

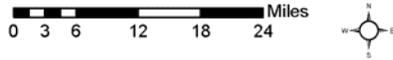
7.7 Southeast Zone

The following table provides a list of transmission needs identified in the Southeast Zone and the map on the following page shows the location of each item in the table.

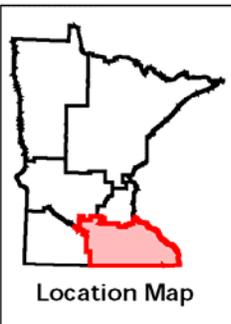
Southeast Zone

Tracking Number	Description	Projected In-Service Year	Need Driver	Section No
2003-SE-N1	Rochester & Southeast Minnesota Areas; includes Rochester load serving study and Rochester new transmission tie	2011	Load serving in Rochester and the Greater La Crosse Area	7.7.2
2003-SE-N3	City of Mankato	To be Determined	Transformer Overloads and system reliability	7.7.3
2005-SE-N1	Mankato Generation	2009	Generation outlet	7.7.4
2005-SE-N2	Cannon Falls Generation	2008	Generation outlet	7.7.5
2005-SE-N3	Lake City Area	2008	Load serving; low voltages	7.7.6
2005-SE-N4	Dodge County Wind	To be Determined	Generation outlet	7.7.7
2005-SE-N5	Mower County Wind	To be Determined	Generation outlet	7.7.8
2005-CX-3	CapX 2020 Vision Plan Twin Cities – Rochester – La Crosse 345 kV			7.7.9
2007-SE-N1	Rochester-Adams 161 kV Line	2010	Line subject to overloads due to wind generators around Adams	7.7.10
2007-SE-N2	Grand Meadows Wind	2009	Generation outlet	7.7.11
2007-SE-N3	North Mankato Load Serving	2010	Low voltages and line overloads	7.7.12
2007-SE-N4	Wind Generation Upgrades – Freeborn and Mower Counties	2010	Generation Outlet	7.7.13

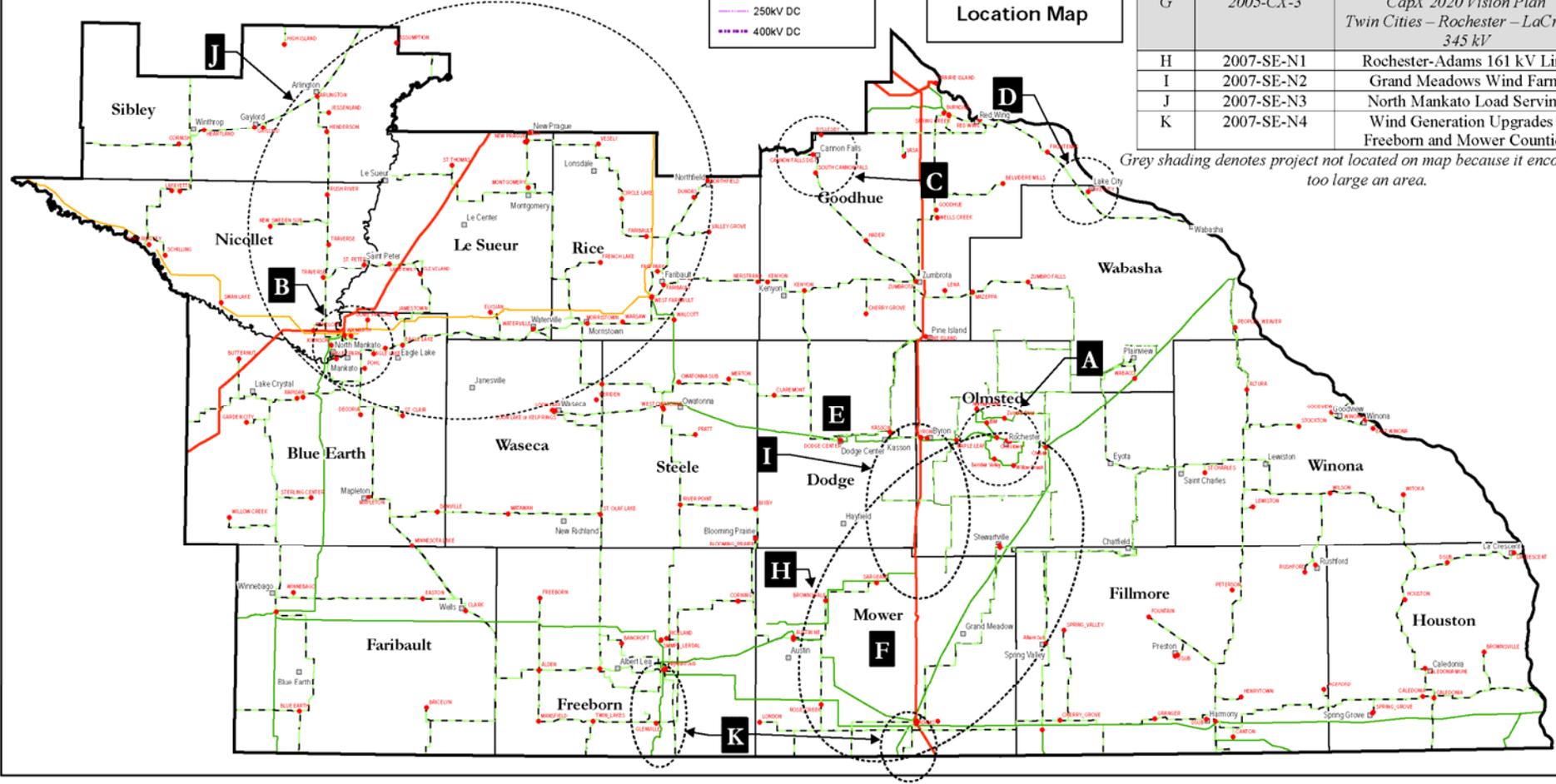
Minnesota Transmission >69kV Southeast Planning Zone



Legend	
●	Transmission Substation
□	Cities
---	Project Location
— (Green)	69kV AC
— (Yellow)	115kV AC
— (Light Blue)	138kV AC
— (Light Green)	161kV AC
— (Dark Green)	230kV AC
— (Red)	345kV AC
— (Blue)	500kV AC
— (Purple)	250kV DC
— (Black)	400kV DC



Map ID	Tracking Number	Description
A	2003-SE-N1	Rochester & Southeast Minnesota Area; includes Rochester load serving study and Rochester new transmission tie
B	2003-SE-N3	City of Mankato
C	2005-SE-N2	Cannon Falls Generation
D	2005-SE-N3	Lake City Area
E	2005-SE-N4	Dodge County Wind
F	2005-SE-N5	Mower County Wind
G	2005-CX-3	CapX 2020 Vision Plan Twin Cities – Rochester – LaCrosse 345 kV
H	2007-SE-N1	Rochester-Adams 161 kV Line
I	2007-SE-N2	Grand Meadows Wind Farm
J	2007-SE-N3	North Mankato Load Serving
K	2007-SE-N4	Wind Generation Upgrades - Freeborn and Mower Counties



Grey shading denotes project not located on map because it encompasses too large an area.

7.7.1 Completed Projects

Some inadequacies in the Southeast Zone that were identified in the 2005 Biennial Report were alleviated through the construction and completion of specific projects over the last two years. Information about each of the completed projects is summarized briefly in the table below, and those matters will be removed from the list of inadequacies that are discussed in the 2007 Report. More detailed information about these projects and inadequacies can be found in the 2005 Report and in the PUC Docket for the matter if the project fell within the jurisdiction of the Public Utilities Commission, in which case the Docket Number is shown below. Also, additional information is available by contacting the designated person for the utility that was responsible for constructing the project.

Tracking Number	Utility	Description	PUC Docket	Date Completed
2003-SE-N2	Great River Energy	Reconductor Summit -West Faribault line. Rebuild Fox Lake - Winnebago line	None	Summit line completed in 2006. Fox Lake rebuilt in 2007
2003-SE-N4	Minnesota Municipal Power Agency Xcel Energy	300 MW generating plant in Faribault connected to the grid through construction of 115 kV interconnect	Permitted by Environmental Quality Board	2006

7.7.2 Rochester and Southeast Minnesota Areas

Tracking Number. 2003-SE-N1

Utility. Xcel Energy, Dairyland Power Cooperative, Rochester Public Utilities, Southern Minnesota Municipal Power Agency, and Wisconsin Public Power Inc.

Inadequacy. Five different issues were identified in the 2005 Report that require attention in the southeast Minnesota area. These include:

1. *Rochester load.* The loss of the Byron – Maple Leaf 161 kV line would limit the input into the Rochester area to about 160 MW, when the summer peak demand is 300 MW. And load growth is projected to require even more power in the area.
2. *Transfer limit.* The capacity of the Byron – Maple Leaf 161 kV line is a limiting factor in setting the available transfer capability for Minnesota to Wisconsin transfers.
3. *Load serving the greater LaCrosse area.* The Greater LaCrosse Area, electrically, includes Winona, LaCrescent, Houston, and Caledonia as well as a significant area surrounding LaCrosse on the Wisconsin side of the Mississippi. In the 2005 Report, it was reported that the loss of the Genoa-LaCrosse-Marshland 161 kV line created an

4. overload on the Genoa – Coulee 161 kV line. In 2007 the Genoa – Coulee 161 kV line was reconductored to 377 MVA. With this reconductor the Genoa – LaCrosse 161 kV line overloads for the loss of the Genoa-Coulee 161 kV line. This overload is exacerbated by an outage of the generator at the Alma site.
5. *Serving Regional Load.* Due to numerous constrained flow-gates within the MAPP and Midwest ISO areas, utilities have experienced difficulty securing firm transmission service to deliver firm generation purchases from sources within and outside the MAPP region. In addition, utilities have encountered difficulty locating possible new generation within their service areas due to these constraints. For those utilities within MISO, transmission is less of an issue with respect to energy; however demonstration of firm transmission for capacity accreditation remains a requirement for any capacity purchases in excess of 10% of network load. Lack of firm transmission exposes these utilities to high energy costs. The inability to secure firm transmission has also limited the sale of excess generation.

It should be noted that in October 2006, the person serving as the Independent Market Monitor for MISO declared a broad area, including the Southeast Transmission Zone, a Narrowly Constrained Area (“NCA”) under the MISO tariff. FERC subsequently accepted the designation. This designation indicates that the area is subject to high congestion charges due to the need to re-dispatch more costly generation (peaking capacity) to alleviate constraints on the area’s transmission system. Because of the electrical location of some generators, these constraints can give the operator “market power” placing area load at a disadvantage. By designating the region an NCA, the operators are limited to their offer prices. The Independent Market Monitor indicated in his report that the NCA condition was likely to continue for some time and remains in effect at the time of this report.

6. *CapX 2020 Vision Plan.* In order to serve projected new load in Minnesota, major additions to the 345 kV system in the state are required with access to regions outside of Minnesota. One of the vision projects identified is the need for a 345 kV line from the south side of the Twin Cities to eastern Wisconsin.
7. *Adams-Rochester 161 kV Line.* This line overloads due to the addition of new wind generation and has been given its own Tracking Number (2007-SE-N1).

Maps of the area are shown on the following two pages.

Alternatives. As discussed in the 2005 Biennial Report the local load serving issues could be addressed with shorter term 161 kV developments. However, the utilities have elected to pursue a long term 345 kV solution that will not only address the local issues but will enhance regional transmission capabilities as well. Distributed generation was considered but found to be less acceptable than construction of a new 345 kV line.

There are two alternatives for a new 345 kV line.

Alternative 1: Hampton Corner – North Rochester-La Crosse 345 kV Transmission line.

Alternative 2: Prairie Island – North Rochester-La Crosse 345 kV Transmission line.

The two alternatives differ only in their northern endpoint. Alternative 1 – the Hampton Corner endpoint – is preferable to the Prairie Island endpoint in Alternative 2 because it is farther away from the existing 345 kV line from Prairie Island to Byron and thus reduces the possibility of losing both lines to a storm event or other natural disaster.

The following is a list of the facilities on the Minnesota side of the Mississippi River required for a line to Hampton Corner.

<u>Length (Miles)</u> *	<u>Description</u>
39-49	Hampton Corner-North Rochester 345 kV
87-95	North Rochester- La Crosse termination 345 kV
2	North Rochester-Northern Hills 161 kV
12-18	North Rochester-Chester 161 kV
N/A	North Rochester 345/161 kV Substation

* Since the routing is not yet determined, the mileages are represented as ranges.

Four possible crossings of the Mississippi River into Wisconsin are being investigated.

Analysis. The major study effort for these deficiencies is the *Southeastern Minnesota-Southwestern Wisconsin Reliability Enhancement Study, dated March 13, 2006* (SE 345 kV Study). In August 2007 Xcel Energy and GRE filed an application for a Certificate of Need with the Public Utilities Commission for the Hampton-North Rochester-LaCrosse line.

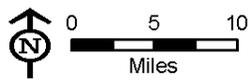
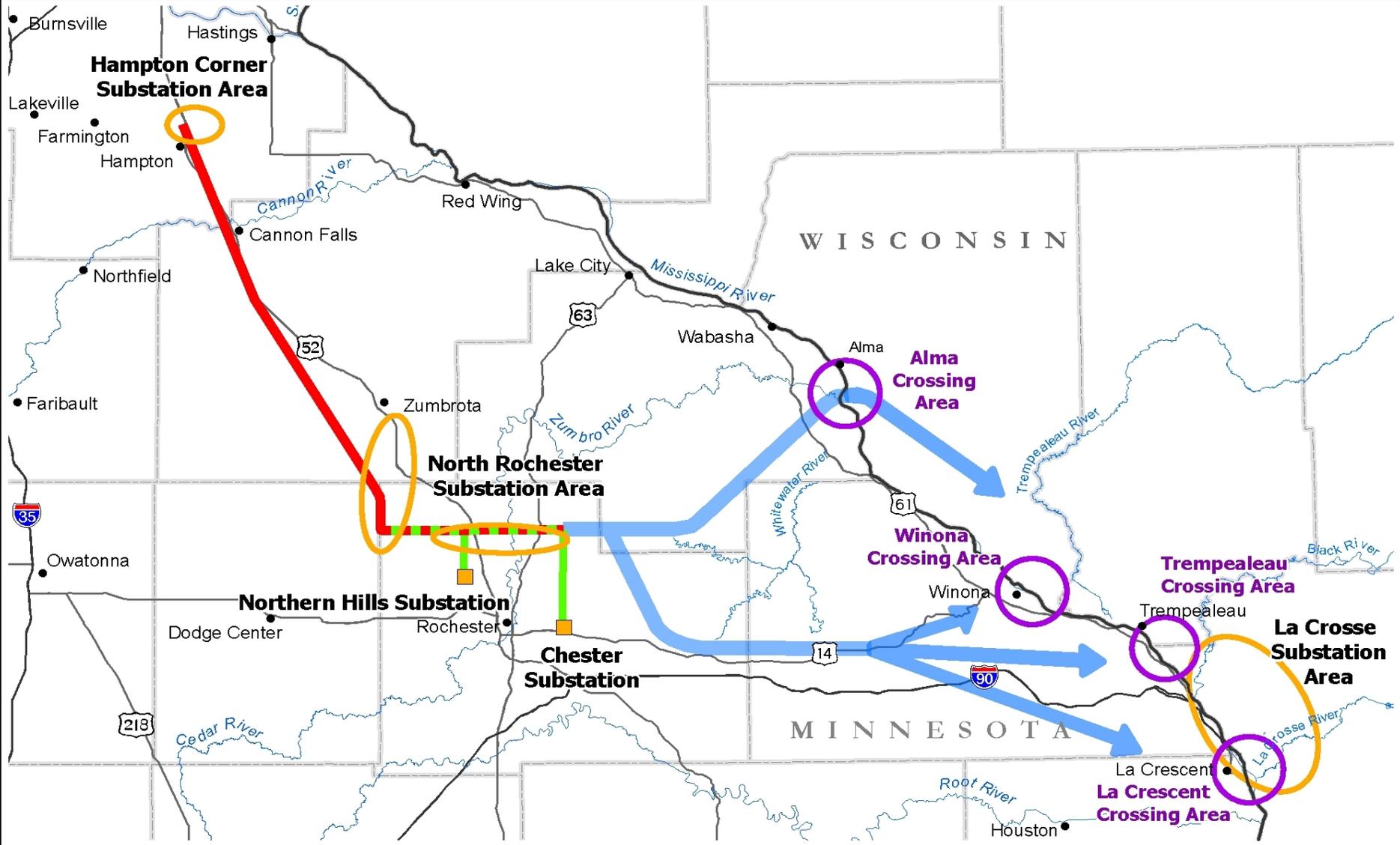
The utilities are still investigating routing issues. There are two main routing options under review. One routing option generally follows US Highway 52. The other generally tracks south from Hampton Corner and then generally east to North Rochester. The North Rochester 345/161 kV substation taps the existing Prairie Island-Byron 345 kV transmission line on the northwest side of the city of Rochester.

The North Rochester – La Crosse segment routing is driven by the suitable Mississippi River crossing candidates. The candidates are from north to south; Alma, Winona, Trempealeau, and La Crescent. Alma, Winona, and La Crescent have existing overhead transmission crossings; while the river at Trempealeau is relatively narrow.

Schedule. The utilities filed a Certificate of Need application for a new 345 kV transmission line in August, 2007. The timeframe for placing the new 345 kV and 161 kV facilities into service is 2012-2015.

PUC Docket Number. CN-06-1115 (Certificate of Need)

Map Document: (N:\GIS\Projects\4392\map_docs\mxd\com_maps\mxd\proposed_sys_config_1_HC_NROC_rhs_ches_rivercrossing_071707.mxd) 7/19/2007 - 9:37:06 AM



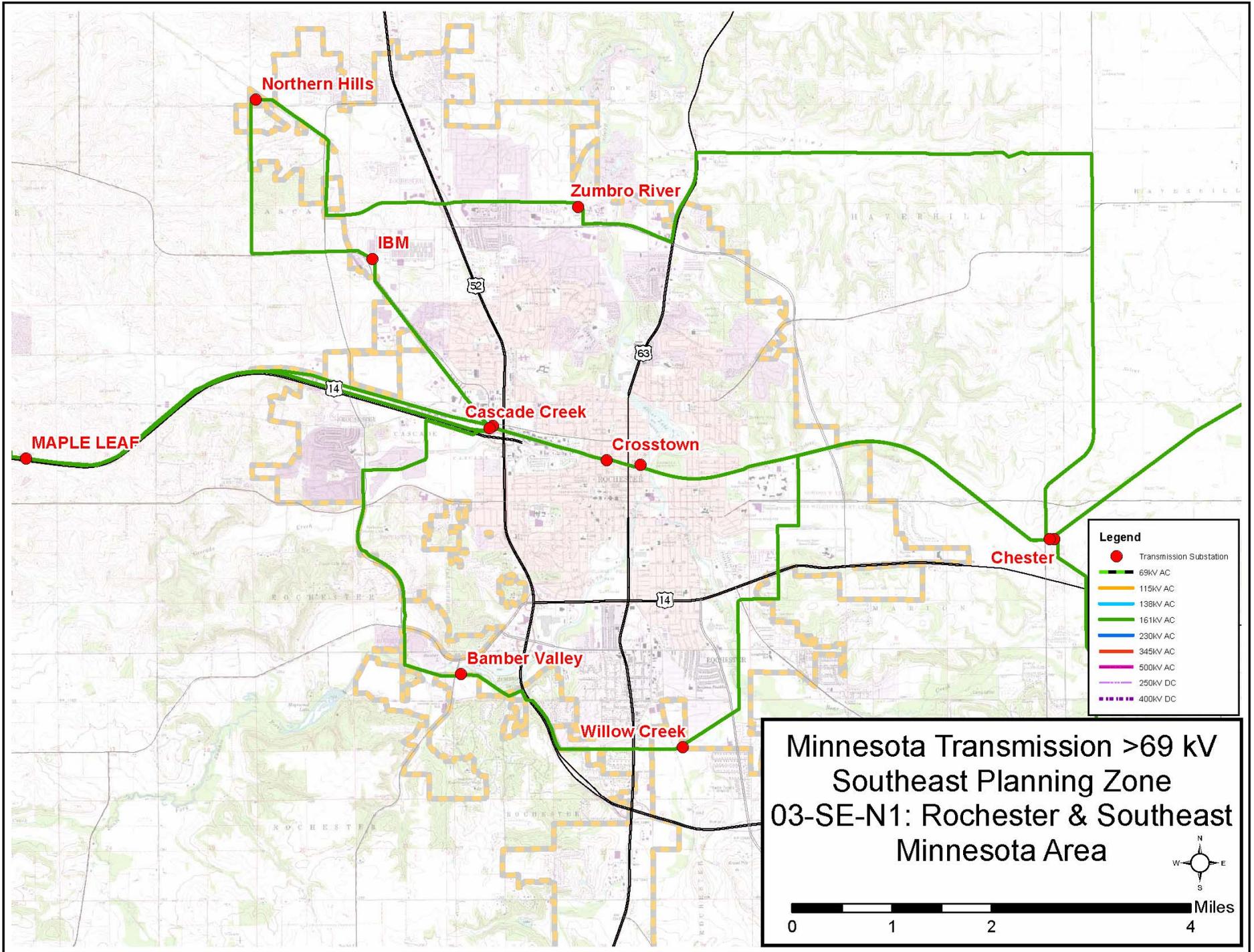
- Legend**
- Existing Substations
 - River Crossings
 - Proposed Substations
 - ➔ River Crossings Configuration

- Proposed System Configuration**
- ⚡ 345 kV
 - ⚡ 345 kV/161 kV
 - ⚡ 161 kV



Proposed System Configuration
Twin Cities - La Crosse

Lines between substations illustrate the electrical configuration and do not represent routes for any project.



7.7.3 City of Mankato

Tracking Number. 2003-SE-N3

Utility. Xcel Energy

Inadequacy. The City of Mankato is supplied by the Wilmarth 345/115/69 kV substation on the north side of the city and a 69 kV transmission line loop around the city. This matter was first reported in the 2005 Report as a two-pronged problem. This year a third concern has been identified. The three separate transmission issues that have been identified are: (1) outage of the Wilmarth-Eastwood-Pohl Road tap results in an overload of the Rutland-Truman 69 kV line and low voltages in the area between Madelia and Decoria, (2) the loss of any of the three 115/69 transformers at the Wilmarth substation results in the overloading of the remaining two and (3) less than desirable reliability due to the large number of common-breaker circuit miles on the existing 69 kV system.

A map of the area is shown on the following page.

Alternatives. There are two alternatives in the Mankato area to address all the low voltage and thermal overload issues that exist.

Alternative 1: This is a 115 kV loop around the City of Mankato. This 115 kV loop can be achieved by implementing the following projects:

- New 161/115/69 kV substation at South Bend township.
- Operate existing 161 kV line from South Bend – Wilmarth at 115 kV.
- Re-terminate the existing 69 kV line from Century – Ballard Corner into South Bend.
- Build a new 115/69 kV substation at Hungry Hollow
- Convert the existing 69 kV line from South Bend – Ballard Corner to 115 kV.
- 115 and 69 kV double circuit from Ballard Corner to Hungry Hollow.
- Convert the existing 69 kV line from Hungry Hollow – Pohl tap to 115 kV.
- Convert Pohl substation to 115 kV.
- Operate the existing 69 kV line, constructed at 161 kV, from Pohl – Eastwood at 115 kV.

This alternative allows a new high voltage loop around the City of Mankato by upgrading the existing 69 kV lines to 115 kV. The operating voltage of the line between Wilmarth and South Bend has to be lowered from 161 to 115 kV, and the line between Pohl and Eastwood is built to 161 kV specifications and needs to be operated at 115 kV. This option also allows addition of new load on the 115 kV loop without replacement of the Wilmarth 115/69 kV transformers.

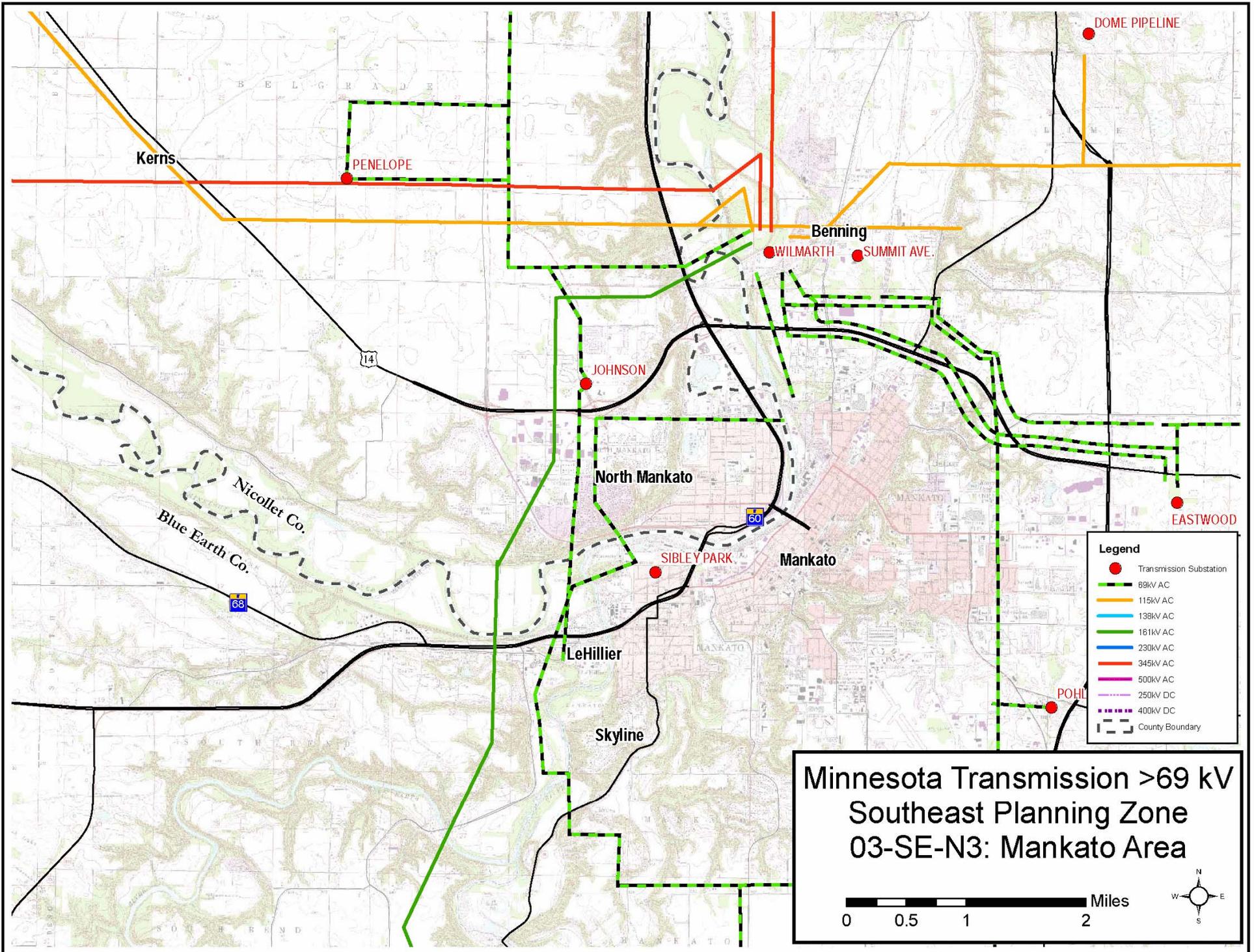
Alternative 2: This alternative comprises a new 115/69 kV substation at Hungry Hollow and a new 115 kV line from Eastwood to Hungry Hollow. This alternative will also involve upgrading all three Wilmarth 115/69 kV transformers to higher capacity.

Analysis. The delays in implementing the Hungry Hollow switching station plan proposed earlier and the increased load in the area have resulted in the need for the 115 kV plan mentioned above.

Schedule. On January 4, 2006, the Public Utilities Commission issued a Route Permit for a new double circuit 115 kV line connecting the Eastwood Substation with the Summit to Loon 115 kV line and converting and expanding the Eastwood Substation from 69 kV to 115 kV. This project was completed in summer 2006.

The timing of the remainder of the 115 kV upgrades is yet to be determined.

PUC Docket Number. TR-05-1192 (Eastwood Project)



7.7.4 Mankato Generation

Tracking Number. 2005-SE-N1

Utility. Xcel Energy

Inadequacy. In 2006 a new generation station went into operation in Mankato called the Mankato Energy Center. This facility contains two natural gas-fired combined cycle combustion turbine generators that are capable of producing more than 650 MW of power. The plant required two short 115 kV lines and one short 345 kV line between the generating station and the Wilmarth Substation. Connecting the new generating station to the system raises the following three primary issues, which were identified in the 2005 Report.

1. Outage of the Blue Lake – Wilmarth 345 kV line will load the Johnson-Traverse 69 kV line above acceptable limits in 2006 and do the same to the Wilmarth – Johnson section of the line in 2009.
2. Outage of the Blue Lake –Wilmarth 345 kV line will load the 0.4 mile underground cable on the Loon Lake – Eastwood 115 kV line above acceptable limits in 2006. This condition existed prior to the new generating facility coming online.
3. Outage of the double circuit Blue Lake – Inver Hills 345 kV line and the Inver Hills – Red Rock 345 kV line will load the Black Dog – Wilson circuit #2 above acceptable limits in 2009.

Alternatives. Two alternatives were described in the 2005 Report. The first alternative involved rebuilding some existing lines and the second alternative involved construction of an entirely new line from Wilmarth to the Twin Cities.

Analysis. Based on the results of the Midwest ISO generation interconnection studies, the recommended plan was to rebuild the Wilmarth – Travers 69 kV line to 84 MVA and replace the 0.4 mile underground cable on the Loon Lake – Eastwood 115 kV with a higher capacity cable. It is still necessary to reductor the Black Dog – Wilson 115 kV circuit #2 with a high capacity, high temperature conductor.

Schedule. The Wilmarth – Traverse 69 kV line was rebuilt and the underground cable on the Loon Lake – Eastwood 115 kV line was replaced in 2006. The reductoring of the Black Dog – Wilson 115 kV circuit #2 will be completed in 2009.

PUC Docket Number. CN-03-1884 (Mankato Energy Center and Connecting Transmission)

7.7.5 Cannon Falls Generation

Tracking Number. 2005-SE-N2

Utility. Xcel Energy

Inadequacy. A new 350 MW natural gas-fired generating plant is under construction in Cannon Falls, near the existing 161 kV transmission line from Cannon Falls to Spring Creek, two miles north of the Cannon Falls substation. The new facility will have to interconnect with the transmission grid.

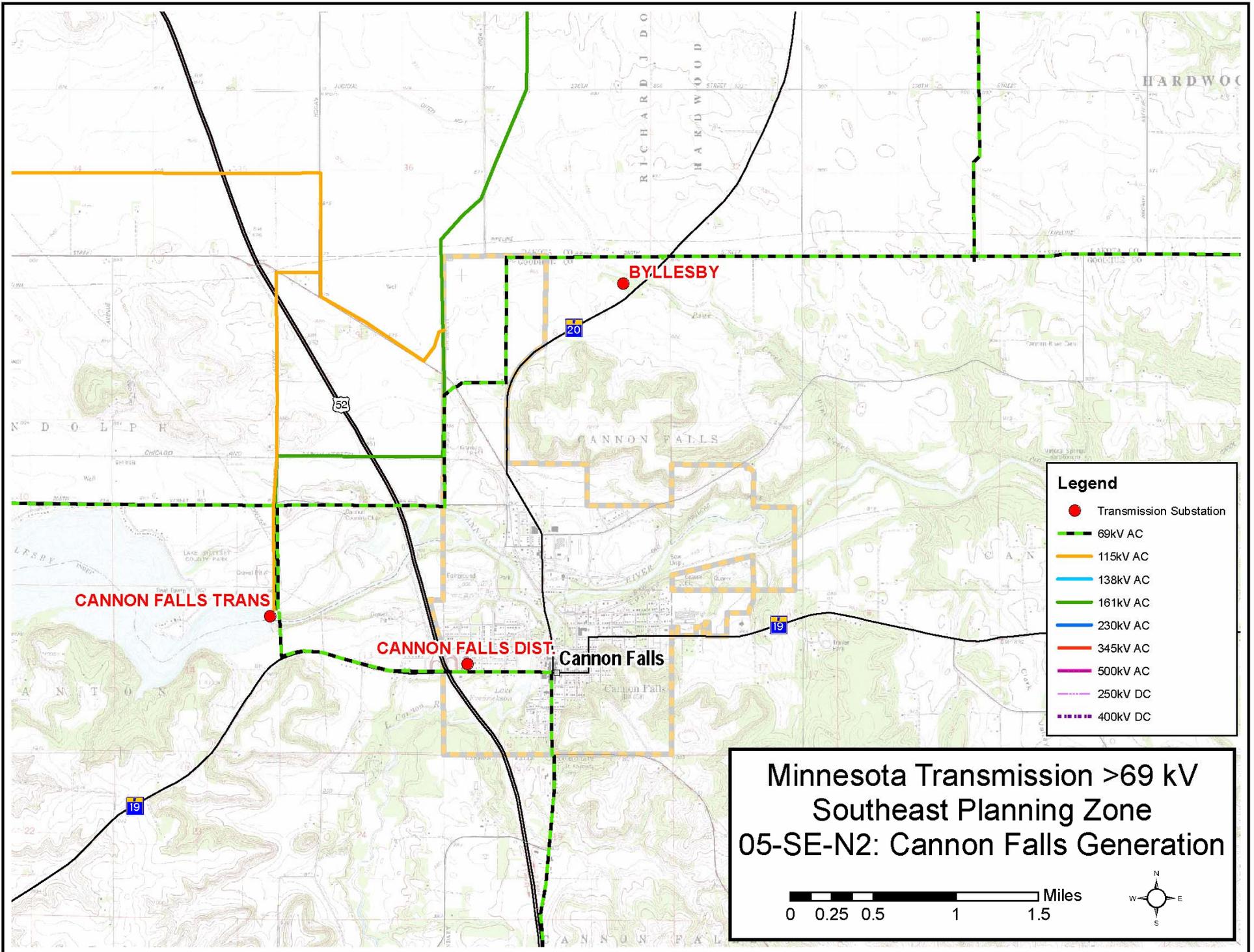
A map of the area is shown on the following page.

Alternatives. Five alternatives were described in the 2005 Report. In April 2006 Xcel Energy applied to the Public Utilities Commission for a Route Permit to interconnect the new plant to the grid by constructing approximately one mile of double circuit 115 kV, about 1.3 miles of two single circuit 115 kV lines, and a new substation called the Colvill Substation.

Analysis. MISO completed an Interconnection Study in July 2005 (G405 Generation Interconnection System Impact Study, Project # 38349 July 19, 2005). The information in the CON application describes the reasons for selecting this alternative.

Schedule. The planned commercial operation date for the new generating plant is May 1, 2008. The transmission interconnection project will be completed in time to allow the new plant to operate when ready.

PUC Docket Number. TL-06-459 (Route Permit)



7.7.6 Lake City Area

Tracking Number. 2005-SE-N3

Utility. Xcel Energy

Inadequacy. Lake City is the largest load on the Red Wing-Alma 69 kV line, with a present peak load of approximately 29.5 MW. This system is located in southeastern Minnesota and Western Wisconsin and is shown in the map below. This area is supplied from two sources, the Alma 161/69 kV and Spring Creek 161/69 kV substations. Steady-state (thermal and voltage) limitations have been identified. In addition, a major business in the Lake City area is expected to expand and will require additional load serving capability.

The existing system configuration is marginal under first contingency (N-1) load serving capability under the year 2005 condition that was studied. Low voltage may occur along the existing line under loss of either the Alma or the Red Wing 69 kV source.

A map of the area is shown on the following page.

Alternatives. The following alternatives have been considered:

Alternative 1: Complete rebuild of the existing 69 kV line from Red Wing to Alma to 161 kV, bypassing Red Wing and extending it to the existing Spring Creek 161 kV.

Alternative 2: Build new 69 kV line from Zumbro Falls to Lake City.

Alternative 3: Tap DPC's existing 69 kV line from Alma to Weaver and build new 69 kV line to Wabasha.

Alternative 4: Build new switching station at Nelson and normally close (NC) the 69 kV line from Naples to Gilmanton Tap.

Alternative 5: Rebuild the existing 69 kV line from Red Wing to Alma to 161 kV and continue to operate at 69 kV.

Alternative 6: Distributed generation.

Analysis. The economic analysis of the five transmission options assumed the eventual rebuild of the existing Red Wing-Alma 69 kV line in about fifteen years time to either 69 kV or 161 kV. Option 1 rebuilds this line to 161 kV immediately. Options 2, 3, 4 and 5 defer the cost of this large investment and change the decision point to determine whether the replacement lines should be 69 kV or 161 kV construction. Option 2 is the lowest cost option when compared against Options 3, 4 and 5 that defer the cost of rebuilding the 69 kV to 161 kV in 2008 timeframe. Options 2, 3, and 4 require only 69 kV construction in the initial stages and would not require a Certificate of Need. Options 1 and 5 would require a Certificate of Need for the initial stage of development.

It is important to note that Alternatives 1 and 2 are the only two alternatives that solved all the area's issues. Alternative 2 has the significant advantage over Alternative 1 in that it provides a third transmission source to Lake City. This makes it possible to obtain the construction outages required for the future rebuild of the Red Wing – Wabasha section of the Red Wing – Alma 69 kV system. It also makes it likely that N-2 (double contingency) coverage is achieved at no additional cost, at least under some off-peak load conditions.

Alternative 2, following the 161 kV rebuild of Red Wing-Alma, provides a new 69 kV source to the Zumbrota area 69 kV system, provided that a 161/69 kV transformer is installed at Lake City. This is a load-serving benefit not offered by the other alternatives.

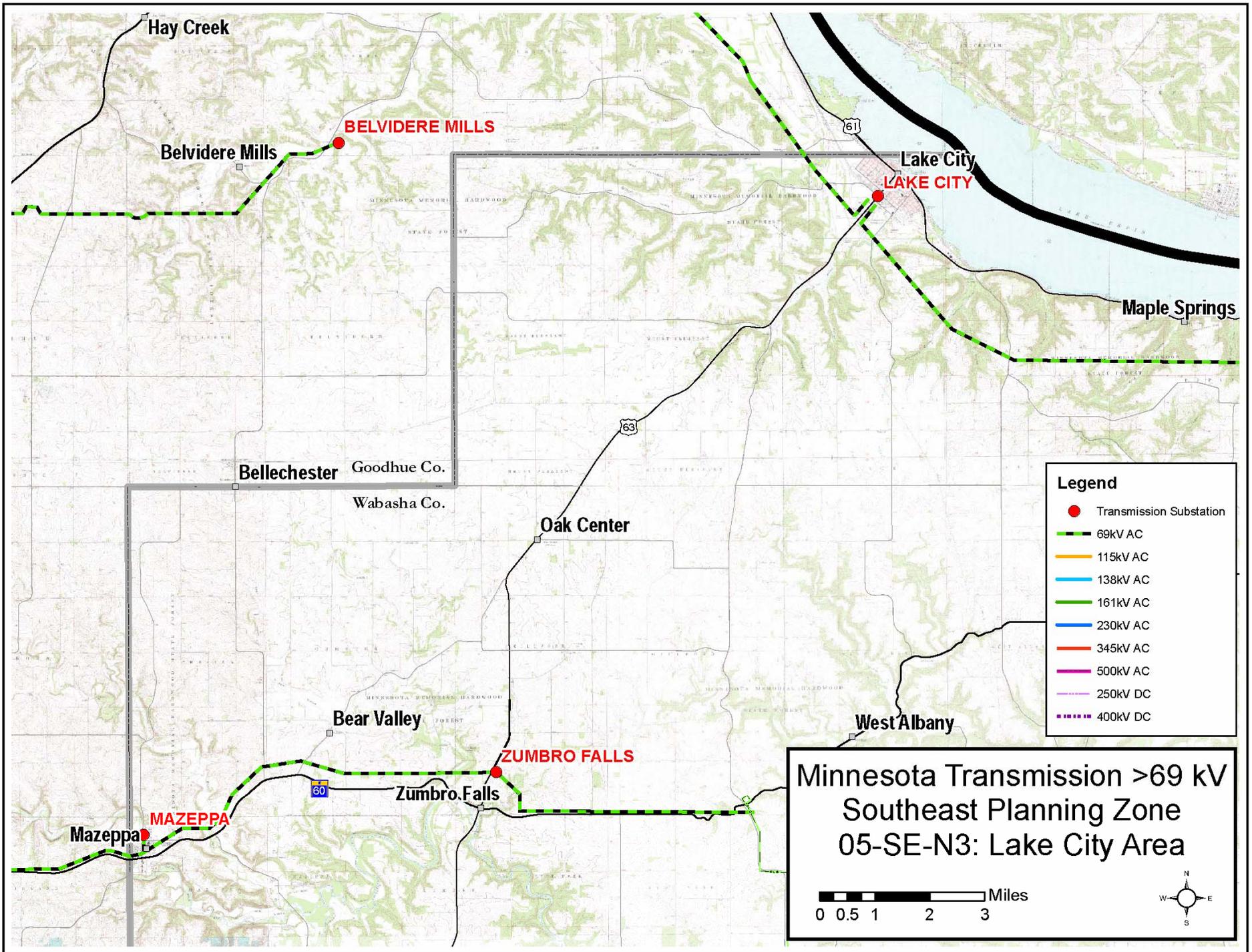
There should be limited environmental impacts from Alternative 1 since the 161 kV line would replace an existing 161 kV line. General siting and construction issues would need to be addressed. Alternative 2 requires a new 16 mile 69 kV line from Zumbro Falls to Lake City. While it requires new right-of-way, there are existing roads that would be available for corridor sharing. There will be issues to address during construction to minimize impacts, but those are similar to Alternative 1. Since Alternatives 1 and 2 were considered the final choices to address the area needs, analysis of Alternatives 3 through 5 was not pursued.

Distributed Generation was considered as an alternative and eliminated early on in the analysis. It was determined that the growing demand in the area would outstrip the installation of any distributed generation projects soon enough that generation was not a feasible long-term option for ensuring adequate load-serving capability in the Lake City area. In addition, generation's reduced reliability when compared to transmission would make it difficult to give the burgeoning commercial/industrial load in Lake City the dependability it needs. Finally, the higher installed cost of generation without a market in which to enter would further reduce its cost-effectiveness.

Schedule. Alternative 2 is the preferred alternative. A new 69 kV line between Zumbro Falls and Lake City (16 miles) will be constructed in the 2008 timeframe. Since the line is under 100 kV, no Certificate of Need and no Route Permit is required from the Public Utilities Commission.

Alternative 2 also calls for the following equipment installations in addition to the new line:

- 69 kV breaker at Zumbrota
- Shunt capacitors at Lake City and Nelson
- Long range – rebuild Red Wing-Lake City-Alma to 161 kV



7.7.7 Dodge County Wind

Tracking Number. 2005-SE-N4

Utility. Xcel Energy

Inadequacy. An independent power producer has connected 49 MW of wind generation to the 69 kV transmission system near Dodge Center. There is a proposal to connect an additional 23 MW for a total of 72 MW. Both system protection and service quality issues require that the wind project only be allowed to operate with the Byron source in-service. Voltage fluctuations that exceed Xcel Energy's voltage flicker criteria were identified at generation levels of greater than 49 MW. The other issue identified was line capacity – the capacity limit of the 69 kV line from Dodge Center to Kasson is reached when the output of the wind generation exceeds 56 MW.

A map of the area is shown on the following page.

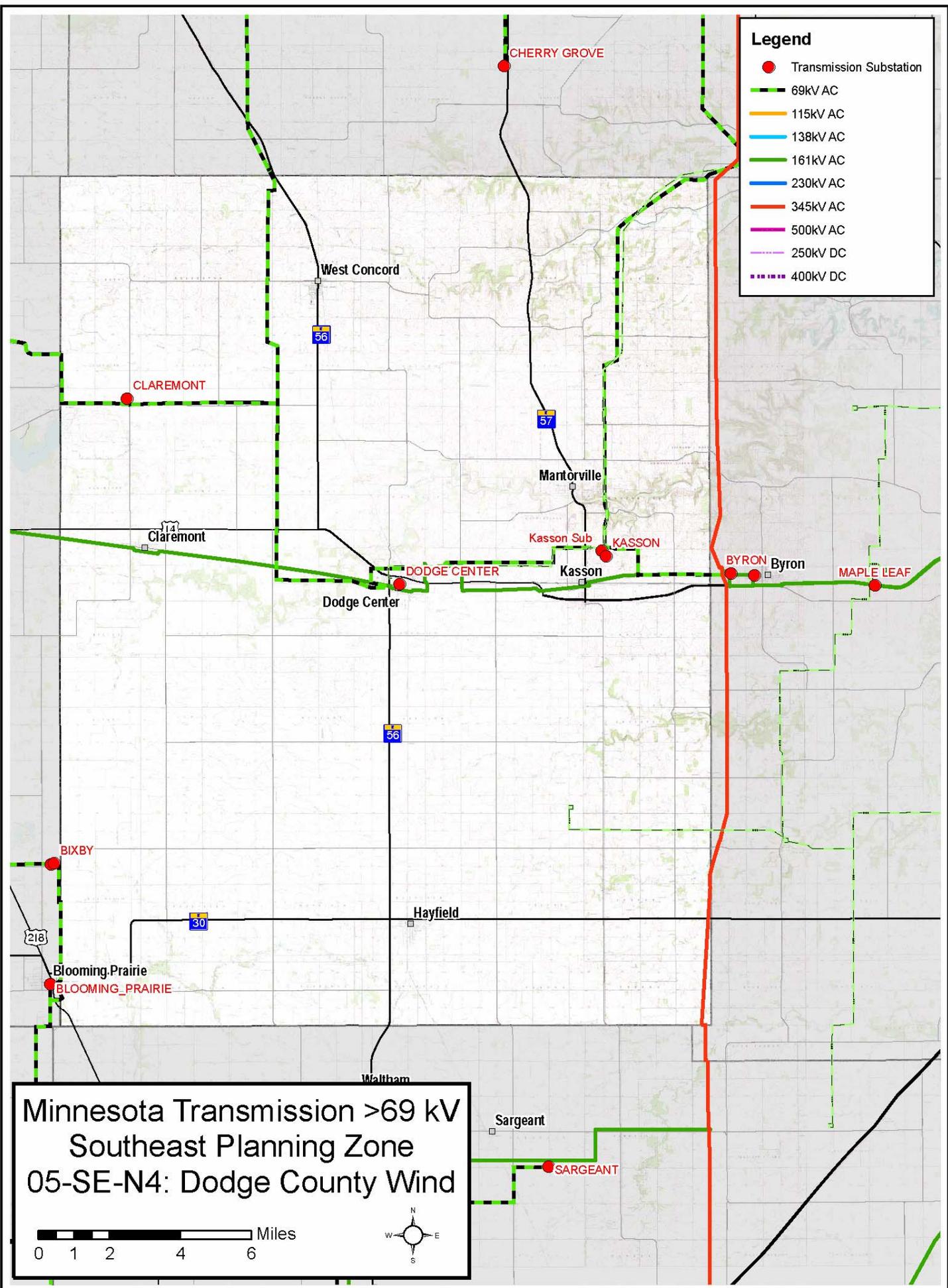
Alternatives. One alternative identified to address system protection and service quality issues is to install breakers at Kasson and Kenyon. A solution to address capacity issues is to upgrade the 69 kV line from Dodge Center to Kasson (approximately seven miles).

Analysis. A number of studies have been conducted. The studies show that upgrading the Dodge Center to Kasson line is preferable to building a new line, which would have greater environmental issues and be more expensive.

Schedule. New breakers have been installed at Kasson and Kenyon. The rebuild of the Dodge Center/Kasson line to a higher capacity has been temporarily deferred until the wind developer indicates an intent to proceed.

Legend

- Transmission Substation
- 69kV AC
- 115kV AC
- 138kV AC
- 161kV AC
- 230kV AC
- 345kV AC
- 500kV AC
- 250kV DC
- 400kV DC



**Minnesota Transmission >69 kV
Southeast Planning Zone
05-SE-N4: Dodge County Wind**

0 1 2 4 6 Miles

7.7.8 Mower County Wind

Tracking Number. 2005-SE-N5

Utility. Interstate Power & Light Company

Inadequacy. The Public Utilities Commission issued a wind permit to High Prairie Wind Farm I in May 2006 for a 98.9 MW wind project in Mower County. High Prairie Wind Farm II, a 100 MW project, was permitted in May 2007. This power cannot be delivered to the transmission grid without certain upgrades.

A map of the area is shown on the following page.

Alternatives. The first response was an upgrade of the Prairie Island – Red Rock 345 kV line #2.

The next alternative is to upgrade the Rochester – Adams 161 kV line. This matter will be reported as Tracking Number 2007-SE-N1.

Analysis. The transmission service request study performed by MISO indicates that only 20 MW would have been deliverable without the upgrades mentioned above. The upgrade of the Prairie Island – Red Rock 345 kV line accommodated the first 100 MW of wind, but the second alternative must be implemented to handle the second 100 MW. After both upgrades are complete, the generator will be able to deliver all of its the power.

Schedule. The first phase of the project – High Prairie Wind Farm I – was placed in service in 2006, and the wind farm was interconnected to the 161 kV side of the Adams substation. The Prairie Island – Red Rock #2 345 kV line upgrade was completed in mid 2007. The Rochester-Adams line is under study so the exact in service date is not yet known.

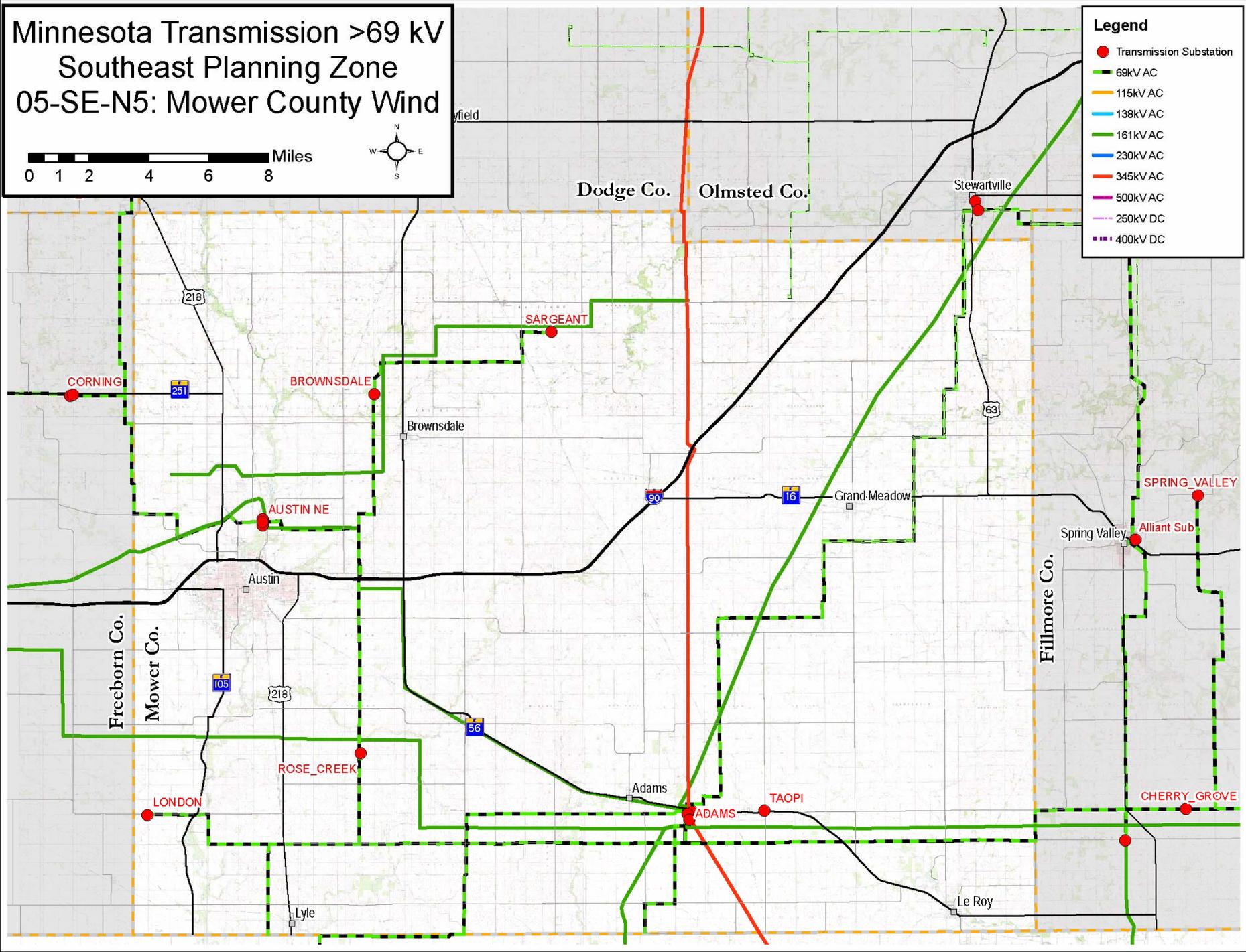
PUC Docket Numbers. WS-06-91 (Wind Farm I Site Permit)
WS-06-1520 (Wind Farm II Site Permit)

Minnesota Transmission >69 kV
 Southeast Planning Zone
 05-SE-N5: Mower County Wind



Legend

- Transmission Substation
- 69kV AC
- 115kV AC
- 138kV AC
- 161kV AC
- 230kV AC
- 345kV AC
- 500kV AC
- 250kV DC
- 400kV DC



7.7.9 CapX 2020 Projects

Tracking Numbers. 2005-CX-2 (Brookings – Southeast Twin Cities 345 kV)
2005-CX-3 (Twin Cities – Rochester – LaCrosse 345 kV)

Discussion. The CapX 2020 Projects are discussed in detail in Section 5. One of the three CapX lines is a 345 kV line from Brookings, South Dakota, to the Southeast Twin Cities. Another CapX line located partially in the Southeast Zone is a 345 kV line from Brookings, South Dakota, to the Southeast Twin Cities.

7.7.10 Rochester – Adams 161 kV Line

Tracking Number. 2007-SE-N1

Utility. Dairyland Power Cooperative

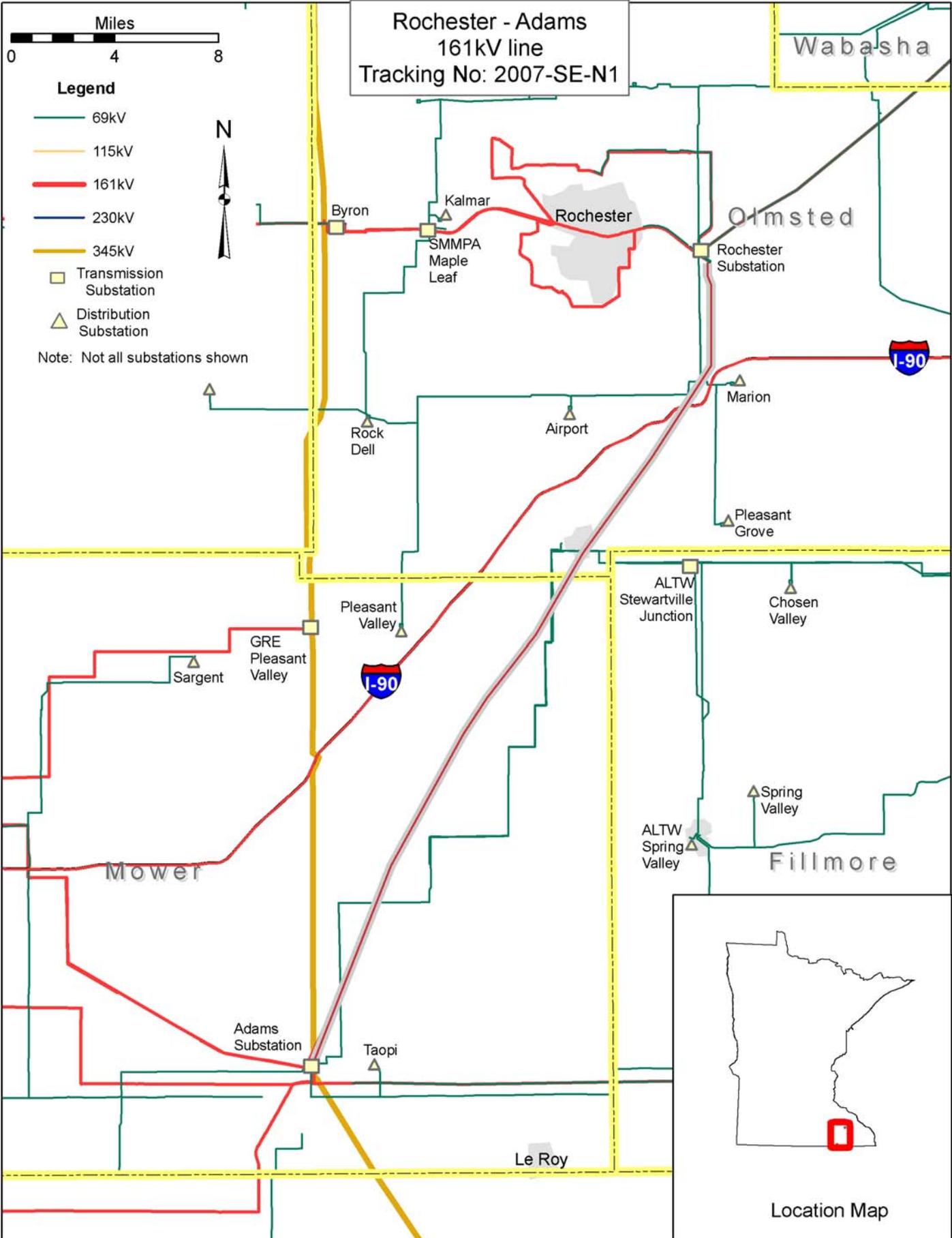
Inadequacy. The loading of the Rochester-Adams 161 kV transmission line has manifested itself as a new transmission inadequacy in 2007. See Tracking Number 2005-SE-N5. This line tends to load heavily under certain conditions such as high south to north transfers. The loading is exacerbated by the noticeable increase of wind generation around and south of the Adams substation. Real time monitoring of Rochester-Adams 161 kV indicates that this line will overload under high south to north transfers for an outage of either the Byron-Pleasant Valley 345 kV line or the Byron 345/161 kV transformer.

Maps of the Rochester-Adams 161 kV line are on the following two pages.

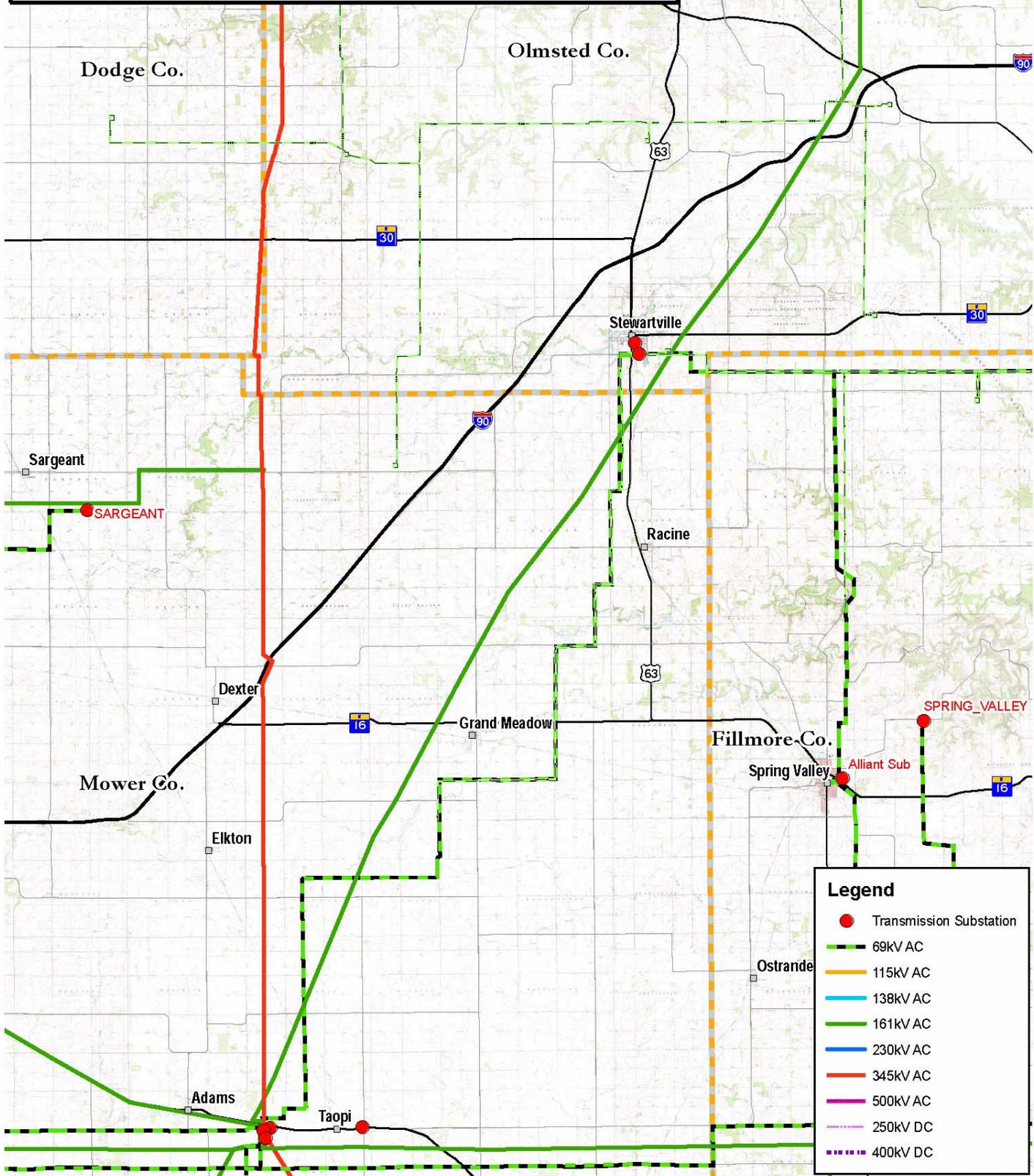
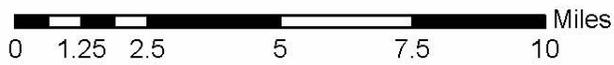
Alternatives. None available, pending completion of a study of the situation that is underway.

Analysis. This deficiency has a detrimental impact on new wind generation requesting firm transmission service in and around the Adams substation.

Schedule. If the solution to this situation is a one-for-one rebuild or reconductor of the Rochester – Adams line, a December 31, 2011, completion date has been reported to MAPP in the *2007 Update to the MAPP 2006 Regional Plan 2006 Through 2015*. This date is subject to change pending the study results.



Minnesota Transmission >69 kV Southeast Planning Zone 07-SE-N1: Rochester - Adams 161 kV Line



Legend

- Transmission Substation
- 69kV AC
- 115kV AC
- 138kV AC
- 161kV AC
- 230kV AC
- 345kV AC
- 500kV AC
- - - 250kV DC
- ⋯ 400kV DC

7.7.11 Grand Meadows Wind

Tracking Number. 2007-SE-N2

Utility. Xcel Energy

Inadequacy. Xcel Energy and enXco (an independent power producer) have teamed together to propose a 200 MW wind farm (100 MW of which will be owned by Xcel Energy) in Mower County in southeast Minnesota.

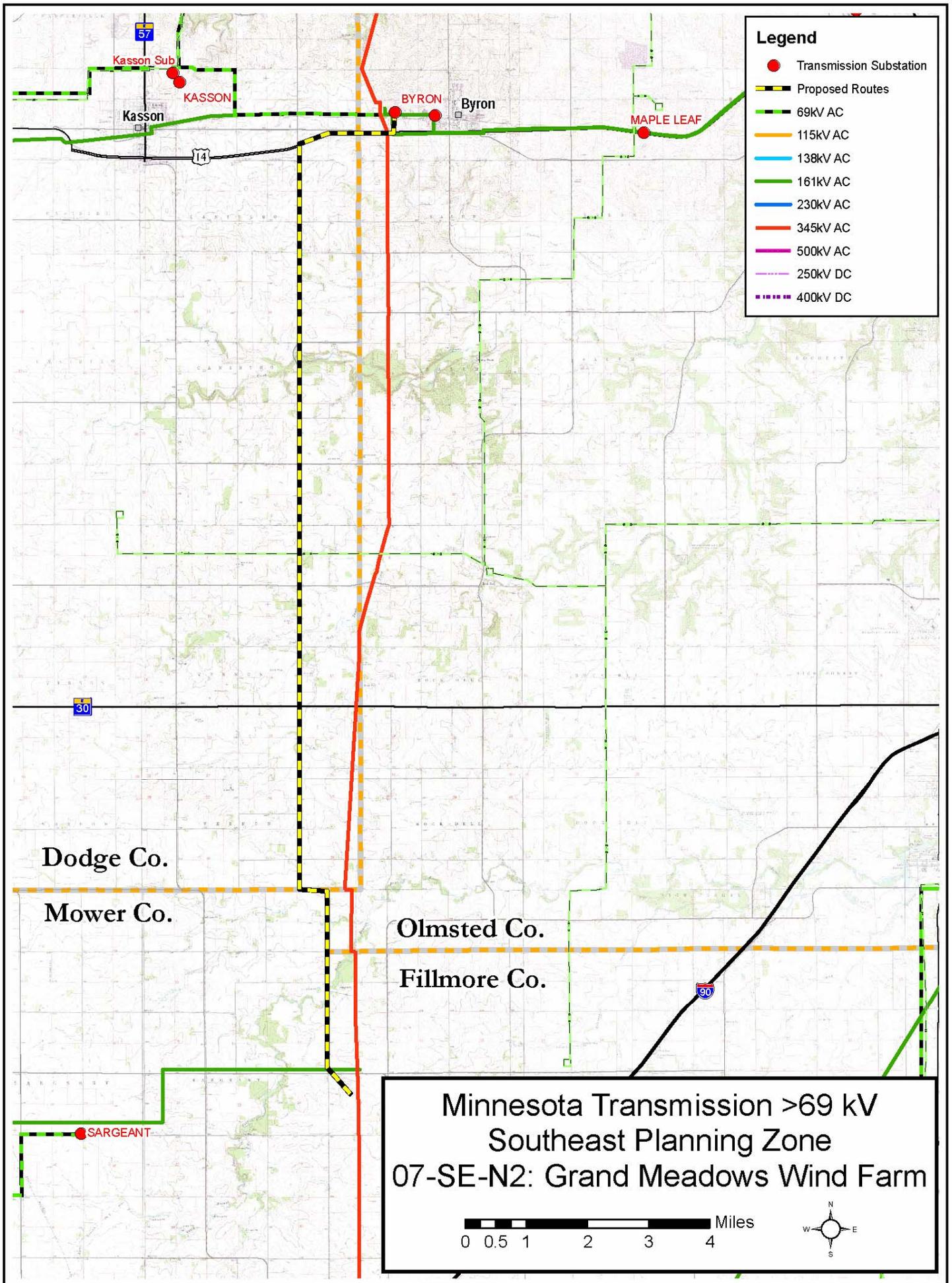
A map of the area is shown on the following page.

Alternatives. On January 24, 2007, the Midwest ISO released the results of its System Impact Study. This study identified a need for two transmission facilities in order for the wind farm to interconnect to the transmission system. The first facility identified is a new Pleasant Valley – Byron 161 kV line and the second is a second 345/161 kV transformer at the Pleasant Valley Substation. Additionally, a new 10-mile 161 kV line is necessary to interconnect the wind farm’s collector substation to the transmission system.

Analysis. MISO is currently performing the facility study, which could potentially identify additional facilities that need replacement. On June 25, 2007, enXcoDevelopment Corporation applied to the Public Utilities Commission for a Site Permit for the 200 MW wind development under the name Wapsipinicon. On that same date, Xcel Energy applied for a Certificate of Need for 100 MW of the project.

Schedule. The current project schedule calls for the wind farm to be in service in 2009.

PUC Docket Numbers. WS-07-839 (enXco Site Permit)
CN-07-873 (Xcel Energy Certificate of Need)



Legend

- Transmission Substation
- Proposed Routes
- 69kV AC
- 115kV AC
- 138kV AC
- 161kV AC
- 230kV AC
- 345kV AC
- 500kV AC
- 250kV DC
- 400kV DC

**Minnesota Transmission >69 kV
 Southeast Planning Zone
 07-SE-N2: Grand Meadows Wind Farm**

0 0.5 1 2 3 4 Miles

N
 W ○ E
 S

7.7.12 North Mankato Load Serving

Tracking Number. 2007-SE-N3

Utility. Xcel Energy and Great River Energy

Inadequacies. The study covers most of the areas North and East of the City of Mankato. The total load in the region is approximately 95 to 100 MW. This region is mostly served from the Wilmarth substation through a long 69 kV line. The following problems were observed in the region:

1. Loss of Wilmarth – Penelope 69 kV line will result in low voltages at Le Sueur and thermal overloads on Jamestown – Cleveland 69 kV line.
2. Loss of Le Sueur – Le Sueur Tap line will result in severe low voltages at Le Sueur and St. Thomas, and thermal overload on Cleveland – Le Center 69 kV line.
3. Loss of Traverse – New Sweden 69 kV line will result in low voltages at Le Sueur, New Sweden and Rush River.
4. Loss of Traverse – St. Peter 69 kV line will result in low voltages at St. Peter, Lake Emily and Cleveland.
5. Loss of Wilmarth – Eagle Lake 69 kV line will result in low voltages on the 69 kV line between Eagle Lake – Cleveland – St. Thomas and Lake Emily, and thermal overloads on the line between Wilmarth – Traverse – St. Peter.

Alternatives. The list of potential alternatives is still being developed, as preliminary scoping for the load-serving study has only recently begun.

Analysis. GRE, SMMPA and Xcel Energy are performing a long-range transmission planning study for this area to address the inadequacies. The study is expected to be completed by the beginning of 2008.

Schedule. The load-serving issues have been projected to occur in the 2010 timeframe. After completing the load-serving study, Xcel Energy and Great River Energy will begin the necessary permitting processes in order to have the lines in service during 2010.

7.7.13 Wind Generation Upgrades – Freeborn and Mower Counties

Tracking Number. 2007-SE-N4

Utility. Interstate Power and Light

Inadequacy. Two wind generating facilities have proposed interconnections to Interstate Power and Light's transmission system in Cerro Gordo and Worth Counties in Northern Iowa. The two Iowa projects, a 150 MW wind generating facility interconnecting in northern Cerro Gordo County and a 160 MW wind generating facility interconnecting in Worth County, have collectively been shown to overload the Lime Creek to Adams and the NIW-to Hayward 161 kV lines. These overloads have been identified as injection related constraints by the Midwest ISO, and mitigation of the constraints is required prior to the projects being granted interconnection service under the MISO tariff.

A system map displaying the location of the interconnection projects and the overloaded line sections is provided for reference on the following page.

Alternatives. The 160 MW wind generating facility has proposed connection to the Lime Creek-Adams 161kV line approximately 27 miles southwest of the Adams substation in Minnesota. The Adams to Lime Creek 161 kV line has been shown to overload from this project's interconnection point to the Adams substation, and reconstruction of the existing line from the interconnection point to Adams substation has been identified as the solution for the overload. The existing line will be removed and a new 440 MVA line will be constructed on the exiting right of way. Approximately 5.5 miles of this line reconstruction will take place in Minnesota. The NIW-Hayward 161 kV line will also be removed, and a newly constructed 440 MVA line will be constructed on the existing right of way. Approximately 11 miles of this line reconstruction will occur in Minnesota. Reconstruction of existing lines was identified as a solution for alleviating line overloads created by interconnection of the two proposed wind generation projects; no other alternatives were identified.

Analysis. The aforementioned overloads were identified as part of the MISO Group 5 System Impact Study. The MISO's Group 5 Study evaluated the impact of 37 generator interconnection projects with 2,857.9 MW of new generation intending to connect in Southern Minnesota, Iowa, and Southeast South Dakota. The Group 5 study has identified many transmission constraints due to insufficient generation outlet. The two Iowa wind farms are referenced in the study as projects G595 and G540/548. The MISO Group 5 System Impact Study is described in Section 3.4 of this Report.

Schedule. It is estimated that reconstruction of the NIW to Hayward 161kV and the reconstruction of the affected portion of the Lime Creek to Adams 161kV line will be completed by 2010. Neither of the interconnection customers has executed interconnection agreements with Interstate Power and Light.

