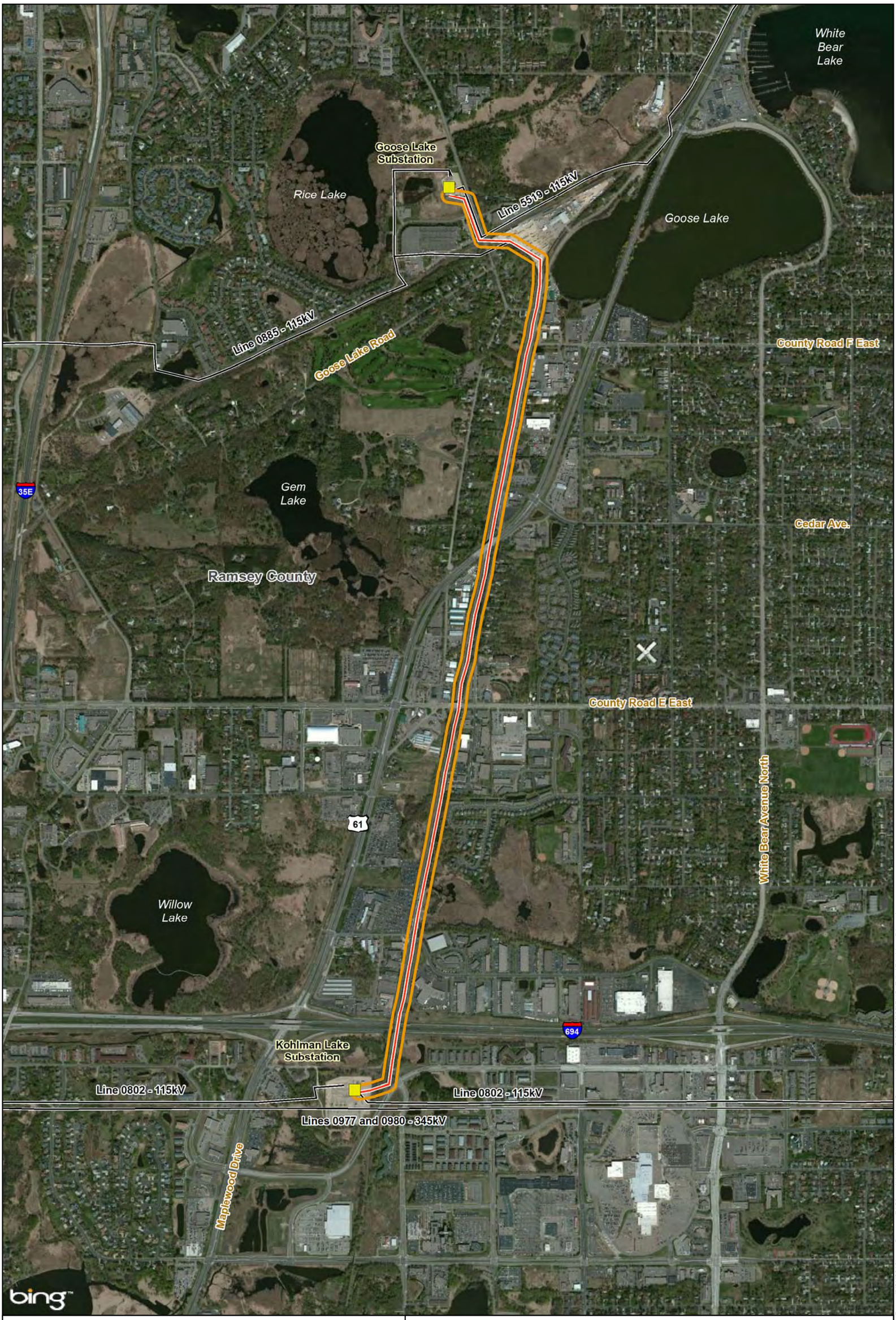
Appendix B. Maps



Xcel Energy Substation

Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV

Existing Xcel Energy Transmission Lines

Route Width

N

Source: Aerial provided by ESRI
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

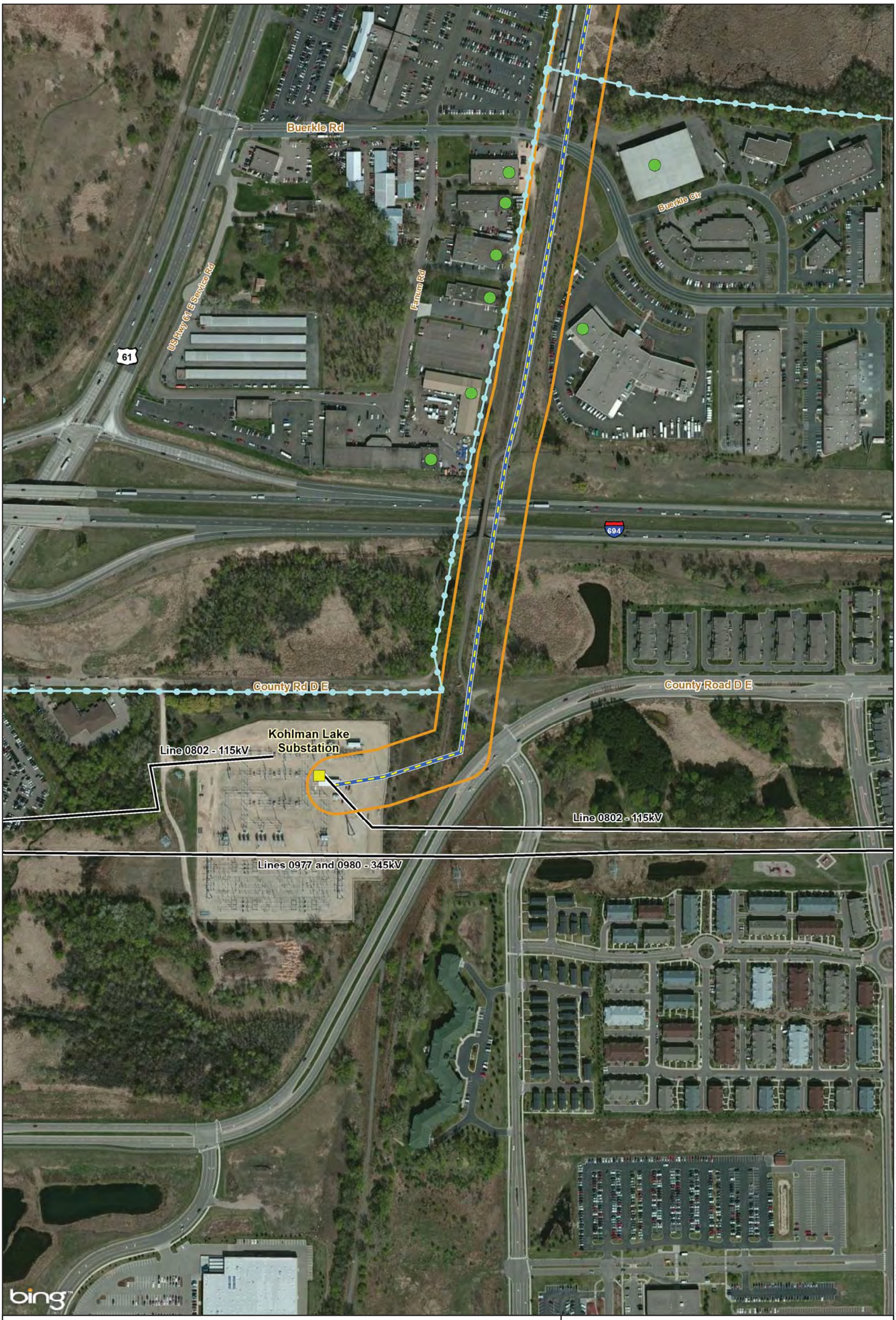
0 1,000 2,000 Feet

Project Overview Map

Map B-1

Kohlman Lake to Goose Lake 115 kV Project

Date: (5/31/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\EA_Map_B1.mxd



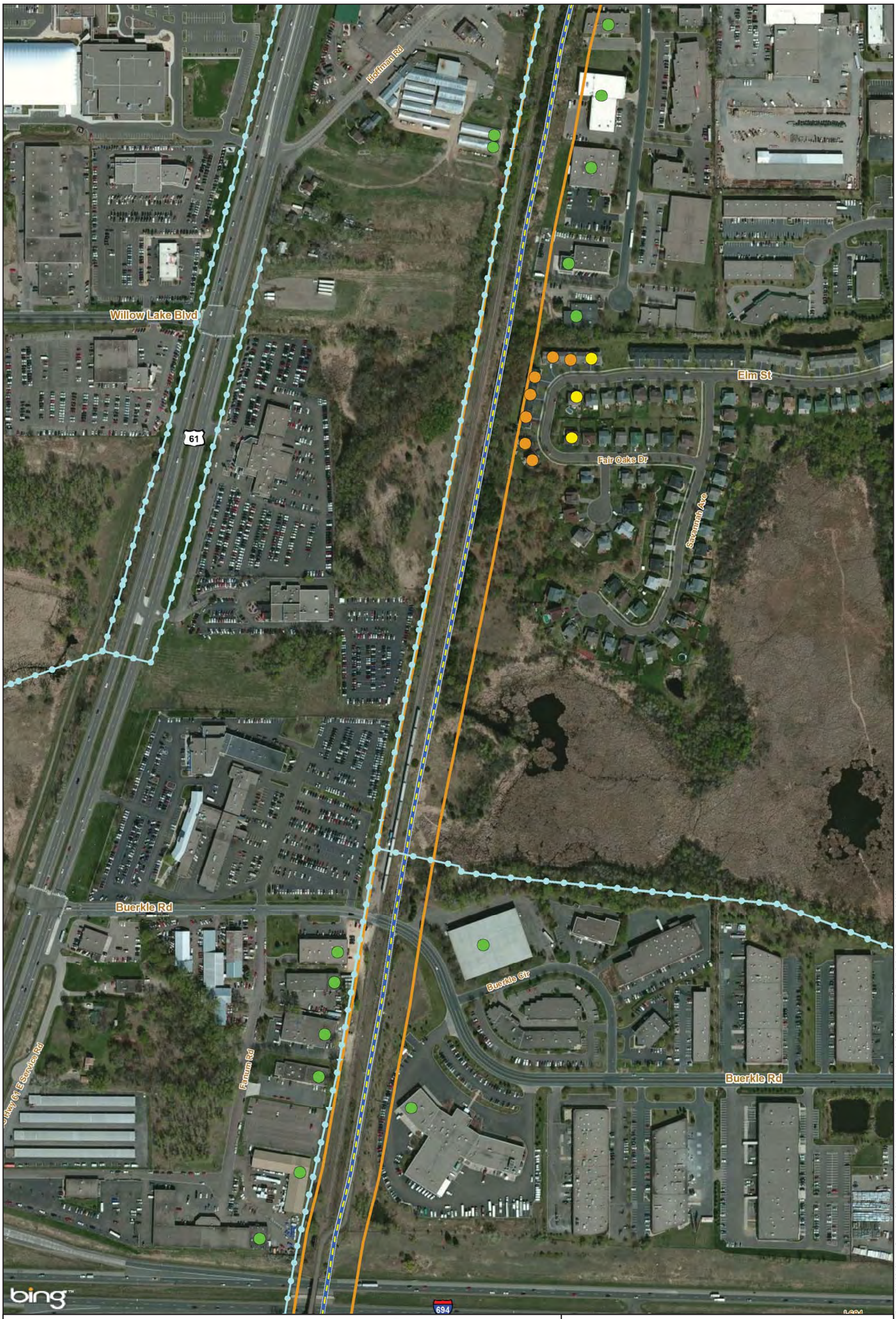
Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
0 150 300 Feet
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
N

Project Route Map

Map B-2

Kohlman Lake to Goose Lake 115 kV Project

Date: (7/1/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\B-2_7_Routemaps_3600k.mxd



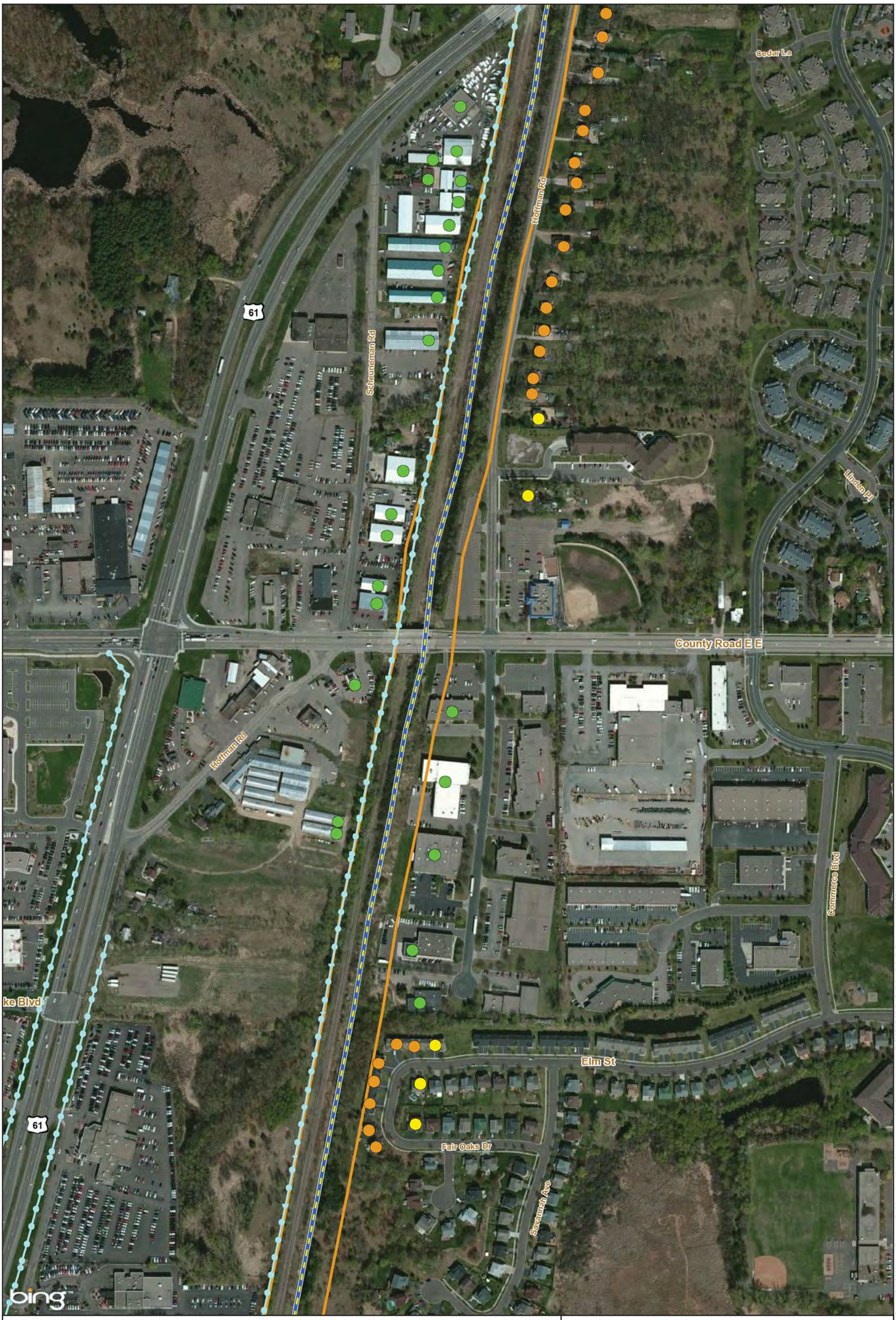
Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
0 150 300 Feet
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
N

Project Route Map

Map B-3

Kohlman Lake to Goose Lake 115 kV Project

Date: (7/1/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\B-2_7_Routemaps_3600k.mxd



Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
0 150 300 Feet
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
N

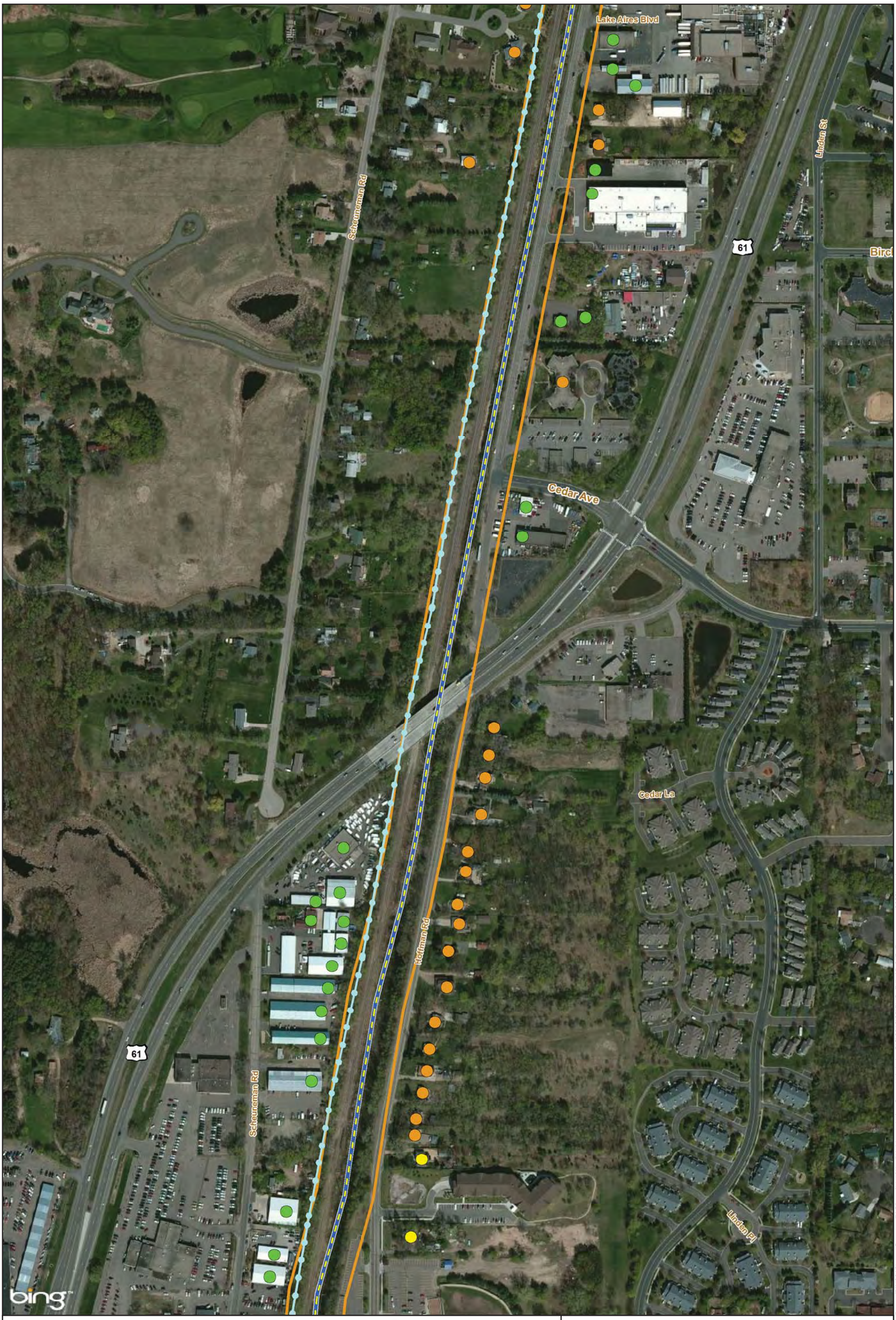
Project Route Map

Map B-4

Kohlman Lake to Goose Lake 115 kV Project

Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\B-2_7_Routemaps_3600k.mxd

Date: (7/1/2013)



Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
0 150 300 Feet
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
N

Project Route Map

Map B-5

Kohlman Lake to Goose Lake 115 kV Project

Date: (7/1/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\B-2_7_Routemaps_3600k.mxd

Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
0 150 300 Feet

Project Route Map

Map B-6

Kohlman Lake to Goose Lake 115 kV Project

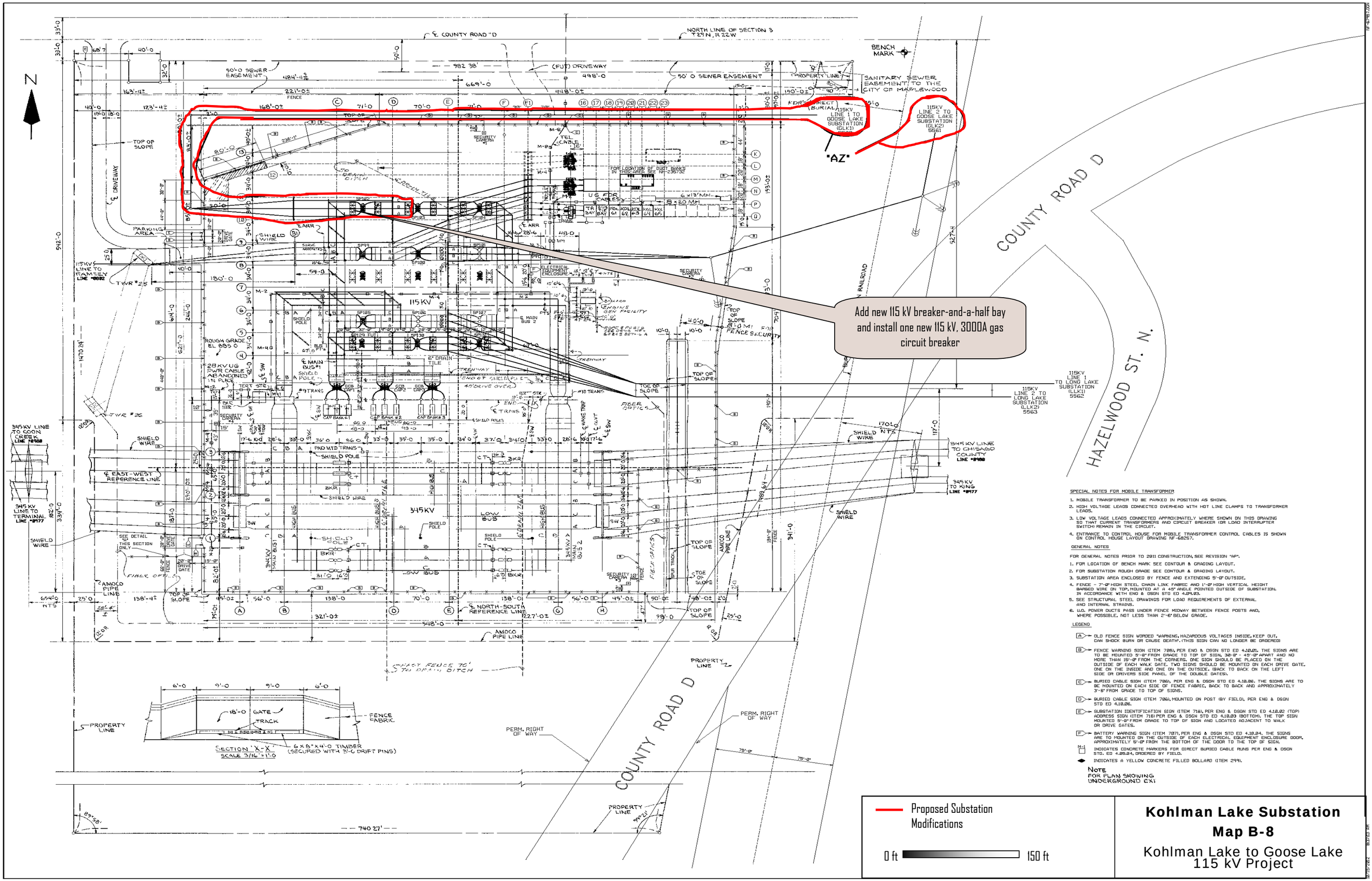
Existing Xcel Energy Substation
New Double Circuit (Circuit #1 and Circuit #2)
New Double Circuit (Circuit #2 and Existing Line 5519)
Existing Xcel Energy Transmission Lines
Route Width - 200 Feet
Sewer System
0 150 300 Feet
Residences: 0-100 Feet
Residences: 100-200 Feet
Residences: 200-300 Feet
Businesses within 300 Feet
N

Project Route Map

Map B-7

Kohlman Lake to Goose Lake 115 kV Project

Date: (7/1/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\B-2_7_Routemaps_3600k.mxd



SPECIAL NOTES FOR MOBILE TRANSFORMER

1. MOBILE TRANSFORMER TO BE PARKED IN POSITION AS SHOWN.
2. HIGH VOLTAGE LEADS CONNECTED OVERHEAD WITH HOT LINE CLAMPS TO TRANSFORMER LEADS.
3. LOW VOLTAGE LEADS CONNECTED APPROXIMATELY WHERE SHOWN ON THIS DRAWING SO THAT CURRENT TRANSFORMERS AND CIRCUIT BREAKER (OR LOAD INTERRUPTER SWITCH) REMAIN IN THE CIRCUIT.
4. ENTRANCE TO CONTROL HOUSE FOR MOBILE TRANSFORMER CONTROL CABLES IS SHOWN ON CONTROL HOUSE LAYOUT DRAWING NF-68257.

GENERAL NOTES

FOR GENERAL NOTES PRIOR TO 2011 CONSTRUCTION, SEE REVISION "AP".

1. FOR LOCATION OF BENCH MARK SEE CONTOUR & GRADING LAYOUT.
2. FOR SUBSTATION ROUGH GRADE SEE CONTOUR & GRADING LAYOUT.
3. SUBSTATION AREA ENCLOSED BY FENCE AND EXTENDING 5'-0" OUTSIDE.
4. FENCE - 7'-0" HIGH STEEL CHAIN LINK FABRIC AND 1'-0" HIGH VERTICAL HEIGHT BARBED WIRE ON TOP, MOUNTED AT A 45° ANGLE POINTED OUTSIDE OF SUBSTATION. IN ACCORDANCE WITH ENG & DSGN STD ED 4.09.03.
5. SEE STRUCTURAL STEEL DRAWINGS FOR LOAD REQUIREMENTS OF EXTERNAL AND INTERNAL STRAINS.
6. U.G. POWER DUCTS PASS UNDER FENCE MIDWAY BETWEEN FENCE POSTS AND, WHERE POSSIBLE, NOT LESS THAN 2'-6" BELOW GRADE.

LEGEND

- A → OLD FENCE SIGN WORDED "WARNING, HAZARDOUS VOLTAGES INSIDE, KEEP OUT, CAN SHOCK BURN OR CAUSE DEATH". (THIS SIGN CAN NO LONGER BE ORDERED)
- B → FENCE WARNING SIGN (ITEM 706), PER ENG & DSGN STD ED 4.10.01. THE SIGNS ARE TO BE MOUNTED 5'-0" FROM GRADE TO TOP OF SIGN, 30'-0" - 45'-0" APART AND NO MORE THAN 15'-0" FROM THE CORNERS. ONE SIGN SHOULD BE PLACED ON THE OUTSIDE OF EACH WALK GATE. TWO SIGNS SHOULD BE MOUNTED ON EACH DRIVE GATE, ONE ON THE INSIDE AND ONE ON THE OUTSIDE, (BACK TO BACK ON THE LEFT SIDE OR DRIVERS SIDE PANEL OF THE DOUBLE GATES).
- C → BURIED CABLE SIGN (ITEM 706), PER ENG & DSGN STD ED 4.10.08. THE SIGNS ARE TO BE MOUNTED ON EACH SIDE OF FENCE FABRIC, BACK TO BACK AND APPROXIMATELY 3'-6" FROM GRADE TO TOP OF SIGNS.
- D → BURIED CABLE SIGN (ITEM 706), MOUNTED ON POST (BY FIELD), PER ENG & DSGN STD ED 4.10.06.
- E → SUBSTATION IDENTIFICATION SIGN (ITEM 716), PER ENG & DSGN STD ED 4.10.02 (TOP) ADDRESS SIGN (ITEM 716) PER ENG & DSGN STD ED 4.10.03 (BOTTOM). THE TOP SIGN MOUNTED 5'-0" FROM GRADE TO TOP OF SIGN AND LOCATED ADJACENT TO WALK OR DRIVE GATES.
- F → BATTERY WARNING SIGN (ITEM 707), PER ENG & DSGN STD ED 4.10.04. THE SIGNS ARE TO MOUNTED ON THE OUTSIDE OF EACH ELECTRICAL EQUIPMENT ENCLOSURE DOOR, APPROXIMATELY 5'-0" FROM THE BOTTOM OF THE DOOR TO THE TOP OF SIGN.
- M-1 □ INDICATES CONCRETE MARKERS FOR DIRECT BURIED CABLE RUNS PER ENG & DSGN STD. ED 4.06.04, ORDERED BY FIELD.
- ◆ INDICATES A YELLOW CONCRETE FILLED BOLLARD (ITEM 299).

NOTE
FOR PLAN SHOWING UNDERGROUND EXI

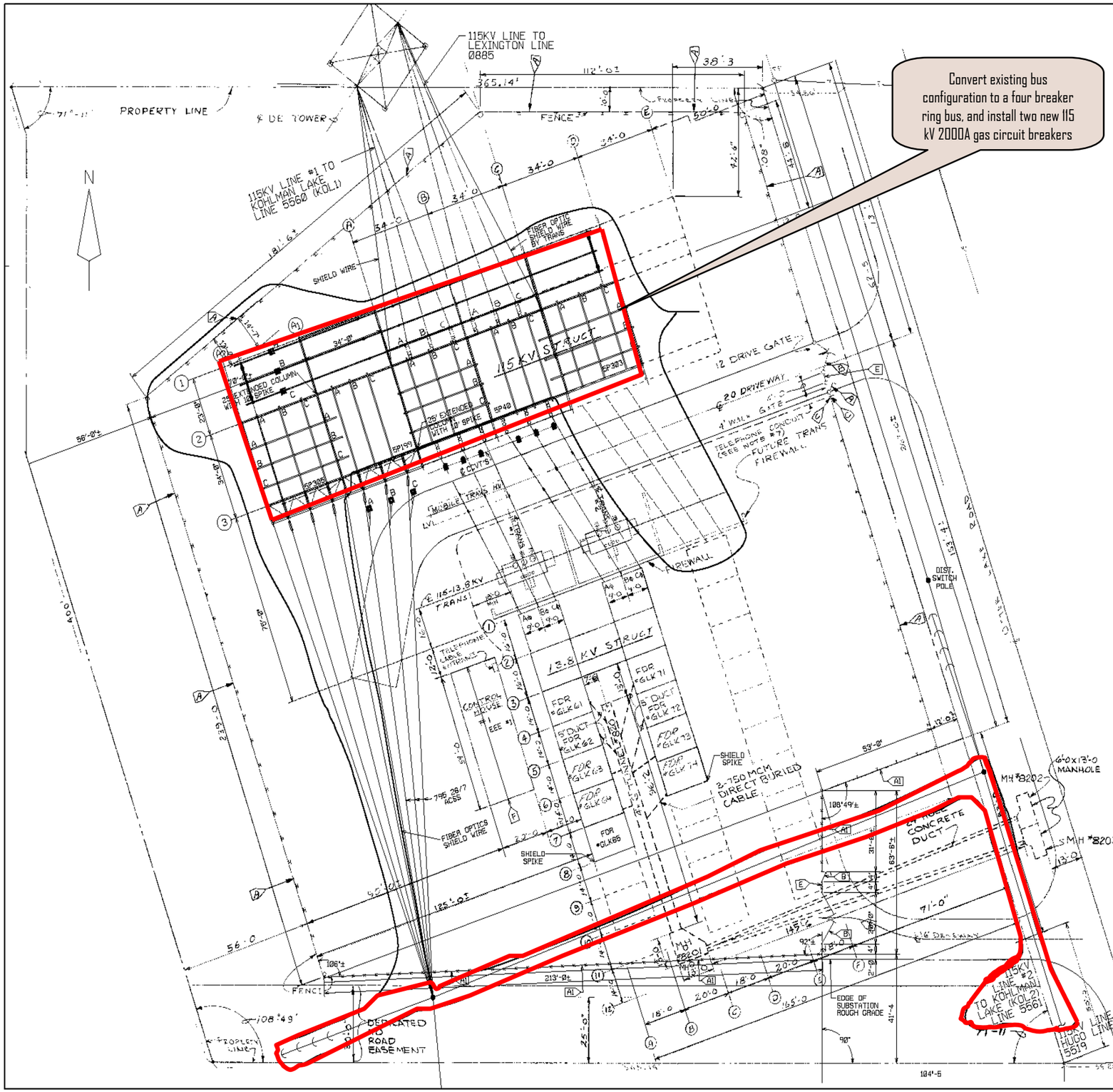
Proposed Substation Modifications

0 ft — 150 ft

Kohlman Lake Substation

Map B-8

Kohlman Lake to Goose Lake 115 kV Project



Convert existing bus configuration to a four breaker ring bus, and install two new 115 kV 2000A gas circuit breakers

GENERAL NOTES

FOR GENERAL NOTES PRIOR TO 2012 CONSTRUCTION, SEE REVISION "A0".

1. FOR LOCATION OF BENCH MARK SEE CONTOUR & GRADING LAYOUT.
2. FOR SUBSTATION ROUGH GRADE SEE CONTOUR & GRADING LAYOUT.
3. SUBSTATION AREA ENCLOSED BY FENCE AND EXTENDING 5'-0" OUTSIDE.
4. FENCE - 7'-0" HIGH STEEL CHAIN LINK FABRIC AND 1'-0" HIGH VERTICAL HEIGHT BARBED WIRE ON TOP, MOUNTED AT A 45° ANGLE POINTED OUTSIDE OF SUBSTATION. IN ACCORDANCE WITH ENG & DSGN STD ED 4.09.03.
5. SEE STRUCTURAL STEEL DRAWINGS FOR LOAD REQUIREMENTS OF EXTERNAL AND INTERNAL STRAINS.
6. U.G. POWER DUCTS PASS UNDER FENCE MIDWAY BETWEEN FENCE POSTS AND, WHERE POSSIBLE, NOT LESS THAN 2'-6" BELOW GRADE.
7. TELEPHONE CONDUIT (PVC) WILL BE USED FROM 90° ELBOW AT THE CONTROL HOUSE TO 2'-0" OUTSIDE THE FENCE AT APPROXIMATELY 1'-6" BELOW GRADE.

LEGEND

A → OLD FENCE SIGN WORDED "WARNING, HAZARDOUS VOLTAGES INSIDE, KEEP OUT, CAN SHOCK BURN OR CAUSE DEATH". (THIS SIGN CAN NO LONGER BE ORDERED)

B → FENCE WARNING SIGN (ITEM 708), PER ENG & DSGN STD ED 4.10.01. THE SIGNS ARE TO BE MOUNTED 5'-0" FROM GRADE TO TOP OF SIGN, 30'-0" - 45'-0" APART AND NO MORE THAN 15'-0" FROM THE CORNERS. ONE SIGN SHOULD BE PLACED ON THE OUTSIDE OF EACH WALK GATE. TWO SIGNS SHOULD BE MOUNTED ON EACH DRIVE GATE, ONE ON THE INSIDE AND ONE ON THE OUTSIDE. (BACK TO BACK ON THE LEFT SIDE OR DRIVERS SIDE PANEL OF THE DOUBLE GATES).

C → BURIED CABLE SIGN (ITEM 706), PER ENG & DSGN STD ED 4.10.06. THE SIGNS ARE TO BE MOUNTED ON EACH SIDE OF FENCE FABRIC, BACK TO BACK AND APPROXIMATELY 3'-6" FROM GRADE TO TOP OF SIGNS.

D → BURIED CABLE SIGN (ITEM 706), MOUNTED ON POST (BY FIELD), PER ENG & DSGN STD ED 4.10.06.

E → SUBSTATION IDENTIFICATION SIGN (ITEM 718), PER ENG & DSGN STD ED 4.10.02 (TOP) ADDRESS SIGN (ITEM 716) PER ENG & DSGN STD ED 4.10.03 (BOTTOM). THE TOP SIGN MOUNTED 5'-0" FROM GRADE TO TOP OF SIGN AND LOCATED ADJACENT TO WALK OR DRIVE GATES.

F → BATTERY WARNING SIGN (ITEM 707), PER ENG & DSGN STD ED 4.10.04. THE SIGNS ARE TO MOUNTED ON THE OUTSIDE OF EACH ELECTRICAL EQUIPMENT ENCLOSURE DOOR, APPROXIMATELY 5'-0" FROM THE BOTTOM OF THE DOOR TO THE TOP OF SIGN.

M-1 ☐ INDICATES CONCRETE MARKERS FOR DIRECT BURIED CABLE RUNS PER ENG & DSGN STD. ED 4.05.04, ORDERED BY FIELD.

◆ INDICATES A YELLOW CONCRETE FILLED BOLLARD (ITEM 299).

A1 → INDICATES NO TRESPASSING SIGNS WORDED "WARNING/HAZARDOUS VOLTAGES INSIDE/KEEP OUT/CAN SHOCK BURN OR CAUSE DEATH". THIS SIGN IS NSP STOCK NO. 16-0092. (NSP STD. DWG. - NO-160200). THESE SIGNS ARE TO BE MOUNTED ON THE OUTSIDE OF THE FENCE FABRIC APPROXIMATELY 4'-6" FROM FINISHED GRADE TO THE CENTER OF SIGN AND EVERY 50'-0" AROUND THE FENCE PERIMETER.

SPECIAL NOTES FOR MOBILE SUBSTATION

1. MOBILE SUBSTATION TO BE PARKED IN POSITION AS SHOWN.
2. HIGH VOLTAGE LEADS CONNECTED WITH HOT LINE CLAMPS TO OVERHEAD TRANSFORMER LEADS.
3. LOW VOLTAGE LEADS CONNECTED APPROXIMATELY WHERE SHOWN ON THIS DRAWING.

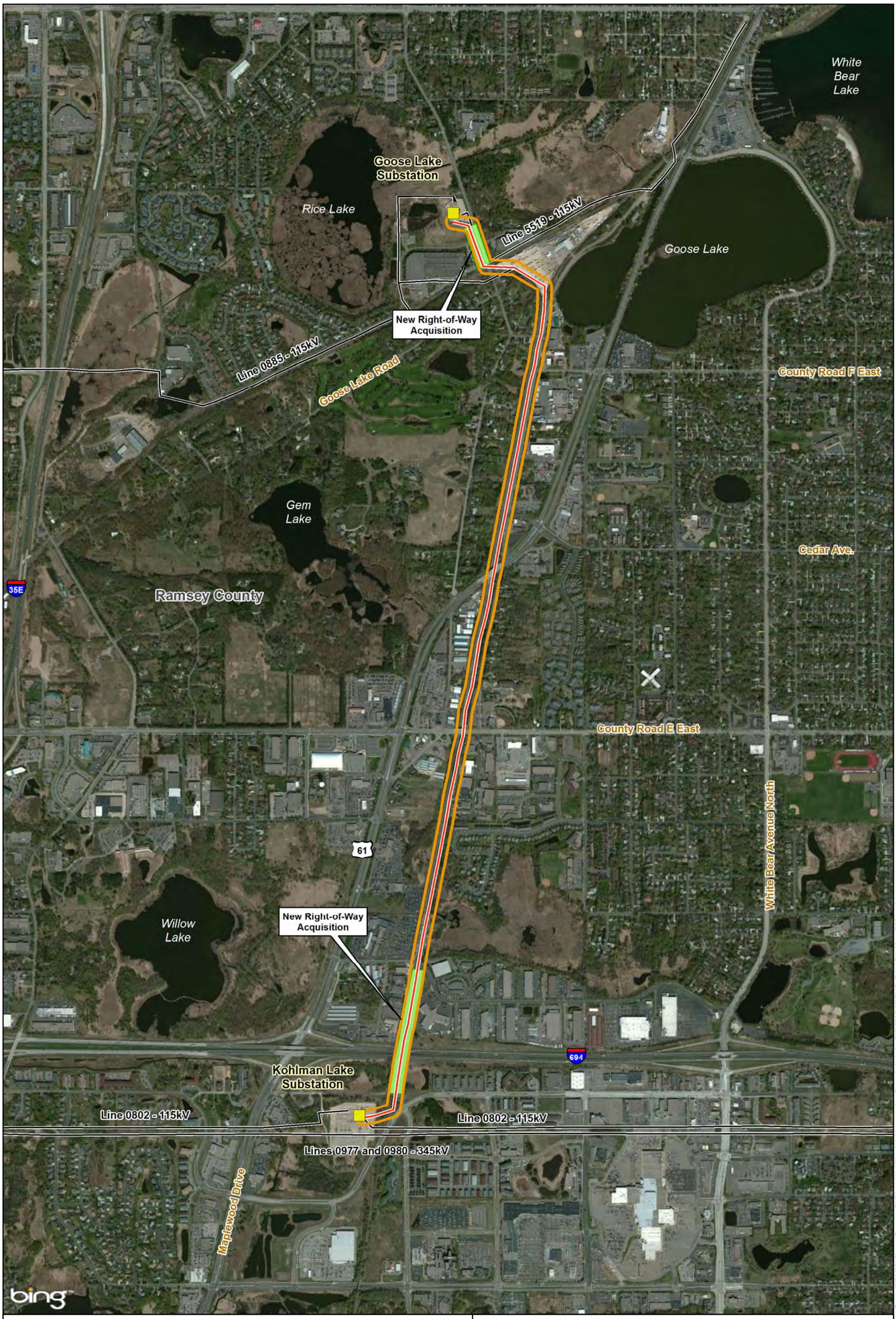
Proposed Substation Modifications

0 ft — 50 ft

Goose Lake Substation

Map B-9

Kohlman Lake to Goose Lake 115 kV Project



Xcel Energy Substation

Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV

Existing Xcel Energy Transmission Lines

Route Width

Approximate Area of New ROW Acquisition

0 1,000 2,000 Feet

Source: Parcel Boundary Data from Xcel
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

Areas of New Right-of-Way Acquisition

Map B-10

Kohlman Lake to Goose Lake 115 kV Project

© 2010 Westwood Professional Services, Inc.

Table 1

Common Tree Species	Average Regrowth after trimming (feet) 4 year cycle
Ash	12
Linden	10
Box-Elder	24
American Elm	20
Black Locust	27
Silver Maple	22
Sugar Maple	14
Red Oak	10
Weeping Willow	24
Cottonwood	24

Table 2

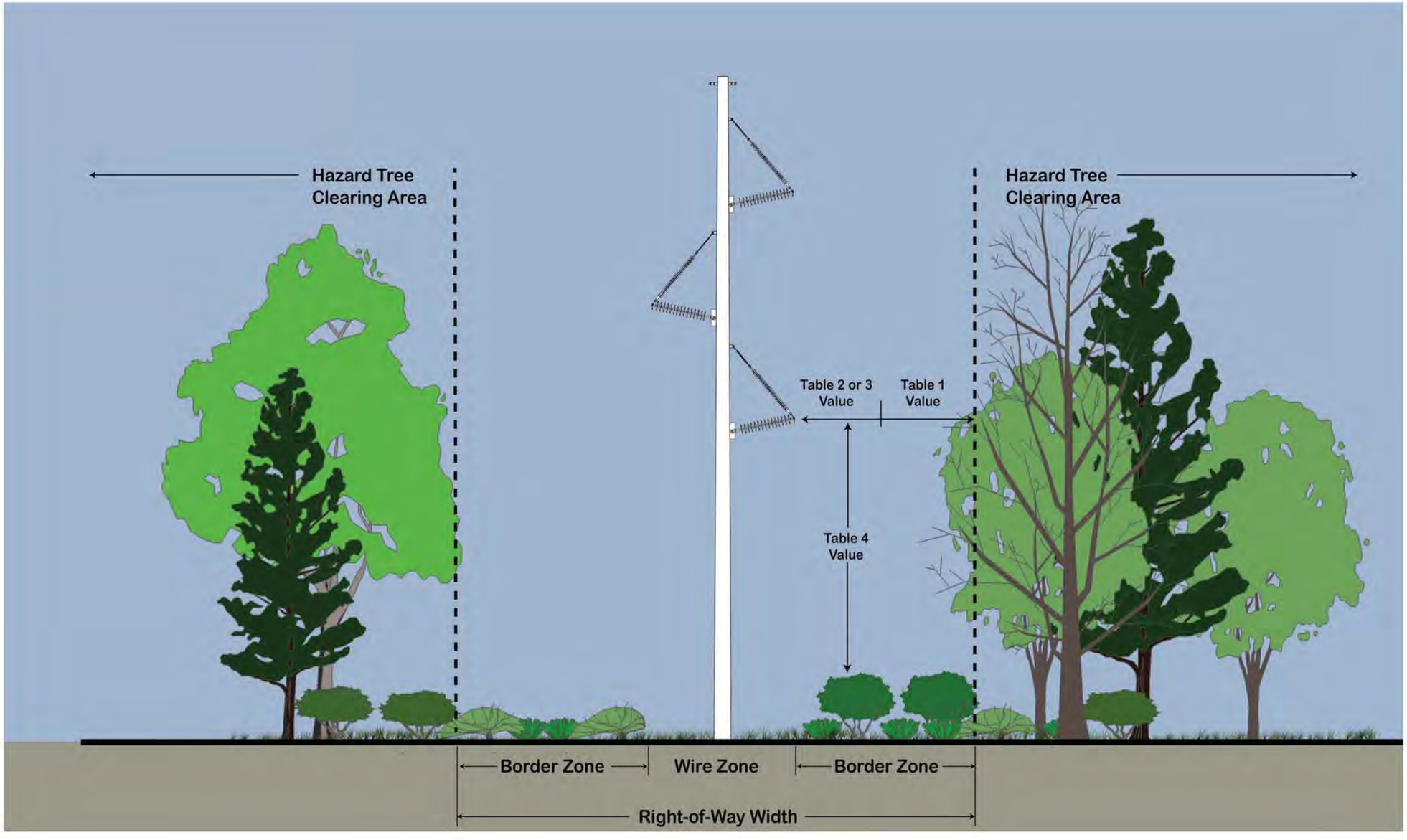
Voltage kV	Horizontal Maintained Tree Clearance at Structure	
	400' span	800' span
69	11 ft	11 ft
115	12 ft	12 ft
161	14 ft	14 ft
345	21 ft	21 ft

Table 3

Voltage kV	Horizontal Maintained Tree Clearance at Lowest Sag Point	
	400' span	800' span
69	11 ft	15 ft
115	12 ft	20 ft
161	14 ft	20 ft
345	21 ft	29 ft

Table 4

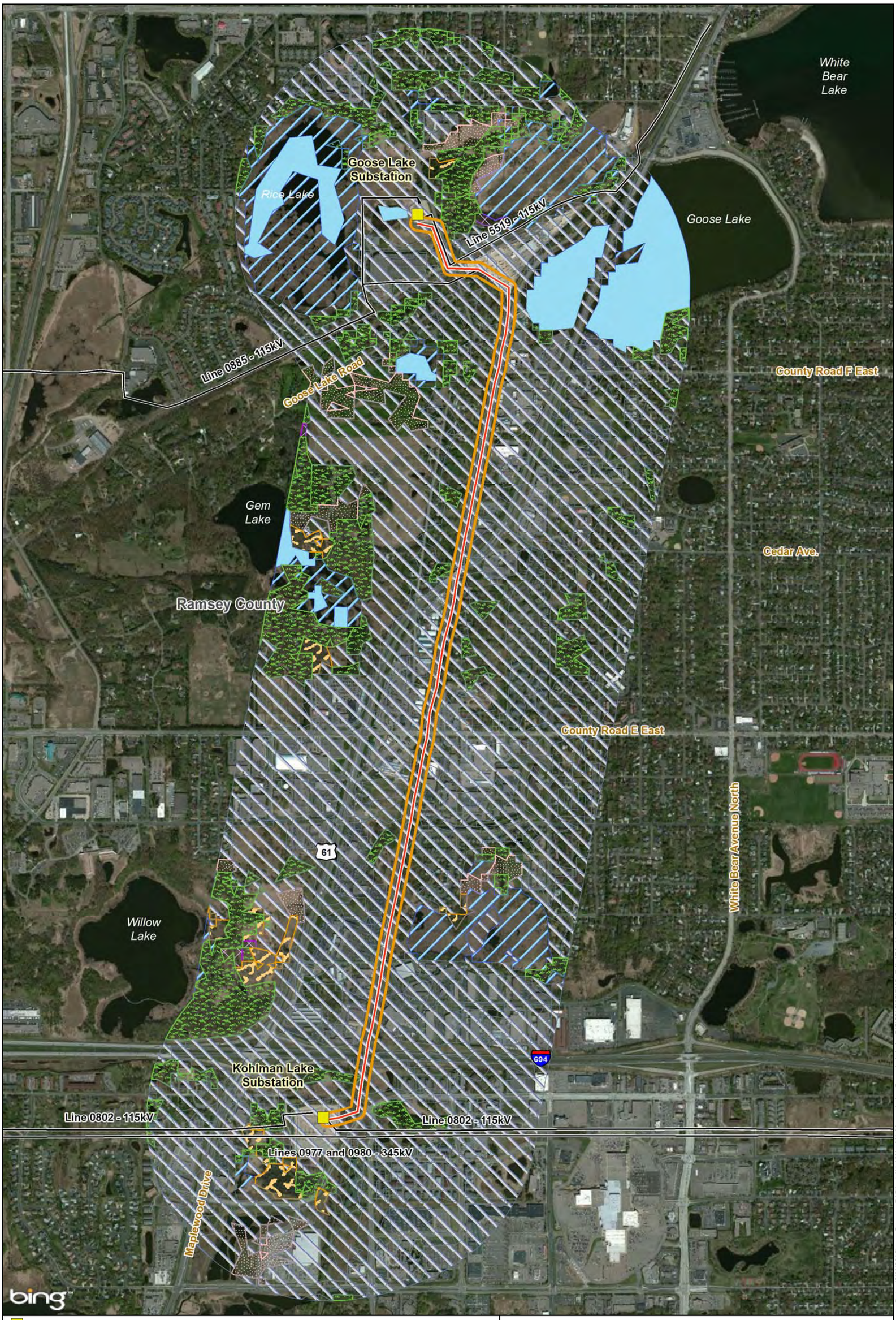
Voltage kV	Vertical Maintained Tree Clearance at Lowest Sag Point	
	400' span	800' span
69	14 ft	18 ft
115	16 ft	20 ft
161	17 ft	21 ft
345	23 ft	27 ft



Data Source(s): Xcel Energy (2010) and Westwood (2010).

Map Document: (P:\2009\107\gis\Site maps\20091075border.mxd)
9/22/2010 -- 4:04:08 PM

Vegetation Management Schematic
Map B-11
Kohlman Lake to Goose Lake 115 kV Project



Xcel Energy Substation

Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV

Existing Xcel Energy Transmission Lines

Route Width

Land Use/Land Cover Classification

- Forest
- Developed
- Wetland
- Open Water
- Grassland/Herbaceous
- Pasture/Hay
- Shrub/Scrub

0 1,000 2,000 Feet

N

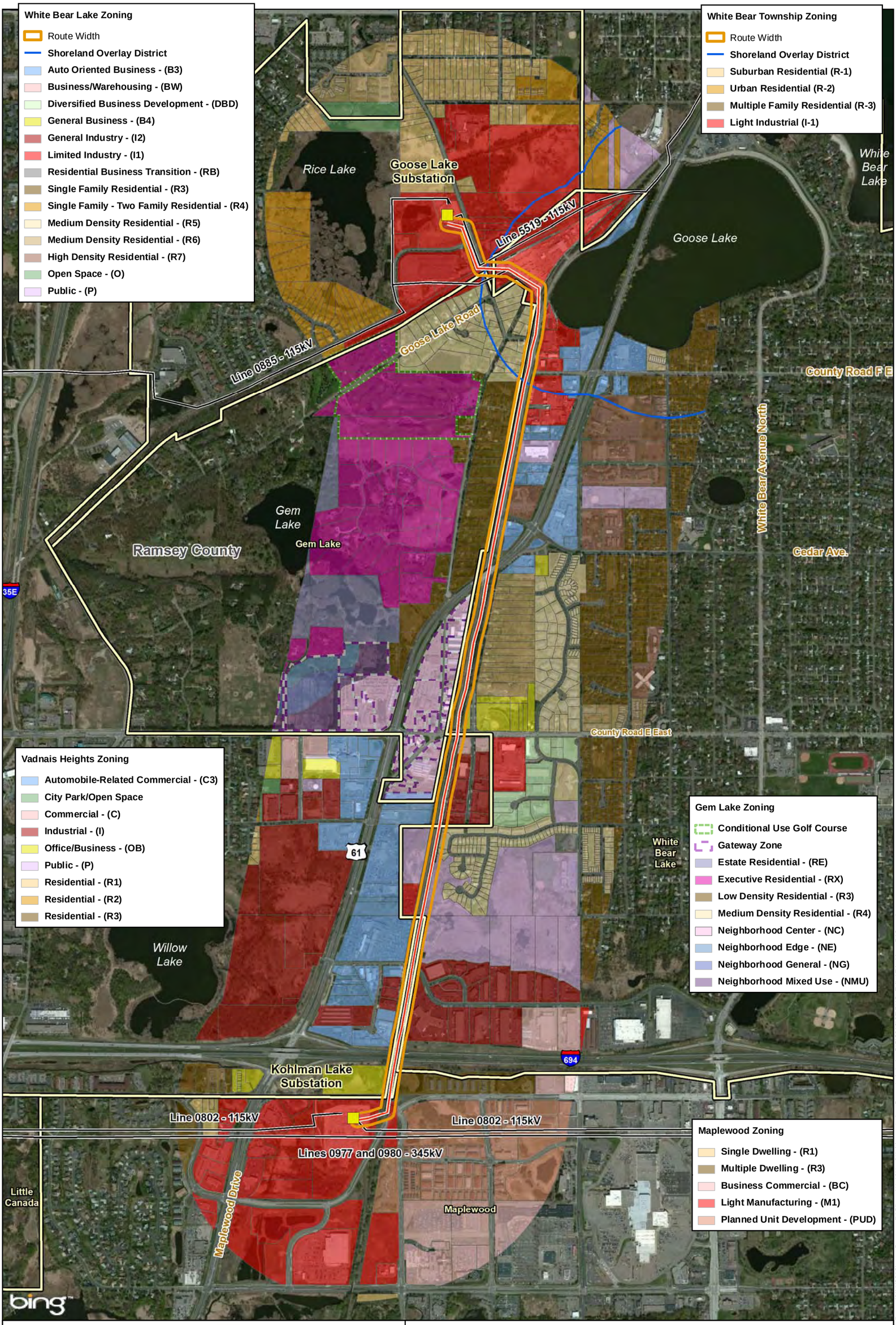
Source: Land Use Land Cover from USDA/NRCS 2006
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

Land Use

Map B-12

Kohlman Lake to Goose Lake 115 kV Project

Date: (6/11/2013) Source: Z:\Clients\0_XXcel\Kohlman\Lake_GooseLake_ArcGIS\2013\05\PUC_EDIS\EA_Map_B12.mxd



Xcel Energy Substation
Kohlman Lake to Goose Lake Transmission Line
Existing Xcel Energy Transmission Lines
Route Width
Municipal Boundary

N

0 1,000 2,000 Feet

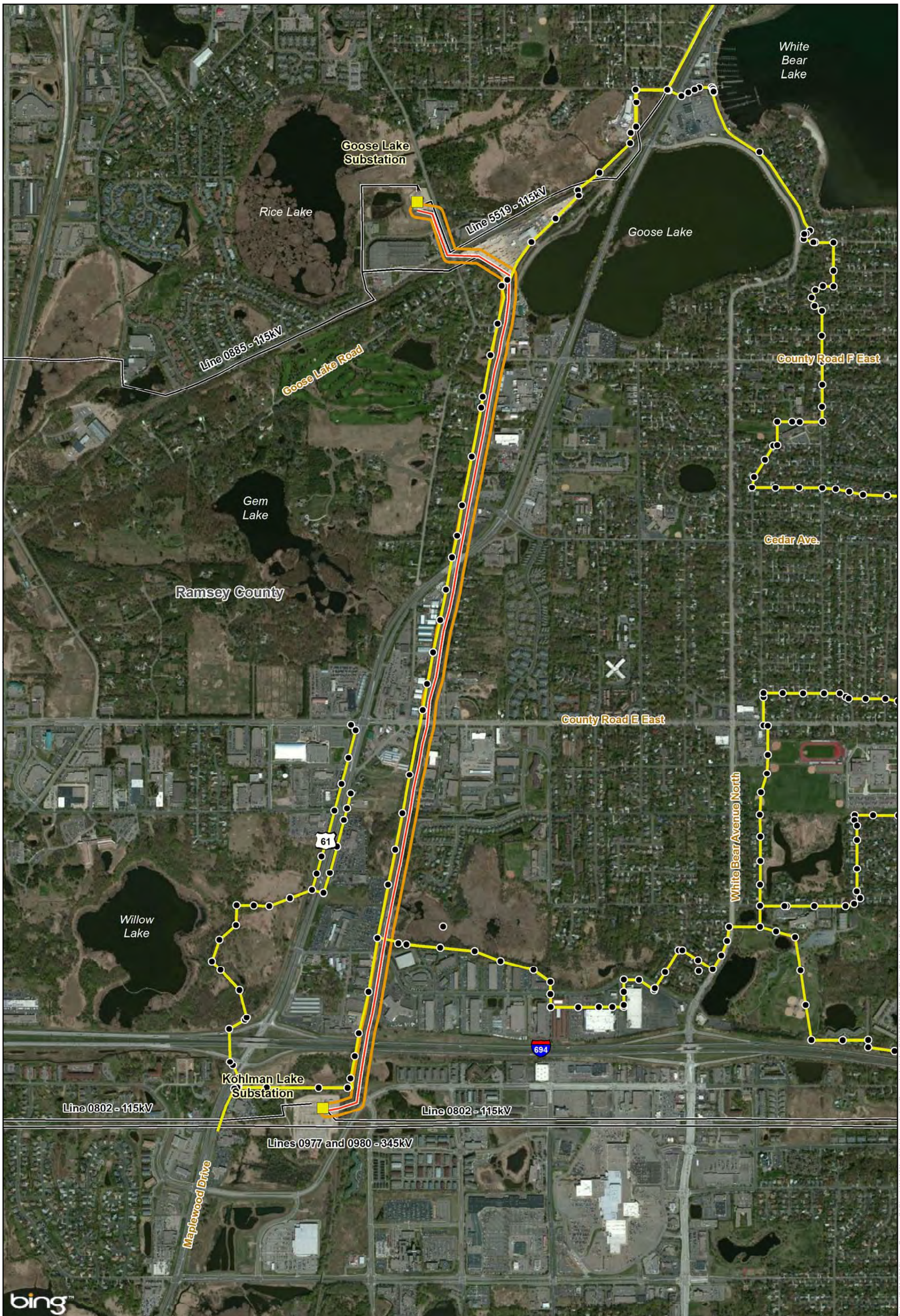
Source: Zoning Data Provided by City of White Bear Lake, City of Maplewood, City of Gem Lake, City of Vadnais Heights, and White Bear Township
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

Zoning

Map B-13

Kohlman Lake to Goose Lake 115 kV Project

Date: (6/11/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\EA_Map_B13.mxd



Xcel Energy Substation

Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV

Existing Xcel Energy Transmission Lines

Route Width

Manhole

Sewer System

N

0 1,000 2,000 Feet

Source: Park and Rec Data obtained from City of White Bear Lake, White Bear Township, City of Maplewood, and Ramsey County
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

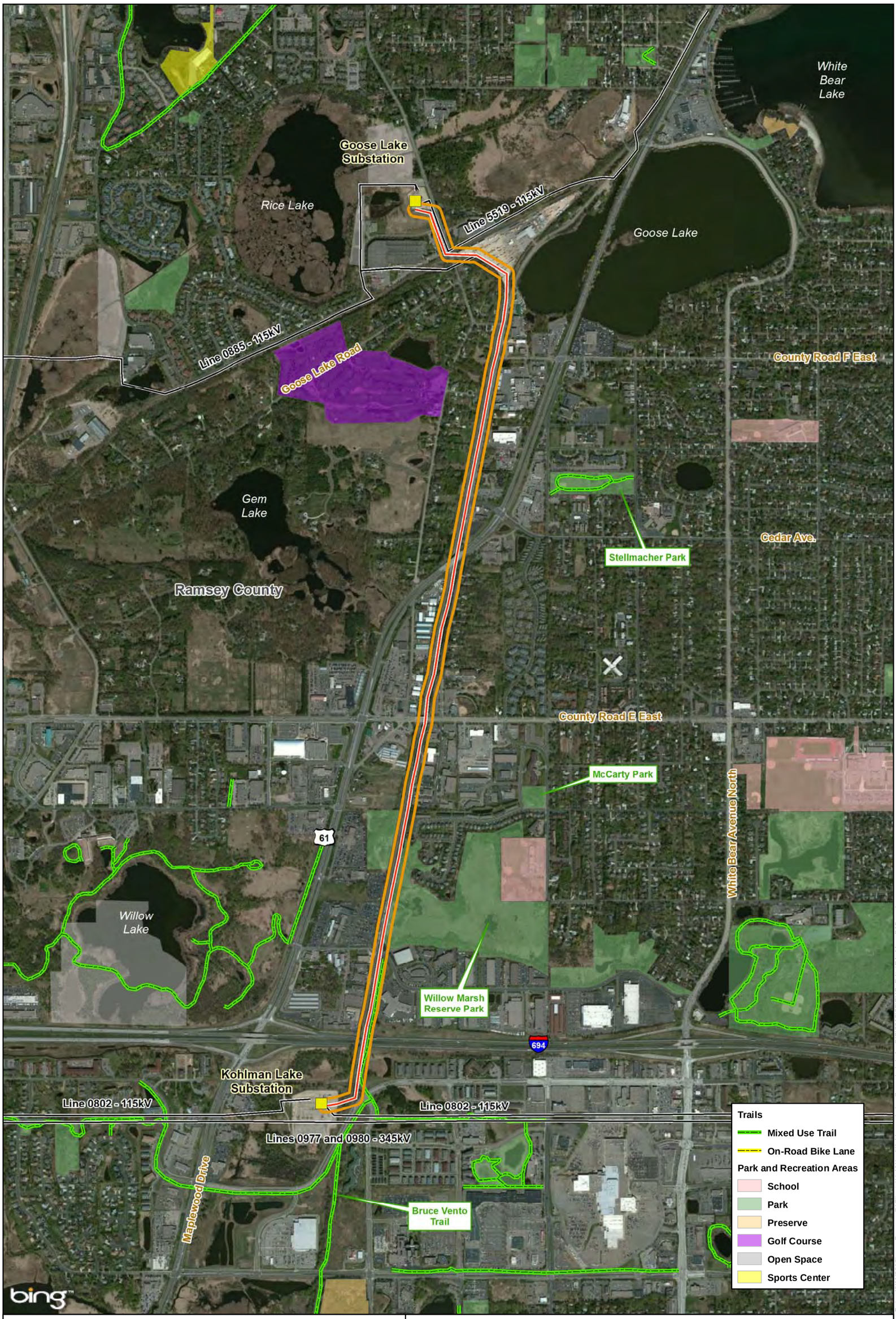
Metropolitan Council Sanitary Sewer System

Map B-14

Kohlman Lake to Goose Lake 115 kV Project

Source: Z:\Clients\0_XXcel\Kohlman\Lake_GooseLake_ArcGIS\2013\05\PUC_Edits\EA_Map_B14.mxd

Date: (5/31/2013)



Xcel Energy Substation

Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV

Existing Xcel Energy Transmission Lines

Route Width

N

0 1,000 2,000 Feet

Source: Park and Rec Data obtained from City of White Bear Lake, White Bear Township, City of Maplewood, and Ramsey County
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

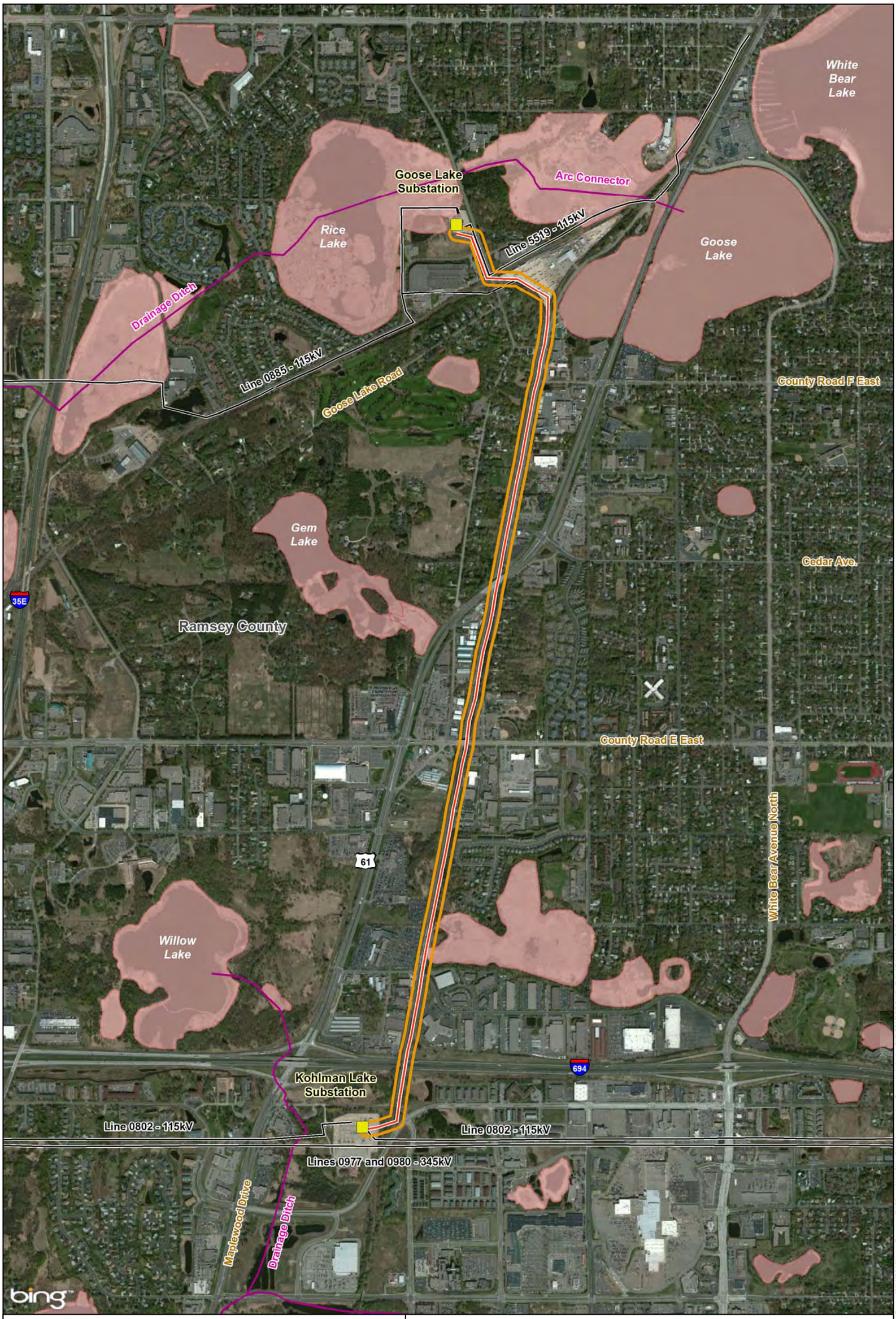
Parks and Recreational Areas

Map B-15

Kohlman Lake to Goose Lake 115 kV Project

Source: Z:\Clients\D_X\Xcel\KohlmanLake_GooseLake_ArcGIS\2013\03\PUC_Edits\EA_Map_B15.mxd

Date: (6/11/2013)



Xcel Energy Substation
Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV
Existing Xcel Energy Transmission Lines
Route Width
Public Water Streams
Public Water Lakes and Wetlands

0 1,000 2,000 Feet

N

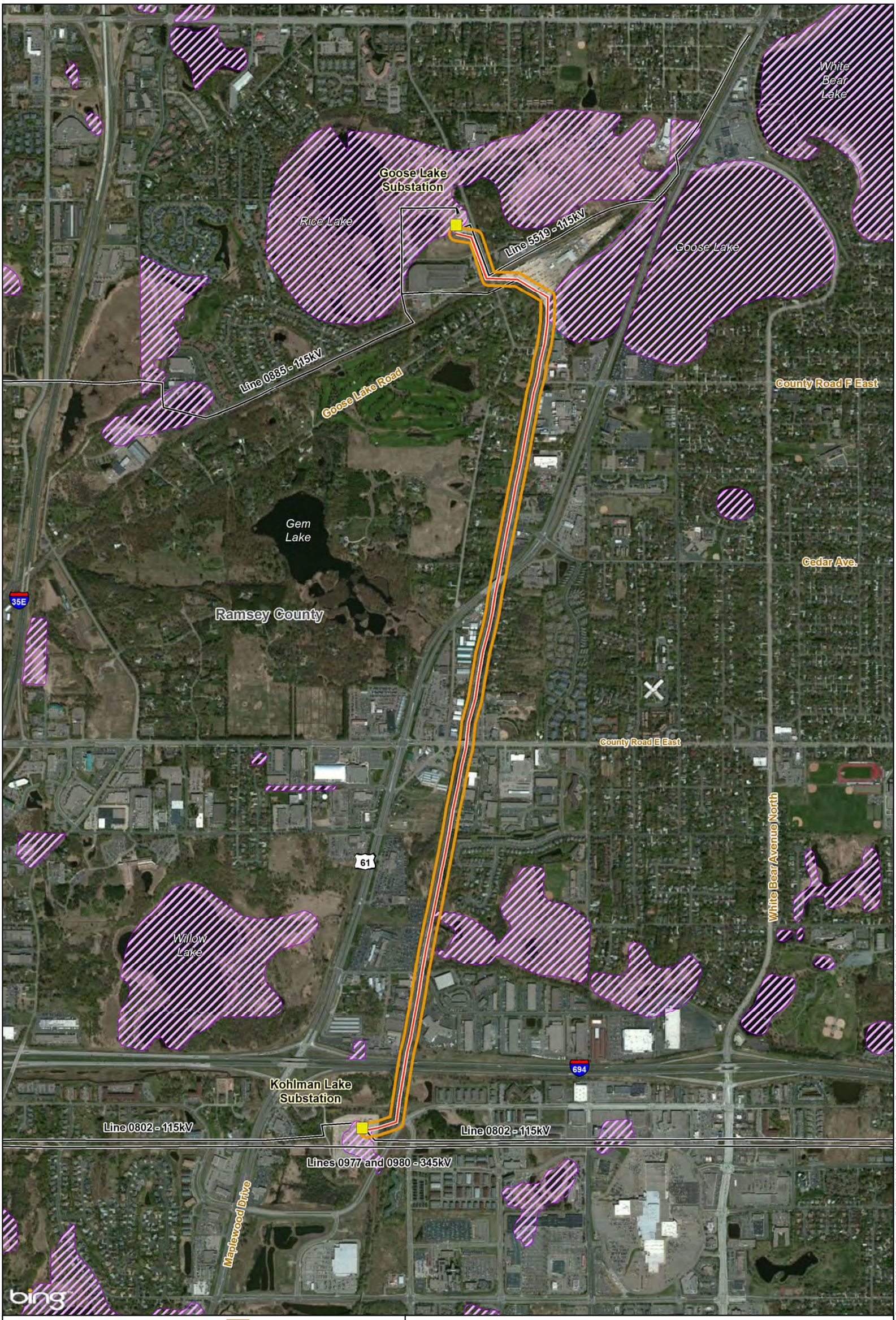
Source: Public Waters Inventory provided by the MN DNR
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

Lakes and Streams

Map B-16

Kohlman Lake to Goose Lake 115 kV Project

Date: (6/11/2013) Source: Z:\Clients\U_X\Xcel\KohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\EA_Map_B16.mxd



Xcel Energy Substation
Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV
Existing Xcel Energy Transmission Lines
Route Width
FEMA Floodplain - 100 Year

N

0 1,000 2,000 Feet

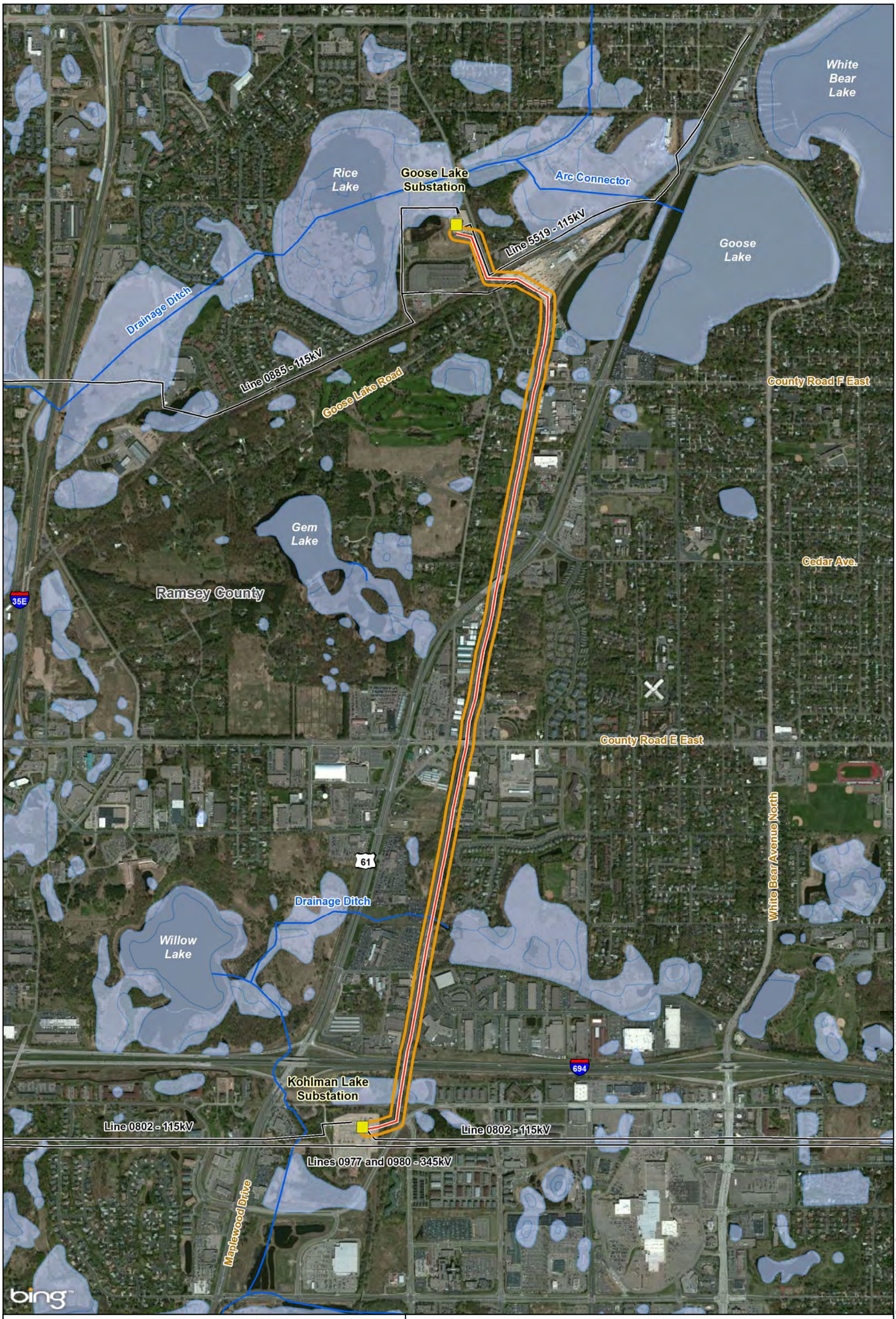
Source: FEMA Floodplain from MN DNR
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

Floodplains

Map B-17

Kohlman Lake to Goose Lake 115 kV Project

Date: (6/11/2013) Source: Z:\Clients\U_X\XcelKohlmannLake_GooseLake_ArcGIS\2013\05\PUC_Edits\EA_Map_B17.mxd



Xcel Energy Substation
Proposed Kohlman Lake to Goose Lake Rebuild to Double Circuit 115kV
Existing Xcel Energy Transmission Lines
Route Width
Waterbody
NWI Wetland

Source: NWI and Waterbody Data Provided by the MN DNR
All other data from Xcel Energy, ESRI, and Merjent
This information is for environmental review purposes only.

0 1,000 2,000 Feet

N

Wetlands

Map B-18

Kohlman Lake to Goose Lake 115 kV Project