Identification of AECI Proposed Route

The evaluation criteria data are summarized in Table 2-19 below.

Table 2-19. Route Corridor Data: Big Lake to Fairport

Route Corridor	Segments	Total Length (miles)	Residences Within 200 ft	Businesses Within 200 ft	Public Facilities Within 200 ft	Crop-land Crossed (acres)	Wood-land Crossed (acres)	Wet-lands Crossed (acres)	Length Parallel To Existing Transmission Lines (Miles)	Perennial Waterways Crossed (number)
FF1	C1-C4-C7	62.2	1	0	0	6357	949	174	22.4	25
FF2	C1-C3-C6-C7	61.5	1	0	0	6303	958	142	16.5	25
FF3	C1-C3-C5-C8	58.0	0	0	0	5226	1024	146	5.7	13
FF4	C2-C8	68.4	3	0	0	7247	597	273	35.2	18

Source: AECI, 2005e

Note that FF3 is ranked 1 for both the highest weighted criteria (total length and residences within 200 feet), and FF4 is ranked 4 for both of these criteria. FF3 also has the lowest acreage of cropland crossed, the second lowest acreage of wetlands and the lowest number of stream crossings. It ranks highest only in the acreage of woodland crossings and length parallel to existing transmission lines. The resulting weighted scores are as follows:

- FF1—55
- FF2—45
- FF3—39
- FF4—72

Based on this evaluation, Route Corridor FF3 was identified as the route corridor for this section, for the Big Lake Alternate Site. Other alternatives are eliminated from further evaluation. This route corridor for Big Lake to Fairport is shown in Figure 2-58.

Fairport to Orrick / Missouri City / Eckles Road Transmission Line

Study Area

The study area AECI identified for locating this transmission line is shown in Figure 2-59.

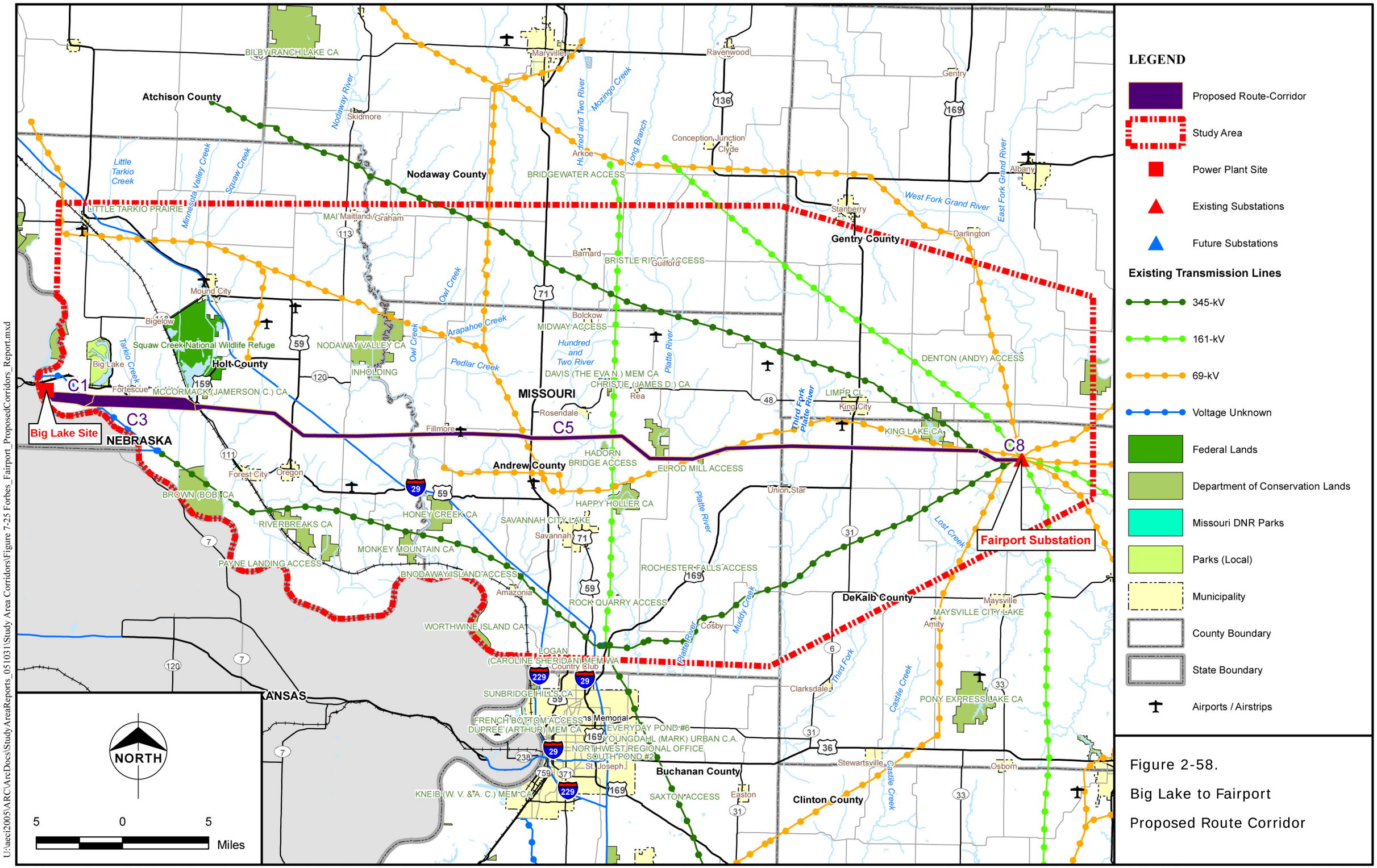
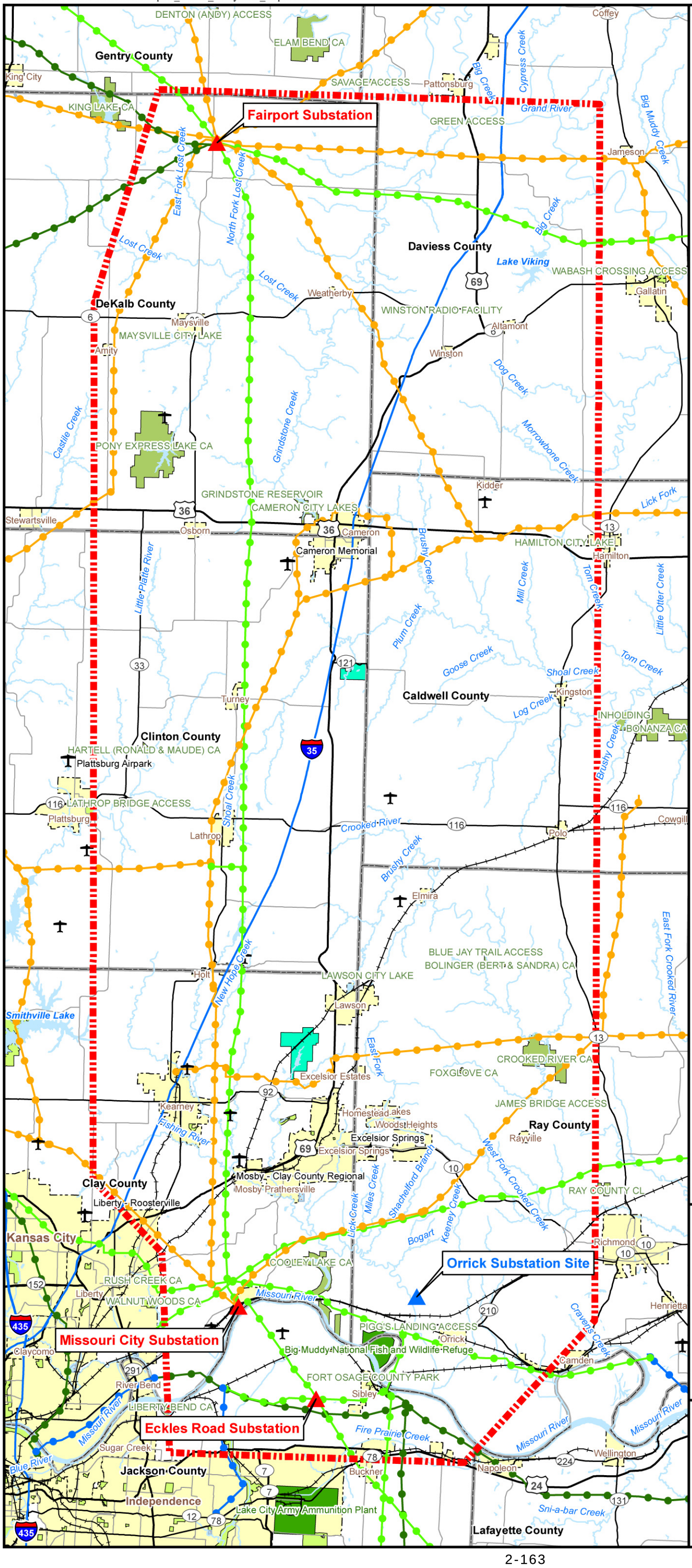


Figure 2-58.
Big Lake to Fairport
Proposed Route Corridor

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Source: AECI, 2005e

U:\AECI2005\ARC\ArcDocs\Fairport_Orrick_StudyArea_Report.mxd



Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Figure 2-59.

Fairport to Orrick/Missouri City/Eckles Road Study Area

Source: AECI, 2005a

The northern part of this study area is rural and the southern part borders the metropolitan Kansas City area.

Public lands within the study area include the Pony Express Lake CA in DeKalb County; Wallace State Park in Clinton County; Watkins Woolen Mill State Park and State Historic Site and Cooley Lake CA in Clay County; and Crooked River CA, a part of the Big Muddy NWR, and Fort Osage County Park in Ray County. A 15-acre area of Isley Park in Excelsior Springs has been designated as the Isley Park Wood NA (MDC, 1996).

Outside the developed areas, which are concentrated in the southern part of the study area, land use is primarily agricultural. Center-pivot irrigation systems are common only along the Missouri River floodplain at the southern end of the study area.

Towns within the study area with 2000 census population over 1,000 include Excelsior Springs and surrounding communities (population 12,769), Cameron (population 8,312), Kearney (population 5,472), Lawson (population 2,336), Lathrop (population 2,092), and Maysville (population 1,212).

As shown in Figure 2-59, there are a number of highways, small airports, and transmission lines within the study area.

Almost all of the land in the study area is considered prime farmland, prime farmland if drained or not flooded, or farmland of statewide importance (AECI, 2005a).

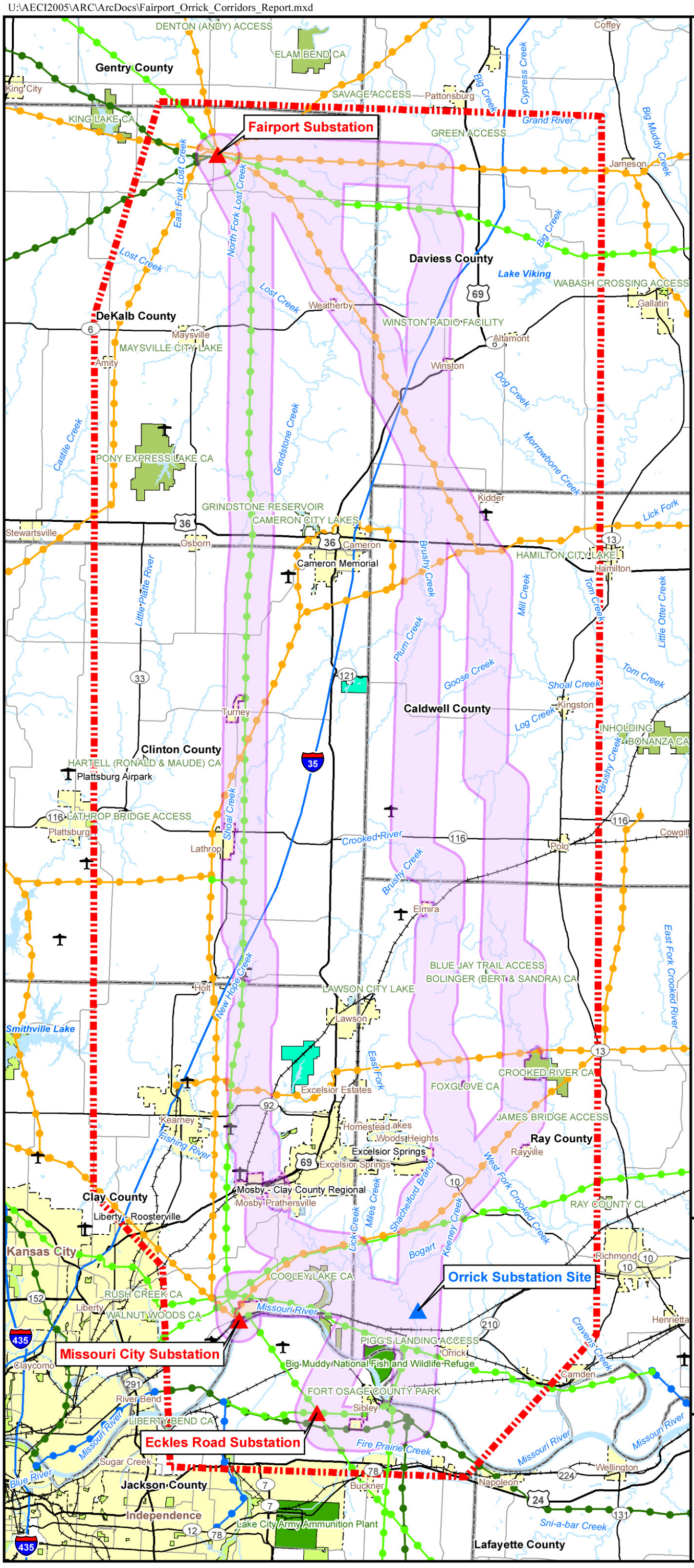
Wetlands are located throughout the study area and are typically associated with rivers, streams and lakes.

Macro Corridors

Macro corridors are shown in Figure 2-60, as follows:

- Fairport to Orrick—58 to 64 miles.
- Orrick to Missouri City—10 to 12 miles.
- Orrick to Eckles Road—7 to 10 miles.

U:\AECI2005\ARC\ArcDocs\Fairport_Orrick_Corridors_Report.mxd



Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Figure 2-60.

Fairport to Orrick/Missouri City/Eckles Road Alternative Macro Corridors

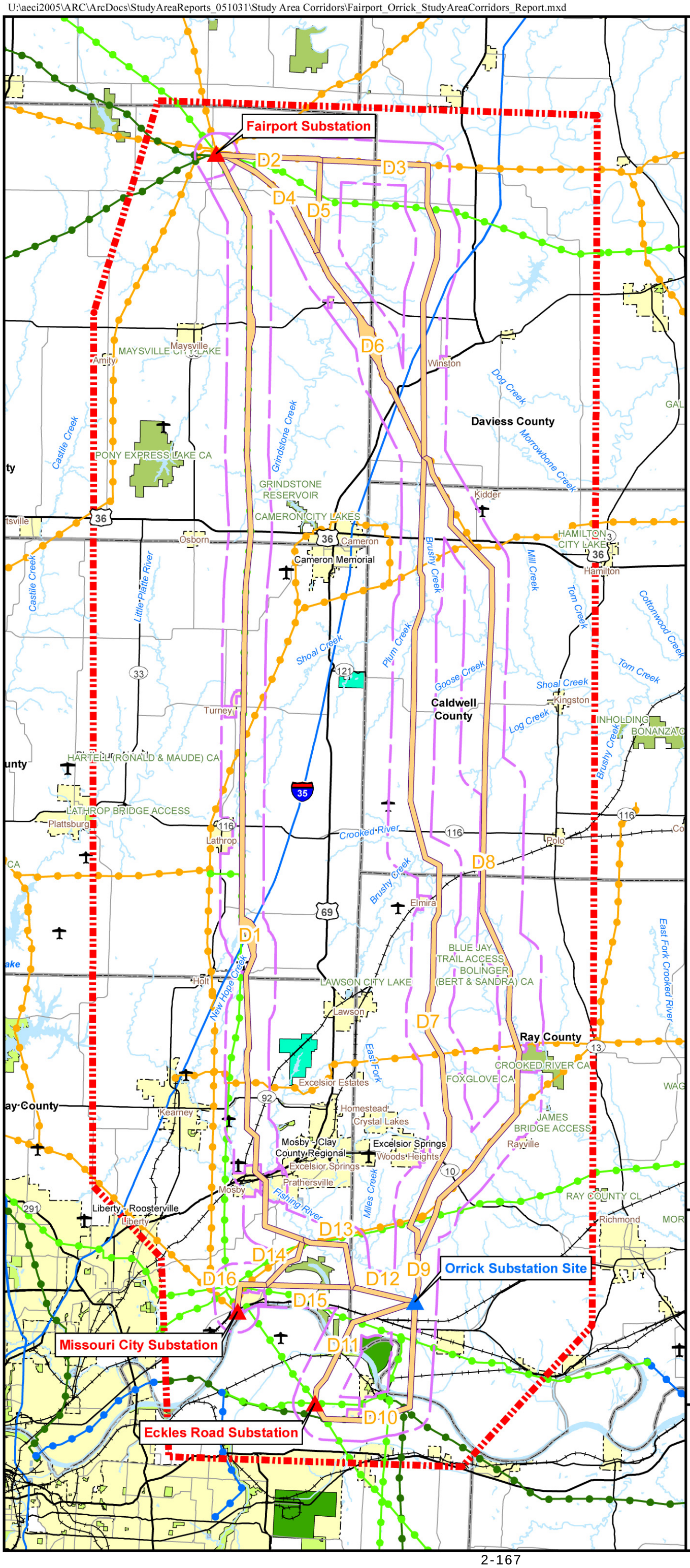
Source: AECI, 2005a

The Fairport to Orrick macro corridors represent reasonably direct routes that avoid, or can avoid, public lands and areas of relatively higher population. They also provide the option of using existing corridors as practicable. Orrick to Missouri City, a distance of only eight miles, is a problematic route because any direct route would require either two crossings of the Missouri River (not considered practicable) or crossing the Cooley Lake CA. Co-location with existing transmission lines across Cooley Lake CA was not ruled out; an alternative to the north of Cooley Lake CA is also considered. The short segment between Orrick and Eckles Road would need to avoid the part of the Big Muddy NWR that lies on a straight line between these two substations. One alternative macro corridor goes to one side, and one to the other.

Route Corridors

The route corridor segments, selected and numbered in a manner similar to the Big Lake to Fairport section, are shown in Figure 2-61. Figures 2-62 and 2-63 show route expansion areas for the north and south parts of this section, respectively. In the north part of the section (Figure 2-62), an expansion area was identified on Segment D1, and another on D6. Both these segments are co-located with another transmission line at these locations. The expansions would allow for movement away from the existing transmission corridor to avoid residences. In the south part of this section, the housing density is so high that some residences would be affected, and the alignment was located to avoid as many residences as practicable. The single expansion area in the southern part of this section was placed at a location where the flexibility could allow for potential reductions in impacts on residences (Figure 2-63).

U:\aeci2005\ARC\ArcDocs\StudyAreaReports_051031\Study Area Corridors\Fairport_Orrick_StudyAreaCorridors_Report.mxd



Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

LEGEND

- Expanded Route Corridors
- Study Area
- Two-mile-wide Macro-Corridors

Existing Transmission Lines

- 345-kV
- 161-kV
- 69-kV
- Voltage Unknown
- Power Plant Site
- Existing Substations
- Future Substations
- Federal Lands
- Department of Conservation Lands
- Missouri DNR Parks
- Parks (Local)
- Municipality
- County Boundary
- Airports / Airstrips

NORTH

4.5 0 4.5

Miles

Figure 2-61.

Fairport to Orrick/Missouri City

Eckles Road

Alternative Route Corridors

Source: AECI, 2005e

\\Gissrv\Projects\aeci2005\ARC\ArcDocs\ExpansionAreas\Fairport_Orrick_RouteExpansionAreas.mxd

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

LEGEND

- Expansion Areas
- Route Corridors
- Study Area
- Two-mile-wide Macro-Corridors

Existing Transmission Lines

- 345-kV
- 161-kV
- 69-kV
- Voltage Unknown
- Power Plant Site
- Existing Substations
- Future Substations
- Federal Lands
- Department of Conservation Lands
- Missouri DNR Parks
- Parks (Local)
- Municipality
- County Boundary
- Irrigation System
- House
- Cemetery
- Church
- Business/Industry
- Hog/Poultry/Feedlot
- School
- Airport / Air Strip

Note: Irrigation systems, houses, cemeteries, churches, hog/ poultry/feedlots, and schools are shown only within the expansion areas.

NORTH

2 0 2 Miles

Figure 2-62.

Fairport to Orrick/Missouri City

Eckles Road (North)

Route Corridor Expansion Areas

Source: AECI, 2005e

\\Gissrv\Projects\aeci2005\ARC\ArcDocs\ExpansionAreas\Fairport_Orrick_RouteExpansionAreas.mxd

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

LEGEND

- Expansion Areas
- Route Corridors
- Study Area
- Two-mile-wide Macro-Corridors

Existing Transmission Lines

- 345-kV
- 161-kV
- 69-kV
- Voltage Unknown
- Power Plant Site
- Existing Substations
- Future Substations
- Federal Lands
- Department of Conservation Lands
- Missouri DNR Parks
- Parks (Local)
- Municipality
- County Boundary
- Irrigation System
- House
- Cemetery
- Church
- Business/Industry
- Hog/Poultry/Feedlot
- School
- Airport / Air Strip

Note: Irrigation systems, houses, cemeteries, churches, hog/ poultry/feedlots, and schools are shown only within the expansion areas.

NORTH

2 0 2 Miles

Figure 2-63.

Fairport to Orrick/Missouri City

Eckles Road (South)

Route Corridor Expansion Areas

Source: AECI, 2005e

Identification of Route

The evaluation criteria data are summarized in the Table 2-20 below.

Table 2-20. Route Corridor Data: Fairport to Orrick/Missouri City/Eckles Road

Route Corridor	Segments	Total Length (miles)	Residences Within 200 ft	Businesses Within 200 ft	Public Facilities Within 200 ft	Crop-land Crossed (acres)	Wood-land Crossed (acres)	Wet-lands Crossed (acres)	Length Parallel To Existing Transmission Lines (Miles)	Perennial Waterways Crossed (number)
Fairport to Orrick (FO)										
FO1	D1-D13-D12	59.4	0	0	0	3685	1197	304	36.1	13
FO2	D4-D6-D7-D9	58.2	0	0	0	2909	2317	210	16.6	18
FO3	D4-D6-D8-D9	59.8	0	0	0	2742	2087	177	23.3	18
FO4	D2-D3-D7-D9	64.0	0	0	0	3389	2417	255	9.0	15
FO5	D2-D3-D8-D9	65.6	0	0	0	3223	2188	223	15.7	15
FO6	D2-D5-D6-D7-D9	60.5	0	0	0	2857	2370	221	15.3	19
FO7	D2-D5-D6-D8-D9	62.1	0	0	0	2691	2140	189	22	19
Orrick to Missouri City (OM)										
OM1	D12-D13-D14-D16	12.2	0	0	0	1330	202	161	0	4
OM2	D12-D15-D16	9.4	0	0	0	1131	104	105	0	1
Orrick to Eckles Road (OE)										
OE1	D10	9.7	0	1	0	1300	143	72	4.8	2
OE2	D11	7.2	0	0	0	908	76	61	0	3

Seven combinations were evaluated from Fairport to Orrick (FO), with FO2 the shortest and FO5 the longest. The resulting weighted scores for Fairport to Orrick are as follows:

- FO1—65
- FO2—54
- FO3—41
- FO4—103
- FO5—91
- FO6—74
- FO7—55

Based on this evaluation, Route Corridor FO3 was identified as the route corridor for this section of the Big Lake Alternate. Other route corridors are eliminated from further evaluation. This route corridor for Fairport to Orrick is shown in Figure 2-64.

For the Orrick to Missouri City (OM) section, OM1 received a score of 38, and OM2 received a score of 24. Scores for OE1 and OE2 were 40 and 25, respectively, for the Orrick to Eckles Road (OE) section. OM2 and OE2 were selected and are considered part of the Big Lake Alternate, and other route corridor options have been eliminated from further evaluation (Figure 2-64).

2.2.12.4 Norborne Site

For the Norborne Plant, AECI determined that two 345-kV transmission lines and related new and upgraded substation facilities would be required to provide adequate outlet capacity for the plant. The transmission lines would need to extend to substations that provided for:

1. Reliable outlet of the new generating capacity

2. Adequate transmission capacity into the existing transmission system, and

3. enhancements to solve known transmission constraints for service to member loads (AECI, 2006t).

First, a line from the proposed Norborne Substation (located east of the proposed plant site) to the Thomas Hill Substation in Randolph County (approximately 60 miles) would be built (Figure 2-65). A second 345-kV line would be built from Norborne to Central Electric Power Cooperative's (Central) Sedalia Substation in Pettis County (approximately 50 miles) and then to the Mt. Hulda Substation in Benton County (approximately 24 miles). The first 17 miles of this line, to the location near the town of Corder, where the line would cross the Kansas City Power and Light 345kV line from Overton to Sibley, would be double-circuit 345 kV. The structure for the double circuit line would be slightly different from the standard H-frame single circuit design that would be used for the rest of the transmission project for Norborne. Support poles would be single structures approximately 105 feet tall. The H-frame structures would be about 80 feet tall.

U:\aeci2005\ARC\ArcDocs\StudyAreaReports_051031\Study Area Corridors\Figure 7-26 Fairport_Orrick_ProposedCorridors_Report.mxd

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Fairport Substation

D4

D6

D8

D9

D11

D12

D15

D16

Orrick Substation Site

Missouri City Substation

Eckles Road Substation

Maysville

MAYSVILLE CITY LAKE

Amity

Winston

Daviess County

PONY EXPRESS LAKE CA

GRINDSTONE RESERVOIR

CAMERON CITY LAKES

Osborn

Cameron

Cameron Memorial

Kidder

HAMILTON CITY LAKE

Hamilton

Castile Creek

Little Platte River

Grindstone Creek

Brushy Creek

Mill Creek

Tom Creek

Cottonwood Creek

Dog Creek

Morrowbone Creek

Shoal Creek

Plum Creek

Goose Creek

Log Creek

Turney

Caldwell County

Kingston

INHOLDING

BONANZA

HARTELL (RONALD & MAUDE) CA

LATHROP BRIDGE ACCESS

Plattsburg

Lathrop

Crooked River

Polo

Elmira

BLUE JAY TRAIL ACCESS BOLINGER (BERT & SANDRA) CA

LAWSON CITY LAKE

Lawson

Holt

New Hope Creek

East Fork

Miles Creek

Fishing River

Ray County

CROOKED RIVER CA

FOXGLOVE CA

JAMES BRIDGE ACCESS

Rayville

Excelsior Estates

Homestead

Crystal Lakes

Kearney

Mosby - Clay County Regional

Excelsior Springs

Woods Heights

Prathersville

Mosby

Liberty - Roosterville

Liberty

RAY COUNTY CL

Richmond

LEGEND

- Proposed Route-Corridor
- Study Area

Existing Transmission Lines

- 345-kV
- 161-kV
- 69-kV
- Voltage Unknown
- Power Plant Site
- Existing Substations
- Future Substations
- Federal Lands
- Department of Conservation Lands
- Missouri DNR Parks
- Parks (Local)
- Municipality
- County Boundary
- Airports / Airstrips

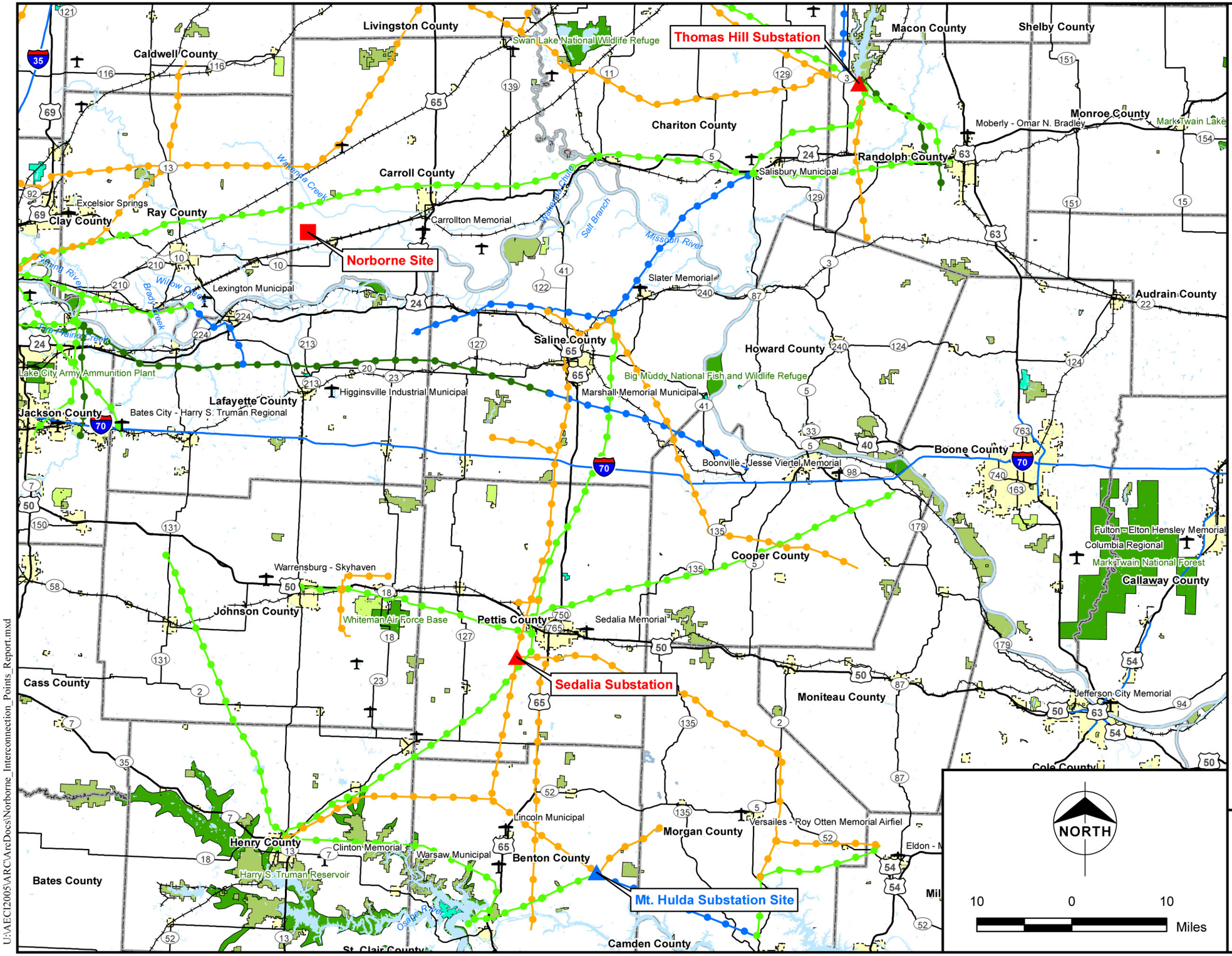
NORTH

4.5 0 4.5 Miles

Figure 2-64.

Fairport to Orrick/Missouri City Eckles Road Proposed Route Corridor

Source: AECI, 2005e



Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

LEGEND

- Power Plant Site
- Existing Substations
- Future Substations

Existing Transmission Lines

- 345-kV
- 161-kV
- 69-kV
- Voltage Unknown
- Federal Lands
- Department of Conservation Lands
- Missouri DNR Parks
- Parks (Local)
- Municipality
- County Boundary
- Airports / Airstrips

Figure 2-65.
Norborne Site
Interconnection Points

U:\AECI2005\ARC\ArcDocs\Norborne_Interconnection_Points_Report.mxd

Source: AECI, 2005a

The substation that would be located just east of the Norborne Plant would be within the facility boundaries. No substation expansion would be required at the existing Thomas Hill Substation. The new substation near Corder would require approximately five fenced acres. At Sedalia and Mt. Hulda, the existing substations would be expanded to accommodate the new facilities and would need to be constructed on three fenced acres at each site. Transformers (345/161 kV) and related switching, safety and control equipment would be added to one or both of these substations. Adequate outlet capacity in the area would be provided by the existing 69-, 138- and 161-kV subtransmission system. This system would consist of existing facilities as well as new and upgraded facilities that are in various stages of planning (AECI, 2005a). Figure 2-65 shows the location of these substations in relation to the Norborne Site. These areas are discussed separately, below.

Norborne to Thomas Hill Transmission Line

Study Area

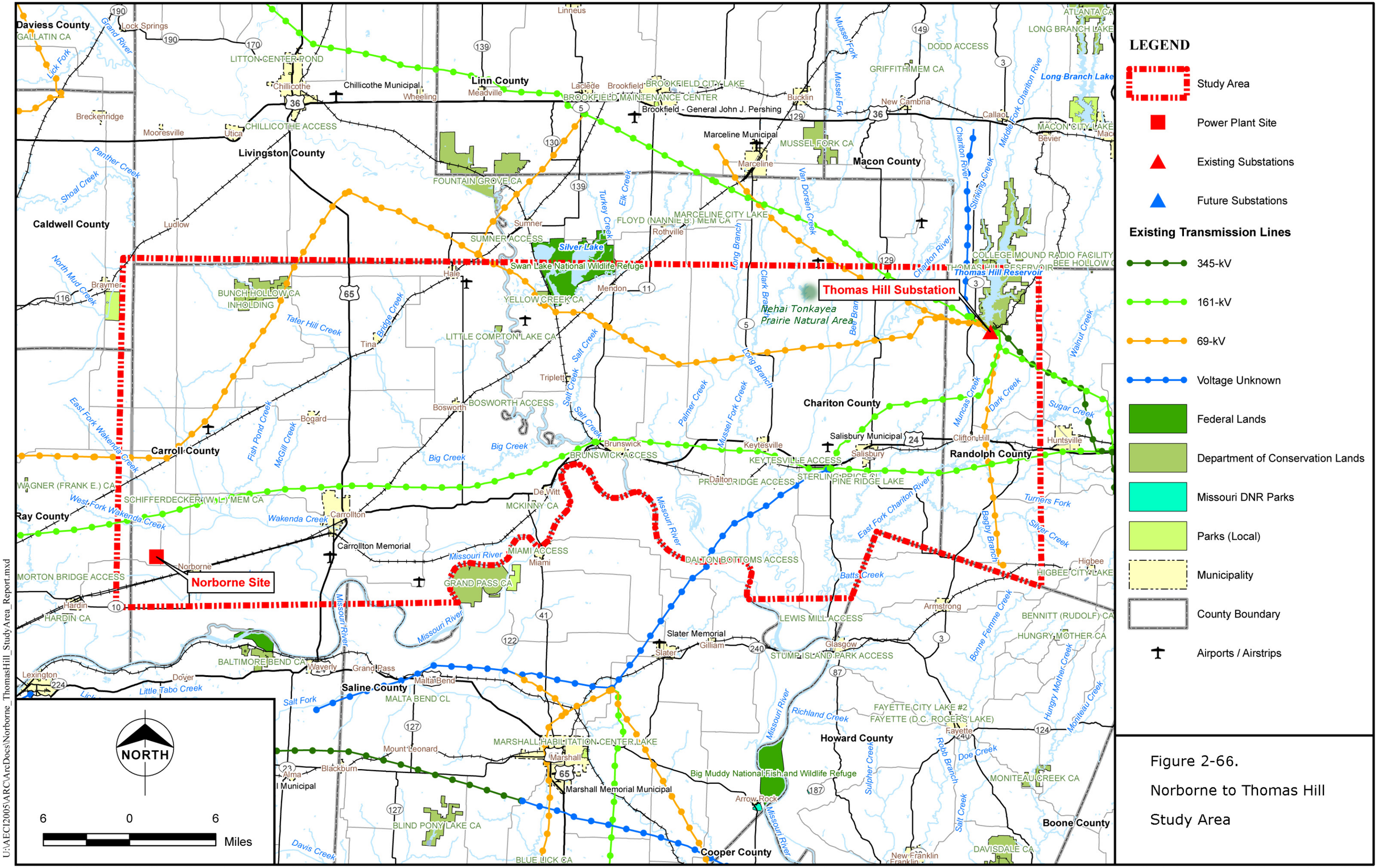
The study area AECI identified for locating the Norborne to Thomas Hill transmission line is shown in Figure 2-66. The area south of the Missouri River was eliminated from the study area because it would have required crossing the Missouri River twice. Primary features within this study area include Swan Lake NWR and the adjacent Yellow Creek CA in Chariton County; Bunch Hollow CA and Little Compton Lake CA in Carroll County; and Thomas Hill Reservoir CA in Randolph County. A 617-acre portion of Yellow Creek CA has been designated as a Missouri NA. A 90-acre area on private land about halfway between Swan Lake NWR and Thomas Hill Reservoir has been designated as a Missouri NA: Nehai Tonkayea Prairie NA (MDC, 1996).

The Grand River and the Chariton River are the major streams that cross the study area. There are a number of public access points along these rivers within the corridor that are managed by the MDC.

There are two towns in the study area with a 2000 census population greater than 1,000: Carrollton (population 4,122) and Salisbury (population 1,726).

The area is primarily rural and the major land use is farming.

As shown in Figure 2-66, there are a number of highways, small private airports, and transmission lines within the study area.



U:\AECI2005\ARC\ArcDocs\Norborne_ThomasHill_StudyArea_Report.mxd

Figure 2-66.
Norborne to Thomas Hill
Study Area

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Source: AECI, 2005a

Almost all of the land in the Norborne to Thomas Hill study area is considered prime farmland, prime farmland if drained or not flooded, or farmland of statewide importance (AECI, 2005a).

Small isolated emergent and scrub-shrub wetlands are randomly scattered throughout the study area. Larger areas of forested wetlands are primarily associated with rivers, streams and lakes. (AECI, 2005a).

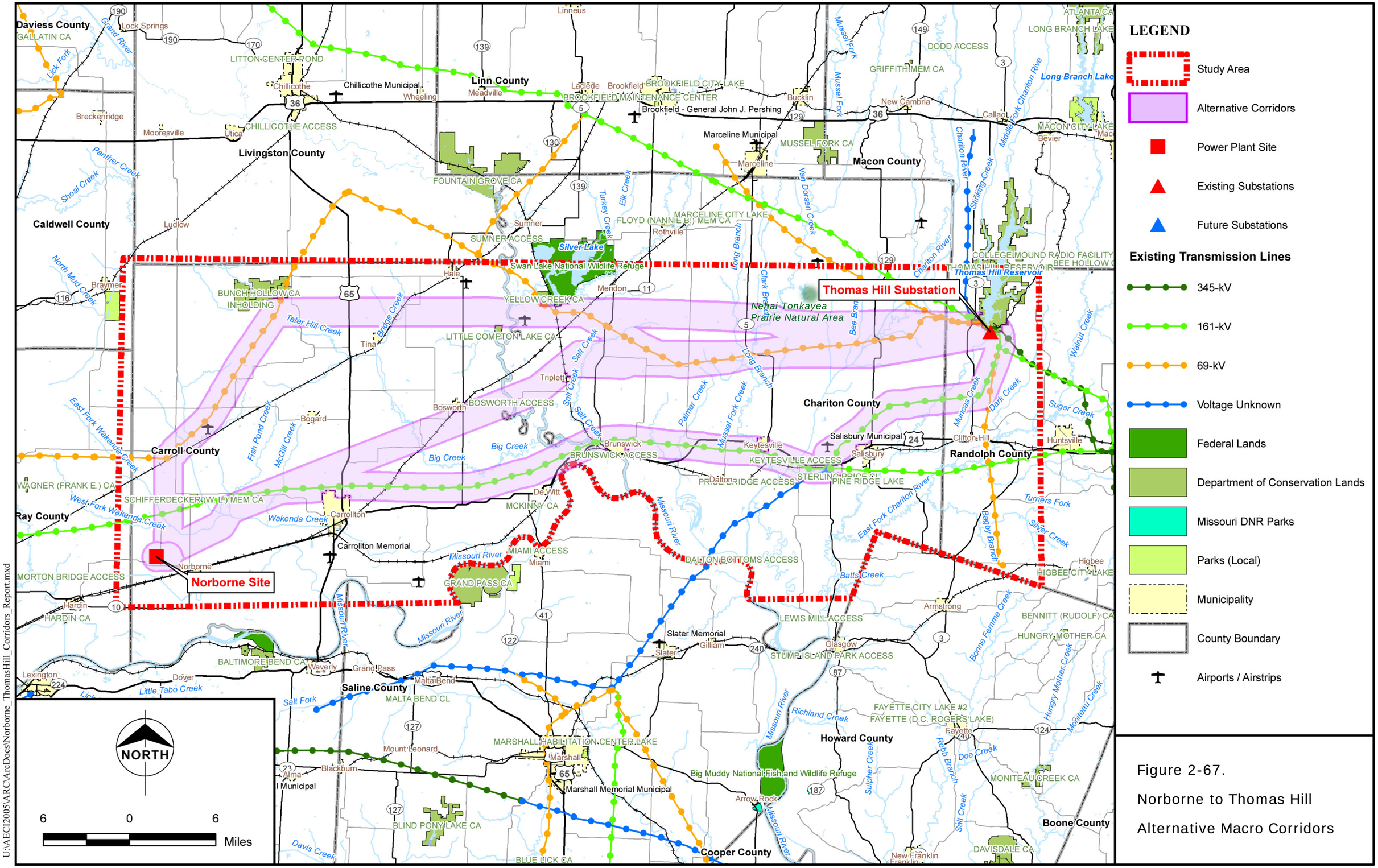
Macro Corridors

The three macro corridors identified between the Norborne Plant Site and the Thomas Hill Substation range from about 62 to 69 miles in length (Figure 2-67). The middle corridor is the most direct route, deviating from a straight line between Norborne and Thomas Hill to cross the Grand River away from meanders and oxbow lakes, and to allow co-location with another transmission line in the eastern part of the corridor. The southern macro corridor follows another transmission line route for almost the entire length of the corridor. The northern macro corridor follows an existing transmission line at the west side of the study area until it is directly west of the Thomas Hill Substation, then goes east to the Thomas Hill Substation, passing south of Bunch Hollow CA, Yellow Creek CA, Swan Lake NWR, and Nehai Tonkayea Prairie NA. A connecting segment between the northern and middle corridor allows for combinations of these two corridors.

A cultural resources study done in 2006 found that there is an archaeological site within the northern macro corridor that is eligible for the National Register. The site is located downstream of the Thomas Hill Reservoir Dam. In the southern macro corridor there is a property that is on the National Register of Historic Places (NRHP), Locust Hill, located just northeast of Brunswick. There are no properties on or eligible for the National Register in the middle macro corridor. There are several archaeological sites scattered throughout all three macro corridors for which determinations of eligibility have not been made (AECI, 2006l).

Route Corridors

Norborne to Thomas Hill route corridors and segment designations are shown in Figure 2-68, and details of expansion areas are shown in Figures 2-69 (west) and 2-70 (east).

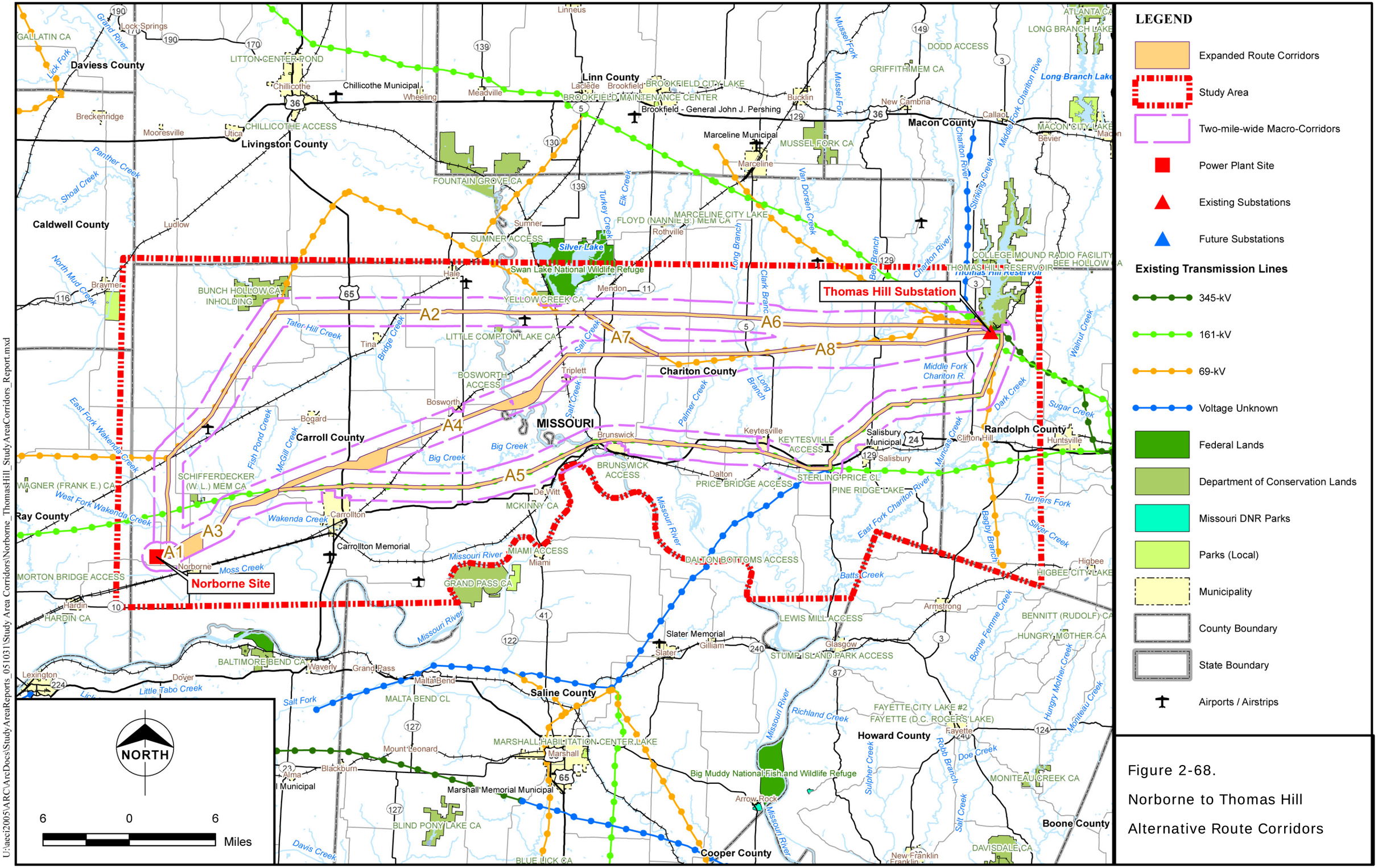


U:\AECI2005\ARC\ArcDocs\Norborne_ThomasHill_Corridors_Report.mxd

Figure 2-67.
Norborne to Thomas Hill
Alternative Macro Corridors

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Sources: AECI, 2005a; MDC, 2006

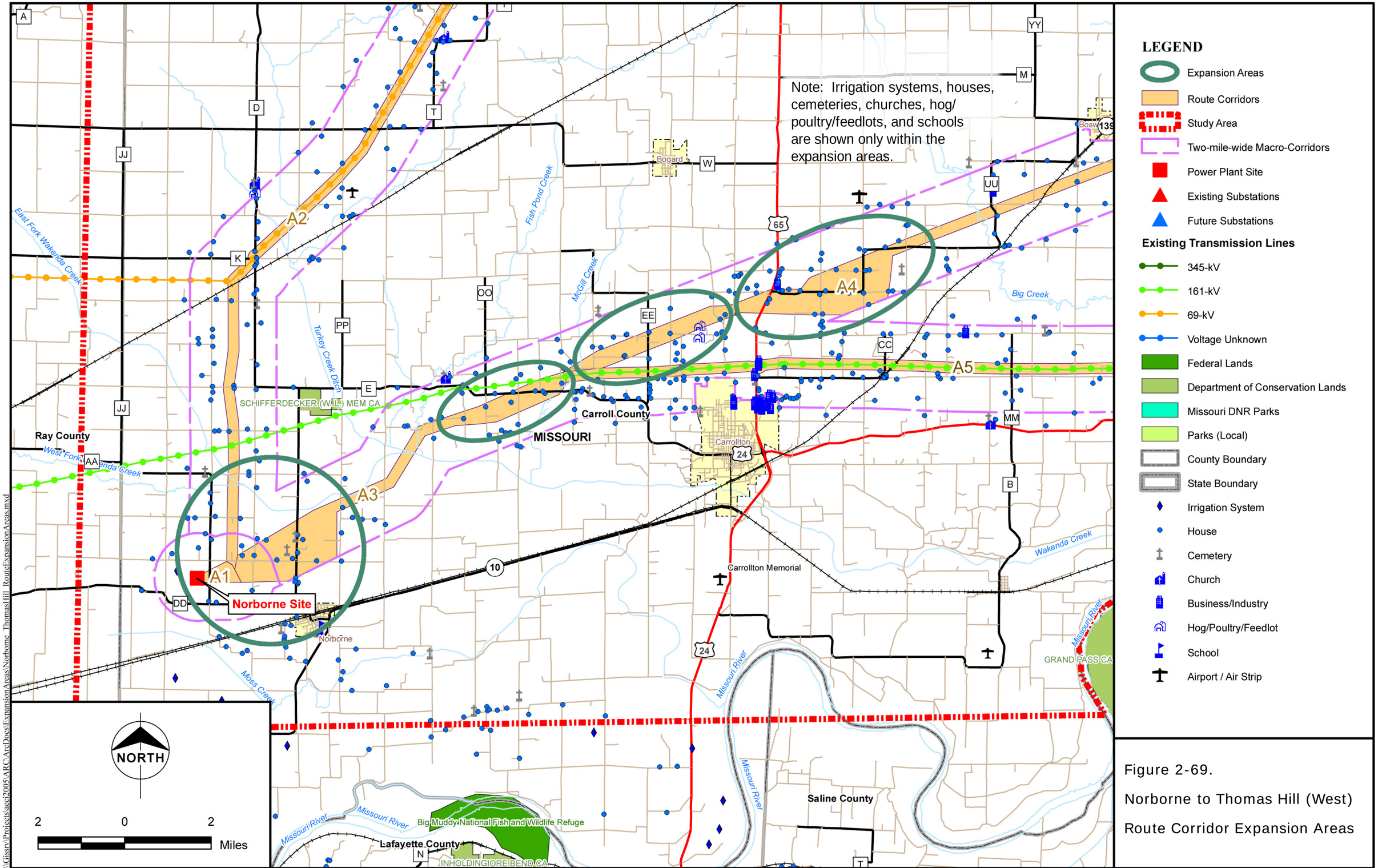


U:\aeci2005\ARC\ArcDocs\StudyAreaReports_051031\Study Area Corridors\Norborne_ThomasHill_StudyAreaCorridors_Report.mxd

Figure 2-68.
Norborne to Thomas Hill
Alternative Route Corridors

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Source: AECI, 2005e



\\Gissrv\Projects\aecl2005\ARC\ArcDocs\ExpansionAreas\Norborne_ThomasHill_RouteExpansionAreas.mxd

Figure 2-69.
Norborne to Thomas Hill (West)
Route Corridor Expansion Areas

Disclaimer: Existing transmission lines are shown to the extent they could be verified within the project study areas using aerial photography, topographic maps, and NW and Central Cooperative's system planning maps. They are not necessarily complete or represent all existing transmission lines in the area.

Source: AECI, 2005e