19

In some cases, multiple state land classifications are located within the same section. Therefore, features may be duplicated and the analysis results may over-represent potential impacts.
Data Sources: references (3); (4)
1 Minnesota School Trust Lands are DNR-administered lands that are set aside to provide a continual source of funding for public education (reference (4).
[2] Minnesota's Forests for the Future Program is a conservation program administered by the DNR to encourage the protection of privately-owned forest lands through conservation easements or land purchases (reference (5)).
[3] Minnesota's Sustainable Forest Incentive Act is a conservation program administered by the DNR that provides annual incentive payments to encourage private landowners to keep their wooded areas undeveloped (reference (109)).

The applicants' equivalent would have significantly more impacts to forestry resources than alignment alternative AA16. Though both routing alternatives have designated forestry resources within their 150-foot rights-of-way based on GIS analysis, AA16 follows an existing transmission line ROW that has been cleared for forestry resources and is maintained as such.

6.2.5.2.3 Recreation and Tourism

Recreation and tourism activities within the Hill City to Little Pine region include outdoor recreational activities and camping opportunities on state managed lands, trails, and scenic byways. Since transmission line construction and operation generally has minimal permanent and temporary impacts to trails, project-related recreation and tourism impacts in this region are expected to be minimal where it parallels existing ROWs.

Alignment alternative AA16 and the applicants' equivalent both cross two scenic byways, two state forests, one off-road vehicle use trail, and one water trail. Alignment alternative would be collocated, while the applicants' equivalent parallels an existing transmission line ROW, thus, permanent impacts to resources in this area would be minimal. Temporary impacts from alignment alternative AA16 and the applicant's equivalent could include construction-related temporary trail closings as well as temporary interruptions in recreational opportunities within Golden Anniversary State Forest and Hill River State Forest. Although temporary impacts would occur because of project construction, they are expected to have a minimal long-term impact on recreation.

6.2.5.3 Archaeological and Historic Resources

There are no documented archaeological or historic architectural resources within the route width of alignment alternative AA16 or the applicants' equivalent. As a result, project impacts to cultural resources are anticipated to be minimal and independent of the route selected.

6.2.5.4 Natural Environment

6.2.5.4.1 Water Resources

Floodplain and groundwater impacts are anticipated to be minimal and independent of the project route selected. This routing alternative comparison discussion addresses watercourses, waterbodies, and wetlands. Map 6-9 and Map 6-10 show the water resources along alternative alignment AA16 and the applicants' equivalent.

6.2.5.4.1.1 Watercourses and Waterbodies

Table 6-43 identifies the number of watercourses and waterbodies crossed by alternative alignment AA16 and the applicants' equivalent. Alternative alignment AA16 would have two PWI basin crossings over 1,000 feet which would require structures placed within the waterbodies; the applicants' equivalent would present only one waterbody crossing over 1,000 feet. However, alternative alignment AA16 would reduce disturbance to watercourses and waterbodies by following an existing transmission line ROW.

Table 6-43 Watercourses and Waterbodies Crossed by the Alternative Alignment AA16 and the Applicants Equivalent

Resources	Alternative Alignment AA16	Applicants' Equivalent
Number of NHD stream crossings	5	5
Number of impaired stream crossings	1	1
Number PWI stream crossings	4	4
Number of NHD lake crossings	1	1
Number of impaired lake crossings	0	0
Number of PWI basin crossings	3	3

6.2.5.4.1.2 Wetlands

Table 6-39 identifies the wetland acreage crossed by alternative alignment AA16 and the applicants' equivalent. Alternative alignment AA16 would cross more non-forested and forested wetlands than the applicants' equivalent. Alignment alternative AA16 would have seven wetland crossings over 1,000 feet and the applicants' equivalent would have six wetland crossings over 1,000 feet.

6.2.5.4.2 Vegetation

The alignment alternative AA16 ROW would not impact forested vegetation because it would be follow an existing transmission line ROW (Map Book 5C). While the NLCD data indicates that forested vegetation is present in the ROW, it has all been cleared previously and maintained to low-stature vegetation for the existing transmission line. The applicants' equivalent ROW would impact approximately 151 acres of forested vegetation (Map Book 5C). No impacts associated with forested fragmentation would occur for alignment alternative AA16 or the applicants' equivalent. Because it would be located within an existing ROW, alignment alternative AA16 would best minimize forest vegetation impacts.

6.2.5.4.3 Wildlife

The alignment alternative AA16 ROW would not impact wildlife habitat because it would follow an existing transmission line ROW. The applicants' equivalent would require forest vegetation and associated wildlife habitat removal in its ROW. Neither alternative pass-through area that are managed or preserved for wildlife. Wildlife habitat fragmentation or increased impact potential to avian species would not occur for either alternative. Potential wildlife habitat impacts would be greater for the applicants' equivalent due to the loss of forested habitat.

6.2.5.5 Rare and Unique Natural Resources

Using the NHIS database, it was determined that no federal protected species have been documented within 1 mile of alignment alternative AA16 or the applicants' equivalent. Two state threatened vascular plant species have been documented within 1 mile of both alternatives (Appendix N). In addition, several state special concern species have been documented within 1 mile of each alternative (Appendix N). While no protected species have been documented within the ROW of either alignment alternative, AA16 consists of a routinely maintained/disturbed ROW, while the applicants' equivalent would require disturbance to and removal of potentially suitable habitat for protected species.

Alignment alternative AA16 ROW and the applicants' equivalent would intersect several sensitive ecological resources, including SBS ranked high, moderate, and below, native plant communities, and areas designated as High Conservation Value Forest (Table 6-44, Map 6-9 and Map 6-10). Alignment alternative AA16 would be co-located with the existing transmission line and as such, would traverse these resources within an existing ROW where disturbance to these resources has already occurred. While the applicants' equivalent would minimize sensitive ecological resource impacts by paralleling an existing transmission line ROW, impacts associated with vegetation clearing or structure placement would still occur.

Table 6-44 Sensitive Ecological Resources in the ROW of Alignment Alternative AA16 and the Applicants' Equivalent

Sensitive Ecological Resource	Area within ROW of AA16	Area within ROW of Applicants' Equivalent
Sites of Biodiversity Significance	195 total acres; 73 acres ranked high; 74 acres ranked moderate; 48 acres ranked below	227 total acres; 74 acres ranked high; 95 acres ranked moderate; 58 acres ranked below
Native Plant Communities	2 acres - conservation status S3-S5	9 acres - conservation status S3-S5
High Conservation Value Forest	5 acres	5 acres

6.2.5.6 Reliability

When one transmission line crosses another, reliability risks increase because the failure of one line can unexpectedly de-energize the other. Additionally, there is increased risk that if one transmission line falls, it can bring down the other transmission line, resulting in two, rather than one, line failures. Furthermore, performing maintenance at the transmission line crossing creates a safety risk, as under normal operating conditions one line must remain energized while work is occurring on the other line. Therefore, where practical, new lines are typically designed to minimize transmission line crossings.

No transmission line crossings are required for these alignment alternatives.

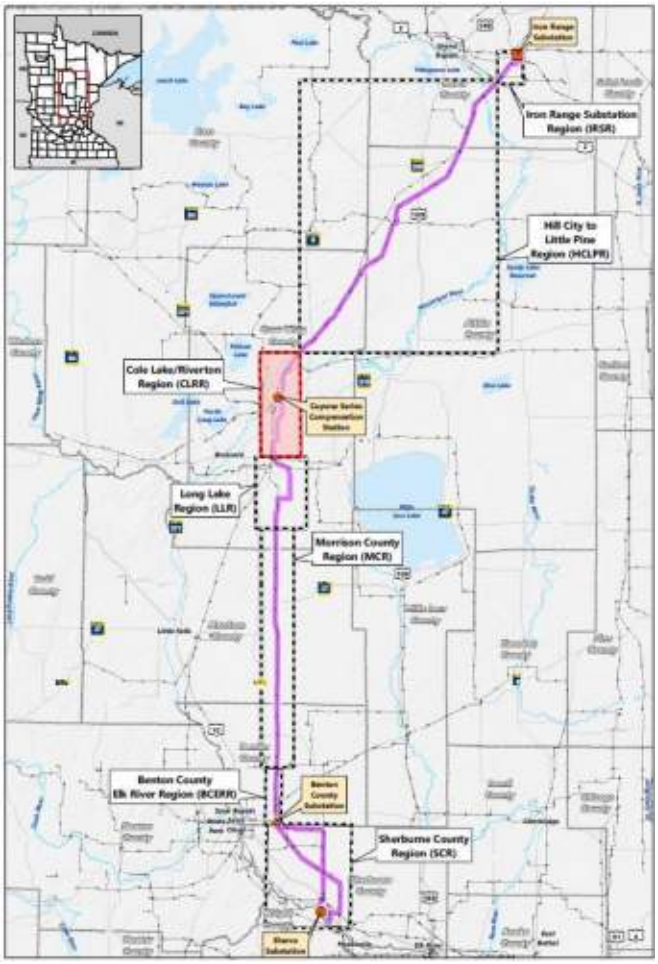
6.2.5.7 Cost

Routing alternative costs are generally proportional to length and take into account the need for specialty and heavy-angle structures, which are more expensive than standard and/or tangent structures (Table 6-39). Although the base cost of alignment alternative AA16 (approximately $60 million) is less than the applicants' equivalent (approximately $70 million), alignment alternative AA16 would require double-circuiting two existing lines in order to route the project within existing ROW of one of the lines to be double-circuited. New double-circuit structures and alignment would therefore add significant cost (approximately $45 million to $58 million) to alignment alternative AA16 (total cost between approximately $106 and $1119 million), making the applicants' equivalent the less expensive alternative.

6.3 Cole Lake-Riverton Region

The Cole Lake-Riverton region is located in Crow Wing County, just south of the Hill City to Little Pine region (Figure 6-5). In addition to the applicants' proposed route, the region has eight route alternatives (D3, E1, E2, E3, E4, E5, F, and G) and seven alignment alternatives (AA3, AA4, AA6, AA7, AA8, AA9, and AA10) (Map Book 3A). Chapter 6.3.1 summarizes the potential impacts resulting from construction and operation of the applicants' proposed route in the Cole Lake-Riverton region. Chapters 6.3.1 through 6.3.9 are dedicated to a comparison of potential project construction and operation impacts. Chapter 6.3.2 discusses route alternative D3, alignment alternatives AA4 and AA6, and the applicants' equivalent. Chapter 6.3.3 discusses alignment alternative AA3 and the applicants' equivalent. Chapter 6.3.4 discusses route alternatives E1, E2, E3, E4, E5, and the applicants' equivalent. Chapter 6.3.5 discusses route alternative F and the applicants' equivalent. Chapter 6.3.6 discusses route alternative G and the applicants' equivalent. Chapter 6.3.5 discusses route alternative F and the applicants' equivalent. Chapter 6.3.7 discusses alignment alternative AA7 and the applicants' equivalent. Chapter 6.3.8 discusses alignment alternative AA8, AA9, and the applicants' equivalent. Chapter 6.3.9 discusses alignment alternative AA10 and the applicants' equivalent.

Figure 6-5 Cole Lake-Riverton Region



6.3.1 Applicants' Proposed Route - Cole Lake-Riverton Region

Potential impacts of the applicants' proposed route in the Cole Lake-Riverton region are summarized in Table 6-45 and discussed in Chapters 6.3.1.1 through 6.3.1.5.

Table 6-45 Human and Environmental Impacts – Applicants' Proposed Route, Cole Lake-Riverton Region

Resource	Element	Applicants' Proposed Route
Length (miles)		17.7
Human Settlement	Residences within 0-75 feet (count)	1
	Residences within 75-250 feet (count)	2
	Residences within 250-500 feet (count)	13
	Residences within 500–1,000 feet (count)	33
Land-Based Economies	Agricultural land in 150-foot ROW (acres)	26
Water Resources	Total wetlands in 150-foot ROW (acres)	111
	Forested wetlands in 150-foot ROW (acres)	21
Vegetation	Forested landcover in 150-foot ROW (acres)	208
Wildlife	Shallow Wildlife Lake in 150-foot ROW (acres)	6
Rare and Unique Natural Resources	Sites of Biodiversity Significance in 150-foot ROW (acres)	115
	Native Plant Communities in 150-foot ROW (acres)	18
	Lake of Biological Significance in 150-foot ROW (acres)	2
	Federal- or state-protected species documented in 150-foot ROW (count)	1
ROW Sharing and Paralleling	Transmission line (miles, percent)	8.8 (50)
	Roadway (miles, percent)	0 (0)
	Field, parcel, or section lines (miles, percent)	8.5 (48)
	Total ROW sharing and paralleling (miles, percent)	15.4 (87)
Estimated Cost	Total estimated cost (2022 dollars in millions)	$90.4

6.3.1.1 Human Settlements

As discussed in Chapter 5.3, potential human settlement are assessed by looking at several evaluative human settlement elements: aesthetics, displacement, noise, property values, zoning and land-use compatibility, electronic interference, and cultural values. Proximity to homes, schools, and other human settlement features and the extent of ROW sharing with existing infrastructure are the primary potential human settlement impact indicators. Human settlement impacts are minimized by routes located away from homes and share a ROW with existing infrastructure.

For some of the human settlement elements in the Cole Lake-Riverton region, project impacts are anticipated to be minimal. For the Cole Lake-Riverton region, aesthetics and displacement are the only human settlement elements for which impacts are anticipated to be non-minimal.

6.3.1.1.1 Aesthetics

Aesthetic impacts are assessed, in part, through a consideration of the existing viewshed, landscape, character, and setting of any given area, followed by an evaluation of how a proposed routing alternative would change these aesthetic attributes (Chapter 5.3.1). Determining the relative scenic value or visual importance in any given area depends, in large part, on the values and expectations held by individuals and communities about the aesthetic resource in question.

Project aesthetic impacts can be minimized by placing the transmission line away from residences and by following existing infrastructure ROW. The proximity of residences is shown in Table 6-46. More than three quarters of the applicants' proposed route in the Cole Lake-Riverton region would parallel an existing transmission line ROW, as shown in Table 6-47.

The proposed Cuyuna Series Compensation Station has one residence within its siting area, and one residence immediately adjacent to the eastern border of the siting area (Map Book 5A). There are a number of residences to the south of the southern boundary, and several of them have a buffer of trees between the siting area and the compensation station. The siting area is located within a region containing several existing transmission lines, so project-related aesthetic impacts are expected to be limited.

Table 6-46 Cole Lake-Riverton Region Proximity of Residences to Applicants' Route

Residences, Distance from Anticipated Alignment	Applicants' Proposed Route
Residences within 0-75 feet	1
Residences within 75-250 feet	2
Residences within 250-500 feet	13
Residences within 500-1,000 feet	33
Total Residences within 1,000 feet	49

Table 6-47 Cole Lake-Riverton Region ROW Sharing and Paralleling of Applicants' Route

Infrastructure	Applicants' Proposed Route miles (percent)
Follows Existing Railroad	0 (0)
Follows Existing Roads	0 (0)
Follows Existing Transmission Line	8.8 (50)
Total – Follows Transmission Line, Road, or Railroad	8.8 (50)
Follows Field, Parcel, or Section Lines	8.5 (48)
Total – ROW Paralleling and Sharing	15.4 (87)
Total Length of Route Alternative	17.7

Portions may share or parallel more than one type of infrastructure ROW or division/boundary line, and therefore, the sum may be greater than 100 percent.

6.3.1.1.2 Displacement

Residences or other buildings are typically not allowed within the ROW of a transmission line for electrical safety code and maintenance reasons. Any residences or other buildings located within a proposed ROW are generally removed or displaced.

There are no churches, childcare centers, or schools located within the 150-foot ROW for the applicants' proposed route alternative. However, there is one permanent residence and one non-residential building (storage shed, agricultural outbuildings, etc.) located within the 150-foot ROW of the applicants' proposed alternative.

The one residential building located within the 150-foot ROW of the applicants' proposed route could be displaced because of the project; similarly, the non-residential building may or may not be displaced. Though buildings are generally not allowed with the transmission line ROW, there are instances where the activities taking place in these buildings are compatible with the safe operation of the line (e.g., animal production). For each of the buildings noted here, the applicants would need to conduct a site-specific analysis to determine if the building would require displacement.

There are no churches, childcare centers, or schools located in the siting are for the applicants' proposed Cuyuna Series Compensation Station. There is one permanent residence and one non-residential building (storage shed, agricultural outbuildings, etc.) located within the siting area that could be displaced because of the project. They are in the southwestern corner of the siting area. The applicants would need to conduct a site-specific analysis, as these buildings may not need to be displaced because of the project.

6.3.1.1.3 Socioeconomics and Environmental Justice

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures indicate how societies progress, stagnate, or regress because of the actions and interactions at the local, regional, or global economic scale. Transmission line projects can contribute to growth and progress at the local level over time, but generally do not have a significant long-term socioeconomic impact.