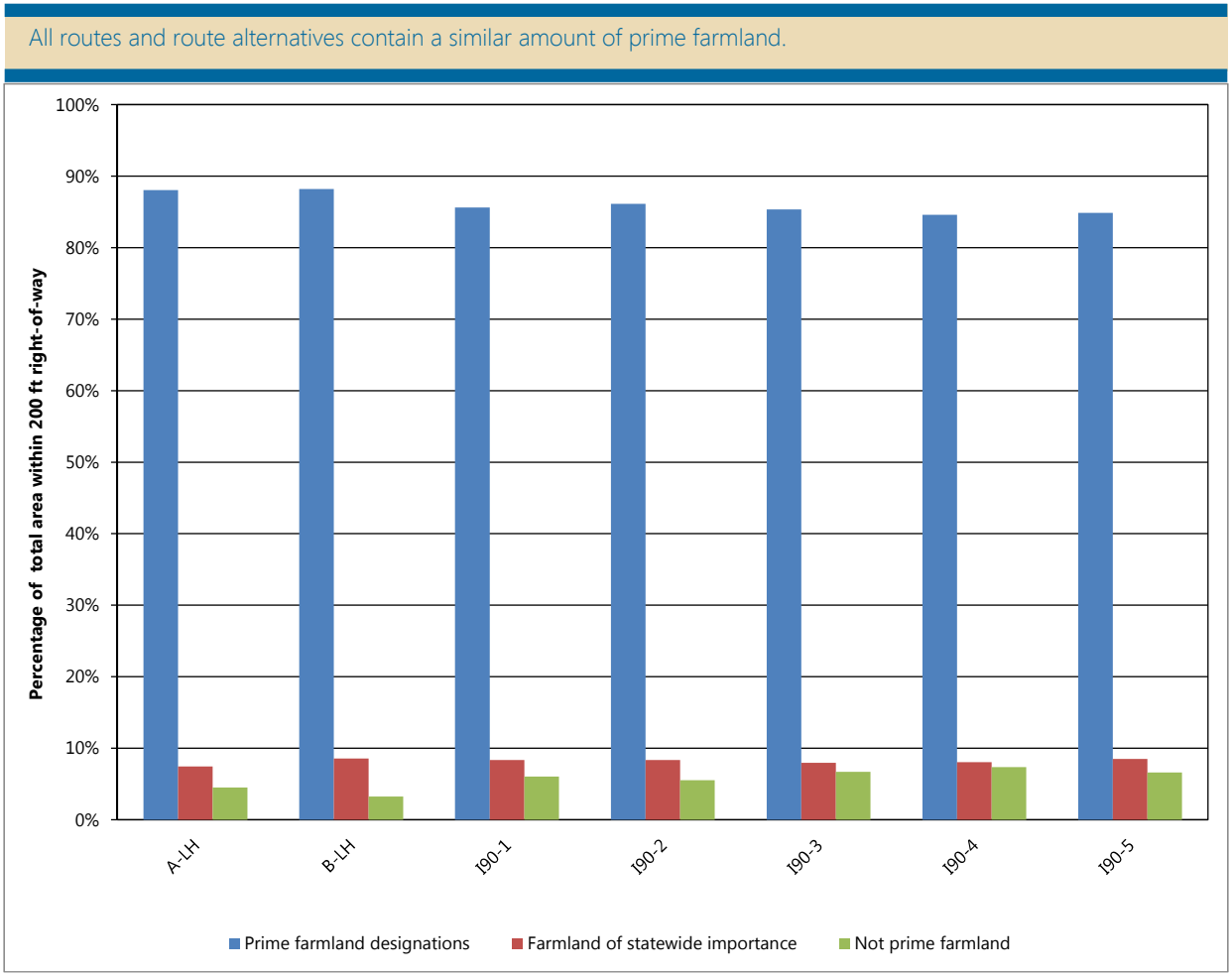
Figure 6-3 Farmland Classifications – Lakefield to Huntley



Source: Reference 58

In addition, Appendix J provides the total acreage of each route or route alternative's ROW that is designated as prime farmland or designated as farmland of statewide importance, and the total acreage of each route or route alternative's ROW that does not fall into either category. Appendix J also provides total cropland acres within each route or route alternative's ROW based on United States Geologic Survey (USGS) National Landscape Conservation System (NLCS) Gap Analysis Program (GAP) data.

While NRCS designated farmland and USGS NLCS GAP datasets are derived differently, the data in Appendix J shows that both datasets tell a similar story in terms of acreages of agricultural land versus non-agricultural land in terms of the relative agricultural impacts of the routes and route alternatives under consideration. Appendix J indicates that the amount of farmland within the ROWs (ranging from approximately 1,240-1,330 acres) does not vary notably from one route or route alternative to the next in the Lakefield to Huntley segment. Generally there is not a notable difference between the routes and route alternatives in this segment with respect to the percentage or type of farmland within the ROW, as indicated in Figure 6-3.

Though the total agricultural acreage and the type of acreage do not vary significantly between the routes and route alternatives, the impacts to agriculture do vary, and this is result of transmission line ROW sharing. As discussed above in the "Human Settlements" section of Section 6.1.1, route A-LH shares nearly 70 percent of its total length with existing transmission line. Along route A-LH, existing H-frame 161 kV transmission line structures would be replaced with taller single pole structures that would accommodate both the existing 161 kV transmission line and the proposed 345 kV transmission line. Because of this, route A-LH introduces few new agricultural impacts, and would likely reduce challenges associated with farming around transmission line structures as monopole structures are typically easier to farm around than H-frame structures.

Route alternative I90-2 also shares a significant percent of its total length with existing transmission line (approximately 75 percent) and shares, in parts, the same alignment as route A-LH. Thus, route alternative I90-2 also has relatively fewer agricultural impacts. Other I90 alternatives, though they share ROW with the existing 161 kV line along I-90 west of the city of Sherburn, do not minimize impacts to agricultural lands along I-90 as a result of this sharing. This is because the existing 161 kV line is not in compliance with MnDOT's accommodation policy. Thus, if the new 345 kV were to be constructed in a double-circuit fashion with this existing 161 line, the transmission line poles would need to be moved further away from the highway and further into agricultural fields. There would be no change from H-frame structures to single pole structures, and structures would be pushed farther into fields.

Route B has the least amount of ROW sharing with transmission lines and thus is anticipated to have relatively greater impacts to agriculture in this segment.

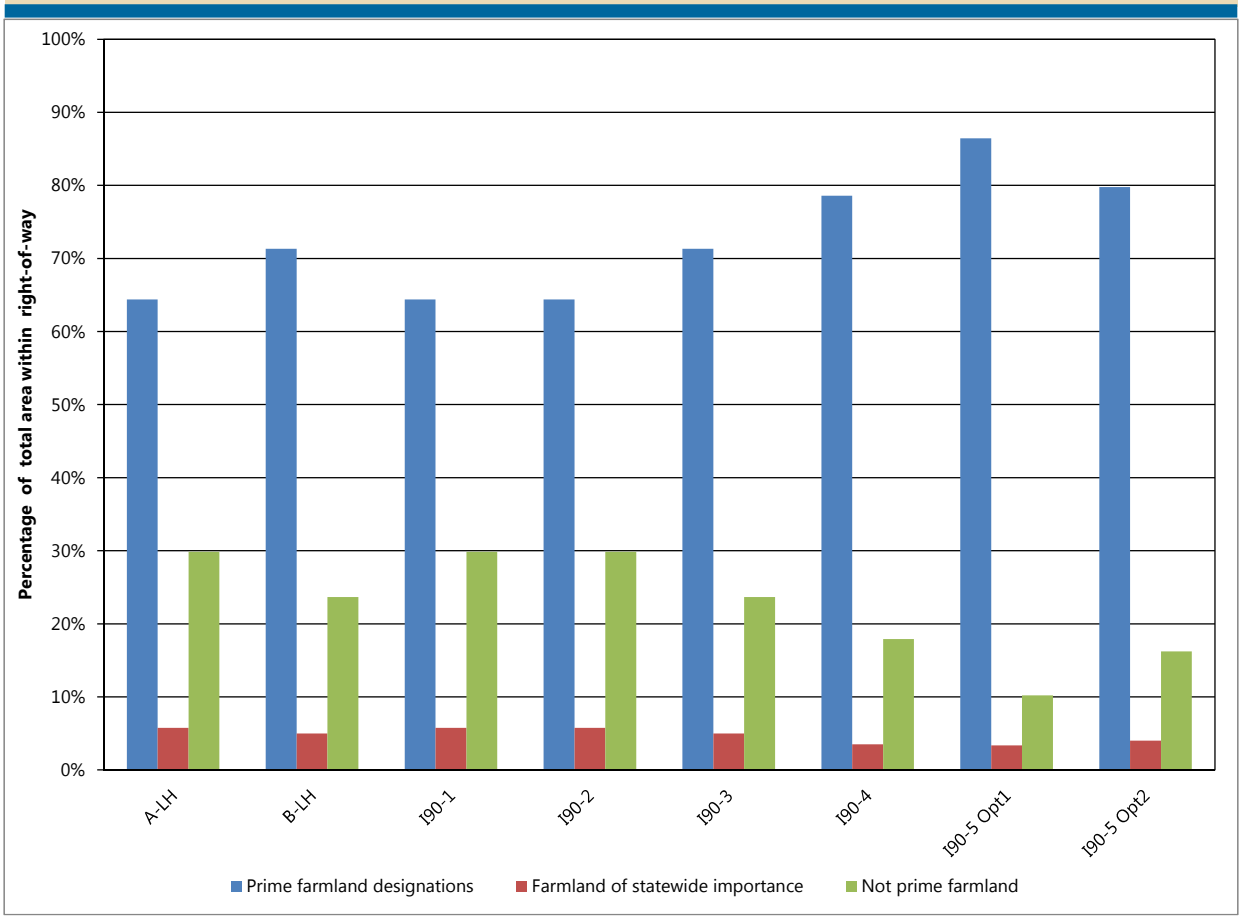
Agricultural impacts occurring where the transmission line parallels and uses some of the I-90 ROW could be minimized through a special permit condition requiring that the line, when paralleling the I-90 ROW, use the ROW to the maximum extent feasible, consistent with MnDOT's accommodation policy. For all routes and route alternatives general mitigation measures for farmland impacts would follow those discussed in Section 5.4.1.

Agricultural Land, Prime Farmland – Associated Facilities

Facilities associated with the route alternatives would have varying effects on farmland, as shown in Figure 6-4. Appendix J provides the total acreage of each route or route alternative's ROW that is designated as prime farmland or designated as farmland of statewide importance, and the total acreage of each route or route alternative's ROW that does not fall into either category. All associated facilities have similar amounts of farmland within their ROWs (Appendix J). Associated facilities for route A-LH and route alternatives I90-1, and I90-2

Figure 6-4 Farmland Classifications – Associated Facilities

The associated facilities for route alternatives I90-4 and I90-5 contain relatively greater amounts of prime farmland.



Source: Reference 58

all have similar percentages of prime farmland within their ROWs. Associated facilities for route B-LH and route alternative I90-3 have a slightly higher percentage of prime farmland within their ROWs. Of all the associated facilities configurations, the configuration associated with route alternative I90-5 Option 1 has the greatest percentage of prime farmland in its ROW.

ROW sharing is an important consideration for the associated facilities' impacts on farmland. Associated facilities configurations for route A-LH and route alternatives I90-1 and I90-2 generally reduce new impacts to farmland by maximizing transmission line ROW sharing.

The project would involve expanding the footprint of the Lakefield Junction substation by approximately 2.2 acres (Reference 1); this entire footprint is classified as prime farmland or prime farmland if drained. The project would require that this land be removed from its current use as farmland to become part of the substation facility.

Approximately 32 acres of land would be required for the Huntley substation. This acreage is farmland at both possible substation sites. Approximately 91 percent of this acreage at the proposed Huntley substation site is classified as prime farmland or prime farmland if drained. The entire 32 acres for the alternative southern Huntley substation is classified as prime farmland or prime farmland if drained (Reference 1).

Recreation and Tourism – Routes and Route Alternatives

No state, county or city parks are located within the ROWs of any of the routes and route alternatives in this segment. A number of other recreational resources can be found within the ROWs of the routes and route alternatives, as summarized below:

- **Route A-LH.** ROW contains 0.3 miles of snowmobile trail, five snowmobile trail crossings and the Fox Lake Game Refuge.
- **Route B-LH.** ROW contains 4.0 miles of snowmobile trail, nine snowmobile trail crossings and the Four Corners Wildlife Management Area (WMA) and Fox Lake Game Refuge. The Toe, Carron and Center Creek WMAs and the Boot Lake Waterfowl Production Area (WPA) are all located within the route width.
- **Route alternatives I90-1 and I90-2.** ROWs contain 1.5 miles of snowmobile trail, 17 snowmobile trail crossings, the Fox Lake Game Refuge and the Krahmer WMA.
- **Route alternative I90-3.** ROW contains 1.5 miles of snowmobile trail, 17 snowmobile trail crossings, the Fox Lake Game Refuge, the city of Fairmont Game Refuge and the Krahmer WMA. The Lake Gluckeen WMA is located within the route width.
- **Route alternative I90-4.** ROW contains 1.7 miles of snowmobile trail, 20 snowmobile trail crossings, the Fox Lake Game Refuge and the Krahmer WMA. The Lake Gluckeen WMA is located within the route width.
- **Route alternative I90-5.** ROW contains 1.6 miles of snowmobile trail, 19 snowmobile trail crossings, the Fox Lake Game Refuge and the Krahmer WMA. The Lake Gluckeen WMA is located within the route width.

Map 6-1 and Map 6-2 show snowmobile trails in the Lakefield to Huntley segment. WMAs, WPAs and game refuges are shown on Map 6-5 and Map 6-6. During construction, portions of these recreational facilities and surrounding areas might need to be blocked off, temporarily impeding recreational use. Once construction has been completed, these facilities would again be available for recreational activities. General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

It is possible that the continuing operation of the line could impact recreation and tourism in the project area. The line could make recreating in certain areas less desirable because of the aesthetic impacts of the line (Section 6.1.1). Additionally, citizens might choose to recreate in areas outside of the project area, thus impacting recreation and tourism economies in the project area. It is difficult to predict if or how the desirability of recreating in areas near the transmission line might change as a result of the line; however, in general, impacts are anticipated to be minimal.

Recreation and Tourism – Associated Facilities

No WMAs, WPAs, snowmobile trails or state, county or city parks are located within the footprints of any of the associated facilities being considered for this project. All of the associated facilities would require construction across the Blue Earth River and the associated Blue Earth River State Water Trail. During construction, a portion of the river and surrounding area might need to be blocked off, temporarily impeding recreationists' use of the water trail and

potentially resulting in the need for a detour. Once construction has been completed, the Blue Earth River State Water Trail would again be available for recreational activities. General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

The associated facilities could impact recreation and tourism through aesthetic impacts. Citizens may choose not to recreate near the Blue Earth River in the area of the associated facilities. Though these impacts are difficult to predict, they are, in general, anticipated to be minimal.

Archaeological and Historic Resources

As discussed in Section 5.5, impacts to archaeological and historic resources are assessed by reviewing SHPO databases to identify archaeological and historic sites in close proximity to the project. The proximity of a transmission line to archaeological and historic sites is the primary indicator of the potential for impacts. Archaeological resources located within areas that would be disturbed during construction can be impacted by the disruption or removal of such resources during construction activities. Historic resources can be impacted by the placement of a line nearby in a manner that impairs or decreases the historic value of the resource, for example altering the historic character of a site by changing the viewshed.

Data from the Minnesota State Historic Preservation Office (SHPO) has been used to identify known archaeological and historic resources within half a mile of the anticipated alignment for each route alternative. These resources are listed in Appendix I and shown on Map 6-3 and Map 6-4.

Routes and Route Alternatives

The numbers of archaeological and historic resources within half a mile of the routes and route alternatives for the Lakefield to Huntley segment are shown in Table 6-1. The numbers of archaeological and historic resources within 100 feet of the anticipated alignments of the routes and route alternatives for the Lakefield to Huntley segment are shown in Table 6-2.

Table 6-1 Archaeological and Historic Resources Within Half a Mile of Routes and Route Alternatives – Lakefield to Huntley

Route Alternative	Archaeological Resources	Historic Resources
A-LH	22	12
B-LH	9	2
I90-1	26	12
I90-2	26	12
I90-3	14	6
I90-4	19	6
I90-5	7	6

Source: Reference 59

Table 6-2 Archaeological Resources Within 100 Feet of the Anticipated Alignments of Routes and Route Alternatives – Lakefield to Huntley

Route Alternative	Archaeological Resources	Comments
A-LH	1	21FA0064 – Site is listed on the NRHP.
B-LH	0	No known archaeological resources would be affected by this route alternative.
I90-1	1	21FA0064 – Site is listed on the NRHP
I90-2	1	21FA0064 – Site is listed on the NRHP
I90-3	0	No known archaeological resources would be affected by this route alternative.
I90-4	1	21FA0042 – Eligibility status for the NRHP has not been evaluated.
I90-5	0	No known archaeological resources would be affected by this route alternative.

Source: Reference 59

The majority of the archaeological resources identified are located a significant distance from the proposed ROWs and would not be affected by the project. Route A-LH and route alternatives I90-1, I90-2 and I90-4, however, all have one identified archaeological resource located within 100 feet of the anticipated alignment for the line (Table 6-2). Route A-LH and route alternatives I90-1 and I90-2 are all within 100 feet of archaeological site 21FA0064, which is listed on the National Register of Historic Places (NRHP). Route alternative I90-4 is within 100 feet of site 21FA0042, which has not been evaluated for its eligibility to be listed on the NRHP. It is possible that these archaeological resources could be adversely affected by the project. Depending on the nature of the resource, however, it may be possible to avoid impacts to resources within the ROW by pole placement or prudent placement of the alignment within the route. No recorded archaeological resources are located within 100 feet of the anticipated alignments of route B-LH and route alternatives I90-3, I90-5 Option 1 and I90-5 Option 2.

All of the routes and route alternatives are within half a mile of known historic resources. These historic resources, however, are more than 500 feet from the anticipated alignments of the routes and route alternatives. Because of the distance between the project and these resources, adverse visual impacts to these historic resources are unlikely; however, the potential does exist. Route B-LH has the least potential for impacts, as only two known historic resources are located within half a mile of its anticipated alignment. Mitigation strategies for impacts to archaeological and historic resources are discussed in Section 5.5.

Associated Facilities

A total of eight archaeological resources and one historical resource are located within half a mile of the proposed associated facilities, although none lie within 100 feet of the facilities. The historic resource is located more than 500 feet from the facilities. Although it is unlikely that the project would result in adverse visual effects to this resource the potential does exist.

The number of archaeological and historic resources within half a mile of the project's possible substation sites is shown in Table 6-3. No known archaeological or historic resources are located within half a mile of the Lakefield Junction substation. The archaeological resources that are located within half a mile of the proposed Huntley substation sites are more than 100 feet away, and it is unlikely that these resources would be affected.

Natural Environment

As discussed in Section 5.6, impacts to the natural environment are assessed by looking at three specific elements of the natural environment: water resources, flora and fauna. For each of these elements, differences in the magnitude of potential impacts across the routes and route alternatives are discussed below.

Overall, analysis of the natural resources present along the routes and route alternatives indicates that the potential impacts to various natural resource elements is anticipated to be minor, and generally does not vary notably between route and route alternatives. This is likely due to the fact that the majority of the project area is agricultural land, with limited diversity in natural resource elements.

Water Resources

As discussed in Section 5.6.1, potential effects on water resources are evaluated by assessing impacts to surface waters, floodplains, wetlands and groundwater. Proximity of the project to lakes, watercourses, floodplains, wetlands and groundwater wells, and the necessity of crossing these features are the primary indicators of potential effects on water resources.

Surface waters, including lakes, watercourses (rivers, streams and ditches), Public Waters Inventory (PWI) waters and impaired waters, Federal Emergency Management Agency (FEMA)-designated 100-year floodplains, National Wetlands Inventory (NWI)-mapped wetlands and County Well Index groundwater wells, exist within the ROW and route width of all routes, route alternatives and associated facilities evaluated in the Lakefield to Huntley

Table 6-3 Archaeological and Historic Resources Within Half a Mile of Substations

Substation	Archaeological Resources	Historic Resources
Lakefield	0	0
Proposed Huntley Site	6	0
Alternative Southern Huntley Site	0	0

Source: Reference 59

segment. In addition, these resources were identified within the footprints of the Lakefield Junction substation and proposed Huntley substation and alternative southern Huntley substation sites.

Some potential impacts on water resources are anticipated to be minimal and independent of the route selected for the project. For the Lakefield to Huntley segment, these impacts are:

- **Floodplains.** FEMA-designated 100-year floodplain is present within the project area. Mapped floodplains would be spanned to the extent feasible; however, the small cross-section of transmission line structures is not expected to affect flood elevations over a large river floodplain. Thus, no impacts to floodplains are anticipated. Some counties and municipalities along rivers have floodplain ordinances, which require that floodplain impacts be avoided when feasible, and permitted (usually through a floodplain permit) if unavoidable.
- **Groundwater.** Structure foundations are typically between 25 feet and 30 feet deep, with well depths typically at least 75 feet deep. Because of this difference in depth and because foundation materials are relatively non-hazardous materials, impacts to groundwater resources are not anticipated.

This section focuses primarily on surface waters and wetlands that are within the ROW or are crossed by the proposed alignments. The number of surface water and wetland crossings is an important element to consider when evaluating route alternatives, even though there are no direct impacts associated with these crossings. This is because the indirect impacts associated with surface water crossings are potentially substantial. The number of surface water crossings has an effect on the magnitude of indirect impacts to wildlife; this is discussed in Section 6.1.1, additional data is provided in Appendix J and Appendix K. Map 6-5 and Map 6-6 identify the water resources near each route, route alternative, associated facility and substation site in the Lakefield to Huntley segment of the project.

Surface Waters – Routes and Route Alternatives

Lake Charlotte and Buffalo Lake – each part of the Chain of Lakes area – and Fox Lake are the largest lakes within this segment of the project, and all are listed on the PWI (Map 6-5 and Map 6-6). Several smaller lakes, some of which would have to be crossed by various alternatives, are also scattered throughout this area (Map 6-5 and Map 6-6). Lake Charlotte and Fox Lake are not located within the route width of any of the routes or route alternatives in this segment of the project. Buffalo Lake is located within the 200-foot ROW of all the I90 route alternatives, but none of the route alternatives would have to cross it. Route alternatives I90-3 and I90-5 would require one lake crossing, while route alternative I90-4 would require two and route B-LH three (Appendix J; Map 6-5 and Map 6-6). In contrast, route A-LH and route alternatives I90-1 and I90-2 would not cross any lakes. No impaired lakes are present within this segment of the project, and no route alternatives in this segment would cross any PWI lakes.

Several PWI watercourses are present in this segment of the project, including the Des Moines and Blue Earth Rivers. Additional watercourses within this segment include Center Creek, South Fork Elm Creek, Lily Creek, South Creek and many county and judicial ditches, many of which are listed on the PWI (Map 6-5 and Map 6-6)

The six impaired watercourses within this segment include the Des Moines River, East Branch Des Moines River, Blue Earth River, Center Creek, Lily Creek and Judicial Ditch 3. All of the routes and route alternatives within this segment would have to cross impaired watercourses (Map 6-5 and Map 6-6, Figure 6-5). Route B-LH has notably fewer impaired watercourse crossings than the other routes, which are similar in their number of crossings.

The routes and route alternatives within this segment would cross several watercourses, as summarized in Figure 6-5. The route routes and route alternatives in this segment would have between 20 and 25 watercourses within their 200-foot ROWs (Appendix J). Route alternatives in this segment would have between 27 and 41 watercourse crossings, with route B-LH crossing the fewest watercourses and route alternative I90-4 the most. Route B-LH would also have the fewest PWI and impaired watercourse crossings.

General mitigation measures that would be employed to minimize impacts to water resources are discussed in Section 5.6.1. It is anticipated that all lakes and watercourses would be spanned. No structures would be placed within them, and no direct impacts to lakes and watercourses are anticipated. Indirect impacts to these resources, such as increases in turbidity, could be minimized by using best management practices (BMPs) and by choosing a route alternative that has relatively few crossings of lakes and watercourses. This is because there are relevant indirect impacts associated with surface water crossings; therefore, having fewer crossings

reduces these indirect impacts. For the Lakefield to Huntley segment, route B-LH has the fewest watercourse crossings. All other route alternatives are similar in the number of water crossings.

Surface Waters – Associated Facilities

Each route and route alternative would have to be connected to associated facilities, which would include reconfiguring local lines to extend from the old Winnebago Junction substation to the proposed Huntley substation or alternative southern Huntley substation. This reconfiguration would involve constructing new transmission lines and removing some existing lines.

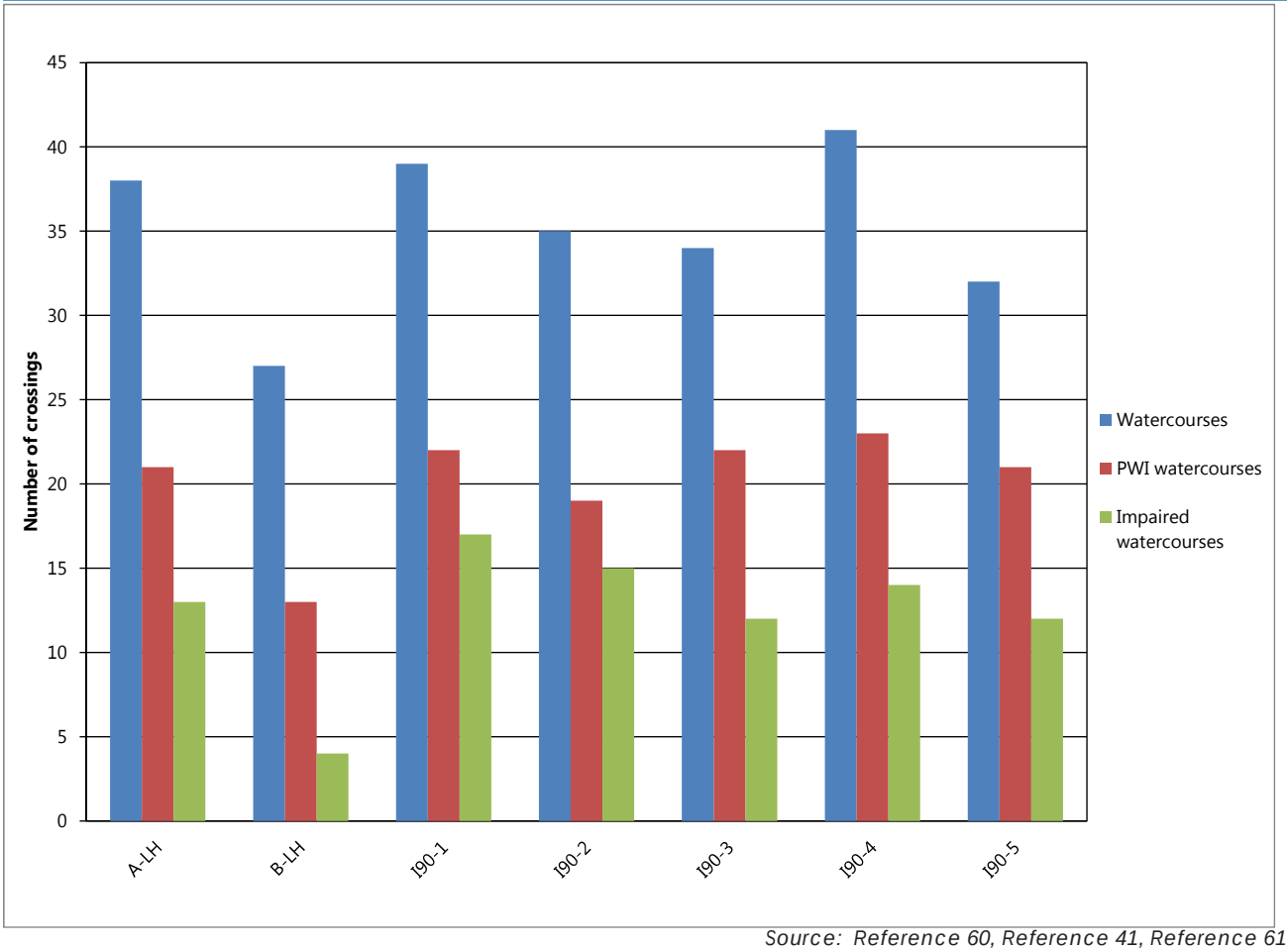
Lakes are not common in the vicinity of the associated facilities. Only one small, unnamed lake would be crossed by the I90-5 Option 1 and I90-5 Option 2 associated facilities. This lake is already crossed by an existing 161 kV HVTL (Map 6-6) and is neither listed on the PWI nor designated an impaired water.

The Blue Earth River, Center Creek, South Creek and unnamed streams and ditches flow through the vicinity of the associated facilities (Map 6-6). Each route alternative's associated facilities would cross the Blue Earth River at least once, with I90-5 Option 1 and I90-5 Option 2's associated facilities each crossing the Blue Earth River four times (Map 6-6). These crossings, however, are already spanned by the existing 161 kV HVTL. Figure 6-6 summarizes the total number of watercourses, PWI watercourses and impaired streams that the associated facilities would cross for each route alternative. As Figure 6-6 indicates, the associated facilities for route alternatives I90-5 Option 1 and I90-5 Option 2 would have significantly more watercourse, PWI watercourse and impaired watercourse crossings than the associated facilities of the other route alternatives.

No lakes are present within the footprints of the Lakefield Junction substation, the proposed Huntley substation site or the alternative southern Huntley

Figure 6-5 Watercourse Crossings – Lakefield to Huntley

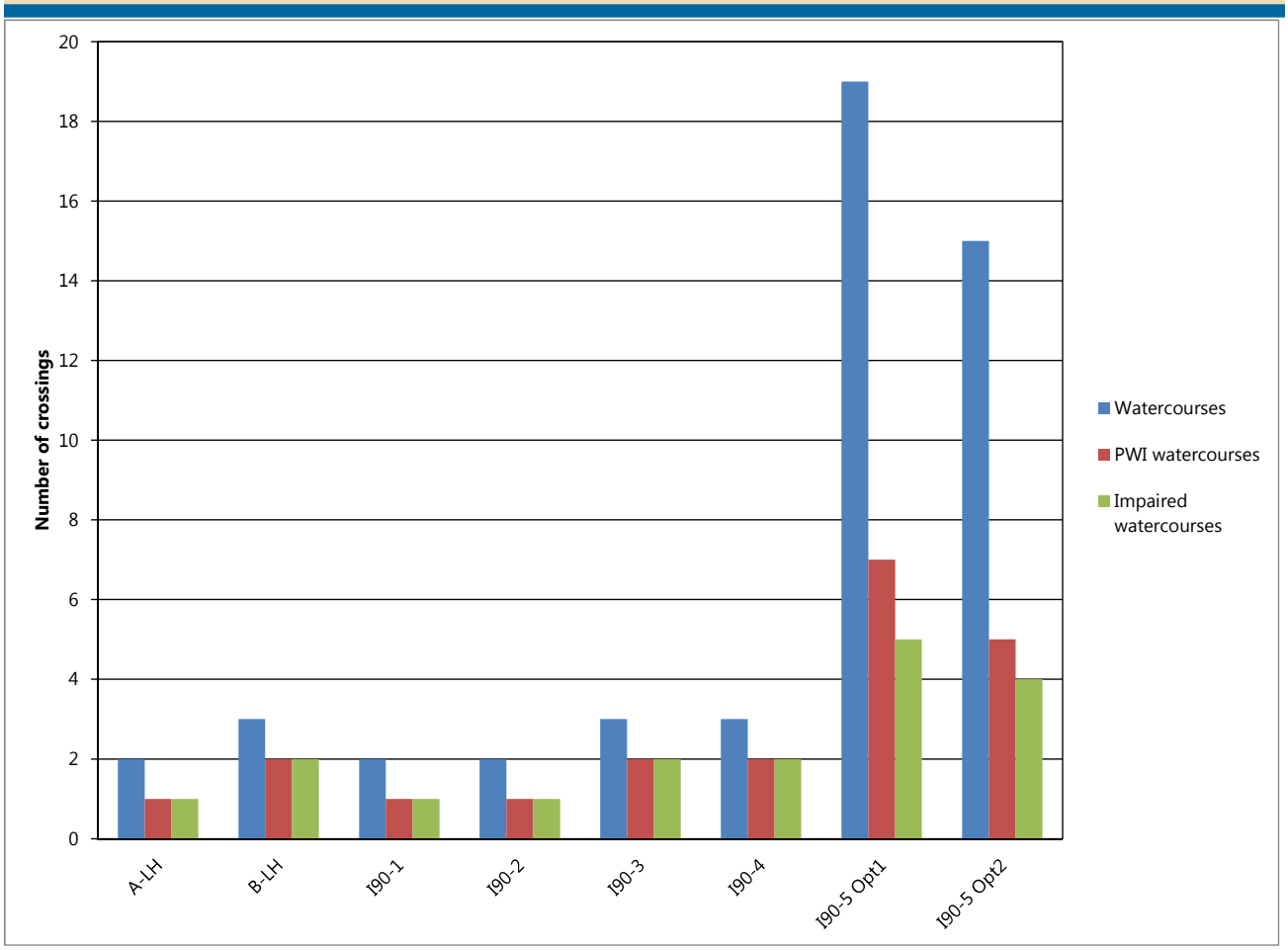
The number and type of watercourse crossings are fairly similar for all routes and route alternatives, except for route B-LH.



Source: Reference 60, Reference 41, Reference 61

Figure 6-6 Watercourse Crossings – Associated Facilities

The associated facilities for route alternative I90-5 have a greater number of watercourse crossings than all other associated facilities.



Source: Reference 60, Reference 41, Reference 61

substation site. Thus, no impacts to lakes due to substations are anticipated.

One unnamed watercourse, which is not listed on the PWI or designated as an impaired water, flows through the far northeastern corner of the alternative southern Huntley substation site, although no effects on this watercourse are anticipated. No other watercourses are present within the proposed substation footprints.

Wetlands – Routes and Route Alternatives

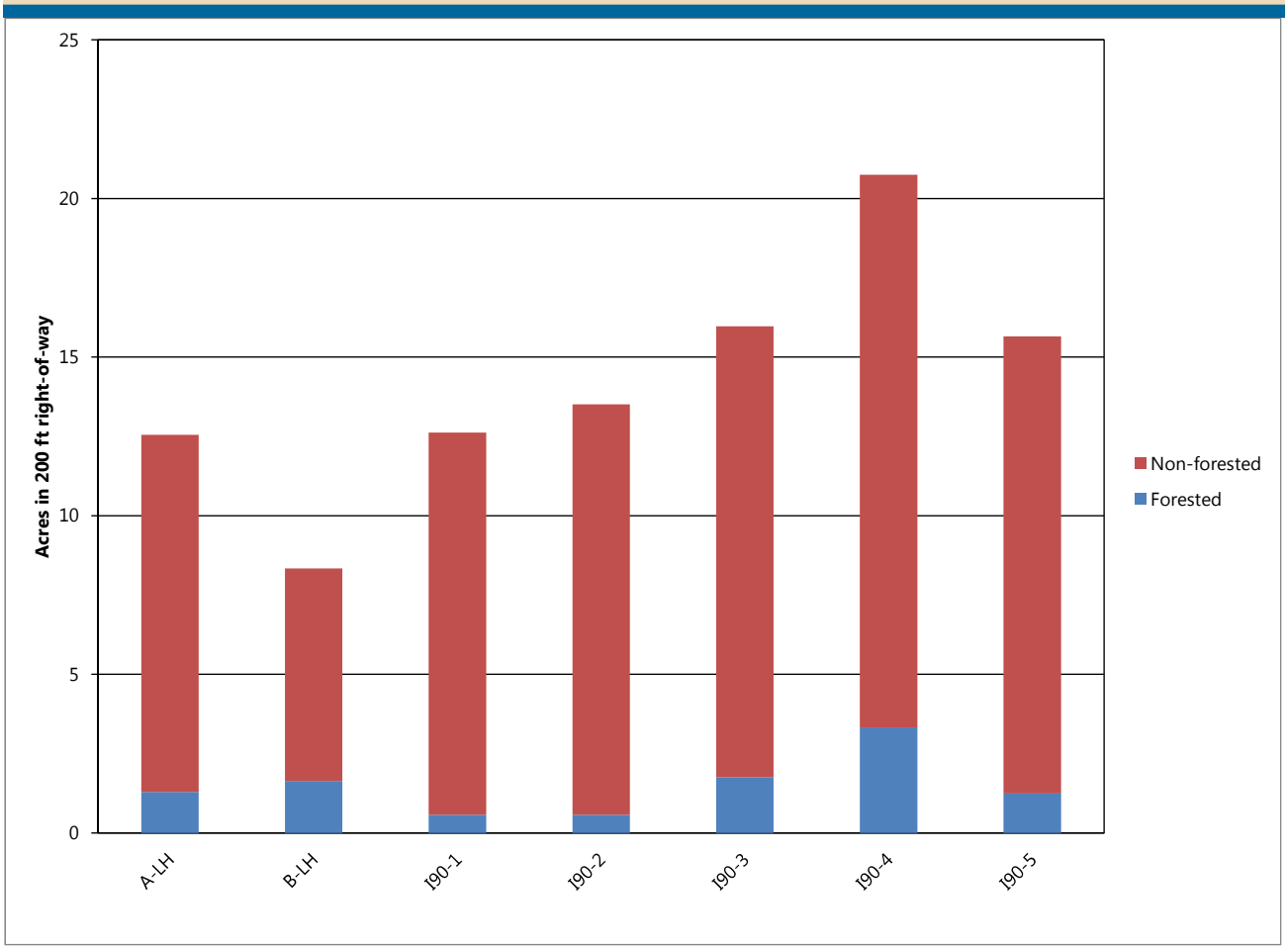
Wetlands within the 200-foot ROW of the routes and route alternatives in this segment consist mostly of small freshwater emergent wetlands, with a few small freshwater ponds and some shrub-dominated wetlands and forested wetlands. Figure 6-7 shows the total area of wetland and forested wetland that are present within the 200-foot ROW of each route and route alternative. Route B-LH has the least amount of wetland within the 200-foot ROW, while route alternative I90-4 has the most (Figure 6-7). Route alternatives I90-1 and I90-2 have the least amount of forested wetland within the 200-foot ROW, while route alternative I90-4 has the most (Figure 6-7).

Although wetlands would be spanned to the extent possible, all routes and route alternatives in this segment would cross a wetland wider than 1,000 feet, which might require that one or more poles be placed within them. All of the I90 route alternatives would have to cross one PWI wetland, while routes A-LH and B-LH would not cross any.

Temporary impacts to wetlands could occur if they need to be crossed during construction. Using BMPs and choosing one of the routes or route alternatives with fewer acres of wetland within the 200-foot ROW could minimize these temporary impacts (Section 5.6.1).

Figure 6-7 Wetlands Within ROW – Lakefield to Huntley

All routes and route alternatives contain about the same amount of wetlands, except for route B-LH and route alternative I90-4.



Source: Reference 46

Permanent impacts to wetlands could occur if the wetlands within the 200-foot ROW are currently forested. Forested wetlands could change to non-forested wetlands because vegetation maintenance procedures under transmission lines would prevent trees from establishing. Choosing route alternatives I90-1 or I90-2 would minimize these impacts because these route alternatives have the least amount of forested wetland within their 200-foot ROWs.

Wetlands – Associated Facilities

As Figure 6-8 indicates, the associated facilities for routes A-LH and B-LH and route alternatives I90-1, I90-2 and I90-3 have the least amount of total wetland and no forested wetland within their ROWs. The associated facilities for route alternatives I90-5 Option 1 and I90-5 Option 2 have notably more total wetland in their ROWs, some of which is forested (Figure 6-8).

None of the associated facilities for any of the routes or route alternatives would cross a wetland wider than 1,000 feet. Hence, no transmission line structures would need to be placed in wetlands crossed by the associated facilities.

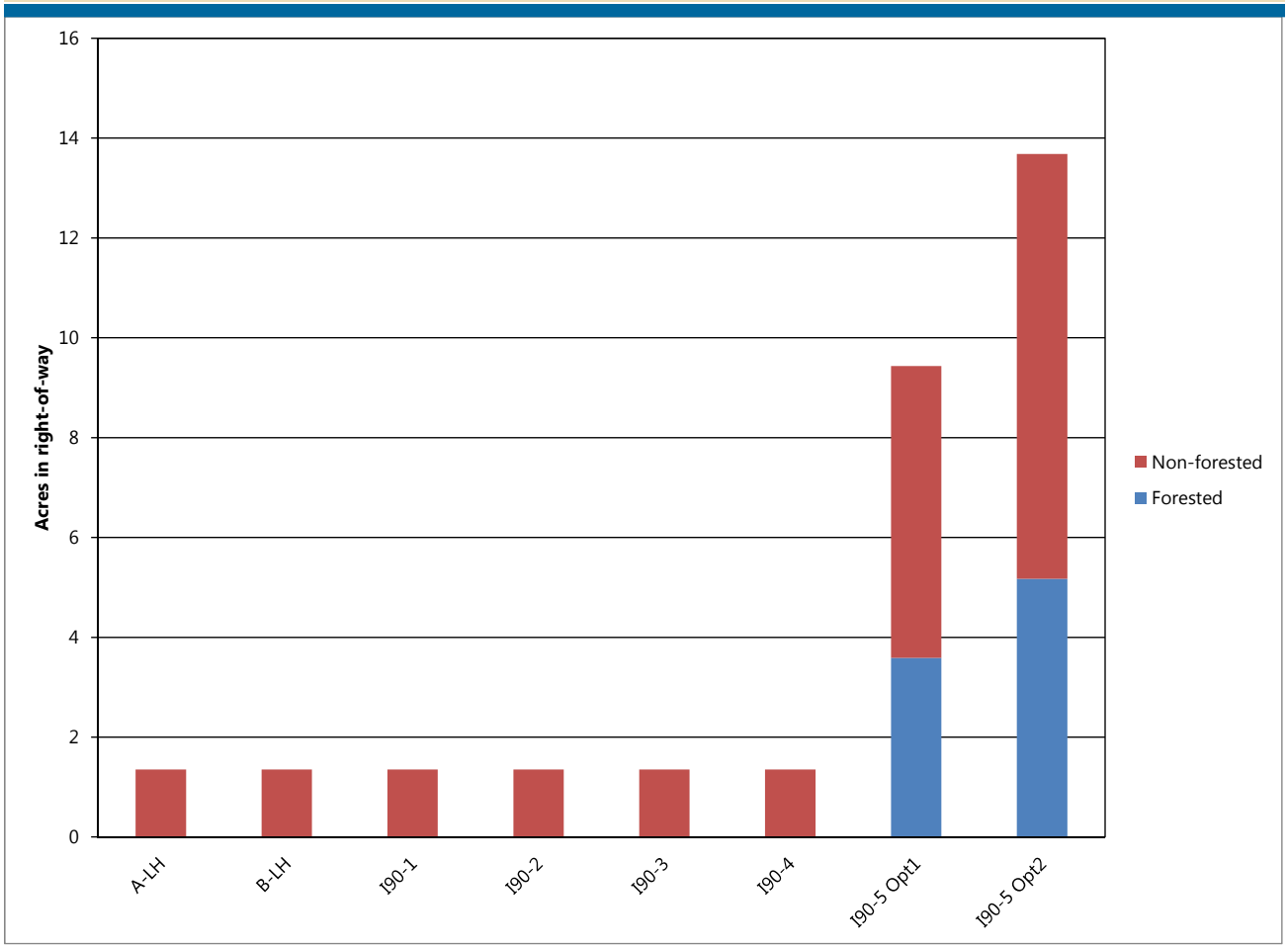
According to the NWI, there are no wetlands within the Lakefield Junction substation, the proposed Huntley substation site or the alternative southern Huntley substation site (Map 6-5 and Map 6-6). Thus, no impacts to wetlands are anticipated at these sites.

Flora

As discussed in Section 5.6.2, general impacts to flora are primarily assessed by looking at vegetation cover, using USGS NLCS GAP cover type mapping. A secondary consideration is proximity to managed game and wildlife areas.

Figure 6-8 Wetlands Within ROW – Associated Facilities

Only the associated facilities for route alternative I90-5 contain forested wetlands.



Source: Reference 46

In general, impacts to flora are anticipated to be minimal for all routes and route alternatives. Impacts may include both temporary and permanent effects and could include localized physical disturbance caused by construction activities such as grading, excavating, soil stockpiling or clearing local vegetation for access roads.

Some potential impacts on flora are anticipated to be minimal and independent of the route selected for the project. For the Lakefield to Huntley segment, these impacts are:

- **Noxious weeds and invasive vegetation.** The composition of vegetation communities along the routes and route alternatives is relatively uniform, as noted above. Therefore, it is reasonable to assume that this is also true of noxious weeds, and that no route alternative poses a notably greater risk from noxious weeds and invasive vegetation than any other. Moreover, mitigation measures to reduce the spread of noxious weeds and invasive vegetation would be the same, regardless of route or route alternative.
- **Lands managed for conservation purposes.** Conservation Reserve Enhancement Program (CREP) and Reinvest in Minnesota (RIM) lands are present throughout the project area. Potential impacts to these lands, however, are not notably different between the various routes and route alternatives. Detailed data on CREP and RIM lands is provided in Appendix J.
- **Wetlands.** Effects on wetland flora may vary among the various routes and route alternatives. Wetland impacts are discussed in the "Water Resources" section of the "Natural Environment" section of Section 6.1.1.
- **Rare or Unique Vegetation Communities.** Effects on rare or unique vegetation communities may vary among routes and route

alternatives, and they are discussed under "Rare and Unique Natural Resources/Threatened and Endangered Species" in the "Natural Environment" section of Section 6.1.1.

Loss of forested vegetation cover is the primary impact to flora that could vary across the routes and route alternatives in this segment. The dominant vegetation cover type for all routes and route alternatives is cropland/grassland, as mapped by USGS NLCS GAP cover data (Appendix J). Average cropland/grassland cover for all route alternatives and route variations is nearly 98 percent. With few exceptions, forested cover for routes and route alternatives is less than 2 percent, and for most it is less than 1 percent. Forested cover in the project area is mainly restricted to riparian forest communities along the Des Moines and Blue Earth Rivers, to other smaller streams and creeks, and in shelterbelts and windbreaks. While impacts to forested cover would be small and similar in character for all routes and route alternatives, small differences in impacts to forested vegetation cover are discussed in greater detail below.

Routes and Route Alternatives

In forested areas, trees or shrubs that would interfere with the safe operation of the line would be removed. Permanent vegetative changes would take place at each new pole footprint (20 to 115 square feet) and within the ROW that lies in the forested communities. For the routes and route alternatives in this segment, forested vegetation cover within 500 feet of anticipated alignments ranges from 81 acres (B-LH, 190-5) to 132 acres (A-LH, 190-1 and 190-2), and forested vegetation cover within the ROW varies from 10 acres (B-LH) to 19 acres (A-LH, I90-1 and I90-2).

Data on vegetation cover is discussed generally in this section. Additional, more detailed data is provided in Appendix J.

Associated Facilities

The route options discussed above would be coupled with associated facilities, which could potentially affect local vegetation communities. New lines could adversely affect flora, while removing existing lines could potentially improve or eliminate current negative effects.

The composition of vegetation communities along the various associated facility alternatives would not differ notably from that found along the alternative routes, so potential impacts would be the same, and the associated facilities, which are primarily located in cropland/grassland, would have minimal effect on forested cover types.

The proposed addition of 2.2 acres to expand the existing Lakefield Junction substation to the east is dominated by cropland. Therefore, there would be no effect on forested land cover at the Lakefield Junction substation.

The proposed Huntley substation site and alternative southern Huntley substation site are also in areas dominated by cropland/grassland cover types. Therefore, there would be no effect on forested land cover at those proposed substations. The existing Winnebago Junction substation would be decommissioned, and the area would be re-vegetated with native seed mixes and allowed to return to a more natural state, which would benefit local flora.

Fauna

As discussed in Section 5.6.3, effects on fauna are primarily assessed by looking at data on vegetation communities and at the various types of managed habitats available in the project area.

For some aspects of fauna, potential impacts from the project are anticipated to be minimal and independent of the route selected for the project. For the Lakefield to Huntley segment, these are:

- **Native vegetation communities.** Vegetation along all routes and route alternatives is dominated by cropland/grassland cover types, based on USGS NLCS GAP cover type mapping. This mapping also indicates that the wildlife habitats present in the project area are primarily those used by common wildlife species such as deer, small mammals, common waterfowl and perching birds. The type and availability of wildlife habitats varies little among routes and route alternatives.

- **Availability of habitats for Species of Greatest Conservation Need (SGCN) species.** Habitats for SGCN species are present in the project area, but they are generally concentrated in riparian and other forested habitats, and in lands managed for wildlife. The relative distribution of forested communities is discussed in the "Flora" section of the "Natural Environment" section of Section 6.1.1. Lands managed for wildlife are discussed below. The distance from lands managed for wildlife, however, varies little among routes and route alternatives.

Indirect impacts to wildlife are primarily generated by crossings of or close proximity to surface waters, especially watercourses. Waterfowl and other species of birds commonly fly along watercourses for local and regional travel. Surface waters are also destinations and congregation points for waterfowl. As a result, there is a higher probability of avian collisions with transmission lines on route alternatives that have relatively more surface water crossings than other alternatives. For the Lakefield to Huntley segment, route B-LH has the fewest watercourse crossings, and route alternatives I90-3 and I90-5 have fewer water crossings than route A-LH and all other I90 route alternatives.

Additionally, indirect impacts to avian wildlife can be generated by the proximity of transmission lines to surface waters. Such lines can serve as an obstacle to waterfowl and other species that utilize surface waters. All of the routes and route alternatives in this segment proceed near and around Fox Lake. Route A-LH, and the I90 alternatives proceed along the southern edge of Fox Lake, with route A-LH also wrapping around the eastern end of the lake. Route B-LH proceeds along the northern edge of Fox Lake. All of the routes and route alternatives introduce a new transmission line into the Fox Lake area and would likely incrementally increase avian impacts in the area due to collisions with transmission line conductors.

All of the routes and route alternatives in this segment also cross the Chain of Lakes area, with routes A-LH and B-LH crossing near Lake Charlotte and Kiester Lake, and the I90 alternatives crossing just south of Buffalo Lake. All of the route and route alternatives introduce a new transmission line into the Chain of Lakes area and would likely incrementally increase avian impacts in the area due to collisions with transmission line conductors. Measures to avoid, minimize and mitigate avian impacts are discussed in Section 5.6.3.

Proximity of Lands Managed for Wildlife – Routes and Route Alternatives

The types of lands managed for wildlife habitat in the project area include WMAs, WPAs and game refuges. Among the routes and route alternatives in this segment, all I90 route alternatives cross the Krahmer WMA (Photo 6-5). Route alternatives I90-3, I90-4 and I90-5 also pass within 500 feet of the Lake Guckeen WMA. Route B-LH crosses the Four Corners WMA, and passes within 500 feet of the Caron, Toe and Center Creek WMAs. Route A-LH does not cross or pass within 500 feet of any WMAs (Map 6-5 and Map 6-6).

The route widths and ROWs of all routes and route alternatives in this segment cross the Fox Lake Game Refuge. Route alternatives I90-3, I90-4 and I90-5 cross the city of Fairmont Game Refuge. The city of Fairmont is considered a game refuge since the municipality has an ordinance allowing hunting permits.

Photo 6-5 Krahmer WMA

All I-90 route alternatives cross Krahmer WMA; signage for the WMA is shown here to the left of I-90.

Source: Barr photo

Looking west along I-90 northeast of Welcome, Minnesota at the eastern edge of the Krahmer WMA

Route B passes within 500 feet of the Boot Lake WPA. No other route or route alternatives cross or pass within 500 feet of a WPA in this segment.

Impacts to fauna due to crossings of or proximity to these lands managed for wildlife are difficult to predict but are generally anticipated to be minimal. Potential impacts include fragmentation of habitat and subtle alterations of habitat that favor non-native species and/or habitat generalists. Impacts to fauna due to crossings of these managed lands are anticipated to be greater than for areas where the transmission line is close proximity to these lands.

Proximity of Lands Managed for Wildlife – Associated Facilities

There are no WMAs, WPAs or game refuges within one mile of the associated facilities. Thus no impacts to fauna associated with these managed lands are anticipated due to the associated facilities.

Rare and Unique Natural Resources / Threatened and Endangered Species

As discussed in Section 5.7, potential effects on rare and unique natural resources are evaluated by assessing state and federally threatened and endangered species and rare communities. The proximity of the project to threatened and endangered species documented in the Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database, native plant communities, Minnesota Biological Survey (MBS) Sites of Biodiversity Significance (SBS) and railroad ROW prairies, indicates which route alternatives would have the fewest effects on rare and unique natural resources.

Documented locations of state and federally threatened and endangered species and rare communities were identified within the ROWs, within 500 feet of the anticipated alignments and within one mile of all routes, route alternatives and associated facilities in the Lakefield to Huntley segment. In addition, documented locations of state and federally threatened and endangered species and rare communities were identified within the Lakefield Junction substation, proposed Huntley substation and alternative southern Huntley substation footprints and within one mile of them.

Rare-community data provided in this section focuses on the presence of these resources within the ROW or substation footprints. Additional data is provided in Appendix J and Appendix K. Map 6-7 and Map 6-8 and the detailed maps in Appendix L identify the rare and unique natural resources near routes, route alternatives, associated facilities and substations in the Lakefield to Huntley segment of the project. In order to protect rare resources from being exploited or destroyed, Map 6-7 and Map 6-8 and the maps in Appendix L do not indicate the names of species or communities identified within the NHIS database.

State and Federally Threatened and Endangered Species

As discussed in Section 5.7, state special concern and tracked species are not protected under the Minnesota Endangered and Threatened Species statute (Minnesota Statutes, 2013, section 84.0895)**; because of this**, they will **only** be **mentioned** here. In addition, because all watercourses would be spanned, no impacts to aquatic organisms like mussels are anticipated, so documented records of aquatic species in the NHIS database will not be discussed here. Appendix K, however, summarizes all NHIS species records near the project area.

Routes and Route Alternatives

Eight threatened and endangered species have been documented within one mile of the various routes and route alternatives in the Lakefield to Huntley segment of the project. These species are summarized in Table 6-4 and include four state-endangered plant species and four bird species, one state-endangered and three state-threatened.

One of the vascular plant species documented in the vicinity of this segment includes the federally-threatened prairie bush clover (*Lespedeza leptostachya*). The preferred habitat of prairie bush clover, eared false foxglove (*Agalinis auriculata*), tuberous Indian-plantain (*Arnoglossum plantagineum*) and sullivant's milkweed (*Asclepias sullivantii*) is native tall grass prairie (Reference 62). Although the majority of native tall grass prairie in the State of Minnesota has been lost to agriculture, remnants of native prairie are scattered throughout southern Minnesota; these remnants provide potential habitat for these species. See Rare Communities discussion (below) for more information on remnants of native prairie in the project area.

The Henslow's sparrow (*Ammodramus henslowii*) is a migratory song bird that prefers uncultivated grasslands and old fields (Reference 62). The loggerhead shrike (*Lanius ludovicianus*) is a migratory song bird that inhabits relatively open land with some shrub cover (Reference 62). The burrowing owl (*Athene cunicularia*) prefers open, grazed pastures or native, mixed-grass prairies populated by burrowing mammals (Reference 62).

The king rail (*Rallus elegans*) is a bird that inhabits open wetlands such as marshes (Reference 62).

As indicated in Table 6-4, all of the routes and route alternatives in this segment have between five and nine documented records of state or federally listed species within one mile of them, and the federally listed prairie bush clover is also present within one mile of each route and route alternative. With the exception of route B-LH, none of the routes or route alternatives in this segment have documented records of state or federally listed species within the 200-foot ROW or within 500 feet of the anticipated alignments (Table 6-4). Route B-LH has three documented records of threatened and endangered species within the 200-foot ROW and five within 500 feet of its anticipated alignment (Table 6-4).

In addition to state and federally listed species, several state-special concern and tracked species were also documented within the vicinity of the routes and route alternatives in this segment, including three state-special concern vascular plants: green dragon (*Arisaema dracontium*), small white lady's slipper (*Cypripedium candidum*) and rattlesnake master (*Eryngium yuccifolium*); one tracked vascular plant, black grass (*Juncus gerardii*); one special concern tree, the Kentucky coffee tree (*Gymnocladus dioica*); two tracked invertebrates, the Iowa skipper (*Atrytone arogos iowa*) and the regal fritillary (*Speyeria idalia*); and two tracked birds, the upland sandpiper (*Bartramia longicauda*) and the bald eagle (*Haliaeetus leucocephalus*).

Black grass has been found within the 200-foot ROW of the I90 route alternatives; small white lady's slipper and rattlesnake master have been found within the 200-foot ROW of route B-LH. Bald eagles have not been found within the 200-foot ROW or within 500 feet of the anticipated alignments of any route alternatives in this segment. Bald eagles, however, have been documented within one mile of route A-LH and route alternatives I90-1 and I90-2 (Appendix K).

Impacts to threatened and endangered species could be minimized by selecting a route or route alternative with the fewest documented records of threatened and endangered species within close proximity of the anticipated alignment – such as route A-LH or one of the I90 route alternatives. Impacts could also be minimized by avoiding habitat associated with these rare species. See the "Rare Communities" section of the "Natural Environment" section of Section 6.1.1. Impacts to the four vascular plant species could be minimized by selecting the route or route alternative that avoids or spans remnant native prairie communities. Potential impacts and mitigation measures associated with threatened and endangered bird species are the same as those discussed for other avian species (Section 5.6.3).

Associated Facilities

Each route and route alternative would have to be connected to associated facilities. No non-aquatic state or federally threatened or endangered species have been documented within the ROW or within 500 feet of the anticipated alignments of the associated facilities.

No state or federally threatened or endangered species have been documented within one mile of the Lakefield Junction substation, the proposed Huntley substation site, or the alternative southern Huntley substation site (Appendix J and Appendix K). Thus, no impacts to these species are anticipated.

Rare Communities

Several sources of data were used to assess potential effects on rare communities, **including MBS native plant communities and MBS SBS**. Data on rare communities is discussed generally in this section. Additional detailed data is provided in Appendix J and Appendix K.

Routes and Route Alternatives

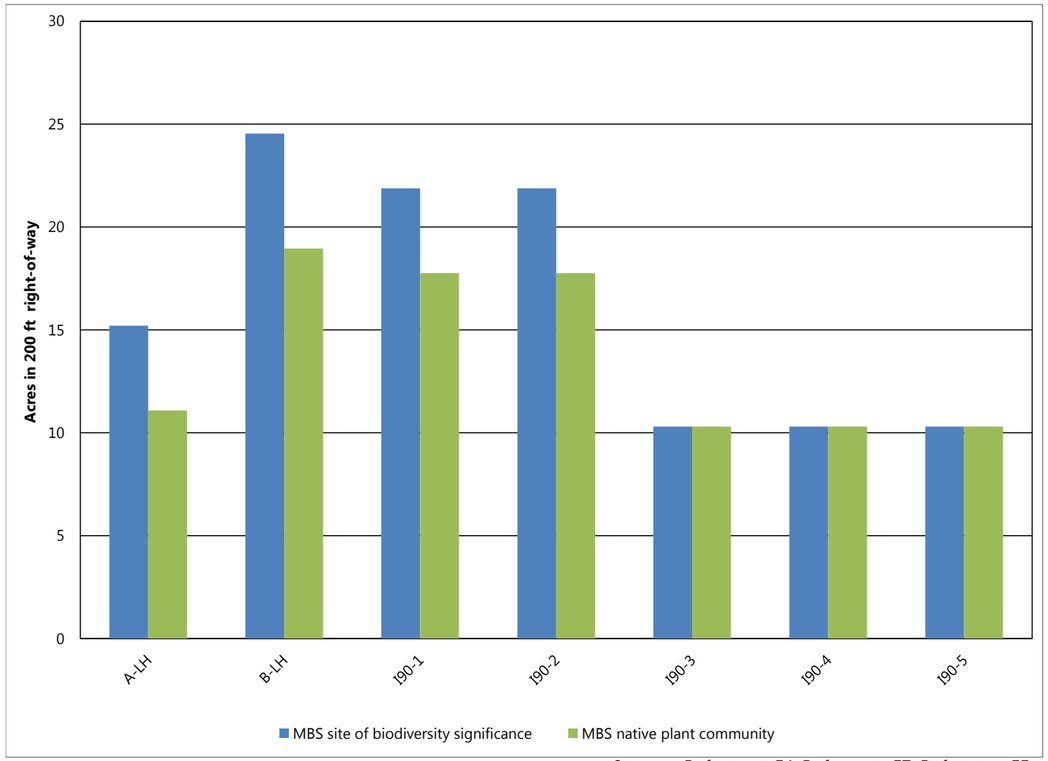
Figure 6-9 shows the area of rare communities (MBS native plant communities and MBS SBS) within the 200-foot ROW of each route and route alternative in this segment. As Figure 6-9 indicates, route B-LH **and route alternatives I90-1 and I90-2 have** more acres of MBS SBS and MBS native plant communities within the 200-foot ROW than do route A-LH and route alternatives I90-3, I90-4 and I90-5. None of the MBS native plant communities within the ROW of route B-LH, however, are forested, while at least one half of the area covered by MBS native plant communities in route A-LH and route alternatives I90-3, I90-4 and I90-5 consists of forested communities (Appendix K). Because route A-LH and the I90 route alternatives follow existing HVTL alignments for a portion of their route, some tree clearing has already taken place.

Although MBS native plant communities and SBS would be spanned to the extent possible, all routes and route alternatives in this segment would cross native plant communities and SBS wider than 1,000 feet, which might require that one or more poles be placed within them. Route A-LH and all of the I90 route alternatives would require crossing a Southern Mesic Oak

Table 6-4 Rare Species – Lakefield to Huntley

Scientific Name	Common Name	Type	State Status	Federal Status	Route and Route Alternatives / Distance to Anticipated Alignments																				
					A-LH			B-LH			I90-1			I90-2			I90-3			I90-4			I90-5		
					100 feet	500 feet	1 mile	100 feet	500 feet	1 mile	100 feet	500 feet	1 mile	100 feet	500 feet	1 mile	100 feet	500 feet	1 mile	100 feet	500 feet	1 mile	100 feet	500 feet	1 mile
Agalinis auriculata	Eared False Foxglove	Vascular plant	Endangered	None	0	0	2	0	1	1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2
Ammodramus henslowii	Henslow's Sparrow	Bird	Endangered	None	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Athene cunicularia	Burrowing Owl	Bird	Endangered	None	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lanius ludovicianus	Loggerhead Shrike	Bird	Endangered	None	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Rallus elegans	King Rail	Bird	Endangered	None	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arnoglossum plantagineum	Tuberous Indian-plantain	Vascular Plant	Threatened	None	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asclepias sullivantii	Sullivant's Milkweed	Vascular Plant	Threatened	None	0	0	2	1	1	1	0	0	4	0	0	0	0	0	7	0	0	7	0	0	7
Lespedeza leptostachya	Prairie Bush Clover	Vascular Plant	Threatened	Threatened	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Arisaema dracontium	**Green Dragon**	**Vascular Plant**	**Special Concern**	**None**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**
Atrytone arogos iowa	**Iowa Skipper**	**Invertebrate Animal**	**Special Concern**	**None**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**
Cypripedium candidum	**Small White Lady's-slipper**	**Vascular Plant**	**Special Concern**	**None**	**0**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Eryngium yuccifolium	**Rattlesnake-master**	**Vascular Plant**	**Special Concern**	**None**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**	**3**
Gymnocladus dioica	**Kentucky Coffee-tree**	**Tree**	**Special Concern**	**None**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**
Speyeria idalia	**Regal Fritillary**	**Invertebrate Animal**	**Special Concern**	**None**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**
Bartramia longicauda	**Upland Sandpiper**	**Bird**	**Tracked**	**None**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**
Haliaeetus leucocephalus	**Bald Eagle**	**Bird**	**Tracked**	**None**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Juncus gerardii	**Black Grass**	**Vascular Plant**	**Tracked**	**None**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

Figure 6-9 Rare Plant Communities – Lakefield to Huntley



Source: Reference 54, Reference 57, Reference 55

– Basswood Forest wider than 1,000 feet; this native plant community has a state conservation rank of S3, which is vulnerable to extirpation in Minnesota (Appendix J). Route B-LH would require crossing two areas of Dry Hill Prairie (Southern) native plant communities greater than 1,000 feet; this native plant community has a state conservation rank of S2, which is imperiled (Appendix J). Route alternatives I90-3, I90-4 and I90-5 would only cross one SBS wider than 1,000 feet, while the remaining routes and route alternatives in this segment would cross two or more SBS wider than 1,000 feet (Appendix J).

Route B-LH is also the only route alternative that has DNR-designated railroad ROW prairie within its 200-foot ROW and the only route that would cross it (Appendix J).

All routes and route alternatives, except route B-LH, contain about the same amount of rare plant communities.

Effects on rare communities could be minimized by selecting the route or route alternative with the fewest acres of native plant communities, MBS SBS or railroad ROW prairies, such as route A-LH or one of the I90 route alternatives, and by spanning areas where these communities are present. Where placing structures in these rare communities cannot be avoided, rare species associated with these habitats could be affected, and surveys for rare species might be necessary. Because trees would need to be cleared during construction, and maintenance requirements under transmission lines could prevent trees from establishing, effects on rare forested communities would be minimized by selecting route B-LH, which has the fewest acres of rare forested communities present in the ROW.

Associated Facilities

No NHIS native plant communities or railroad ROW prairies lie within the ROW or within 500 feet of the anticipated alignments of any associated facilities. Hence, no impacts to these rare communities are anticipated.

As shown in Figure 6-10 and Appendix J and Appendix K, MBS SBS and MBS native plant communities are present within the ROW for each route and route alternative's associated facilities. The ROWs of the associated facilities for route A-LH and route alternatives I90-1 and I90-2 contain significantly fewer MBS SBS and MBS native plant communities than the associated facilities for the remaining routes and route alternatives.

A colonial waterbird nesting site has been documented adjacent to the Blue Earth River in the southeastern part of the project area. This nesting site is located more than half a mile from the associated facilities for route alternatives I90-5 Option 1 and I90-5 Option 2. Potential impacts to the colonial waterbird nesting site could be minimized by choosing one of the other routes or route alternatives whose associated facilities are located more than one mile from the colonial waterbird nesting site.

There are no MBS native plant communities, MBS SBS or railroad ROW prairies within the footprints of the Lakefield Junction substation, the proposed Huntley substation site, or the alternative southern Huntley substation site (Appendix J and Appendix K). Thus, no impacts to rare communities are anticipated at these substation sites.

Use or Paralleling of Existing Rights-of-Way

Sharing ROW with existing infrastructure or paralleling existing ROWs minimizes fragmentation of the landscape and can minimize impacts to adjacent property.

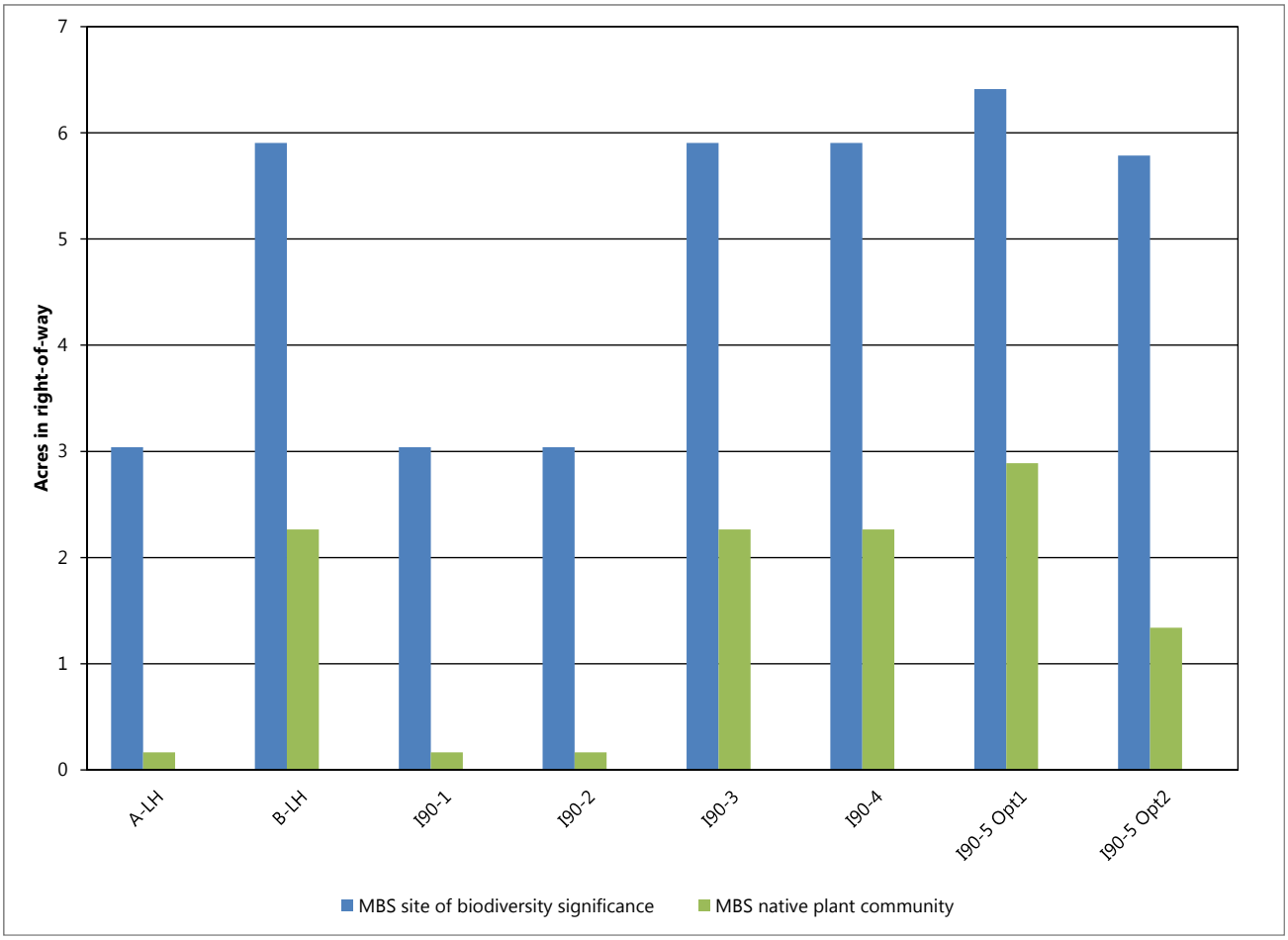
Routes and Route Alternatives

Map 6-9 and Map 6-10 shows areas where the ROW for the proposed routes and route alternatives would share or parallel ROW with existing transportation, transmission line or other infrastructure. Figure 6-2 shows the percentage of total line distance where existing infrastructure ROW is shared or paralleled for each route and route alternative in this segment. Areas where routing options follow field lines, survey lines, natural division lines and agricultural field boundaries, or cut cross country through fields or pastures are also shown. In these areas, there is no opportunity to use ROW sharing to minimize the amount of ROW that must be acquired from private land owners.

Route alternatives that follow the I-90 ROW share or parallel the greatest percentage of their total length with existing ROWs, including transmission and roadway ROWs. Route A-LH and route alternatives I90-1 and I90-2 share the greatest amount of transmission line ROW. As discussed above ("Agricultural Land, Prime Farmland – Routes and Route Alternatives" section in Section 6.1.1.), there is a significant difference between transmission line ROW sharing and interstate highway ROW sharing with respect to agricultural impacts. Where a new transmission line can be double-circuited with an existing line and share ROW, the incremental amount of private land impacted is minimal. Where a new transmission line parallels I-90, the line must

Figure 6-10 Rare Plant Communities – Associated Facilities

The associated facilities for route A and for route alternatives I90-1 and I90-2 contain fewer rare plant communities.



Source: Reference 54, Reference 57, Reference 55

be located completely outside the interstate ROW. In this manner, the line is accommodated, but the amount of ROW sharing is minimal. While route A-LH would share slightly less existing ROW than the I90 route alternatives overall, it uses the most existing transmission line ROW. Route B-LH would share the least of its total length with existing transmission line or roadway ROW compared with the other routes and route alternatives in the Lakefield to Huntley segment.

Associated Facilities

Each of the routing options discussed above would be coupled with associated facilities, which would create additional ROW sharing considerations where local lines would need to be reconfigured to extend from the old Winnebago Junction substation to the proposed Huntley substation or alternative southern Huntley substation.

Between the existing Winnebago Junction substation and the proposed Huntley substation, all route alternatives would follow an existing 161 kV ROW. Facilities associated with route A-LH and route alternatives I90-1 and I90-2 would share existing ROW for their entire length. Route B-LH and route alternative I90-3 would introduce new ROW, as they do not follow the existing 161 kV line from the Rutland substation and would therefore require a new 161 kV line ROW to bring the 161 kV line from the Rutland substation down to the B-LH ROW, where it could be accommodated on route B-LH's 345/161 kV structures. Similarly, route alternative I90-4 would require a new ROW to bring the existing 161 kV line from the Rutland substation south and then east to the proposed Huntley substation site.

The I90-5 route alternatives differ notably from one another in the extent of their ROW sharing. Route alternative I90-5 Option 1 would use multiple ROWs to bring the lines from Winnebago Junction substation south to the alternative southern Huntley

substation site, whereas route alternative I90-5 Option 2 re-routes most of the local lines along the existing 161 kV ROW coming south from the existing Winnebago Junction substation.

Electric System Reliability

The North American Electric Reliability Corporation (NERC) has established mandatory reliability standards for American utilities. For new transmission lines, these standards require the utility to evaluate whether the grid would continue to operate adequately under various contingencies.

Two contingency categories apply here. Under Category C, NERC requires utilities to analyze the consequences of a single storm or other event that causes simultaneous outages of both circuits on a double-circuit transmission line.

The applicable Category D contingencies are loss of all transmission lines along a common ROW and loss of an entire voltage level at a substation. The effects of these transmission contingencies on the system (and the transmission system's ability to serve load) must be monitored and managed by utilities. The more that common ROWs are used for multiple transmission lines, particularly high voltage facilities, the more likely it becomes that an outage involving multiple facilities could occur.

Routes and Route Alternatives

For the Lakefield to Huntley segment, ITCM evaluated the electrical performance of the proposed 345 kV transmission line were it to be double-circuited with the existing Lakefield to Border 161 kV line. Their analysis showed that the system could withstand the outage of both lines at the same time and would therefore meet NERC reliability requirements. As a result, ITCM has proposed to double-circuit the new 345 kV line with the existing Lakefield to Border 161 kV line along nearly all of route A-LH. (Reference 7). The 345 kV line could also be double-circuited along portions of the I90 route alternatives.

Likewise, ITCM evaluated system performance were the project to be built on 345/161 kV double-circuit capable towers along primarily new ROW (route B-LH and portions of the I90 alternatives). In this case, the 345 kV side of the structure would be used for the 345 kV conductors, while the 161 kV side would be available when conditions warrant. The ITCM analysis indicates that this double-circuit configuration would also meet NERC Category C contingency requirements.

ITCM's analysis, however, also indicates that a 345 kV/345 kV double-circuit configuration for the project would not meet NERC Category C requirements. This is not only because the 161 kV circuit is needed to efficiently serve local electric loads, but also because having two 345 kV circuits on the same poles would not meet applicable Category C reliability criteria if the purpose of the second 345 kV circuit was to increase generation outlet capacity. Thus, a 345 kV/ 161 kV double-circuit configuration in this area would meet applicable NERC reliability criteria, but a 345 kV/345 kV double-circuit configuration would not.

Associated Facilities

ITCM also analyzed electric system reliability implications of the various associated facilities configurations. Specifically, ITCM evaluated route alternative I90-5 and the proximity of the 69 kV and 161 kV lines that would be needed to reach the alternative southern Huntley substation site. They also evaluated route alternative I90-4 and the proximity of the 345 kV and 345/161 kV double-circuit lines that would be needed for this alternative. In both cases, their analysis indicated that the Category C requirements would be met for these configurations without degrading reliability in the area.

The I90 route alternatives that use the alternative southern Huntley substation (I90-5 Options 1 and 2) would require new, wider ROWs to accommodate the 161 kV and 69 kV reroutes from the Winnebago Junction substation. To comply with the requirements for Category D contingencies, the 161 kV and 69 kV associated facilities would have to be constructed on parallel, but completely non-overlapping ROW. The result is that the I90-5 route alternatives would require ROWs of 300 feet (Option 1) or 450 feet (Option 2) from the Winnebago Junction substation south to the alternative southern Huntley substation site.

Similarly, to avoid a Category D contingency when using the proposed Huntley substation location for route alternative I90-4, the 345 kV facilities would have to be constructed on parallel ROWs, totaling 400 feet in width for nearly four miles from I-90 to the proposed Huntley substation site.

Even using these wider non-overlapping ROWs, these parallel configurations present reliability concerns because of the resulting concentration of transmission facilities in a common ROW. When facilities are located in close proximity, there is a greater risk that a single event can take out multiple lines. Additionally, the close proximity of the lines

can make repairing the lines more difficult. These difficulties could increase outage times, should an outage occur.

ITCM has indicated that although NERC requirements can be met for route alternatives I90-4 and I90-5, it believes these alternatives create unacceptable electrical reliability risks. ITCM prefers associated facilities that limit the amount and length of paralleling of transmission lines. Although not a NERC requirement, ITCM believes it is particularly desirable to separate lines to the extent possible in this area given the landscape, the overall system support, typical weather conditions and the significant impacts of an outage.

Removing the 161 kV line from Fox Lake and Lake Charlotte Using I90 Alternatives

This EIS discusses the possibility of removing the existing 161 kV Lakefield to Border transmission line from Fox Lake and from Lake Charlotte as part of the project. The majority of this discussion is in Section 6.1.2, which analyzes the various routing options at Fox Lake and Lake Charlotte individually. However, it is possible to remove the existing 161 kV line from these lakes with a route alternative that affects this removal jointly – that is, by using a route alternative that removes the existing line from both lakes.

In order to accomplish this joint removal, a route alternative would need to (1) connect the existing 161 kV line to the Lakefield, Fox Lake, Rutland and Huntley substations, and (2) double-circuit the existing 161 kV line with the new 345 kV line such that the existing 161 kV line is removed from Fox Lake and Lake Charlotte. Route alternatives I90-1 and I90-2 meet these criteria.

Route alternatives I90-1 and I90-2 would require a small segment of new 161 kV line to run southward from the Fox Lake substation until intersecting the new 345 kV line, where it would be picked up and double-circuited (Map 3-8). The 345/161 kV double-circuit line would follow I90-1 or I90-2 east along I-90 and an existing 69 kV transmission line and then north along Highway 15, until the point where Highway 15 intersects route B. At route B, the 161 kV line would jog slightly west and then northward along 210th Ave. to the Rutland substation. The 345 kV line would proceed for a short length as a single circuit until rejoining route A and the 161 kV line from the Rutland substation.

Removing the existing 161 kV line from Fox Lake and Lake Charlotte and double-circuiting with route alternative I90-1 or I90-2 would create positive impacts at both lakes. The removal would positively impact aesthetics at both lakes and could improve enjoyment of use of the lakes. The removal would also improve aesthetics near the lakes generally by replacing two transmission line ROWs (new 345 kV line and existing 161 kV line) with one transmission line ROW (345/161 kV double-circuit line). The removal would free up farmland for approximately 15 miles (approximately 250 acres) along the existing 161 kV line and would also improve aesthetics for

Photo 6-6 Rutland Substation and Lines along 210th Avenue

A short segment of 161 kV line would be routed along 210th Ave. to the Rutland substation if the existing 161 kV line is removed from Lake Charlotte.

Source: Barr photo

Looking north along 210th Ave toward the Rutland Substation.

Table 6-5 Summary of Costs for Routes, Route Alternatives and Associated Facilities Between Lakefield Junction and Huntley

Route ID	Length (miles)	Estimated Costs ($ millions)			
		Transmission Line	Substations	Associated Facilities	Total Cost
A-LH	57.6	139.7	**41**	3	**183.7**
B-LH	55.5	122.6	**41**	3	**166.6**
I90-1	57.0	141.1	**41**	3	**185.1**
I90-2	55.6	135.9	**41**	3	**179.9**
I90-3	58.3	140.6	**41**	4.3	**185.9**
I90-4	58.4	140.9	**41**	5.4	**187.3**
I90-5 Option 1	54.9	133.5	**41.6**	23.7	**198.8**
I90-5 Option 2	54.9	133.5	**41.6**	18.6	**193.7**
I90-2 with removal of 161 kV line from Fox Lake and Lake Charlotte	55.6	135.9	**41.2**	10.6	**187.7**

farmsteads along the line. Lastly, the removal would decrease avian impacts at both lakes.

To make connections with the Rutland substation, approximately 1.4 miles of new 161 KV line would need to be built, with 0.4 mile along route B and 1.0 mile along 210th Ave. (Photo 6-6). There is an existing 69 kV line along 210th Ave. that the new line could parallel or be co-located with the 161 kV line. Two residences and agricultural fields would be affected by the new 161 kV line from route alternative I90-1 or I90-2 to the Rutland substation.

Beyond the direct impacts of the new 161 kV line to reach the Rutland substation, the removal would also create adverse incremental impacts along route alternatives I90-1 and I90-2. Aesthetic impacts along these alternatives would likely be somewhat greater – two sets of conductors being less desirable to look at than one. Impacts to farmland and direct impacts to the natural environment would likely remain the same. The ROW for the new 345 kV line is 200 feet and would remain so whether a second circuit (the 161 kV line) were placed on the structures or not. Avian impacts would likely remain the same, but could increase slightly. Placing more conductors in the air, even if along the same ROW, would likely increase the likelihood of a collision. The magnitude of this increase is uncertain.

Thus, in total, there are positive impacts that would accrue were the 161 kV line removed from Fox Lake and Lake Charlotte using route alternative I90-1 or I90-2, and there are adverse impacts of double-circuiting to avoid these lakes. The adverse impacts are incremental in nature.

Costs that are Dependent on Design and Route

For its route permit application, ITCM prepared cost estimates for constructing the project – including the new 345 kV transmission line, new and expanded substations, and the reconfiguration of associated facilities – along routes A and B. These estimates not only appeared in ITCM's route permit application but are also summarized in Section 3.9 of this EIS. They were prepared with detailed design information for each route and are accurate to within about plus or minus 30 percent.

To compare costs of the various routing options evaluated in this EIS, ITCM prepared preliminary cost estimates for each of the routes, route alternatives and route variations. These cost estimates use cost per mile, based on the general structure type (e.g., single circuit, double-circuit or triple circuit) and costs of the associated facilities and substations. The cost estimates are not based on detailed design information, which is not currently available. These cost estimates are also accurate to within about plus or minus 30 percent. In order to compare apples to apples, the same type of preliminary cost estimates were also used for routes A and B, even though these costs are slightly higher than those previously provided in the route permit application and in Section 3.9 of this EIS.

A summary of the costs associated with constructing the project along routes and route alternatives between the Lakefield Junction substation and the Huntley substation are provided in Table 6-5.

The lowest cost alternative would be constructing the project along route B-LH due to its shorter length and because it would not entail rebuilding

a 161 kV line into a double-circuit 345 kV/161 kV line. The I90 route alternatives would generally have higher costs than routes A-LH and B-LH. Higher construction costs along I-90 are due to more limited access options and more restrictions for the highway crossings.

For route alternatives I90-1, I90-3, I90-4 and I90-5, there would also be additional costs associated with removing the existing 161 kV line along I-90 west of Sherburn and rebuilding it into a double-circuit 345 kV/161 kV line. The highest costs for constructing the project between Lakefield Junction and Huntley would be for the two I90-5 options, primarily because of the number and lengths of the 161 kV and 69 kV lines that would need to be reconfigured to connect to the alternative southern Huntley substation. Route alternatives I90-1 and I90-2 could be used to remove the existing 161 kV Lakefield to Border line from Fox Lake and Lake Charlotte. The cost of removing the segment of 161 kV line between the Fox Lake substation and Rutland substation, including the crossings of Fox Lake and Lake Charlotte, as well as rebuilding a portion of the 345 kV line to a double-circuit 345 kV/161 kV line would be approximately 7.8 million dollars.

6.1.2 Route Variations

In order to possibly avoid or mitigate the potential impacts of routes A and B this EIS, consistent with the scoping decision, analyzes variations along these routes in four specific areas – the Jackson Municipal Airport (JA), Fox Lake (FL), Lake Charlotte (LC) and the Center Creek WMA (CC). This section analyzes the impacts of the variations and routes A-LH and B-LH in these areas**, as well as those of modified route A**. For these analyses, a suffix is attached to routes A and B to denote the area being analyzed. Thus, for example, A-FL is route A in the area of Fox Lake; **MR**A-FL **is modified route A in the area of** Fox Lake. Common start points and end points for analyses are shown on the maps in Section 3.0.

The discussion here of route variations and their impacts is organized geographically and proceeds from west to east, discussing each route variation area in turn – the Jackson Municipal Airport (JA), Fox Lake (FL), Lake Charlotte (LC) and the Center Creek WMA (CC) (Map 3-9).

In general, the route variations in this segment provide means to mitigate potential impacts associated with routes A and B. As with the routes and route alternatives in this segment, impacts are closely related to transmission line ROW sharing. Impacts to human settlements are anticipated to be minimal with aesthetic impacts and impact to private airstrips being the only impacts that could be mitigated by routing. Two route variations and a portion of route A would impact a private airstrip in Fox Lake Township, Martin County. Three route variations and a portion of route A could impact, to an uncertain degree, a private airstrip in Rutland Township, Martin County.

Impacts to public health and safety and to archaeological and historic resources are anticipated to be minimal for all route variations. Impacts to land-based economies are almost exclusively impacts to agricultural operations. Impacts to agricultural operations cannot be avoided; however, they can be mitigated and primarily by following existing transmission line ROW. Impacts to the natural environment cannot be avoided, but these impacts are anticipated to be minimal. Direct impacts to fauna are anticipated to be minimal. Indirect impacts – collisions of avian species with transmission line conductors – would occur but can be mitigated by limiting these impacts to incremental impacts and by structure design and the use of bird flight diverters.

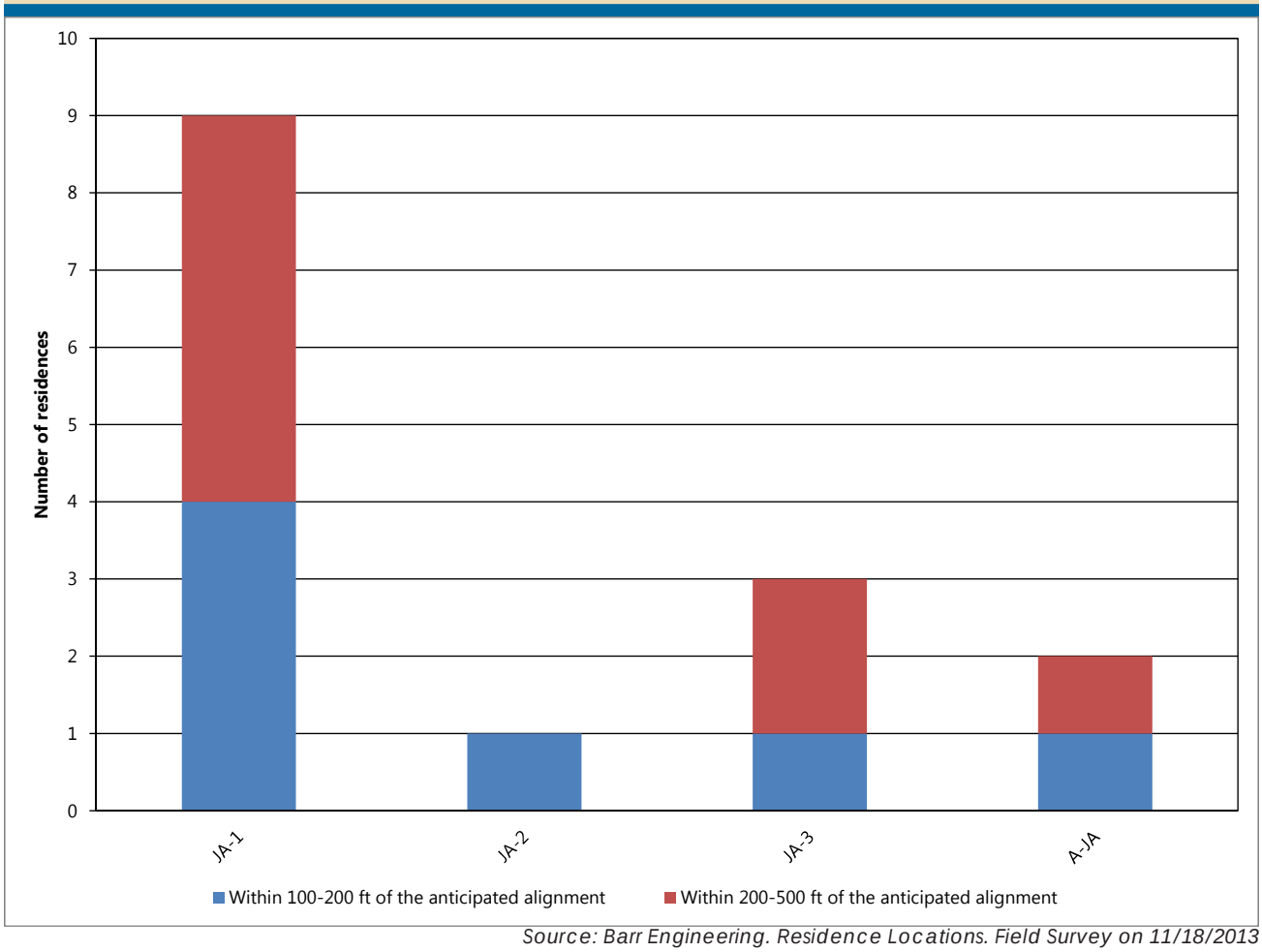
In the Jackson Municipal Airport area, route variation JA-2 **and route MRA-JA minimize** aesthetic impacts. Route variation JA-2 and route A-JA minimize agricultural impacts; however, route A-JA impacts a well and associated animal housing units. **Route MRA-JA mitigates these impacts with an alignment away from the well and animal housing units.** Route variation JA-2 **and route MRA-JA minimize** impacts to flora and fauna near the Des Moines River by proceeding at a relatively greater distance from the river.

At Fox Lake, route variation FL-1, which crosses Fox Lake, minimizes aesthetic and agricultural impacts. Route variation FL-1 would also likely minimize avian impacts near the lake; as such impacts would be incremental and mitigated by structure design. Route variations FL-2 and FL-3 and route A-FL would impact a private airstrip in Section 23 of Fox Lake Township, Martin County. There are positive impacts that would accrue if the existing 161 kV line were removed from Fox Lake and double-circuited on route variation FL-3 or FL-4 **or on route MRA-FL**. The removal would create new adverse impacts related to transmission facilities necessary to affect the double-circuiting and would create incremental aesthetic and avian impacts along route variation **selected for double-circuiting**.

At Lake Charlotte, route variation LC-4, which crosses Lake Charlotte, minimizes aesthetic and agricultural impacts. Route variation LC-4 would also likely minimize avian impacts near the lake; as such impacts would be incremental and mitigated

Figure 6-11 Proximity of Homes – Jackson Municipal Airport

Route variation JA-1 has the greatest number homes within 500 feet of its anticipated alignment.



Source: Barr Engineering. Residence Locations. Field Survey on 11/18/2013

by structure design. Route variations LC-1, LC-2 and LC-4 and route A-LC could impact a private airstrip in Section 18 of Rutland Township, Martin County. There are positive impacts that would accrue if the existing 161 kV line were removed from Lake Charlotte and double-circuited on a route variation that proceeds around the southern edge of Lake Charlotte. The removal would create new adverse impacts related to transmission facilities necessary to affect the double-circuiting and would create incremental aesthetic and avian impacts along the route variation selected for double-circuiting.

At the Cedar Creek WMA, route variation CC-1 and route B-CC have similar impacts. Route B-CC is furthest from homes in the area and best minimizes aesthetic impacts.

Jackson Municipal Airport Variations

There are three route variations north of the Jackson Municipal Airport (JA-1 through JA-3), all of which begin with and return to route A. For route variations JA-2 and JA-3 and route**s** A-JA **and MRA-JA**, the existing Lakefield to Border 161 kV line would be removed and double-circuited with the new 345 kV line. For variation JA-1, the 161 kV line would remain in place.

Route variation JA-2 is furthest from residences in the area and follows the existing 161 kV line for the greatest length; thus, route variation JA-2 minimizes aesthetic impacts in the area. Route variation JA-2 proceeds the furthest east along the existing 161 kV line before turning north, thus minimizing agricultural impacts. Route A-JA runs parallel to 820th St. and this paralleling also minimizes agricultural impacts. However, route A-JA has the potential to significantly interfere with a well on the north side of 820th St. that is used for animal housing units (also along 820th St.).

All routing options in this area cross the Des Moines River. All options cross the river at the existing 161 kV crossing except for route variation JA-1. Thus,

route variation JA-1 is anticipated to have relatively greater impacts to flora and fauna near the river. Though forest vegetation is limited in the area, route variation JA-2 minimizes impacts to forested areas near the river by proceeding **north to 820th St. at a distance away from these areas. Route variation JA-2 also minimizes impacts to forested areas at the river by utilizing** the existing 161 kV line **ROW**.

Route A-JA best utilizes existing transmission line and roadway ROW in the area. Route A-JA and route variation JA-2 best utilize existing transmission line ROW. Route variation JA-1 best utilizes roadway ROW in this area.

Modified route A in the Jackson Municipal Airport area (MRA-JA) is a combination of route variation JA-2 and route A-JA, and thus has attributes of both of these routing options. MRA-JA, like JA-2, is relatively further from residences and further from forested areas near the Des Moines River. MRA-JA minimizes impacts to forested areas at the river by crossing the river in a fairly perpendicular manner, thus minimizing the length of line across the river. MRA-JA, like A-JA, parallels 820th St., which minimizes agricultural impacts. MRA-JA has a different alignment than A-JA along 820th St.; this alignment mitigates impacts to a well and animal housing units along this street.

Human Settlements

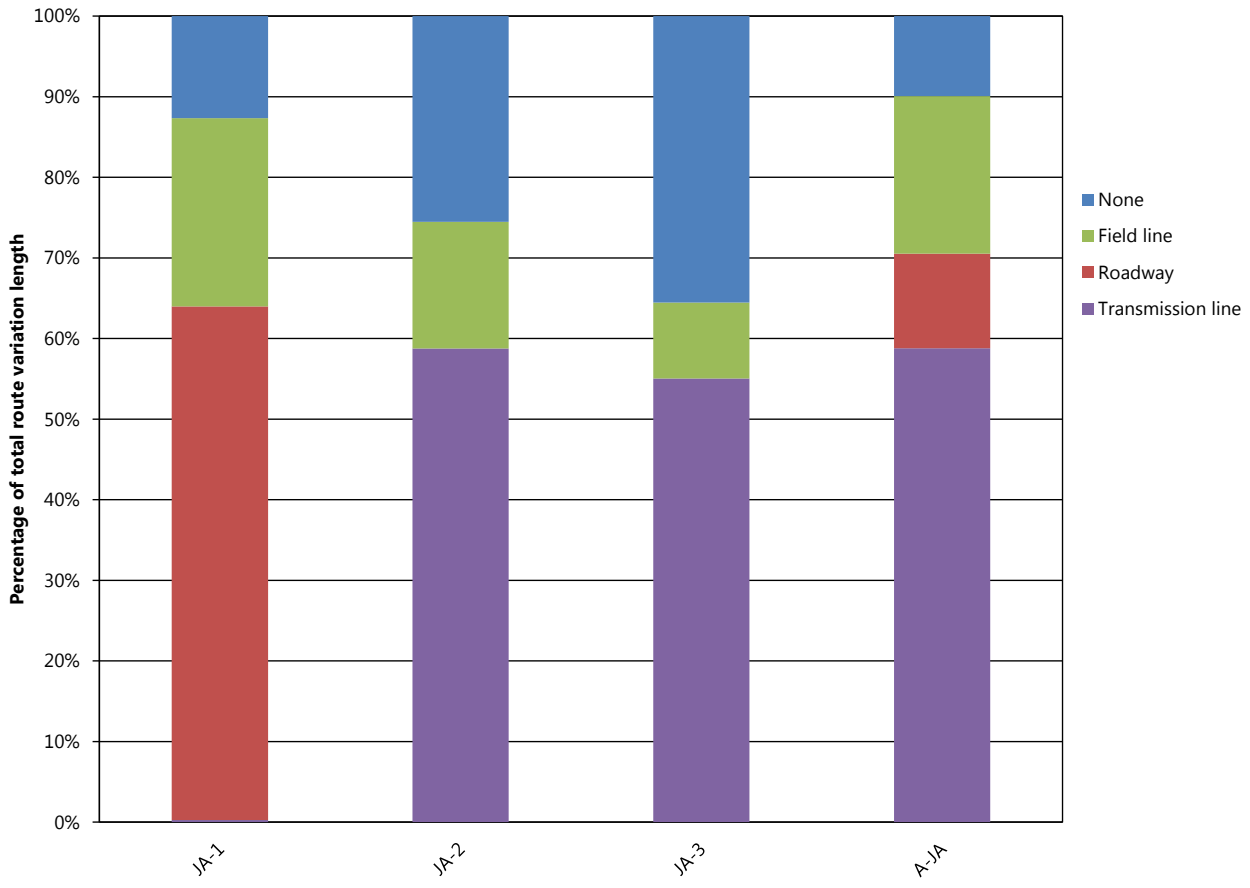
As with the routes and route alternatives for this segment, the only element of human settlements where impacts are anticipated to be non-minimal and to vary notably between route variations is aesthetics. Based on the analysis here, route variation JA-2 appears to minimize impacts to aesthetics and human settlements in this area of the project.

Aesthetics

Figure 6-11 and Map 6-11 show the proximity of homes to route variations in the Jackson Municipal Airport area, and Figure 6-12 shows ROW sharing or paralleling for these variations. This data suggests

Figure 6-12 ROW Sharing – Jackson Municipal Airport

All route variations share or parallel 55-70 percent of their length with transmission line and roadway ROW



Source: Barr Engineering. December 2013

that route variation JA-2 would minimize aesthetic impacts to residents by placing the line at a greater distance from homes and following, to a greater extent, the existing 161 kV transmission line.

Transportation and Public Services

The Jackson Municipal Airport is located within one mile of route variations JA-2, JA-3 and route A-JA (Map 6-11). Route variation JA-1 takes the line further northwest than any of the other route variations in this area, allowing the greatest distance between the proposed HVTL and the airport. The city of Jackson has an expansion plan for the airport that would increase runway length and extend associated approach slopes. This expansion plan has been taken into consideration in the FAA analysis of potential impacts (Reference 1). Based on FAA analysis to date, no impacts to flight operations at the airport are anticipated for route variations and routes in this area – now and with the airport's expansion plan. As noted in Section 5.2.4, depending on the final route selected, mitigation might be required so that the transmission line towers do not interfere with safe operation of the airport. Mitigation measures are described in Section 5.2.4; low-profile structures that may be used for mitigation are shown in Appendix C.

Public Health and Safety

As with the routes and route alternatives for this segment, no impacts to public health and safety are anticipated from any of the route variations in this area, including potential impacts related to EMF, implantable medical devices, stray voltage, induced voltage and air quality. Based on MPCA's WIMN, there are no documented sites of environmental contamination within 500 feet of the Jackson Municipal Airport route variations (Map 6-11). Thus, no public health impacts due to environmental contamination are anticipated.

Land-based Economies

As with the routes and route alternatives for this segment, the only elements of land-based economies where impacts are anticipated to be non-minimal and to vary notably between route variations are agriculture and recreation and tourism.

Agricultural Land, Prime Farmland

Figure 6-13 shows the percentage of each variation's ROW that has been classified by NRCS as prime farmland or farmland of statewide importance. Figure 6-13 also identifies the remaining percent of each variation's ROW that does not fall under either of these designations. Portions of the ROW identified in Figure 6-13 as "not designated as prime farmland" may include, for example, developed areas, lakes and forest areas. Appendix J provides the total acreage of each variation's ROW that is designated as prime farmland or designated as farmland of statewide importance, and the total acreage of each variation's ROW that doesn't fall into either category. Appendix J also provides total cropland acres within each route or route variation's ROW based on USGS NLCS GAP data.

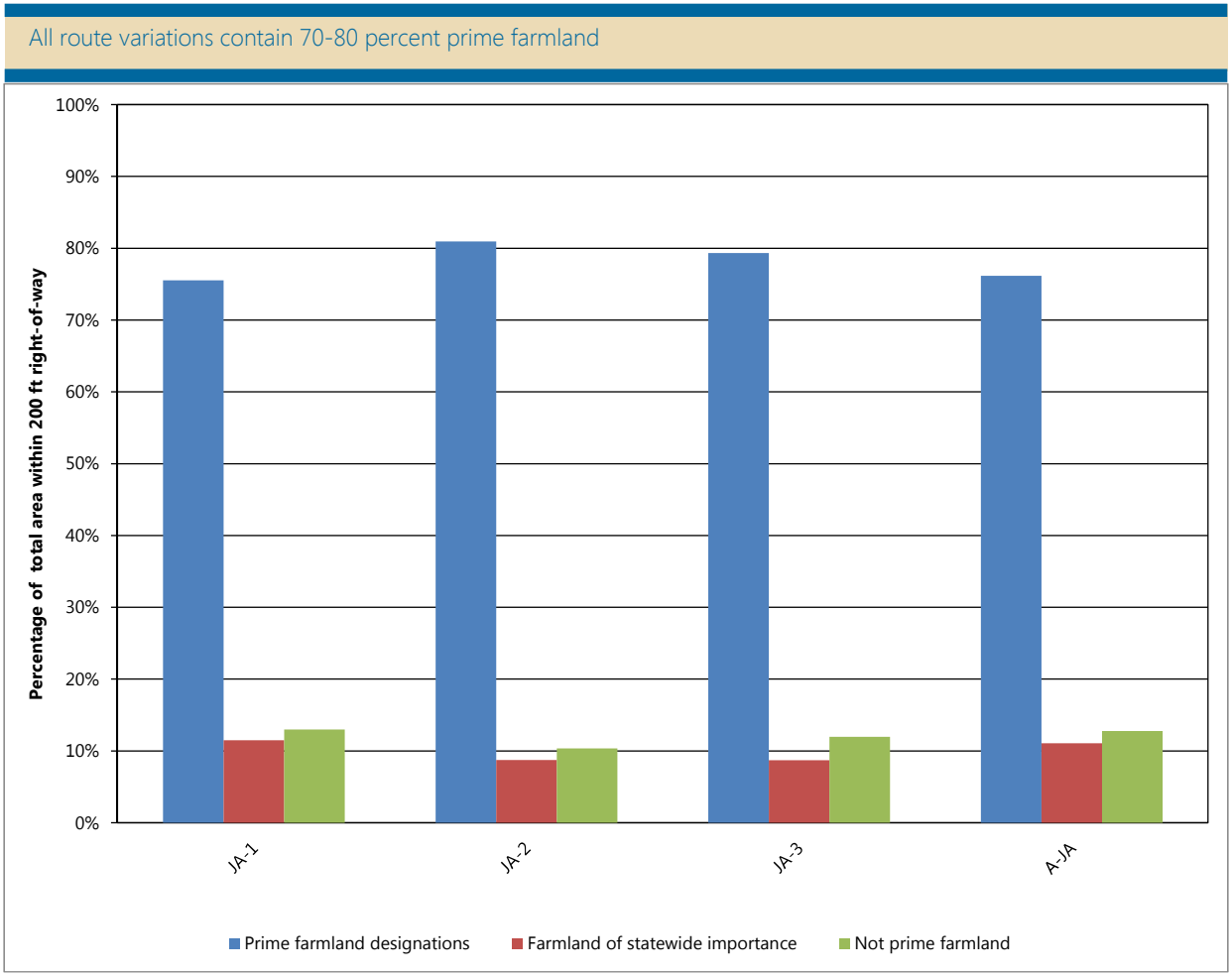
As shown in Appendix J and Figure 6-13, there is not a notable difference in the total amount of agricultural acreage (ranging from 165-200 acres) or the percentage of prime farmland in the ROW between route variations in the Jackson Municipal Airport area. Though the total agricultural acreage and the type of acreage do not vary significantly between variations, the impacts to agriculture do vary, and this is result of transmission line ROW sharing. Route variation JA-1 does not use existing transmission line ROW and thus has greater impacts to agricultural land than other variations in this area. Route variation JA-2 proceeds the furthest east along the existing 161 kV line before turning north, thus maximizing ROW sharing and minimizing agricultural impacts. Route A-JA runs parallel to 820th St. and this paralleling, because it is along field edges and because part of the transmission line ROW could be shared with 820th St. minimizes agricultural impacts. General mitigation measures for farmland would follow those discussed in Section 5.4.1.

In addition to impacts to agricultural land, the route variations in this area likely have different impacts on a well and associated animal housing units along 820th St (Map 6-11). Route A-JA has the potential to significantly interfere with the operation and maintenance of a well on the north side of 820th St. (Photo 6-7). Additionally, route A-JA could require mitigation for induced voltage on animal housing units along 820th St. All other route variations in this area avoid this well and associated animal housing units.

Recreation and Tourism

No WMAs, WPAs, state water trails or state, county or city parks are located within the ROWs of the Jackson Municipal Airport route variations (Map 6-13). The Cottonwood and Jackson County Snowmobile Trail, however, crosses or parallels each of the route variations (Map 6-11). Route variations JA-2 and JA-3 might have the least construction-related effect on snowmobilers, as they would each cross the trail only once. Route variation JA-1 might have the greatest effect on the Cottonwood and Jackson County Snowmobile Trail because, in addition to crossing the trail in three locations,

Figure 6-13 Farmland Classifications – Jackson Municipal Airport



Source: Reference 58

Photo 6-7 Animal Housing Units along 820th St. and Route A-JA

Source: EERA photo
Looking west along 820th St

approximately one mile of the trail parallels and is located within the JA-1 ROW. General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

Archaeological and Historic Resources

The number of archaeological and historic resources within half a mile of the Jackson Municipal Airport variations is shown in Table 6-6 and on Map 6-12. The archaeological resources are located more than 100 feet from the anticipated alignments of the variations and are not likely to be impacted. No historic resources are located within half a mile of the variations; thus, no impacts to these resources are anticipated

Natural Environment

Analysis of natural resource elements along the Jackson Municipal Airport route variations indicates that potential impacts to the natural environment would be minor, with generally little variation in impacts between route variations. Avian impacts are anticipated to be relatively greater with route variation JA-1, as this variation crosses the Des Moines River where there is currently no crossing, whereas all other route variations in the area utilize an existing crossing.

Water Resources

Surface waters, including lakes, watercourses, PWI waters and impaired waters, FEMA-designated 100-year floodplains, NWI-mapped wetlands and County Well Index groundwater wells were identified within the ROWs and within 500 feet of the anticipated alignments of the route variations in the Jackson Airport area. This section focuses primarily on surface waters and wetlands that are within the ROW or crossed by the proposed alignments; additional data is provided in Appendix J. Map 6-13 identifies the water resources within the Jackson Municipal Airport area.

Surface waters

Several small, unnamed lakes are present within this area; none of these lakes are listed on the PWI or designated as impaired lakes (Map 6-13). One unnamed lake is located within the 200-foot ROW of route variation JA-1 and would be crossed twice by this route variation; the other route variations do not have any lakes within their ROWs.

Several watercourses are present in the Jackson Municipal Airport area. The Des Moines River, which is listed on the PWI, flows through this area. Additional watercourses within this area include South Fork Elm Creek and many county and judicial ditches. The following watercourses in this area are listed on the PWI: Des Moines River, South Fork Elm Creek, Judicial Ditch 18 and several unnamed creeks (Map 6-13). Both the Des Moines River and South Fork Elm Creek are listed as impaired watercourses.

Several watercourses would be crossed by the route variations in the Jackson Airport area. Figure 6-14 summarizes the total number of watercourses, PWI watercourses and impaired stream crossings for each of the Jackson Airport route variations. The route variations have between three and eight watercourses within their 200-foot ROWs (Appendix J). Route variations JA-2 and JA-3 and route A-JA have the fewest watercourse crossings and route variation JA-1 has the most (Figure 6-14). JA-1 crosses the Des Moines River where there is currently not a crossing. Route variations JA-2 and JA-3 and route A-JA cross the Des Moines River at the existing 161 kV line crossing.

All route variations would have four PWI watercourse crossings (Figure 6-14). Route variations in the Jackson Municipal Airport area would have between one and three impaired stream crossings, with route variation JA-1 having the fewest impaired stream crossings and route variations JA-2 and JA-3 and route A-JA having the most (Figure 6-14).

General mitigation measures that would be employed to minimize impacts to water resources

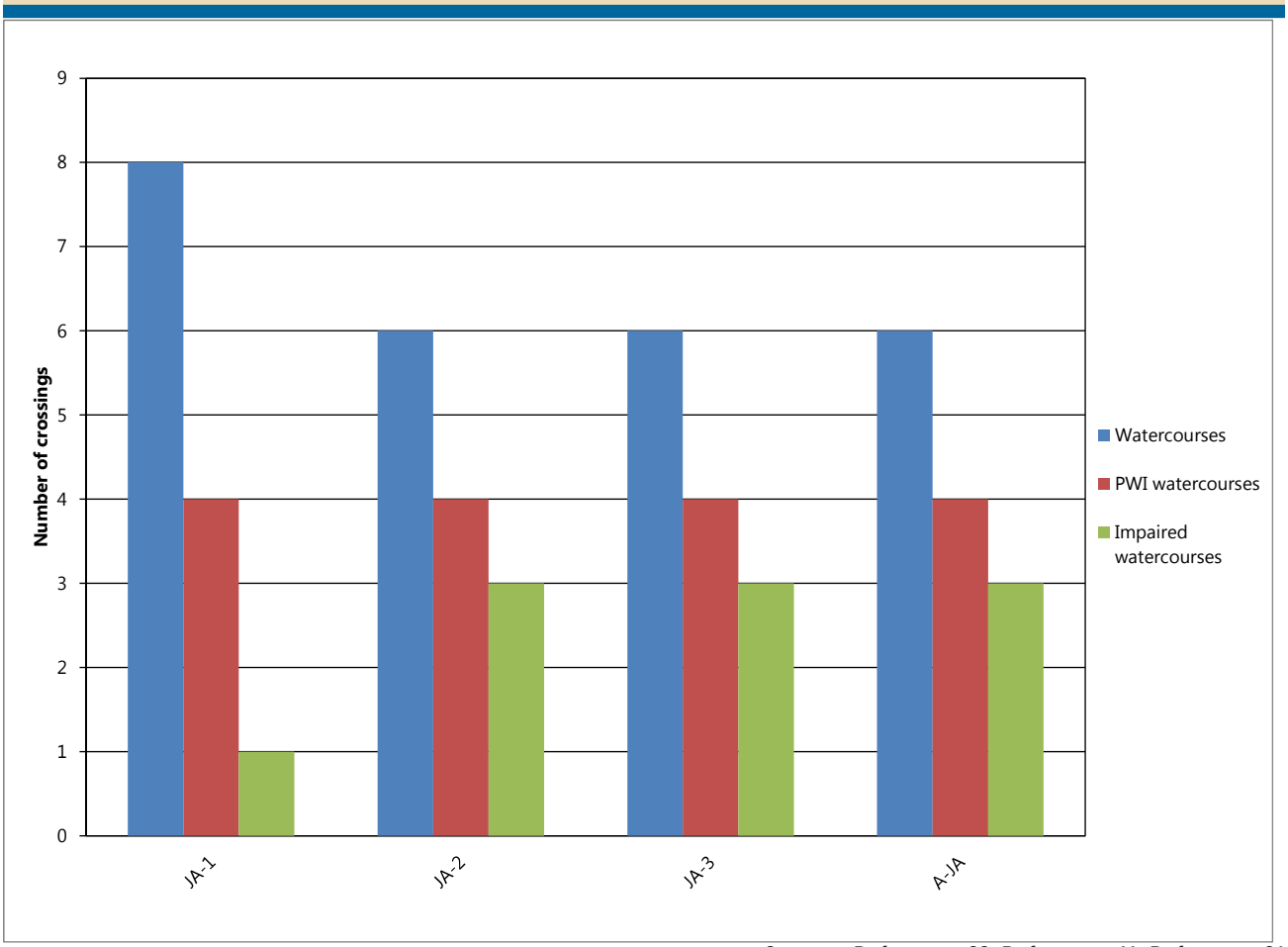
Table 6-6 Archaeological and Historic Resources within Half a Mile of Route Variations –Jackson Municipal Airport

Route Variation	Archaeological Resources	Historic Resources
JA-1	2	0
JA-2	2	0
JA-3	2	0
A-JA	2	0

Source: Reference 59

Figure 6-14 Watercourse Crossings – Jackson Municipal Airport

The number and types of watercourse crossing are fairly similar for all route variations.



Source: Reference 60, Reference 41, Reference 61

are discussed in Section 5.6.1. Because all lakes and watercourses would be spanned, no structures would be placed within these features and direct impacts to lakes and watercourses are not anticipated. Potential indirect impacts to these resources, such as increases in turbidity, could be minimized through use of BMPs. Within this area, impacts to water resources could be further minimized by choosing a route alternative that minimizes the proximity of the alignment to lakes and watercourses. Thus, because route variation JA-2 is relatively distant from the Des Moines River, it is anticipated to have fewer impacts to water resources than route variation JA-3 and route A-JA.

Wetlands

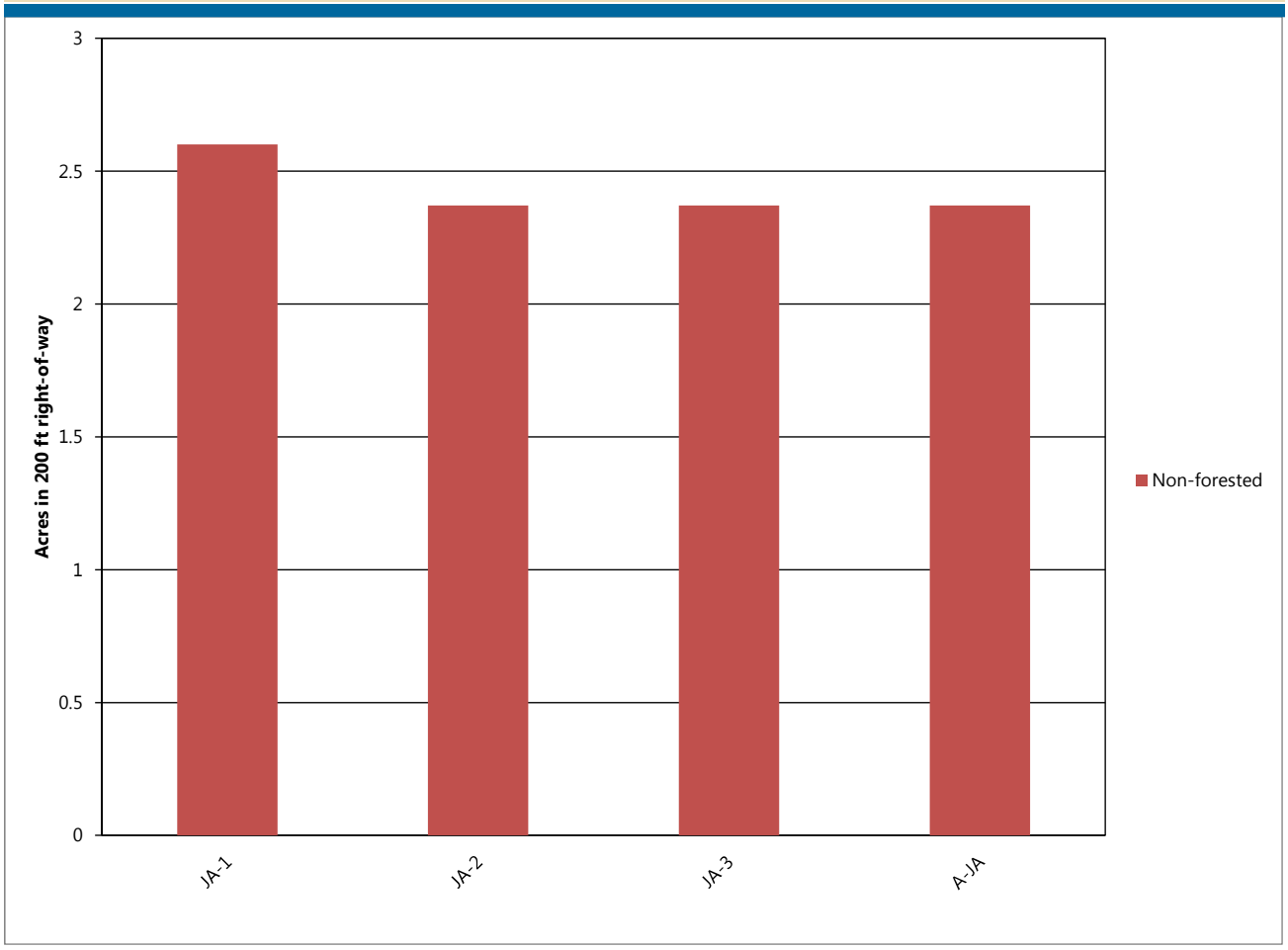
Wetlands within the 200-foot ROWs of the route variations in the Jackson Municipal Airport area consist of small freshwater emergent wetlands, small freshwater ponds and riverine wetlands. No forested wetlands are present within the ROWs of any route variations in this area. Figure 6-15 shows acreages of forested/non-forested wetland in the 200-foot ROW of each route variation in this area. Route variations JA-2 and JA-3 and route A-JA have the least amount of wetland within the 200-foot ROW, while route variation JA-1 has the most wetlands within the 200-foot ROW (Figure 6-15).

Based on NWI mapping, none of the route variations in this area would cross wetlands wider than 1,000 feet; therefore, it is anticipated that no structures would be placed in wetlands within this area of the project. Accordingly, impacts to wetlands in this area of the project are anticipated to be minimal.

Temporary impacts to wetlands may occur if they need to be crossed during construction. Utilizing BMPs and choosing one of the route variations with fewer acres of wetland within the 200-foot ROW could minimize temporary impacts to wetlands.

Figure 6-15 Wetlands Within ROW – Jackson Municipal Airport

All route variations contain about the same amount of wetlands.



Source: Reference 46

Flora

As with the routes and route alternatives for this segment, the only type of flora for which impacts are anticipated to be non-minimal and to vary notably between route variations is forested vegetation cover. Of the route variations in this area, route variation JA-2 has the fewest number of acres of forested vegetation cover within the transmission line ROW.

General effects on the composition of vegetation communities for the Jackson Municipal Airport route variations are described in Section 5.6.2 and are similar to the effects described above. See "Flora" subsection of the "Natural Environment" section of Section 6.1.1. For the Jackson Municipal Airport route variations, forested vegetation cover within 500 feet of the anticipated alignments of the variations ranges from 27 acres (JA-1) to 59 acres (JA-3). Forested vegetation cover in all four Jackson Municipal Airport route variations is less than 6 percent of the total vegetation cover and varies within the ROW from 3.2 acres (JA-2) to 9.5 acres (JA-3, A-JA). No Jackson Municipal Airport route variation would remove more than 5 percent of the existing forested vegetation cover within the 200-foot ROW.

Fauna

Direct impacts to fauna are anticipated to be minimal for all route variations in this area. The Jackson Municipal Airport route variations do not cross, or pass within one mile of, any lands managed for wildlife use, which includes WMAs, game refuges and WPAs.

Route variations JA-2 and JA-3, as well as route A-JA, cross the Des Moines River at an existing crossing and would change this crossing from a 161 kV single-circuit line to a 345/161 kV double-circuit line. Route variation JA-1 crosses the Des Moines River at a new crossing. All of these crossings could have indirect impacts on avian species, as these species

can collide with transmission line conductors. Avian impacts can be mitigated by using the existing crossing of the river (JA-2, JA-3, A-JA), as impacts at this crossing are anticipated to be incremental. Impacts could also be mitigated by adding bird flight diverters or by structure design (Section 5.6.3).

Rare and Unique Natural Resources / Threatened and Endangered Species

Documented locations of state and federally threatened and endangered species and rare communities were identified within the ROWs, within 500 feet of the anticipated alignments and within one mile of all Jackson Municipal Airport route variations. Rare-community data provided in this section focuses on the presence of these resources within the ROW. Additional data is provided in Appendix J and Appendix K. Map 6-14 and the detailed maps in Appendix L identify the rare and unique natural resources near the Jackson Municipal Airport route variations, but to protect rare resources from being exploited or destroyed, Map 6-14 and the maps in Appendix L do not indicate the names of species or communities identified within the NHIS database.

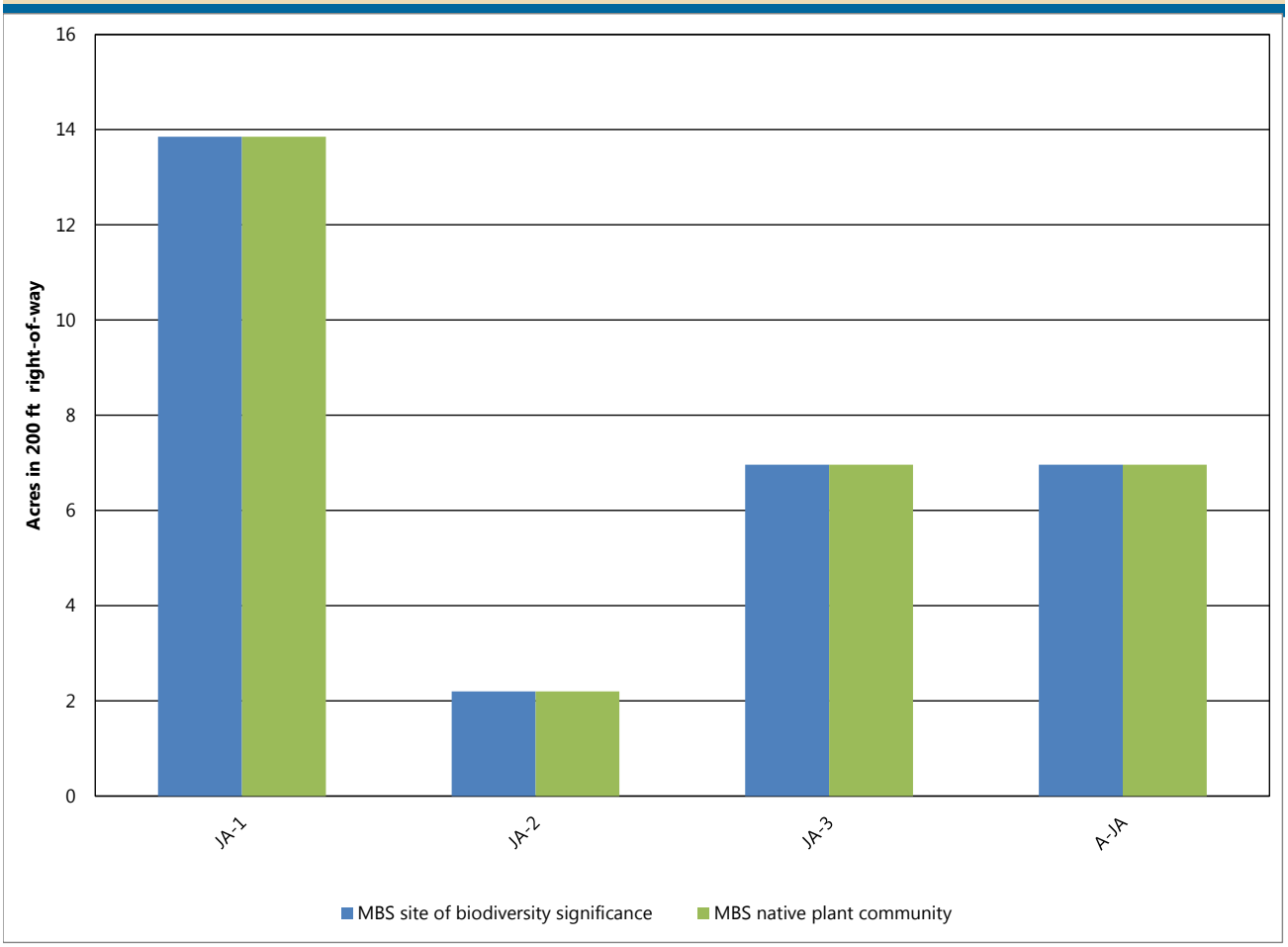
According to the DNR NHIS database, no records of state or federally threatened or endangered species have been documented within one mile of the Jackson Municipal Airport route variations. Thus, no impacts on state and federally threatened and endangered species are anticipated, whichever route variation is selected. **In addition, no state-special concern or tracked species have been documented within the 200-foot ROW or within 500 feet of the anticipated alignments of the route variations.** Therefore, this element will not be discussed further in this section.

Rare Communities

Rare community data for the route variations in the Jackson Municipal Airport area was analyzed for potential impacts to these communities. Additional data is provided in Appendix J and Appendix K.

Figure 6-16 Rare Plant Communities – Jackson Municipal Airport

Route variation JA-1 contains the greatest amount of rare plant communities.



Source: Reference 54, Reference 57, Reference 55

Table 6-7 Summary of Costs for Routes Variations – Jackson Municipal Airport

Route ID	Length (miles)	Estimated Costs ($ million)
JA-1	9.6	20.3
JA-2	8.2	19.2
JA-3	8.2	19.2
A-JA	7.7	18.1

Figure 6-16 shows the areas of rare communities (MBS native plant communities and MBS SBS) within the 200-foot ROW of each Jackson Municipal Airport route variation. As Figure 6-16 indicates, route variation JA-1 has significantly more acres of MBS SBS than do the other three Jackson Municipal Airport route variations. While route variation JA-1 has more acres of MBS native plant communities, none of these communities are forested. In contrast, all of the native plant communities in the 200-foot ROW of route variations JA-2 and JA-3 and route A-JA are forested and would require tree clearing.

Although MBS native plant communities and SBS would be spanned to the extent possible, some routes and route alternatives in this segment would cross native plant communities and SBS wider than 1,000 feet, which might require that one or more poles be placed within them. Route A and route variations JA-2 and JA-3 would require crossing a Southern Mesic Oak – Basswood Forest wider than 1,000 feet; this native plant community has a state conservation rank of S3, which is subject to extirpation in Minnesota (Appendix J). Route variation JA-1 would require crossing two areas of Dry Hill Prairie (Southern) native plant communities greater than 1,000 feet; this native plant community has a state conservation rank of S2, which is imperiled (Appendix J). In addition, route variation JA-3 would require crossing one SBS wider than 1,000 feet, while route variation JA-1 would require crossing two SBS wider than 1,000 feet (Appendix J).

None of the Jackson Municipal Airport route variations have DNR-designated railroad ROW prairie within their 200-foot ROWs.

Effects on rare communities could be minimized by selecting the route variation with the fewest acres of native plant communities and MBS SBS, such as route variation JA-2, and by spanning areas where these communities are present. Where placing structures cannot be avoided, rare species associated with these habitats could be affected. Surveys for rare species might be necessary in areas where rare habitat is unavoidable. Because trees would need to be cleared during construction, and maintenance requirements under transmission lines would prevent trees from establishing, effects on rare forested communities could be minimized by selecting route variation JA-1, which does not have any rare forested communities present in the ROW.

Use or Paralleling of Existing Rights-of-Way

Map 6-15 shows areas where the ROW for the proposed route variations would share ROW or parallel existing transportation, transmission line or other infrastructure. Figure 6-12 shows the percentage of total line distance where existing infrastructure ROW is shared or paralleled under each route variation in the Jackson Municipal Airport area. Overall, route A-JA shares the greatest percentage of its length with existing transmission line and roadway ROW. Of the route variations in this area, route variation JA-1 follows the least existing transmission line ROW, but follows roadways for nearly 65 percent of its length. Route variation JA-3 shares ROW for less of its total length than do the other Jackson Municipal Airport route variations.

Costs that are Dependent on Design and Route

A summary of the costs associated with constructing the Jackson Airport route variations are provided in Table 6-7. Cost estimates have a range of plus or minus 30 percent.

The most expensive of the Jackson Airport variations is route variation JA-1, which is the longest of the three variations. The least costly is route A-JA, which is about 1.9 miles shorter than route variation JA-1.

Modified Route A

In the area of the Jackson Municipal Airport, modified route A (MRA-JA) is a combination of route variation JA-2 and route A-JA and has potential impacts similar to both of these routing options (Map 3-10).

MRA-JA does not follow the existing 161 kV crossing of the Des Moines River, but rather

has a nearly perpendicular crossing of the Des Moines River (Map 3-10; Map Sheet LH21). Route variation JA-2 utilizes the existing crossing and follows the existing 161 kV line until turning north toward 820th St. With respect to aesthetic impacts, both MRA-JA and JA-2 avoid residences in the area. Because it follows the existing 161 kV line, JA-2 is more harmonious with this existing line; however, both MRA-JA and JA-2 would result in one transmission line, a double-circuit 345/161 kV line, across the Des Moines River.

All route variations in the Jackson Municipal Airport area have similar amounts of farmland in their ROWs (Figure 6-13). However, impacts to agriculture vary between route variations due to ROW sharing (Figure 6-12). JA-2 minimizes agricultural impacts by following the existing 161 kV line for a portion of its length between the Des Moines River crossing and 820th St. MRA-JA does not follow the existing 161 kV line and thus would have agricultural impacts greater than JA-2 for this portion of the line. Route A-JA minimizes agricultural impacts by following 820th St. for a portion of its length. However, route A-JA could impact agricultural operations in the area by impacting a well on the north of 820th St. and associated animal housing units (Photo 6-7). MRA-JA mitigates these potential impacts by (1) proceeding on the south side of 820th St. to avoid the well on the north side, and (2) crossing to the north side of 820th St. to avoid animal housing units on the south side of 820th St. (Map Sheet LH21).

Impacts to flora and fauna and to rare communities can be mitigated by crossing the Des Moines River at the existing 161 kV crossing and proceeding north to 820th St. at some distance from the river. Both route variation JA-2 and route MRA-JA employ this mitigation strategy. Route variation JA-2 utilizes the existing 161 kV line ROW. Using the existing ROW minimizes tree clearing at the river. In the area of the crossing, the Des Moines River is oriented in a northeast-to-southwest direction (Map 6-14; Map Sheet LH21). The existing 161 kV line and JA-2 parallel and cross the river in a similar direction, thus lengthening the span across the river, but minimizing the portion of the span that crosses forested areas.

The orientation of the existing 161 kV line and JA-2, though likely minimizing impacts to plant communities, is not advantageous for avian species. Placing the line parallel to and across the river for an extended length increases the likelihood of avian impacts with conductors. Additionally, there would be two sets of conductors with a double-circuit 345/161 kV crossing.

MRA-JA crosses the Des Moines River in a relatively more perpendicular fashion than JA-2. This perpendicular crossing minimizes the length of the span across the river. However, the crossing would impact a total of approximately 3.5 acres of Southern Mesic Oak-Basswood forest on either side of the river. This type of Oak-Basswood forest has a conservation status of S3, which indicates that it is a forest type vulnerable to extirpation in Minnesota. Crossing the river in a more perpendicular manner is advantageous for avian species; using MRA-JA would likely have fewer avian impacts than JA-2.

Construction of the project along JA-2 at the Des Moines River would require work solely in the existing 161 kV ROW. Construction along MRA-JA would require limited work in the existing 161 kV ROW to remove structures, and construction in the new double-circuit 345/161 kV ROW.

Impacts to flora and fauna and to rare communities near the Des Moines River could be mitigated by using the existing 161 kV line ROW for the river crossing (JA-2), by utilizing a smaller ROW (i.e., a ROW less than the 200 feet requested by ITCM) across the river to minimize tree clearing, and by using specialty structures that would facilitate conductors spanning treed areas near the river such that tree clearing would not be required or would be minimized. Mitigation for MRA-JA could potentially include planting of oak and basswood seedlings in the abandoned 161 kV ROW.

Fox Lake Variations

There are six route variations in the Fox Lake area (FL-1 through FL-6), all of which begin with and return to route A. Two variations, FL-5 and FL-6, proceed around the western end of Fox Lake before proceeding along the existing Lakefield to Border 161 kV line and back to route A. Three variations, FL-2, FL-3 and FL-4, proceed along the southern edge of Fox Lake and then around its eastern end before rejoining route A. One variation, FL-1, crosses Fox Lake, double-circuiting with the existing 161 kV line that crosses the lake. In addition to analyzing each of these variations, this section discusses the possibility of removing the existing 161 kV line from Fox Lake and double-circuiting it with the new 345 kV line along route variations FL-3 and FL-4.

Route variation FL-2 has the fewest number of residences near the line (zero; A-FL has one). Route variations FL-1 and FL-6 minimize aesthetic impacts by following existing transmission line or roadway ROW. Of these two, FL-1 best minimize aesthetics impacts overall because it does not introduce a new transmission line ROW into the area. Route variations FL-2 and FL-3 and route A-FL would significantly impact an airstrip in Section 23 of Fox Lake Township, Martin County.

Route variation FL-1 best minimizes impacts to agriculture by using the existing 161 kV transmission line ROW across Fox Lake and then north and east until reconnecting with route A. Direct impacts to fauna, with the exception of route variation FL-5, are anticipated to be minimal. It is anticipated that route variation FL-1 would best minimize avian impacts in the area. Route variation FL-1 would be a double-circuit crossing whether there is already a crossing of the lake; thus, any avian impacts would be incremental.

Route variations FL-1 and FL-6 best utilize existing transmission line and roadway ROW in the area. Both variations follow existing transmission line or roadway ROW for their entire lengths. All other route variations share approximately 70-90 percent of their lengths with transmission line or roadway ROW.

There are positive impacts that would accrue if the existing 161 kV line were removed from Fox Lake and double-circuited on route variation FL-3 or FL-4 until reconnecting with route A northeast of Fox Lake. The removal would positively impact aesthetics at Fox Lake and generally in the area by creating one transmission line ROW instead of two near the lake. The removal would have a positive impact on agricultural operations along the existing 161 kV line. The removal would decrease avian impacts at the lake. The removal would create new adverse impacts related to transmission facilities necessary to affect the double-circuiting and would create incremental aesthetic and avian impacts along route variations FL-3 and FL-4.

Modified route A in the Fox Lake area (MRA-FL) is the same as route variation FL-4, except for a small difference in the anticipated alignment of MRA-FL along I-90 and MRA-FL's movement of an existing 69 kV to follow this alignment. Thus, MRA-FL has potential impacts similar to FL-4. Like FL-4, MRA-FL could be used to remove the existing 161 kV line from Fox Lake.

Human Settlements

As with the routes and route alternatives for this segment, the only element of human settlements where impacts are anticipated to be non-minimal and to vary notably between route variations is aesthetics. Those variations that through double-circuiting limit the number of HVTL ROWs in the Fox Lake area to one, rather than two, would minimize impacts to aesthetics and human settlements. Route variation FL-1, which double-circuits the existing 161 kV line over Fox Lake, best minimizes aesthetic impacts in the area. Route variations FL-3 and FL-4, if they were double-circuited with the 161 kV line, would also minimize aesthetic impacts.

Aesthetics

Before proceeding to a discussion of aesthetic impacts, it's necessary to further describe how route variation FL-1 would cross Fox Lake. Crossing Fox Lake could be achieved with either a parallel configuration (existing 161 kV line alongside a new 345 kV line) or a double-circuit configuration (345 kV/161 kV). After analysis, ITCM has indicated that there is not sufficient room at the lake for a parallel crossing. No matter which configuration is used at this location, the existing 161 kV structures must be replaced on each side of the crossing to accommodate the 345 kV line. Thus, ITCM concluded that if these existing structures must be removed, they should be replaced with double-circuit structures.

Accordingly, this EIS analyzes a double-circuit crossing of Fox Lake. This crossing would require specialty steel H-frame structures with a ROW width of 250 feet and a span length of 1,820 feet (Appendix C). These structures would be used on each side of the lake crossing and would be designed such that the conductors have with a relatively flat profile to minimize impacts to waterfowl and birds. A photo-simulation of the double-circuit crossing at Fox Lake is shown in Appendix D2.

Figure 6-17 and Map 6-16 show the proximity of homes to route variations in the Fox Lake area, and Figure 6-18 analyzes ROW sharing or paralleling for these route variations. This data suggests that route variation FL-2 best minimizes aesthetic impacts by avoiding homes. This data also suggests that route variations FL-1 and FL-6 best minimize aesthetic impacts by following existing transmission line or highway ROW. Despite the relatively greater number of homes along route variations FL-1 and FL-6, their relatively greater extent of ROW sharing or paralleling likely best minimizes aesthetic impacts in the Fox Lake area. Between these two, FL-1 and FL-6, route variation FL-1 likely best minimizes aesthetic impacts because it does not introduce a new HVTL ROW into the area. It places the new 345 kV line

where there is already a 161 kV line. In this sense, route variation FL-1 is most harmonious with the existing infrastructure in the area. To be sure, the crossing structures and the additional conductors across Fox Lake would impact aesthetics at the lake. However, this would be an incremental impact, as there is already a line across the lake, as opposed to an entirely new impact for a 345 kV line around the lake.

It's possible that aesthetic impacts could also be minimized by a double-circuiting that removes the 161 kV line from the lake and follows route variation FL-3 or FL-4 around the eastern end of the lake. This removal and double-circuiting is discussed below.

Finally, though property value impacts are not well correlated with transmission line ROWs (Section 5.1.4 and Appendix G), it is likely that there is a linkage between aesthetics impacts and property value impacts with respect to harmonious placement of the new 345 kV line. That is, harmony with existing infrastructure not only minimizes aesthetic impacts, it likely also minimizes property value impacts, to the extent such impacts occur. The Fox Lake area has substantial public and private investments. To the extent that new investments (i.e., a new 345 kV line) are harmonious with current investments, impacts to property values are likely minimized across the area as a whole.

Transportation and Public Services

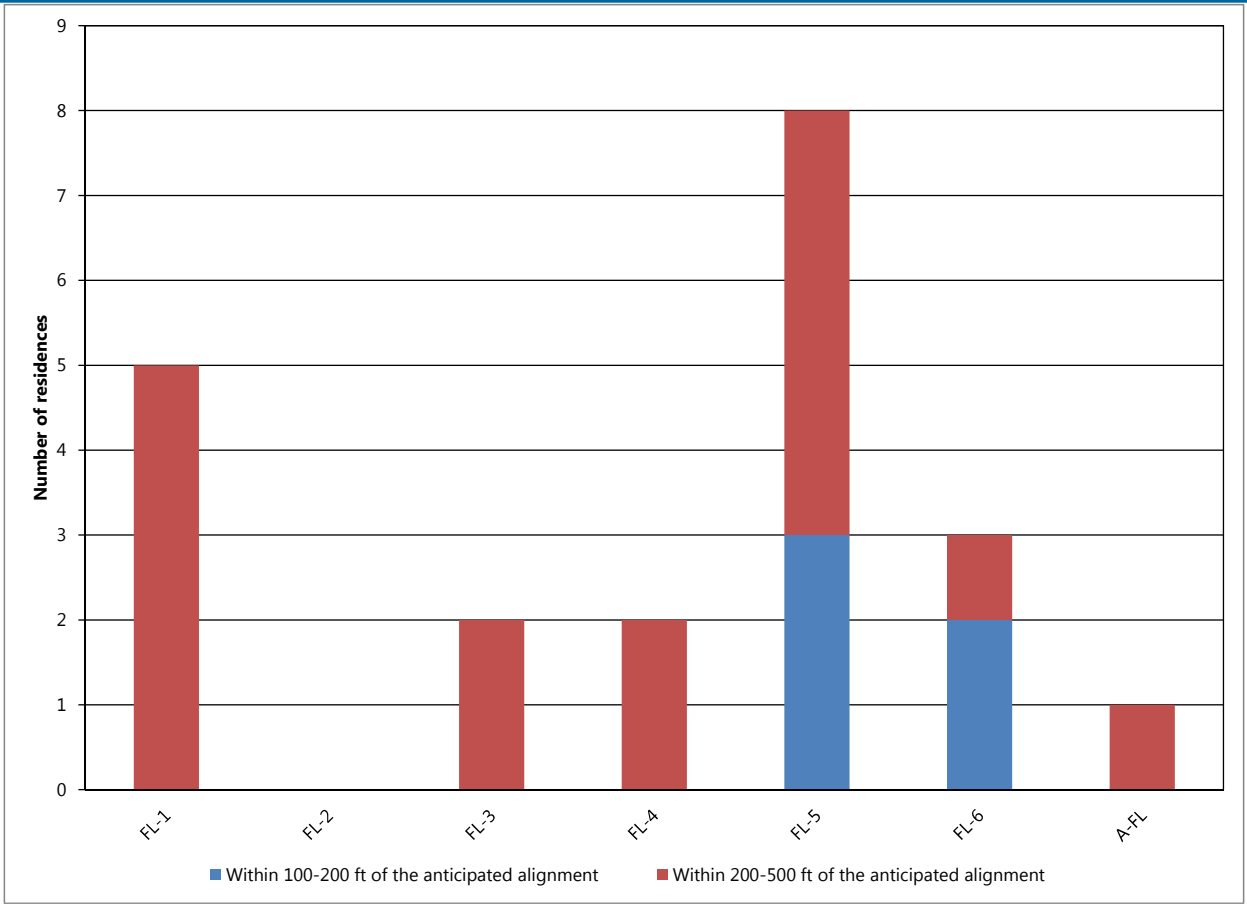
As with the routes and route alternatives for this segment, the elements of transportation and public services where impacts are anticipated to be non-minimal and to vary notably between route variations are airports and, with respect to roads, the number of crossings of I-90.

Airports

One private-use grass airstrip is located within 100 feet of route variations FL-2 and FL-3 and route A-FL (Map 6-16). It is anticipated that impacts to this airstrip would be significant if one of these routing options were selected for project. The impact to the airstrip with these routing options appears to be

Figure 6-17 Proximity of Homes - Fox Lake

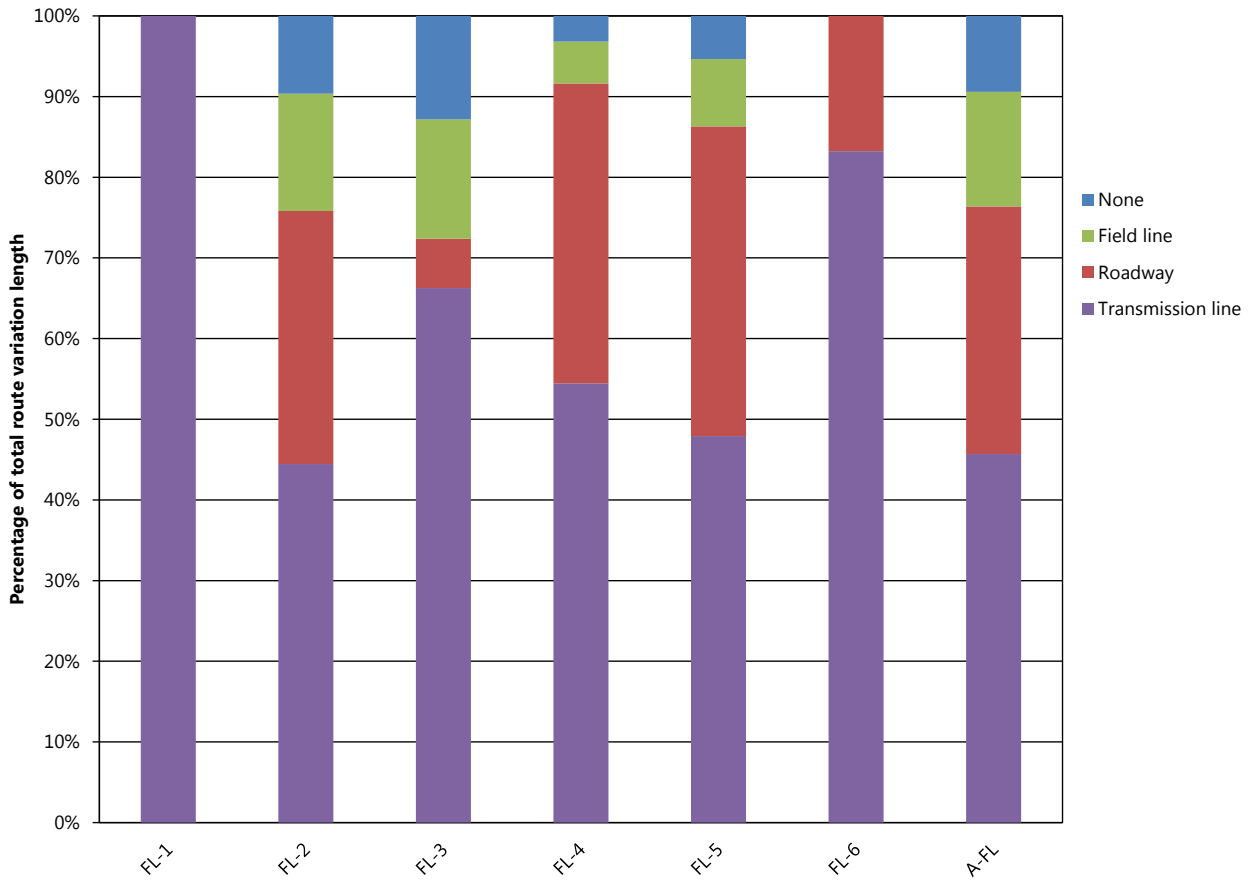
Route variations FL-2 and A-FL have the fewest number of homes within 500 feet of their anticipated alignments.



Source: Barr Engineering. Residence Locations. Field Survey on 11/18/2013

Figure 6-18 ROW Sharing – Fox Lake

Route variations FL-1 and FL-6 share or parallel 100 percent of their length with transmission line or roadway ROW.



Source: Barr Engineering. December 2013

unavoidable. Mitigation could possibly be achieved by moving or otherwise reconfiguring the airstrip.

This airstrip is also within one mile of route variations FL-1, FL-5 and FL-6; however, no impacts to the airstrip are anticipated with these variations.

Crossings of I-90

As noted above, MnDOT has expressed an interest in not only minimizing long-term impacts to the functioning and maintenance of I-90, but also in minimizing the number of crossings of I-90. In the Fox Lake area, route A-FL and route variation FL-2 cross I-90 twice. All other route variations in this area do not cross I-90.

Public Health and Safety

As with the routes and route alternatives for this segment, no impacts to public health and safety are anticipated from any of the route variations in this area, including potential impacts related to EMF, implantable medical devices, stray voltage, induced voltage and air quality.

Based on MPCA's WIMN, there are no documented sites of environmental contamination in the WIMN database within 100 feet of the Fox Lake route variations. All route variations, with the exception of route variation FL-5, have two hazardous waste generator sites, four storage tanks and three or four 'multiple activities' listings within 500 feet of their anticipated alignments (Map 6-16). The 'multiple activities' listings include hazardous waste generator sites, leaking storage tanks and storage tanks. Per the WIMN database, all leak sites are inactive. For all route variations, health and safety risks can be avoided, if necessary, by adjusting alignments or designing pole placements to avoid these sites.

Land-based Economies

As with the routes and route alternatives for this segment, the only elements of land-based

economies where impacts are anticipated to be non-minimal and to vary notably between route variations are agriculture and recreation and tourism.

Agricultural Land, Prime Farmland

Figure 6-19 shows the percentage of each variation's ROW that has been classified by NRCS as prime farmland or farmland of statewide importance. Figure 6-19 also identifies the remaining percent of each variation's ROW that does not fall under either of these designations. Portions of the ROW identified in Figure 6-19 as "not designated as prime farmland" may include, for example, developed areas, lakes and forest areas. Appendix J provides the total acreage of each variation's ROW that is designated as prime farmland or designated as farmland of statewide importance, and the total acreage of each variation's ROW that doesn't fall into either category. Appendix J also provides total cropland acres within each route or route alternative's ROW based on USGS NLCS GAP data.

As shown in Appendix J, route variations in the Fox Lake area have between approximately 280 and 300 acres of farmland within their ROWs. Figure 6-19 shows that route variations FL-1, FL-5 and FL-6 have similar impacts on prime farmland, with approximately 85 percent of their ROWs classified as prime farmland, prime farmland if drained, or prime farmland if protected from flooding. Route variations FL-2, FL-3 and FL-4 and route A-FL would affect somewhat more prime farmland, with approximately 95 percent of their ROWs classified as one of the three prime farmland categories.

Though route variation FL-1 is similar to other variations with respect to acreage and type of farmland, this variation minimizes impacts to farmland by using the existing 161 kV transmission line ROW across Fox Lake and then north and east until reconnecting with route A. Photo 6-8 shows existing H-frame structures in the agricultural fields north of Fox Lake. As this is an existing transmission line ROW, double-circuiting the 345 kV line would create a minimal, incremental impact to agricultural land along the variation. Additionally, the new double-circuit line would replace existing H-frame structures with single pole structures, thus increasing the acreage that can be managed and lessening potential difficulties in operating equipment in adjacent fields. General mitigation measures for farmland would follow those discussed in Section 5.1.4.

Recreation and Tourism

No state water trails, snowmobile trails or state, county or city parks are located within the ROWs of the Fox Lake route variations (Map 6-16). Although route variation FL-1 crosses Fox Lake, it would follow an existing 161 kV transmission line and would not introduce new direct impacts to fishing, boating or other recreational activities. It is possible that the increased number of conductors over the lake would make recreating on the lake relatively less pleasurable for citizens, due to aesthetic impacts. This indirect impact is uncertain and difficult to quantify.

Route variations FL-1, FL-2, FL-3 and FL-4 as well as route A-FL would cross the Fox Lake Game Refuge. During construction, this could affect access to the refuge and could cause game and other wildlife to leave the area. These effects, however, are anticipated to be temporary, lasting only for the duration of construction. Route variations FL-5 and FL-6 would not traverse the Fox Lake Game Refuge but would be located immediately adjacent to it. General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

Archaeological and Historic Resources

Archaeological and historic resources in the Fox Lake area are shown on Map 6-17. The number of archaeological and historic resources within half a mile of the Fox Lake variations is shown in Table 6-8. The archaeological resources are located more than 100 feet from the anticipated alignments of the variations and are unlikely to be affected by the variations. One of the historic resources, the Fox Lake Power Plant (MR-MAY-001), is located within 500 feet of route variation FL-1. Although the project is unlikely to have adverse visual effects on this historic resource, the potential does exist.

Natural Environment

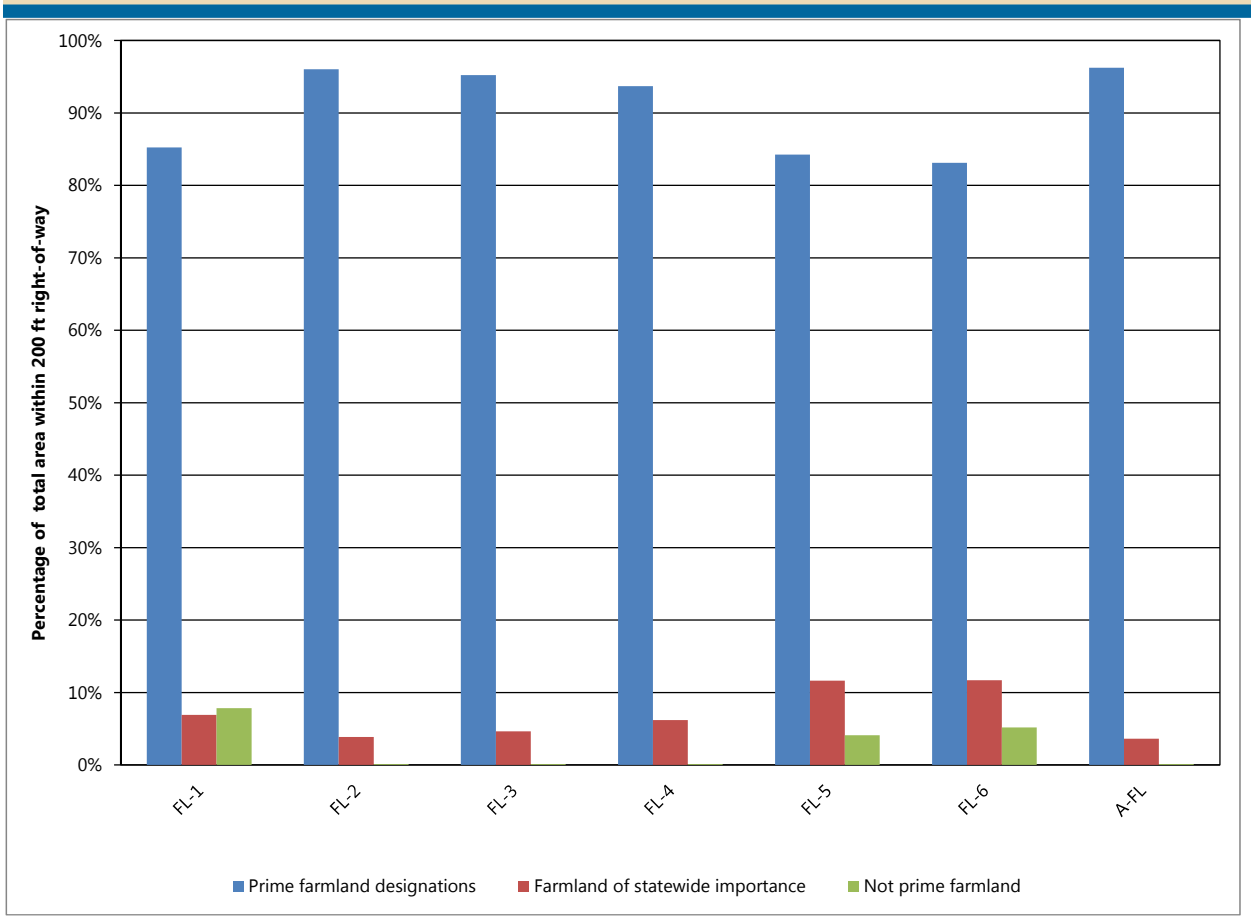
Analysis of natural resource elements along the Fox Lake route variations indicates that potential impacts to the natural environment would be minor, with generally little variation in impacts between route variations. Avian impacts are anticipated to vary between route variations, with route variation FL-1 likely best minimizing these impacts. Impacts due to route variation FL-1 would be incremental and can be minimized through structure design and bird flight diverters. All other route variations introduce a second transmission line ROW into the area, thus increasing the likelihood of avian impacts.

Water Resources

Surface waters, including lakes, watercourses, PWI and impaired waters, FEMA-designated 100-year floodplains, NWI-mapped wetlands and County

Figure 6-19 Farmland Classifications – Fox Lake

All route variations contain 85-95 percent prime farmland.



Source: Reference 58

Photo 6-8 Existing 161 kV Line North of Fox Lake

Route variation FL-1 would replace existing H-frame structures with single pole structures north of Fox Lake.

Source: EERA photo
Looking north from 140th St.

Well Index groundwater wells were identified within the ROWs and within 500 feet of the anticipated alignments of all route variations in the Fox Lake area. This section focuses primarily on surface waters and wetlands that are within the ROW or are crossed by the proposed alignments. Additional data is provided in Appendix J. Map 6-18 identifies the water resources near each route variation in the Fox Lake area.

Surface waters

Fox and Seymour Lakes, both of which are listed on the PWI, are the main waterbodies in this area. Fox Lake is designated as an impaired water. Fox Lake is crossed by route variation FL-1. This variation would cross Fox Lake and would also cross two smaller lakes adjacent to Fox Lake (Map 6-18). No other route variations would cross any lakes (Appendix J; Map 6-18).

Several watercourses are present in this area. Elm and Lily Creeks, which are listed on the PWI and also listed as impaired waters, are the main watercourses that flow through this area. Additional watercourses within this area include county judicial ditches and small unnamed watercourses, many of which are listed on the PWI (Map 6-18).

Figure 6-20 summarizes the total number of watercourses, PWI watercourses and impaired streams in this area that each route variation would cross. Each variation within this area would have between five and seven watercourses within its ROW (Appendix J), and each variation would cross watercourses between six and nine times, with route variation FL -1 crossing the fewest times and route variation FL-6 the most (Figure 6-20). Route variations FL-1, FL-5 and FL-6 would cross PWI watercourses twice, while the remainder of the variations would cross three times (Figure 6-20). Watercourses crossed would include Elm Creek, Lily Creek, Judicial Ditch 37 and several unnamed streams (Figure 6-20).

General measures to minimize effects on water resources are discussed in Section 5.6.1. Because all lakes and watercourses would be spanned, no structures would be placed within these features, and direct effects on lakes and watercourses are anticipated to be minimal. Potential indirect impacts, such as increases in turbidity, could be minimized by using BMPs and by choosing a route variation with relatively fewer crossings of lakes and watercourses.

Wetlands

Figure 6-21 summarizes the total amounts of wetland and forested wetland that lie within the ROW of each route variation in this area. Route variations FL-2, FL-3 and FL-4 and route A-FL have the least amount of wetland within their ROWs, while FL-1 has the most (Figure 6-21). Route variations FL-1, FL-5 and FL-6 have less than one quarter acre of forested wetland within their ROWs, while forested wetland is not present within the ROWs of the remaining route variations (Figure 6-21).

Although wetlands would be spanned to the extent possible, route variation FL-1 would cross two wetlands wider than 1,000 feet, while route variations FL-5 and FL-6 would each cross one (Appendix J). The remaining route variations would not cross wetlands wider than 1,000 feet. Wetlands wider than 1,000 feet could require that one or more poles be placed within them.

Using BMPs and choosing one of the route variations with fewer acres of wetland within the ROW could minimize temporary impacts to wetlands during construction. Forested wetlands could become non-forested because vegetation maintenance procedures under transmission lines could prevent trees from establishing. Choosing route variations FL-2, FL-3, or FL-4, or route A-FL would minimize this impact because these route variations have the fewest acres of forested wetland within their ROWs.

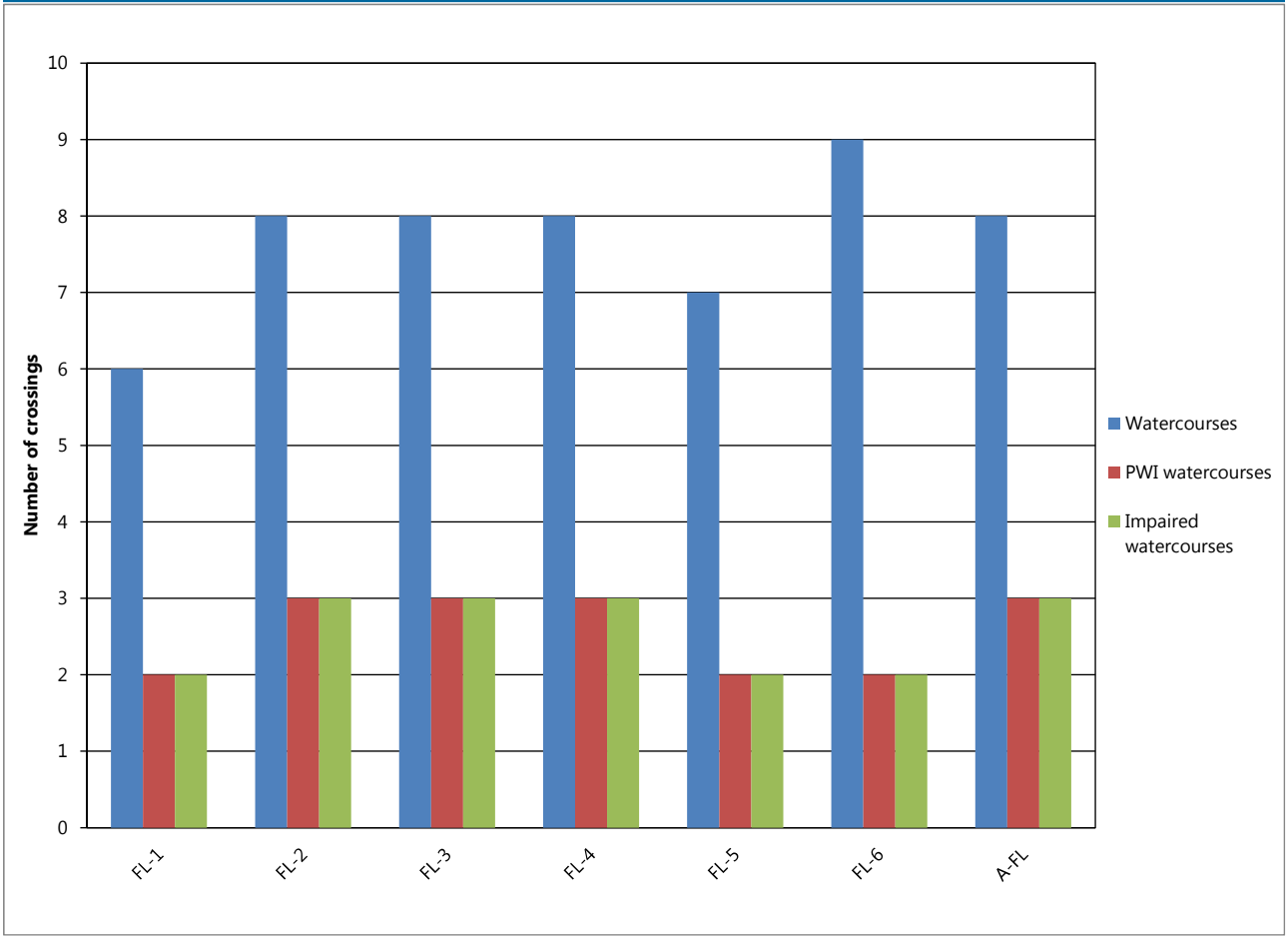
Table 6-8 Archaeological and Historic Resources within Half a Mile of Route Variations –Fox Lake

Route Variation	Archaeological Resources	Historic Resources
FL-1	1	2
FL-2	0	2
FL-3	1	2
FL-4	1	2
FL-5	0	0
FL-6	0	0
A-FL	0	2

Source: Reference 59

Figure 6-20 Watercourse Crossings – Fox Lake

All route variations have 6-9 watercourse crossings.



Source: Reference 60, Reference 41, Reference 61

Flora

As with the routes and route alternatives for this segment, the only type of flora for which impacts are anticipated to be non-minimal and to vary notably between route variations is forested vegetation cover. General effects on the composition of vegetation communities for the Fox Lake route variations are described in Section 5.6.2, and are similar to those described in the "Natural Environment" section of Section 6.1.1. The Fox Lake route variations vary slightly in the amount of forested vegetation cover within 500 feet of their anticipated alignments. Route variations FL-2, FL-3 and FL-4 and route A-FL all have less than 1.4 acres of forested cover within 500 feet of their alignments, while route variations FL-1, FL-5 and FL-6 have between 22 and 25 acres. The forested vegetation cover within 500 feet of the anticipated alignments for all Fox Lake route variations, however, is less than 1.5 percent of the total vegetation cover.

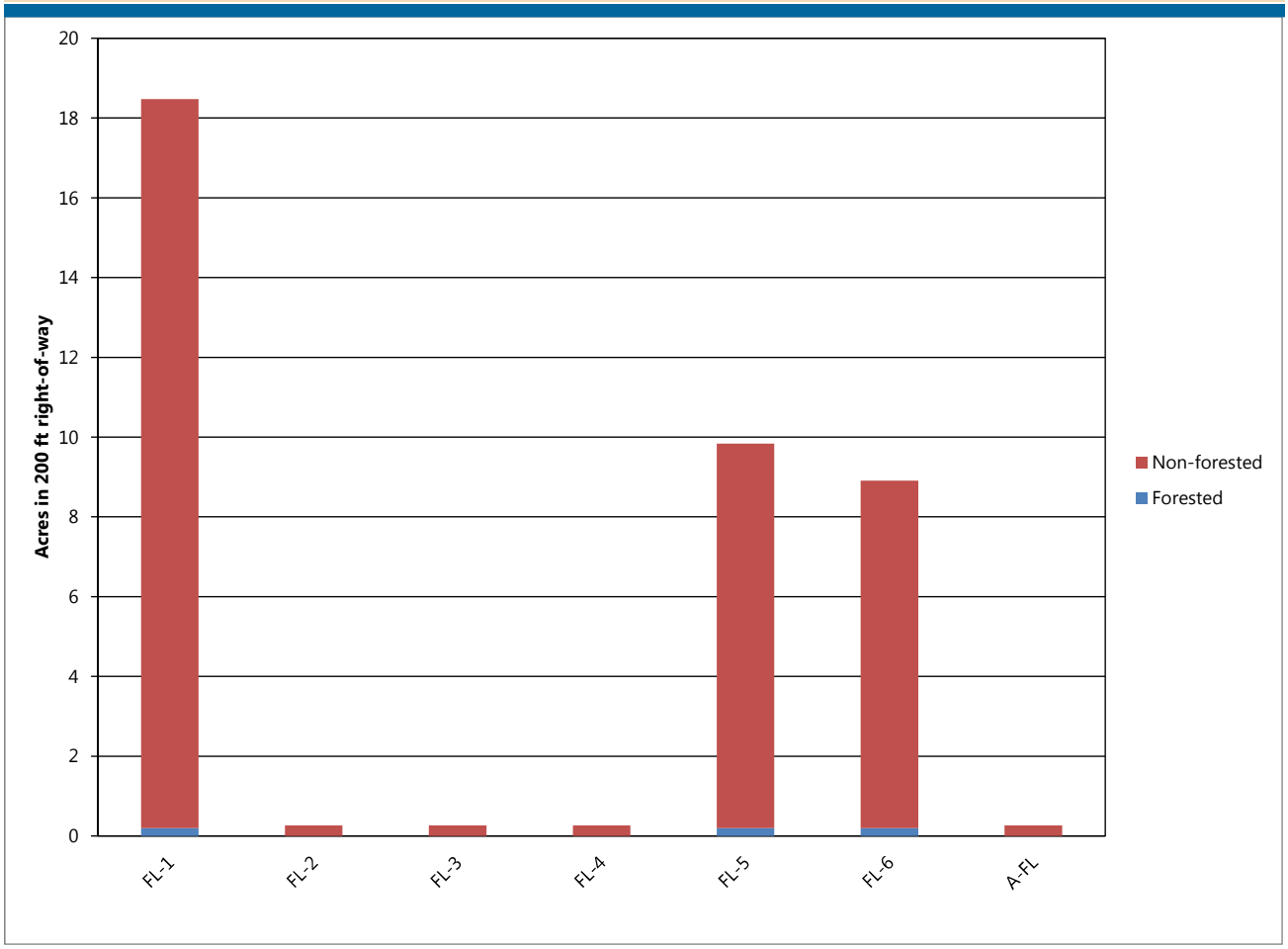
The effects on forested vegetation cover within the ROWs for the Fox Lake route variations are minimal. Within the ROWs, no forested vegetation cover appears in Fox Lake route variations FL-2, FL-3 and FL-4 and route A-FL. For Fox Lake route variation FL-6, 1.4 acres of forested cover lie within the ROW, and in the FL-1 and FL-5 ROWs, there is less than 0.4 acre. The relative forested vegetation cover within the ROWs for all Fox Lake route variations is less than 0.5 percent.

Fauna

Direct impacts to fauna are anticipated to be minimal for all route variations in the Fox Lake area. General effects on lands managed for wildlife use along the Fox Lake route variations are described in Section 5.6.3 and are similar to those described in the "Natural Environment" section of Section 6.1.1. Fox Lake route variations FL-1, FL-5 and FL-6 cross the Rooney Run WMA, and route variations FL-5 and FL-6 also cross the Four Corners WMA. Route variation FL-5 passes within 500 feet of the Caron

Figure 6-21 Wetlands Within ROW – Fox Lake

Route variations FL-1, FL-5 and FL-6 have the greatest amount of wetlands in their ROWs.



Source: Reference 46

WMA. No other Fox Lake route variations cross or come within 500 feet of WMAs (Map 6-18).

Route variations FL-1, FL-2, FL-3 and FL-4 as well as route A-FL would cross the Fox Lake Game Refuge. Route variations FL-5 and FL-6 would not traverse the Fox Lake Game Refuge but would be located immediately adjacent to it. No Fox Lake route variations cross or come within one mile of WPAs.

The route variations at Fox Lake could create indirect impacts on fauna, primarily impacts to avian species, which are susceptible of colliding with transmission line conductors. Route variation FL-1 would be a double-circuit crossing and thus would have an incremental impact on avian collisions. The new double-circuit line would have a flat profile that is similar to the existing 161 kV line (Appendix D2). This profile is understood to minimize potential avian collisions. Thus, incremental impacts on avian species due to FL-1 are likely to be minimal.

Additionally, route variation FL-1 maintains the status quo for avian transmission line obstacles, (i.e., it keeps the number of HVTL ROWs at one). All other route variations (FL-2 through FL-6) and route A-FL introduce a second transmission line ROW near Fox Lake. The impacts of these routing options on avian species are uncertain. The impacts on avian species may vary across these routing options. All routing options other than route variation FL-1 are very near Fox Lake but proceed along different edges of the lake for different distances. For avian species, encountering one transmission line obstacle (FL-1) would likely create fewer avian impacts than encountering two obstacles (all other variations) near Fox Lake.

It is also possible to maintain one HVTL ROW in the area by removing the existing 161 kV line from the lake and double-circuiting it along FL-3 or FL-4. This option is discussed below.

Rare and Unique Natural Resources / Threatened and Endangered Species

Documented locations of state and federally threatened and endangered species and rare communities were identified within the ROWs, with 500 feet of the anticipated alignments, and within one mile of all Fox Lake route variations. Rare-community data provided in this section focuses on the presence of these resources within the ROW. Additional data is provided in Appendix J and Appendix K. Map 6-19 and the detailed maps in Appendix L identify the rare and unique natural resources near the Fox Lake route variations. In order to protect rare resources from exploitation or destruction, Map 6-19 and the maps in Appendix L do not indicate the names of species or communities identified within the NHIS database.

According to the DNR NHIS database, between two and four records of threatened and endangered plant species have been documented with one mile of all of the Fox Lake route variations. However, no records of state or federally threatened or endangered **species or state-special concern and tracked** species have been documented within the ROWs or 500 feet of the anticipated alignments of the Fox Lake route variations. Thus, potential impacts on state and federally threatened and endangered species are not likely and would be similar, whichever route variation is selected. Therefore, this element is not discussed further in this section.

Rare Communities

Rare community data for the route variations in the Fox Lake area was analyzed for potential impacts to these communities. Additional data is provided in Appendix J and Appendix K.

Figure 6-22 shows the area of rare communities (MBS native plant communities and MBS SBS) within the ROW of each Fox Lake route variation. As Figure 6-22 indicates, route variations FL-5 and FL-6 are the only route variations with MBS native plant communities and MBS SBS within their ROWs. Route variation FL-6 has fewer acres of MBS SBS than route variation FL-5 because it avoids the Caron WMA, which is classified as an MBS SBS. In contrast, the ROW of route variation FL-5 passes through more MBS native plant community than does route variation FL-6. The MBS plant communities in both cases consist of prairie.

Although MBS native plant communities and SBS would be spanned to the extent possible, some routes and route alternatives in this segment would cross native plant communities and SBS wider than 1,000 feet, which might require that one or more poles be placed within them. Route variation FL-6 would require crossing one Mesic Prairie (Southern) native plant community greater than 1,000 feet; this native plant community also has a state conservation rank of S2, which is imperiled (Appendix J). Route variations FL-5 and FL-6 would each require crossing one SBS wider than 1,000 feet (Appendix J). Route variation FL-5 would require crossing over 2,000 feet of a SBS, which would likely require placement of more than one pole within it.

None of the Fox Lake route variations have DNR-designated railroad ROW prairie within their ROWs.

Impacts to rare communities could be minimized by selecting any of the route variations other than route variations FL-5 and FL-6, which have rare communities present within their ROWs or, by spanning areas where these communities are present. Where structure placements in these rare communities cannot be avoided, rare species associated with these habitats could be affected. Surveys for rare species might be necessary in such areas.

Use or Paralleling of Existing Rights-of-Way

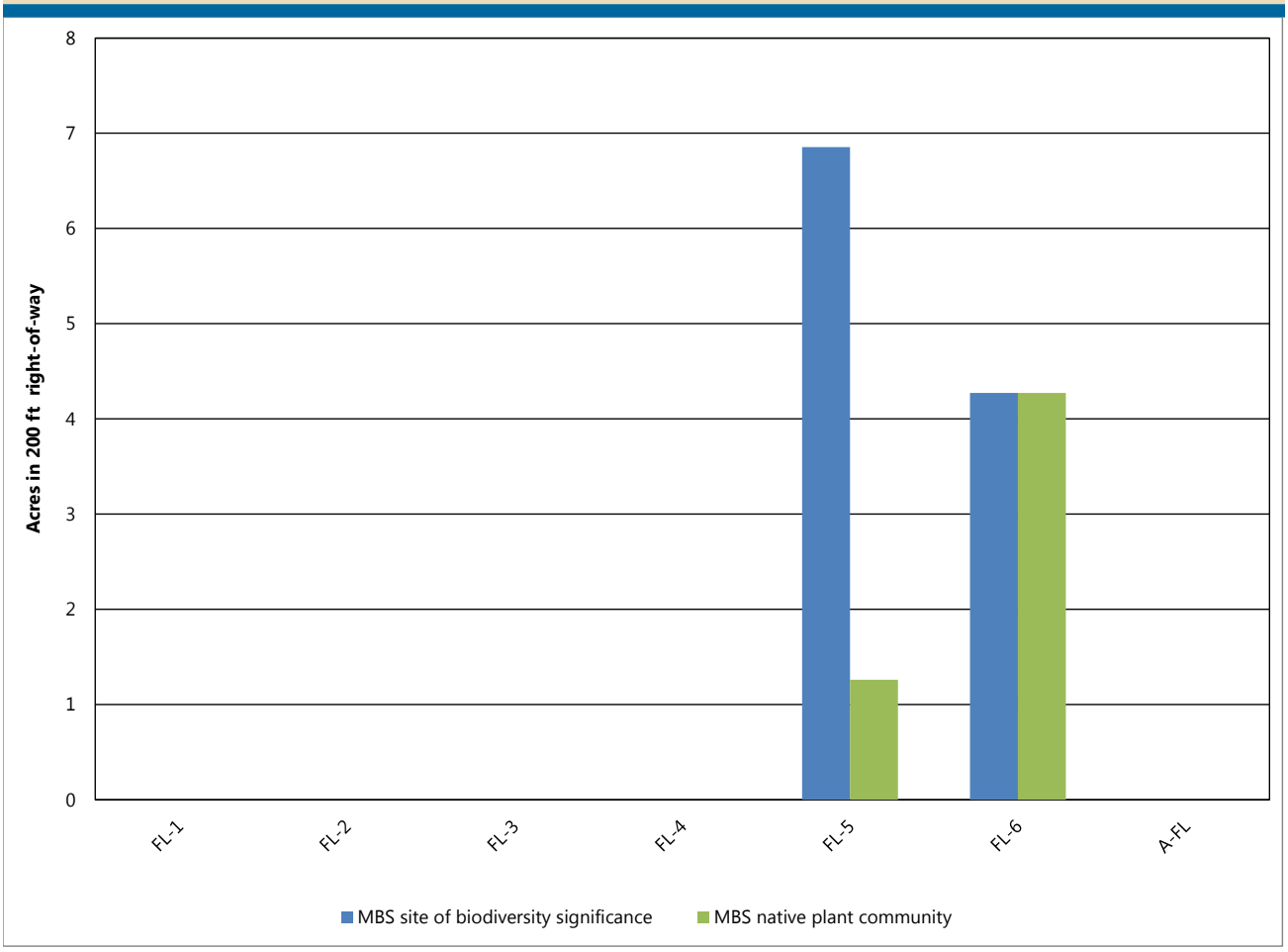
Map 6-20 shows areas where the ROWs for the proposed route variations would share or parallel ROW with existing transportation, transmission line or other infrastructure. Figure 6-18 shows the percentage of total line distance where existing infrastructure ROW is shared or paralleled under each route variation in the Fox Lake area. In this area, route variations FL-1 and FL-6 follow existing transmission line or highway ROW for their entire lengths. Route variation FL-1 follows existing the 161 kV transmission line ROW across Fox Lake, while all other route variations in the Fox Lake area parallel I-90 or county roads around Fox Lake.

Removal of Existing 161 kV Line from Fox Lake

To remove the existing 161 kV from the Fox Lake, the line would need to come out of the Fox Lake substation and proceed southward toward I-90 on a short stretch of new 161 kV line until it connected with route variations FL-3 and FL-4 (Map 3-12). From there the line would be double-circuited with the 345 kV line (and triple-circuited, in part, with an existing 69 kV transmission line) on route variation FL-3 or FL-4 until reconnecting with route A northeast of Fox Lake. This approach would remove the 161 k V line from the lake and that portion of the line north

Figure 6-22 Rare Plant Communities – Fox Lake

Only route variations FL-5 and FL-6 contain rare plant communities.



Source: Reference 54 Reference 57, Reference 55

Photo 6-9 Fox Lake Substation

A short segment of 161 kV line south from the Fox Lake substation would be needed if the existing 161 kV line is removed from Fox Lake.

Source: EERA photo
Looking north from I-90 toward the Fox Lake substation

Table 6-9 Summary of Costs for Routes Variations - Fox Lake

Route ID	Length (miles)	Estimated Costs ($ million)
FL-1	12.6	33.7
FL-2	12.9	28.8
FL-3	12.9	29.6
FL-4	12.9	29.2
FL-5	13.8	30.7
FL-6	13.0	30.1
A-FL	13.2	29.5
FL-3 with removal of 161 kV line from lake	12.9	32.6
FL-4 with removal of 161 kV line from lake	12.9	32.6

of lake until the point where route variation FL-3 or FL-4 joins back up with route A (Map 3-12).

Removing the existing 161 kV line from Fox Lake and double-circuiting along route variation FL-3 or FL-4 would create positive impacts in the Fox Lake area. The removal would positively impact aesthetics at Fox Lake and could improve enjoyment and use of the lake. The removal would free up farmland along the existing 161 kV line (5.7-7.2 miles, approximately 100-130 acres) and would also improve aesthetics for farmsteads along the line north of Fox Lake. Finally, the removal would decrease avian impacts at the lake. Photo 6-9 shows the area near the Fox Lake substation where the new 161 kV line would be added

The removal would also create adverse incremental impacts along route variation FL-3 or FL-4. Aesthetic impacts along these variations would likely be somewhat greater – two sets of conductors being less desirable to look at than one. Impacts to farmland would likely remain the same. The ROW for the new 345 kV line is 200 feet and would remain so whether a second circuit (the 161 kV line) were placed on the structures or not. Avian impacts would likely remain the same, but could increase slightly. Placing more conductors in the air, even if along the same ROW, would likely increase the likelihood of a collision. The magnitude of this increase is uncertain.

Thus, in total, there are positive impacts that would accrue were the 161 kV line removed from Fox Lake and the adverse impacts of double-circuiting around the lake on FL-3 or FL-4 are incremental.

Costs that are Dependent on Design and Route

A summary of the costs associated with constructing the Fox Lake route variations are provided in Table 6-9. Cost estimates have a range of plus or minus 30 percent.

The most expensive of the Fox Lake variations is route variation FL-1, and these higher costs are the result of replacing the lake crossing. This route would cross Fox Lake and would replace the existing 161 kV line with a 345 kV/161 kV double-circuit line. The costs of constructing this double circuit line across the lake, including installation of specialty transmission structures, would be about $3 million.

The costs of constructing route variations FL-3 and FL-4 and removing the 161 kV line from Fox Lake would also be higher than those of the other route variations. These higher costs are the result of increased costs of double-circuiting the 345 kV and 161 kV lines along route variations FL-3 and FL-4 and the costs of removing the 161 kV line.

Modified Route A

In the Fox Lake area, modified route A (MRA-FL) is the same as route variation FL-4, except for a small difference in the anticipated alignment of MRA-FL along I-90 and MRA-FL's movement of an existing 69 kV to follow this alignment (Map 3-11). Thus, MRA-FL has potential impacts similar to FL-4.

MRA-FL differs from FL-4 in that MRA-FL crosses I-90 twice to avoid a residence on the north side of I-90. One of these crossings follows an existing 69 kV line across I-90. FL-4 avoids this residence by going around it to the north and

thus does not cross I-90. It's anticipated that both routing options could mitigate aesthetic impacts to this residence. MRA-FL crosses I-90 to affect this mitigation; FL-4 does not.

Like FL-4, MRA-FL could be used to remove the existing 161 kV line from Fox Lake. The potential impacts of doing so would be similar to those of using FL-4; however, using MRA-FL would mean that both the 345 kV line and the 161 kV line, would cross I-90 twice in this area. As MRA-FL anticipates movement of an existing 69 kV line to follow the 345 kV line, the crossings of I-90 would be triple-circuit 345/161/69 kV crossings.

Lake Charlotte Variations

There are five route variations (LC-1 through LC-5) in the Lake Charlotte area, all of which begin with and return to route A. Three variations, LC-1, LC-2 and LC-5 proceed around the southern end of Lake Charlotte along 160th St. before turning north and rejoining route A. One variation, LC-3, and route A-LC also proceed around the southern end of Lake Charlotte but do so further south, near Kiester Lake. Route variation LC-3 and route A-LC then proceed north along Highway 15 before rejoining route A. One variation, LC-4, crosses Lake Charlotte, paralleling or double-circuiting the existing 161 kV line that crosses the lake. In addition to analyzing each of these variations, this section discusses the possibility of removing the existing 161 kV line from Lake Charlotte and double-circuiting it with the new 345 kV line south of Lake Charlotte along one of the variations or route A-LC.

Route variation LC-3 is near the fewest number of homes. Route variations LC-1 and LC-4 best utilize existing transmission line and roadway ROW; route variation LC-4 makes the best use of existing transmission line ROW by following the existing 161 kV line across the lake. On whole, it is anticipated that route variation LC-4 would best minimize aesthetic impacts in the area by utilizing existing transmission line ROW. Additionally, it is anticipated that a double-circuit crossing of Lake Charlotte, as opposed to a parallel crossing, would best minimize aesthetic impacts.

Route variations LC-1, LC-2 and LC-4 and route A-LC would likely impact an airstrip in Section 18 of Rutland Township. The magnitude of this impact is uncertain. The airstrip currently operates successfully with the existing 161 kV line running parallel to and just south of the airstrip.

Route variation LC-4 best minimizes impacts to agriculture by using the existing 161 kV transmission line ROW across Lake Charlotte. Direct impacts to fauna are anticipated to be minimal for all route variations. It is anticipated that route variation LC-4, with a double-circuit crossing of Lake Charlotte, would best minimize indirect impacts (avian impacts) in the area. Route variations LC-1 and LC-4 best utilize existing transmission line and roadway ROW in the area. Route variation LC-4 makes the best use of existing transmission line ROW by following the 161 kV line across Lake Charlotte.

There are positive impacts that would accrue if the existing 161 kV line were removed from Lake Charlotte and double-circuited on a route variation that proceeds around the southern edge of Lake Charlotte. The removal would positively impact aesthetics at Lake Charlotte and generally in the area, by creating one transmission line ROW instead of two near the lake. The removal would have a positive impact on agricultural operations along the existing 161 kV line. The removal would likely decrease avian impacts at the lake. The removal would create new adverse impacts related to transmission facilities necessary to affect the double-circuiting and would create incremental aesthetic and avian impacts along the route variation selected for double-circuiting.

Modified route A in the Lake Charlotte area (MRA-LC) is the same as route variation LC-5, except for the location where MRA-LC drops southward from the existing 161 kV line, west of Lake Charlotte. Thus, MRA-LC has potential impacts similar to LC-5. Like LC-5, MRA-LC could be used to remove the existing 161 kV line from Lake Charlotte.

Human Settlements

As with the routes and route alternatives for this segment, the only element of human settlements where impacts are anticipated to be non-minimal and to vary notably between route variations is aesthetics. Those variations that through double-circuiting limit the number of HVTL ROWs in the Lake Charlotte area to one, rather than two, would minimize impacts to aesthetics and human settlements. Route variation LC-4, with a double-circuit crossing of the lake best minimizes aesthetic impacts in the area. Route variations LC-2, LC-3 or LC5 if they were double-circuited with the 161 kV line, would also minimize aesthetic impacts.

Aesthetics

Before proceeding to a discussion of aesthetic impacts, it's necessary to further describe how route variation LC-4 could cross Lake Charlotte. Crossing Lake Charlotte could be achieved with either a parallel configuration (existing 161 kV line alongside a new 345 kV line) or a double-circuit configuration

(345 kV/161 kV). Unlike Fox Lake, ITCM's analysis indicates that a parallel crossing and a double-circuiting crossing are possible at Lake Charlotte.

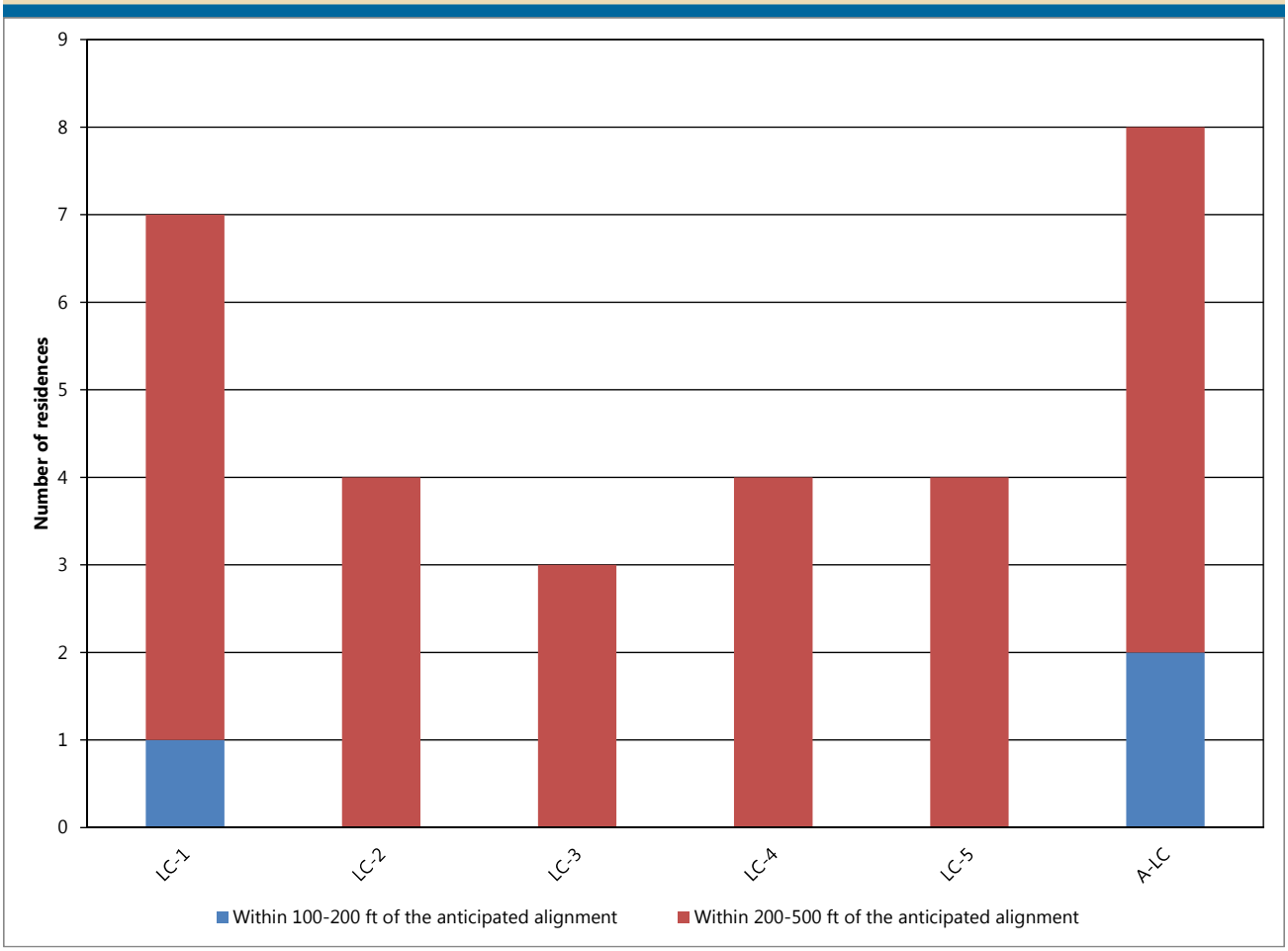
Accordingly, this EIS analyzes a parallel and a double-circuit crossing of Lake Charlotte. A parallel crossing would place the new 345 kV line next to the 161 kV line on steel H-frame structures, similar to those used for the existing 161 line. The parallel crossing would have a ROW width of 250 feet and a span length of 2,000 feet (Appendix D2). A double-circuit crossing would use specialty steel H-frame structures, designed so that the conductors would have with a relatively flat profile to minimize impacts to waterfowl and birds. The double-circuit crossing would have a ROW width of 250 feet and span length of 1,820 feet (Appendix D2).

Figure 6-23 and Map 6-21 show the proximity of homes to route variations in the Lake Charlotte area, and Figure 6-24 analyzes ROW sharing or paralleling for these route variations. This data suggests that route variation LC-3 would minimize aesthetic impacts to residents by avoiding homes. While this route variation does not share or papallel as much existing transmission and highway ROW as the other route variations in this area, it avoids crossing or closely passing sensitive viewsheds along Lake Charlotte's shoreline (Photo 6-10). This data also suggests that route variation LC-4 best minimizes aesthetic impacts in the area by utilizing existing transmission line ROW (Photo 6-11). Route variations LC-1, LC-2 and LC-5 also minimize aesthetic impact by following, for a part of their lengths, an existing 69 kV line south of Lake Charlotte.

With respect to route variation LC-4 and the crossing of Lake Charlotte, it is anticipated that a double-circuit crossing of the lake would best minimize aesthetic impacts at the lake (Appendix D2). The structures for a parallel and double-circuit crossing are similar in height. However, the conductors with the double-circuit crossing are in a relatively flatter profile and this likely makes them, to the extent possible, less objectionable from an aesthetic

Figure 6-23 Proximity of Homes – Lake Charlotte

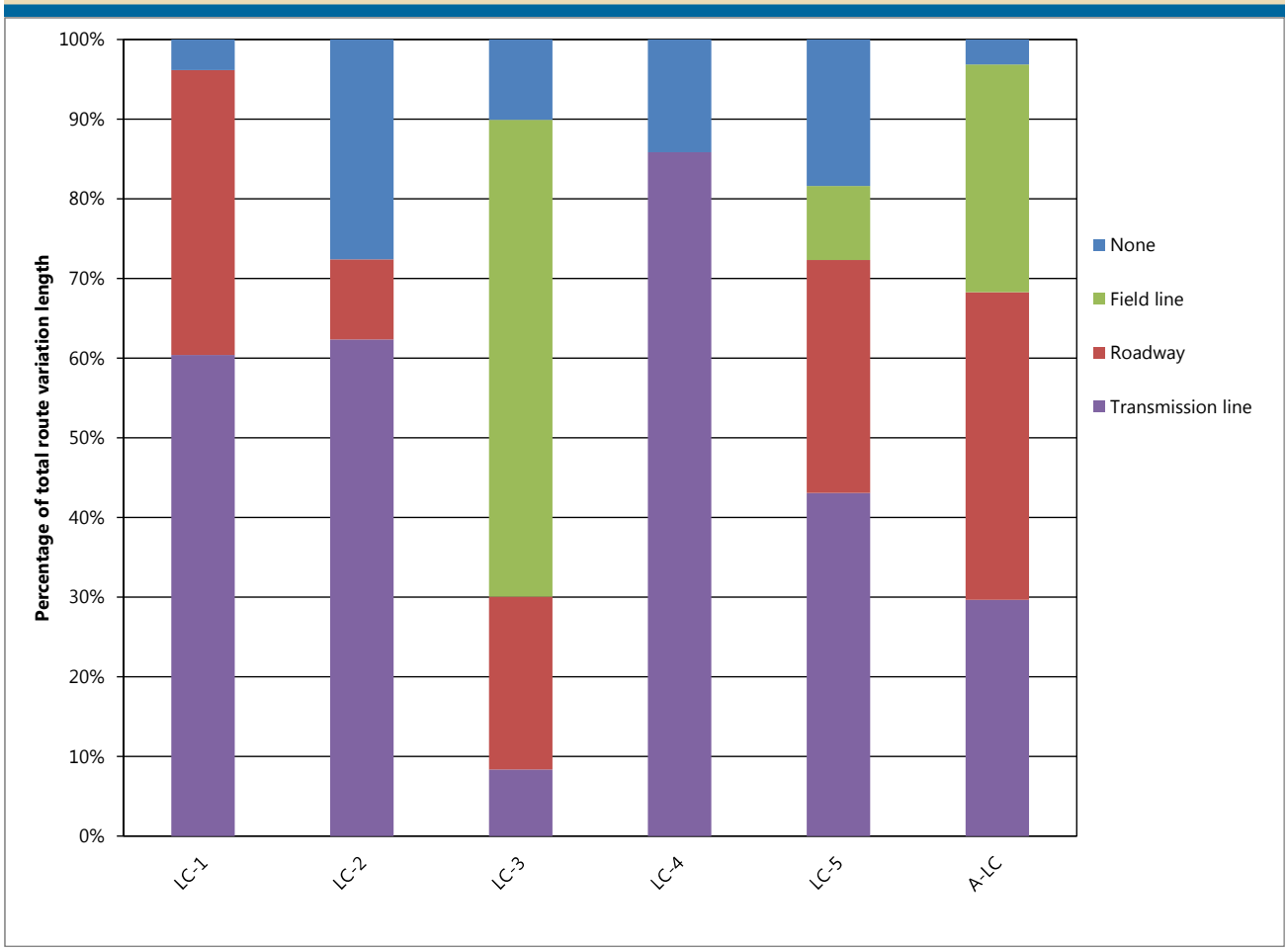
Route variations LC-1 and A-LC have the greatest number of homes within 500 feet of their anticipated alignments.



Source: Barr Engineering. Residence Locations. Field Survey on 11/18/2013

Figure 6-24 ROW Sharing – Lake Charlotte

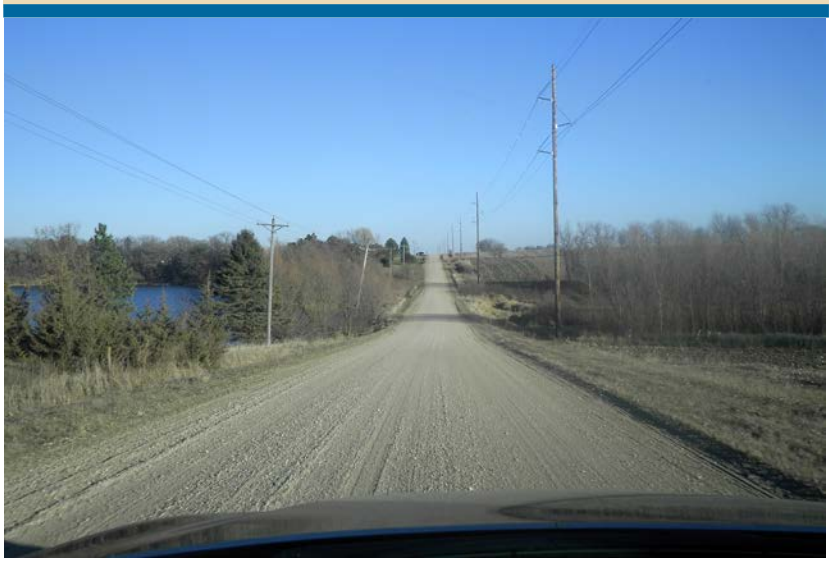
All route variations, except LC-3, share or parallel 70-95 percent of their length with transmission line or roadway ROW.



Source: Barr Engineering. December 2013

Photo 6-10 Lake Charlotte

Route variations LC-1, LC-2 and LC-5 pass along the south side of Lake Charlotte. Looking east along 160th St toward Lake Charlotte.



Source: Barr photo

standpoint. To be sure, the specialty crossing structures and the additional conductors across Lake Charlotte would impact aesthetics at the lake. However, this would be an incremental impact, as there is already a line across the lake, as opposed to an entirely new impact for a 345 kV line around the lake.

It is possible that aesthetic impacts could also be minimized by a double-circuiting that removes the 161 kV line from Lake Charlotte and follows a route variation other than route variation LC-4 around the southern end of the lake. This removal and double-circuiting is discussed below.

Finally, though property value impacts are not well correlated with transmission line ROWs (Section 5.1.4 and Appendix G), it is likely that there is a linkage between aesthetics impacts and property value impacts with respect to harmonious placement of the new 345 kV line. That is, harmony with existing infrastructure not only minimizes aesthetic impacts it likely also minimizes property value impacts, to the extent such impacts occur. The Lake Charlotte area has public and private investments. To the extent that new investments (i.e., a new 345 kV line) are harmonious with current investments, impacts to property values are likely minimized in the Lake Charlotte area as a whole.

Transportation and Public Services

As with the routes and route alternatives for this segment, the element of transportation and public services where impacts are anticipated to be non-minimal and to vary notably between route variations is airports. One private-use grass airstrip is located within 500 feet of route variations LC-1, LC-2 and LC-4 and route A-LC (Map 6-21). Route variations LC-3 and LC-5 pass within one mile of this airstrip.

This airstrip currently operates successfully with the existing 161 kV line running parallel to and just south of the airstrip. Thus, the magnitude of the impact to this airstrip due to the new 345 kV line is uncertain. The new line would introduce taller structures into the area and may cause a safety concern. Impacts to this airstrip could be minimized by route variations LC-3 and LC-5 as these variations provide greater distance between the new 345 kV line and this airstrip. Impacts might also be mitigated through the use of specialty structures (shorter structures) and by moving or otherwise reconfiguring the airstrip or its operations.

Public Health and Safety

As with the routes and route alternatives for this segment, no impacts to public health and safety are anticipated from any of the route variations in this

Photo 6-11 Existing 161 kV Line West of Lake Charlotte

Route variation LC-4 would bump north of the existing 161 kV line around a nearby residence. The 161 kV line could be removed and double-circuited with the 345 kV line in this area.

Source: EERA photo
Looking east from 196th Ave toward Lake Charlotte

area, including potential impacts related to EMF, implantable medical devices, stray voltage, induced voltage and air quality. Based on MPCA's WIMN, there are no documented sites of environmental contamination within 500 feet of the Lake Charlotte route variations. Thus, no impacts to public health from environmental contamination are anticipated.

Land-based Economies

As with the routes and route alternatives for this segment, the only elements of land-based economies where impacts are anticipated to be non-minimal and to vary notably between route variations are agriculture and recreation and tourism.

Agricultural Land, Prime Farmland

Figure 6-25 shows the percentage of each variation's ROW that has been classified by NRCS as prime farmland or farmland of statewide importance. Figure 6-25 also identifies the remaining percent of each variation's ROW that does not fall under either of these designations. Portions of the ROW identified in Figure 6-25 as "not designated as prime farmland" may include, for example, developed areas, lakes and forest areas. Appendix J provides the total acreage of each variation's ROW that is designated as prime farmland or designated as farmland of statewide importance, and the total acreage of each variation's ROW that doesn't fall into either category. Appendix J also provides total cropland acres within each route or route alternative's ROW based on USGS NLCS GAP data.

As shown in Appendix J, route variations in the Lake Charlotte area have between approximately 97 and 141 acres of designated farmland within their ROWs. Figure 6-25 shows farmland classifications along the route variations in the Lake Charlotte area. The routes with the most potential effect on prime farmland are route variations LC-2 and LC-3 and route A-LC, with their ROWs containing more than 90 percent prime farmland classifications. Of the route variations in the Lake Charlotte area, route variation LC-4 has the least prime farmland within its ROW. Furthermore, route variation LC-4 utilizes an existing transmission line ROW, which minimizes farmland impacts and avoids introducing farmland impacts along new ROWs. Thus, route variation LC-4 best minimizes impacts to agricultural operations in the Lake Charlotte area.

Recreation and Tourism

No WMAs, WPAs, state water trails or state, county or city parks are located within the ROWs of the Lake Charlotte route variations (Map 6-23). The Prairieland Snowmobile Trail, however, traverses or parallels some of the route variations (Map 6-21). Route variation LC-4 would have the least effect on this trail as it only crosses the Prairieland Trail once. Route variation LC-3 and route A-LC would also cross the Prairieland Trail once, but both would parallel the trail, and approximately 985 feet (0.19 mile) of the trail would be located within these variations' ROWs. Route variations LC-1, LC-2 and LC-5 could potentially affect the Prairieland Trail the most, since approximately 3,085 feet (0.58 mile) of the trail would be located within the ROWs of these variations, even though each of them would only cross the trail once.

Although route variation LC-4 crosses Lake Charlotte, it would follow the alignment of an existing 161 kV transmission line and would not introduce new direct impacts to fishing, boating or other recreational activities. It is possible than the increased number of conductors over the lake would make recreating on the lake relatively less pleasurable for citizens, due to aesthetic impacts. This indirect impact is uncertain and difficult to quantify.

General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

Archaeological and Historic Resources

Map 6-22 shows cultural resources in the Lake Charlotte area. The number of archaeological and historic resources within half a mile of the Lake Charlotte variations is shown in Table 6-10. No known archaeological resources are located within half a mile of the variations. One known historic resource is located within half a mile of route variation LC-3 and route A-LC. Although it is unlikely that the project would have any adverse visual effects on this historic resource, the potential for harm does exist. Route variations LC-1, LC-2, LC-4 and LC-5 would not affect known archaeological or historic resources.

Natural Environment

Analysis of natural resource elements along the Lake Charlotte route variations indicates that potential impacts to the natural environment would be minor, with generally little variation in impacts between route variations. Avian impacts are anticipated to vary between route variations, with route variation LC-4 likely best minimizing these impacts. Impacts due to route variation LC-4 would be incremental and can be minimized through structure design. All other route variations introduce a second transmission line ROW into the area, thus increasing the likelihood of avian impacts.

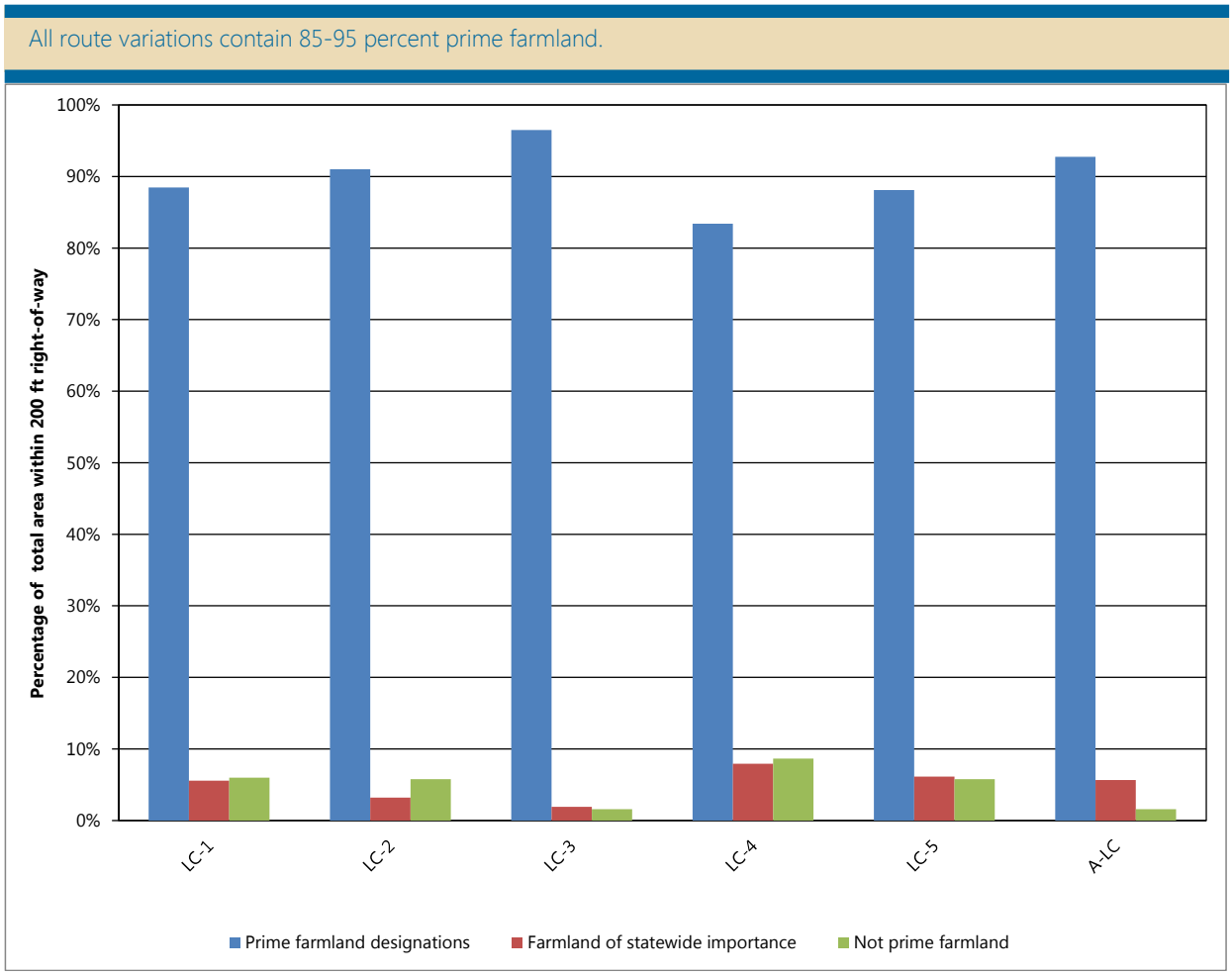
Water Resources

Surface waters, including lakes, watercourses, PWI and impaired waters, FEMA-designated 100-year floodplains, NWI-mapped wetlands and County Well Index groundwater wells, were identified within the ROWs and within 500 feet of the anticipated alignments of the route variations in the Lake Charlotte area. Data provided in this section focuses primarily on water resources that lie within the ROW or that are crossed by the proposed alignments. Additional data is provided in Appendix J. Map 6-23 identifies the water resources near each route variation in the Lake Charlotte area.

Surface waters

Lake Charlotte, part of the Chain of Lakes area, is the largest lake within this area and it is listed on the PWI (Map 6-24). In addition, several smaller lakes are scattered throughout this area, (Map 6-24). Lake Charlotte is crossed by route variation LC-4. The other route variations would not require any lake crossings (Appendix J; Map 6-23).

Figure 6-25 Farmland Classifications – Lake Charlotte



Source: Reference 58

Table 6-10 Archaeological and Historic Resources within Half a Mile of Route Variations – Lake Charlotte

Route Variation	Archaeological Resources	Historic Resources
LC-1	0	0
LC-2	0	0
LC-3	0	1
LC-4	0	0
LC-5	0	0
A-LC	0	1

Source: Reference 59

County Ditch 72, which is listed on the PWI, is the main watercourse that flows through this area (Map 6-24), although many small, unnamed watercourses also lie within this area.

The route variations in the Lake Charlotte area would cross several watercourses. Figure 6-26 shows the total number of watercourses and PWI watercourses that would be crossed by each route variation in this area. The route variations within this area have between one and seven watercourses within their ROWs (Appendix J). Route variations would cross watercourses between zero and four times, with route variation LC-4 having none and LC-5 four (Figure 6-26). Route variations LC-1 and LC-2 and route A-LC would each cross only one PWI watercourse, while route variation LC-3 would cross three and LC-5 four (Figure 6-26).

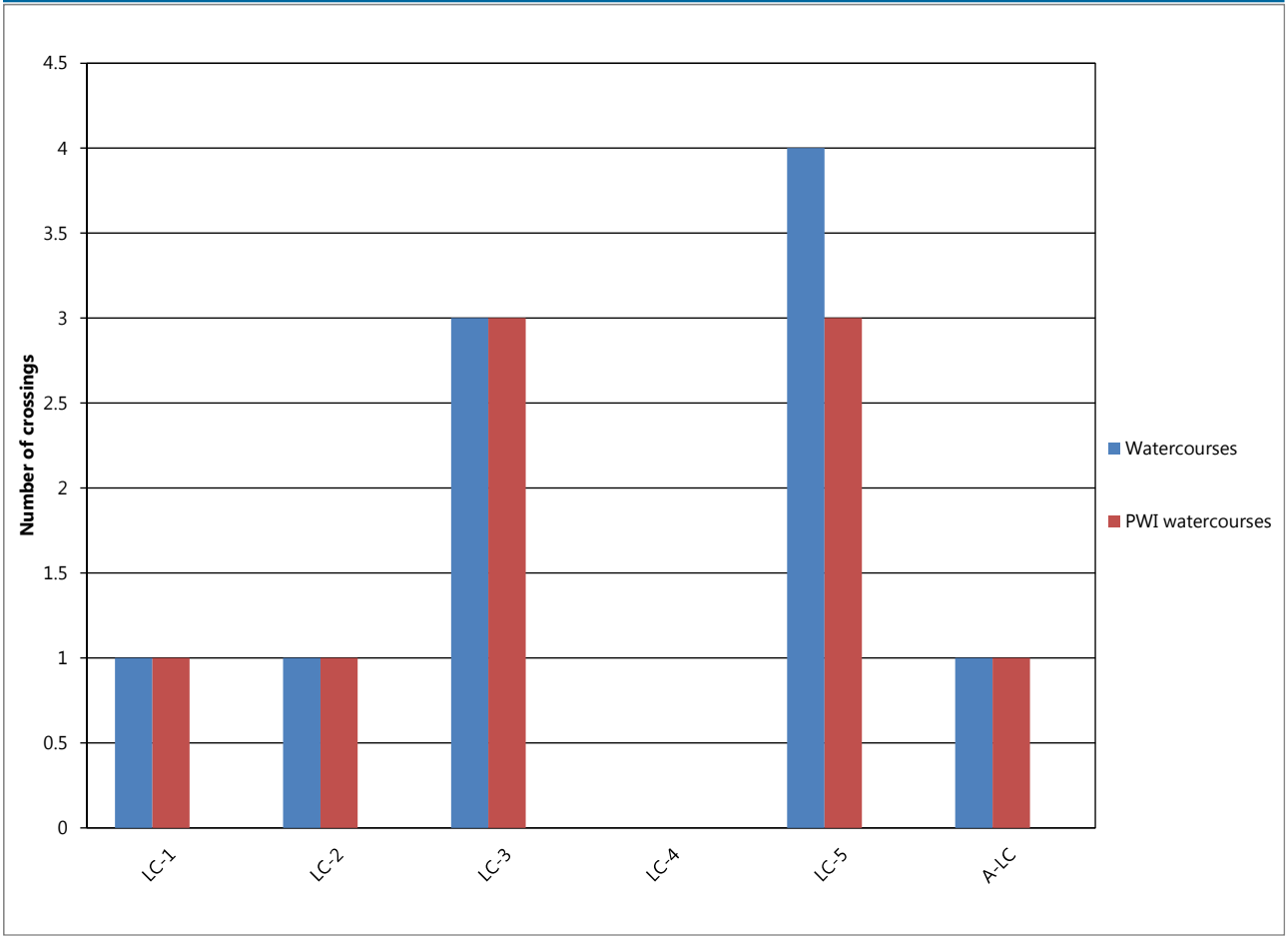
General mitigation measures for water resources are discussed in Section 5.6.1. Because all lakes and watercourses would be spanned, no structures would be placed within these features, and direct impacts to lakes and watercourses are anticipated to be minimal. Potential indirect impacts to these resources, such as increases in turbidity, could be minimized by using BMPs and by choosing a route variation that has relatively fewer crossings of lakes and watercourses.

Wetlands

Wetlands within the ROWs of the route variations in this area consist mostly of small freshwater emergent wetlands, with a few small freshwater ponds and forested wetlands also present. Figure 6-27 shows the total amount of wetland and forested wetland that is present within the ROWs of each route variation. All Lake Charlotte route variations have similar and relatively low wetland acreage within the 200-foot ROW, with the exception of route variation LC-4, which has approximately four times the wetland acreage in the 200-foot ROW as the other route variations (Figure 6-27). Route variations LC-1, LC-2 and LC-4 have the least amount of forested

Figure 6-26 Watercourse Crossings – Lake Charlotte

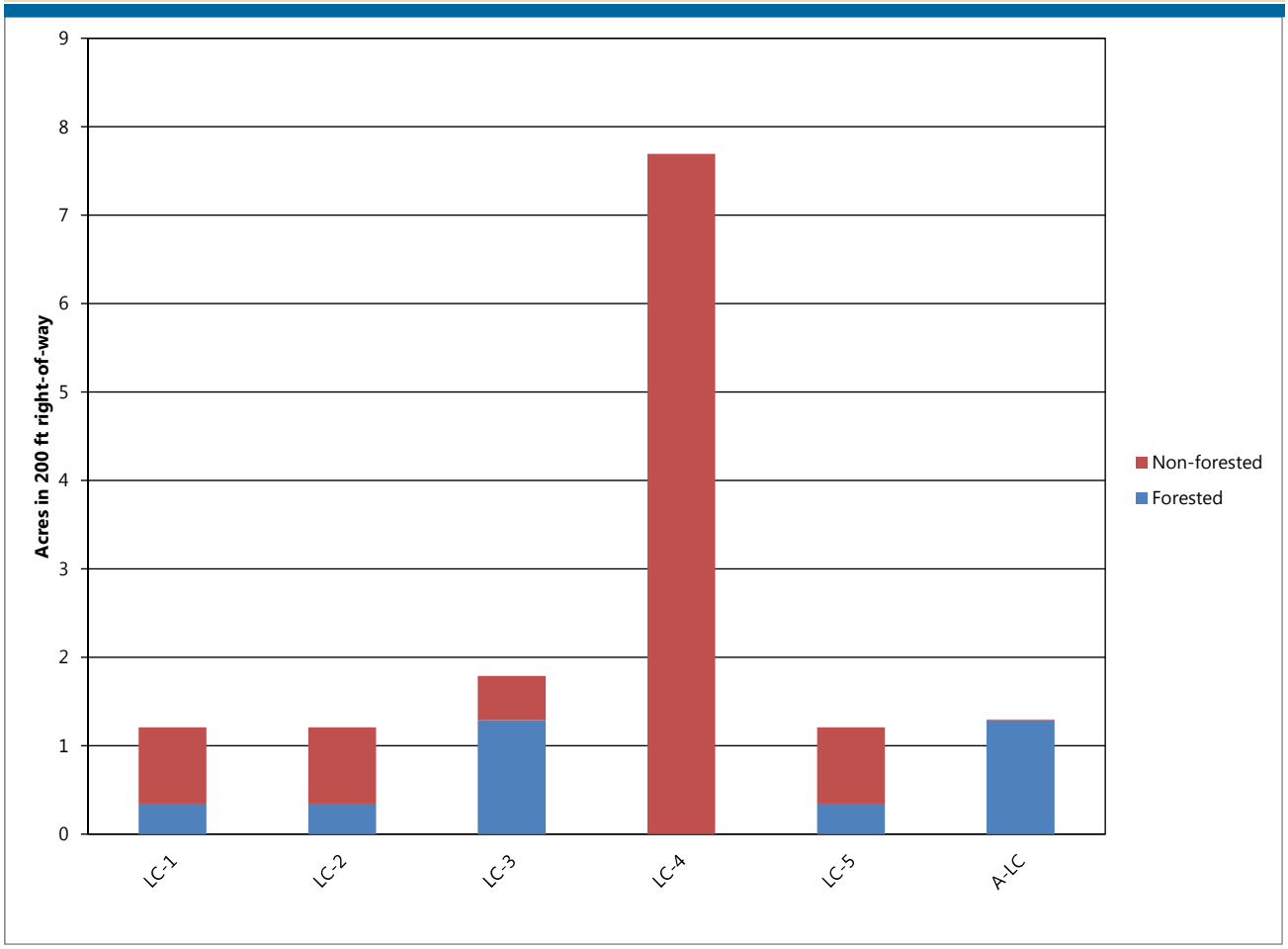
The number of watercourse crossings in the Lake Charlotte area is few.



Source: Reference 60, Reference 41, Reference 61

Figure 6-27 Wetlands Within ROW – Lake Charlotte

All route variations, except LC-4, contain about the same amount of wetlands.



Source: Reference 46

wetland within the 200-foot ROW, while route variations LC-3 and LC-5 have the most (Figure 6-27).

Although wetlands would be spanned to the extent possible, route variation LC-4 would cross a wetland wider than 1,000 feet, which could require that one or more structures be placed within the wetland.

Temporary impacts to wetlands could occur if they need to be crossed during construction. Using BMPs and choosing one of the route variations with fewer acres of wetland within the ROW could minimize these temporary impacts.

Permanent impacts to wetlands could also occur if the wetlands within the ROW are currently forested. Forested wetlands could change to non-forested wetlands because vegetation maintenance procedures under transmission lines might prevent trees from establishing. While choosing route variation LC-4 would have the most wetland area in the ROW and would require a pole to be placed in a wetland, this route variation would minimize impacts to forested wetland because no forested wetland is present within its ROW.

Flora

General impacts to the composition of vegetation communities for the Lake Charlotte route variations are described in Section 5.6.2, and are similar to those described in the "Natural Environment" section of Section 6.1.1. Impacts to forested vegetation cover within the ROWs and within 500 feet of the anticipated alignments for these variations are anticipated to be negligible. Total forested vegetation cover within 500 feet of the anticipated alignments is less than 8 acres for each of the route variations, or about 1 percent of the total vegetation cover.

Within their ROWs, route variations LC-3 and LC-4 have no forested vegetation cover. Variation LC-5 has 0.2 acre of forested cover in the ROW, and route variations LC-1 and LC-2 have less than 0.1 acre. The

forested vegetation cover within the ROW for all Lake Charlotte route variations is between 0 percent and 0.2 percent of total vegetation cover.

Fauna

Direct impacts to fauna are anticipated to be minimal for all route variations in the Lake Charlotte area. General impacts to lands managed for wildlife use along the Lake Charlotte route variations are described in Section 5.6.3, and are similar to those described in the "Natural Environment" section of Section 6.1.1. The Lake Charlotte route variations do not cross or pass within one mile of any WMAs, game refuges or WPAs.

The route variations at Lake Charlotte could create indirect impacts on fauna, primarily impacts to avian species, which are susceptible of colliding with transmission line conductors. Route variation LC-4 would cross Lake Charlotte in a parallel or double-circuit configuration and would have an incremental impact on avian collisions. Of the two crossing configurations, it is anticipated that a double-circuit configuration would least impact avian flights. The double-circuit line would have a flat profile that is similar to the existing 161 kV line. This profile is understood to minimize potential avian collisions. Thus, using a double-circuit crossing, incremental impacts on avian species due to route variation LC-4 are likely to be minimal.

Additionally, route variation LC-4 maintains the status quo for avian transmission line obstacles, (i.e., it keeps the number of HVTL ROWs at one). All other route variations and route A-LC introduce a second transmission line ROW near Lake Charlotte. The impacts of these routing options on avian species are uncertain. The impacts on avian species may vary across these routing options. All routing options other than route variation LC-4 are very near Lake Charlotte and other lakes in the Chain of Lakes area. For avian species, encountering one transmission line obstacle (LC-4) would likely create fewer avian impacts than encountering two transmission line obstacles (all other variations) near Lake Charlotte.

It is also possible to maintain one HVTL ROW in the area by removing the existing 161 kV line from the lake and double-circuiting it along variations around the southern end of Lake Charlotte. This option is discussed below.

Rare and Unique Natural Resources / Threatened and Endangered Species

Documented locations of state and federally threatened and endangered species and rare communities were identified within the ROWs, within 500 feet of the anticipated alignments and within one mile of all Lake Charlotte route variations. Rare-community data provided in this section focuses on the presence of these resources within the ROW. Additional data is provided in Appendix J and Appendix K. Map 6-24 and the detailed maps in Appendix L identify the rare and unique natural resources near the Lake Charlotte route variations. In order to protect rare resources from being exploited or destroyed, Map 6-24 and the maps in Appendix L do not indicate the names of species or communities identified within the NHIS database.

No documented rare communities lie within the ROWs or within 500 feet of the anticipated alignments of any of the Lake Charlotte route variations. Thus, the project is unlikely to affect rare communities in this area, whichever route variation is selected, and this element is not discussed further in this section.

State and Federally Threatened and Endangered Species

One state-endangered bird, the king rail, which inhabits open wetlands such as marshes (Reference 62), has been documented within one mile of each of the Lake Charlotte route variations and occurs within the ROWs of variations LC-3 and LC-5 (Appendix K).

Effects on threatened and endangered species could be minimized by selecting the route variation with the fewest documented records of state and federally threatened or endangered species near it (LC-1, LC-2, LC-4 or A-LC) and by avoiding habitat associated with these rare species. Potential impacts and mitigation measures associated with the king rail are the same as those discussed for other avian species (Section 5.6.3).

No state-special concern or tracked species have been documented within the ROWs or within 500 feet of the anticipated alignments of any of the Lake Charlotte route variations. In addition, because all watercourses would be spanned, no impacts to aquatic organism (e.g., mussels) are anticipated. Therefore, records of aquatic species in the NHIS database are not discussed here. Appendix K, however, summarizes all NHIS species recorded near the project area.

Use or Paralleling of Existing Rights-of-Way

Map 6-25 shows areas where the ROW for the proposed route variations would share or parallel ROW with existing transportation, transmission line or other infrastructure. Figure 6-24 shows the percentage of total line distance where existing

infrastructure ROW is shared or paralleled for each route variation in the Lake Charlotte area. Transmission line ROW sharing in the Lake Charlotte area is maximized by utilizing the 161 kV transmission line across the lake (route variation LC-4). Route variation LC-1 does not follow the existing 161 kV line across the lake, but offers notably more total ROW sharing than any other route variation in the Lake Charlotte area.

Removal of Existing 161 kV Line from Lake Charlotte

To remove the existing 161 kV line from Lake Charlotte, the line would proceed from route A and be double-circuited with a route variation (or route A itself) that proceeds around the southern end of Lake Charlotte (Map 3-14). Route variations LC-1, LC-2 and LC-5 run along 160th St. just south of Lake Charlotte. Route variation LC-3 and route A-LC proceed further south around Lake Charlotte, near Kiester Lake. For all variations and routes, the 161 kV line would leave the double-circuiting and proceed north along 210th Ave. to the Rutland substation. The 345 kV line would proceed for a brief length as a single circuit until it returns to route A and is double-circuited with the 161 kV line once again. Depending on the variation selected for the 161 kV double-circuiting, the total length of 161 kV line to be removed would range from 1.5 miles (using route variation LC-1) to 3.2 miles (using route variation LC-5).

Removing the existing 161 kV line from Lake Charlotte and double-circuiting around the southern end of the lake would create positive impacts in the Lake Charlotte area. The removal would positively impact aesthetics at Lake Charlotte and could improve enjoyment of use of the lake. The removal would free up farmland along the existing 161 kV line (approximately 1.1-2.9 miles, 20-30 acres) and would also improve aesthetics for farmsteads along the line. There are two homes located west of the lake that are in close proximity to the existing 161 kV line that would particularly benefit from the line removal. Finally, the removal would decrease avian impacts at the lake.

To reconnect with the Rutland Substation, approximately 0.5 to 1.0 mile of the 161 kV line would need to be rebuilt, depending on the variation selected. Route variation LC-3 and route A-LC (the southern option on Map 3-14) would require 1.0 mile of new 161 kV line along 210th Ave. Route variations LC-1, LC-2 and LC-5 (the northern option on Map 3-14) would require 0.5 mile of new 161 kV line along this road. There is an existing 69 kV line along 210th Avenue that the new 161 kV line could parallel or be co-located with. Two residences and agricultural fields would be affected by the new line for route variation LC-3 and route A-LC. One residence and agricultural fields would be affected by the new line for route variations LC-1, LC-2 and LC-5. ITCM has indicated that the new 161 kV line would need to connect at the west side of the Rutland substation. Because 210th Ave. is located on the east side of the substation, the new line would need to be routed to the other side of the facility.

Beyond the direct impacts of the new 161 kV line to reach the Rutland substation, the removal would also create adverse incremental impacts along the variation selected for double-circuiting. Aesthetic impacts along this variation would likely be somewhat greater – two sets of conductors being less desirable to look at than one. Impacts to farmland would likely remain the same. The ROW for the new 345 kV line is 200 feet and would remain so whether a second circuit (the 161 kV line) were placed on the structures or not. Avian impacts would likely remain the same, but could increase slightly. Placing more conductors in the air, even if along the same ROW, would likely increase the likelihood of a collision. The magnitude of this increase is uncertain.

Thus, in total, there are positive impacts that would accrue were the 161 kV line removed from Lake Charlotte and there adverse impacts of double-circuiting around the lake. The adverse impacts are primarily incremental in nature.

Costs that are Dependent on Design and Route

A summary of the costs associated with constructing the Lake Charlotte route variations is provided in Table 6-11. Cost estimates have a range of plus or minus 30 percent.

The most expensive of the Lake Charlotte variations are those that remove the 161 kV line from Lake Charlotte. These higher costs are the result of having to double-circuit the 345 kV and 161 kV lines along a route variation, remove the segment of existing 161 kV line, and rebuild the 161 kV line from the route variation to the Rutland substation.

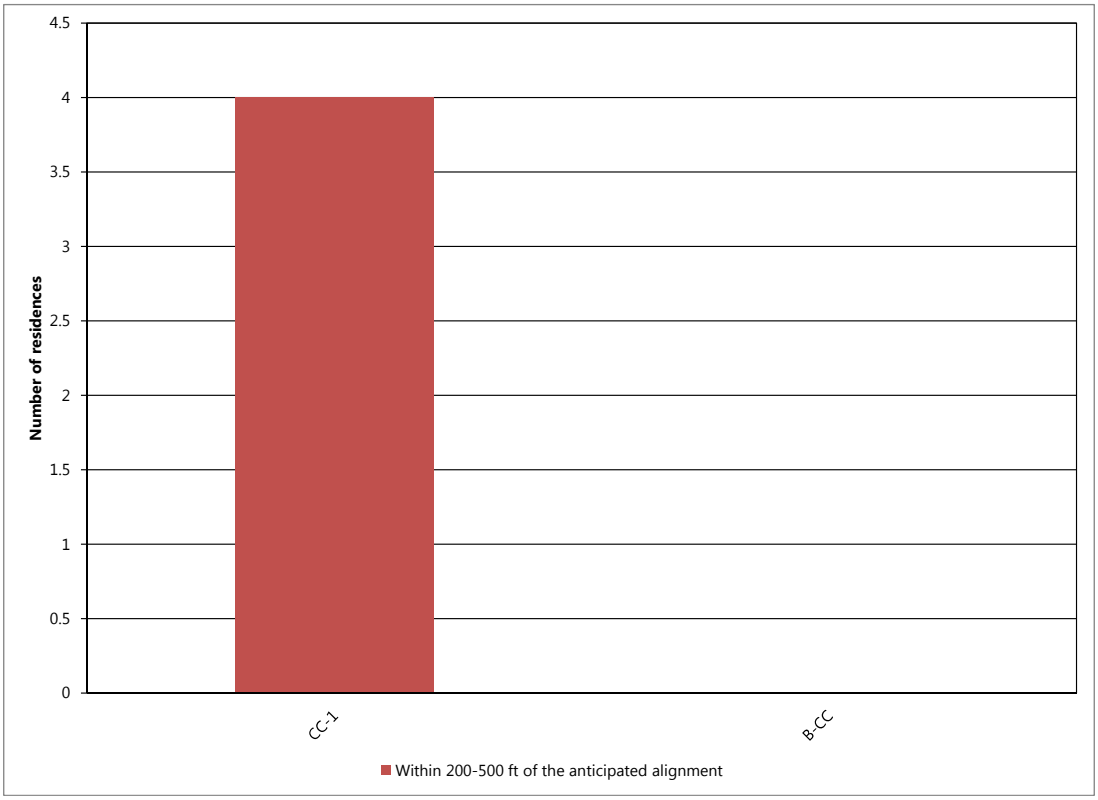
The cost of constructing route variation LC-4 and its associated lake crossing would also be higher than the other route variations. Because this route would cross Lake Charlotte along the existing 161 kV line, there would be additional costs for specialty structures at the lake crossing, up to $3 million if the lines are double-circuited across the lake.

Table 6-11 Summary of Costs for Routes Variations - Lake Charlotte

Route ID	Length (miles)	Estimated Costs ($ million)
LC-1	5.1	11.6
LC-2	5.3	12.1
LC-3	5.9	12.6
LC-4	4.4	13.6
LC-5	5.3	11.9
A-LC	5.9	12.9
A-LC with removal of 161 kV line from Lake Charlotte	5.9	15.6
LC-2 with removal of 161 kV line from Lake Charlotte	4.4	14.6

Figure 6-28 Proximity of Homes – Center Creek WMA

Route variation CC-1 has four homes within 500 feet of its anticipated alignment.



Source: Barr Engineering. Residence Locations. Field Survey on 11/18/2013

Modified Route A

In the Lake Charlotte area, modified route A (MRA-LC) is the same as route variation LC-5, except for the location where MRA-LC drops southward from the existing 161 kV line, west of Lake Charlotte (Map 3-13). Thus, MRA-LC has potential impacts similar to LC-5.

MRA-LC differs from LC-5 in that MRA-LC proceeds further eastward along the existing 161 kV before turning southward to 160th St. (Map 3-13, Map Sheet LH14). MRA-LC uses the same drop-down utilized by LC-3 to reach 160th St. Both drop-downs to 160th St. (MRA-LC and LC-5) proceed across agricultural fields and along field lines. The primary difference between the routing options is that MRA-LC proceeds

further eastward along the existing 161 kV line before turning southward, thus making relatively greater use of existing transmission line ROW in the area.

Like LC-5, MRA-LC could be used to remove the existing 161 kV line from Lake Charlotte. The potential impacts of doing so would be similar to those of using LC-5.

Center Creek WMA Variations

There is one route variation in the Center Creek WMA area (CC-1) and a small segment of route B (B-CC). Route variation CC-1 proceeds south from route B along 265th Ave before turning east and rejoining route B (Map 3-15).

Route B-CC is furthest from homes in the area and best minimizes aesthetic impacts. Impacts to agriculture are anticipated to be similar for route variation CC-1 and route B-CC. Route B-CC does not use or parallel existing transmission line or roadway ROW. Route variation CC-1 parallels 265th Ave.; however, its anticipated alignment does so at such a distance that use of the roadway ROW is minimal.

Human Settlements

As with the routes and route alternatives for this segment, the only element of human settlements where impacts are anticipated to be non-minimal and to vary notably between route variations is aesthetics. In this area of the project, route B-CC minimize impacts on aesthetic and human settlements.

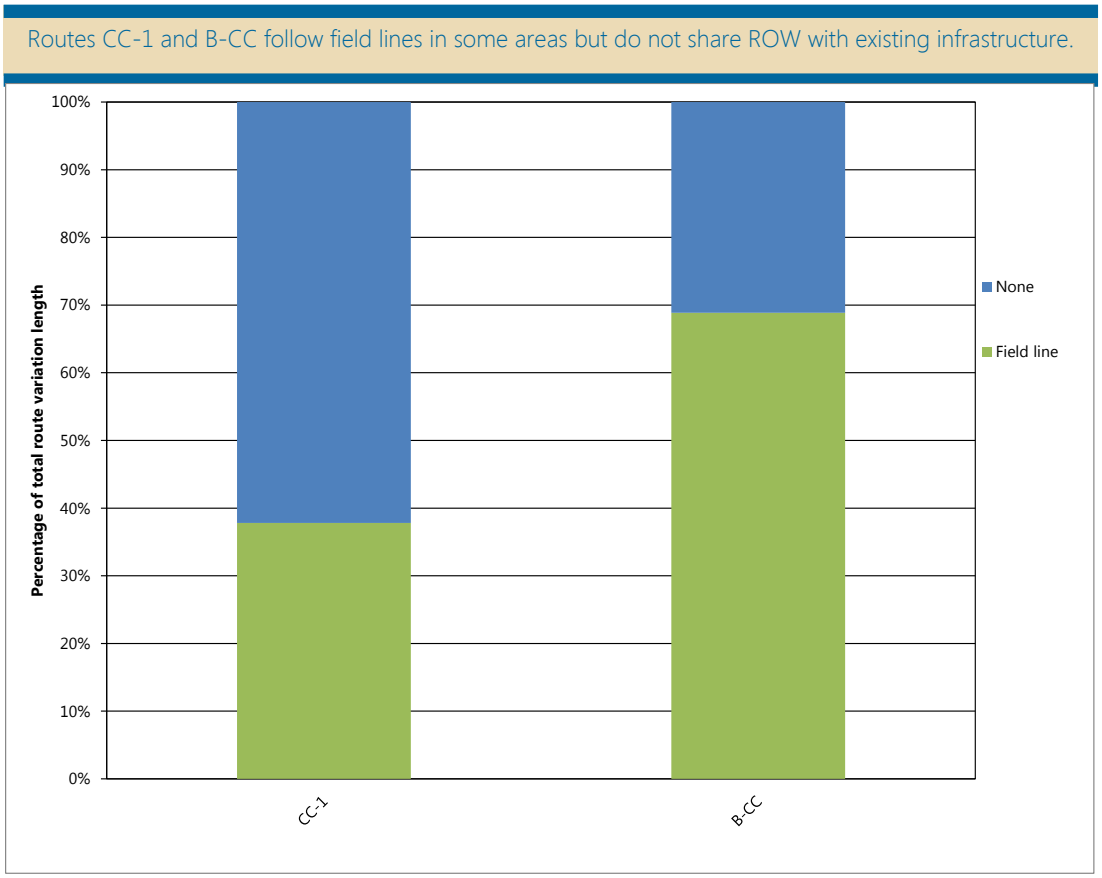
Aesthetics

Figure 6-28 and Map 6-26 show the proximity of homes to route variations in the Center Creek WMA area, and Figure 6-29 analyzes ROW sharing for these route variations. This data suggests that route B-CC would minimize adverse impacts on residents by avoiding homes, despite not following existing infrastructure ROW in the area. Since aesthetics is the primary element of human settlement that differs between route variations in this area, route B-CC appears to minimize effects on human settlements.

Transportation and Public Services

No impacts to transportation and public services are anticipated in the Center Creek WMA area. No airports are located within one mile of the Center Creek WMA route variations (Map 6-26).

Figure 6-29 ROW Sharing - Center Creek



Source: Barr Engineering. December 2013

Photo 6-12 Center Creek WMA

Route variation CC-1 would share ROW with the access road to the Center Creek WMA.

Source: Barr photo
Looking east from 265th Ave toward the Center Creek WMA.

Public Health and Safety

As with the routes and route alternatives for this segment, no impacts to public health and safety are anticipated from the route variations in this area, including potential impacts related to EMF, implantable medical devices, stray voltage, induced voltage and air quality. Based on MPCA's WIMN, there are no documented sites of environmental contamination within 500 feet of Center Creek WMA route variations (Map 6-26). Thus, no public health impacts due to environmental contamination are anticipated.

Land-based Economies

As with the routes and route alternatives for this segment, the only elements of land-based economies where impacts are anticipated to be non-minimal and could vary notably between route variations are agriculture and recreation and tourism.

Agricultural Land, Prime Farmland

Both of the Center Creek WMA route variations have similar amounts of designated prime farmland within their ROWs (Appendix J). All of the farmland within the Center Creek WMA route variation ROWs is classified as prime farmland or prime farmland if drained. General mitigation measures for farmland would follow those discussed in Section 5.4.1.

Recreation and Tourism

No WPAs, state water trails, snowmobile trails or state, county or city parks are located within the ROWs of the Center Creek WMA route variations (Map 6-26 and Map 6-28). A small section of the Center Creek WMA, however, is located within the ROW of route B-CC, and route variation CC-1 would share ROW with the access road to the Center Creek WMA (Photo 6-12). During construction, this road might need to be closed to through-traffic, temporarily hindering access or resulting in the need for a detour. Once construction has been completed, the road would again be available for access to the Center Creek WMA. General mitigation measures for recreation and tourism would follow those discussed in Section 5.4.4.

Archaeological and Historic Resources

There are no documented archaeological or historic resources in the Center Creek WMA area (Map 6-27). No known archaeological resources are located within half a mile of the variations, but one known historic resource is located within half a mile of route variation CC-1. Although it is unlikely that the project would adversely affect views to this historic resource, the potential does exist. Route B-CC would not affect known archaeological or historic resources.

Natural Environment

Impacts to the natural environment in the Center Creek WMA area are anticipated to be minimal.

Water Resources

No impacts to water resources are anticipated in the Center Creek WMA area. Map 6-28 shows that there are no lakes, watercourses or wetlands present within the Center Creek WMA area. Additional data is provided in Appendix J.

Flora

General effects on the composition of vegetation communities for the Center Creek route variations are described in Section 5.6.2 and are similar to those in the "Natural Environment" section of Section 6.1.1. Effects on forested vegetation cover within the ROWs and within 500 feet of the anticipated alignments for the Center Creek route variations are negligible. Total forested vegetation cover within 500 feet of the anticipated alignments is less than 4 acres for route variation CC-1, and there is none at all within route B-CC.

Within the ROWs, no forested vegetation cover is present for route B-CC, and less than half an acre of forested cover is present for route variation CC-1.

Fauna

General effects of the Center Creek route variations on lands managed for wildlife use are described in Section 5.6.3 and are similar to those described in the "Natural Environment" section of Section 6.1.1. The Center Creek route variations do not cross any WMAs, game refuges and WPAs. The Center Creek WMA, however, is located within the ROW of route B-CC, and route variation CC-1 would share ROW with the access road to the Center Creek WMA. No impacts to fauna within or associated with the WMA are anticipated with route B-CC or route variation CC-1.

Rare and Unique Natural Resources / Threatened and Endangered Species

No documented state or federally threatened or endangered species**, state-special concern or tracked species,** or rare communities lie within the ROWs or within 500 feet of the anticipated alignments of any of the Center Creek route variations. Thus, no impacts on state and federally threatened and endangered species and rare communities are anticipated (Map 6-29).

Use or Paralleling of Existing Rights-of-Way

Map 6-30 shows areas where the ROW for the proposed route variations would share or parallel ROW with existing transportation, transmission line or other infrastructure. Figure 6-29 shows the percentage of total line distance where existing infrastructure ROW is shared or paralleled for the two routes in the Center Creek WMA area. Neither of these variations would share ROW with existing transmission line. or roadway ROW.

Costs that are Dependent on Design and Route

A summary of the costs associated with constructing the Center Creek WMA route variations are provided in Table 6-12. Cost estimates have a range of plus or minus 30 percent.

The cost for route variation CC-1 is the same as that for route B-CC.

Table 6-12 Summary of Costs for Routes Variations – Center Creek WMA

Route ID	Length (miles)	Estimated Costs ($ million)
CC-1	0.78	1.7
B-CC	0.78	1.7

Source: Reference 59

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