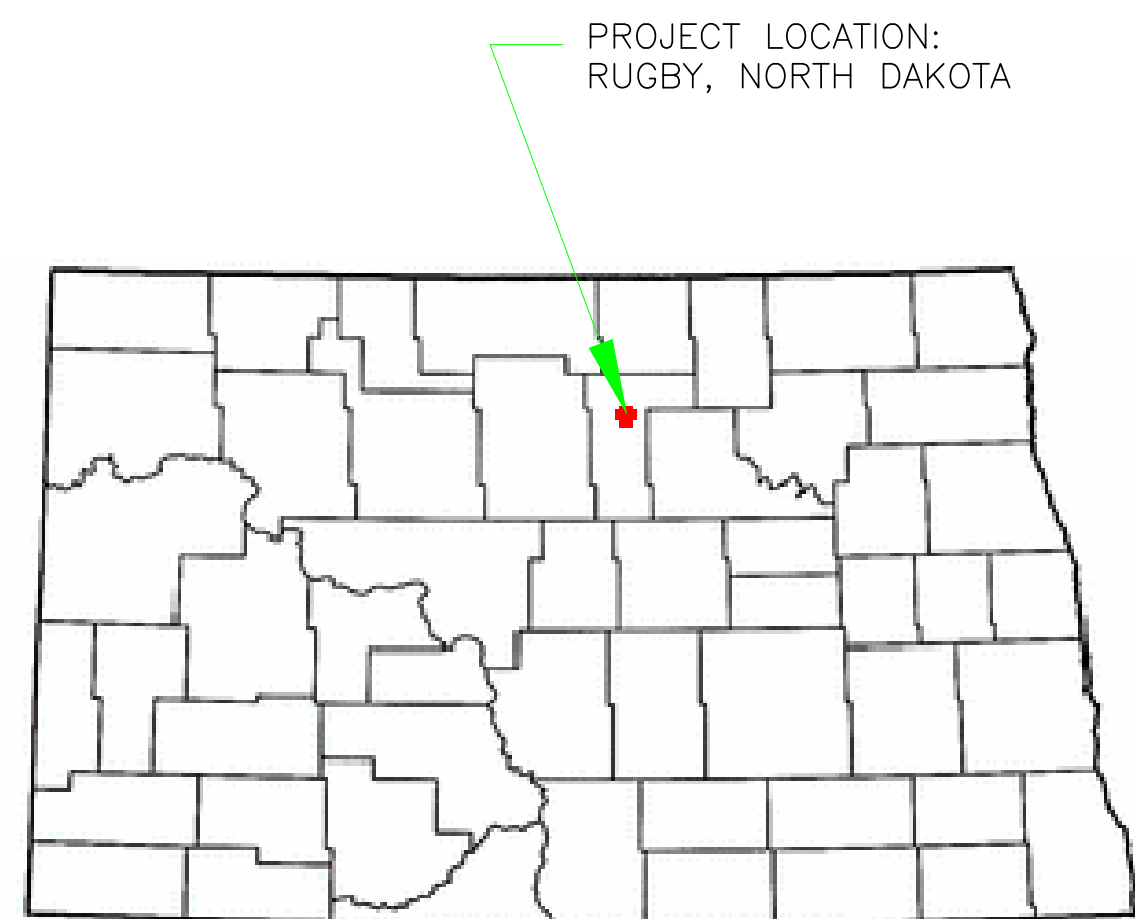


PLAN AND PROFILE WETLANDS LEGEND:

	JURISDICTIONAL - US FISH AND WILDLIFE (NO ACCESS ALLOWED)
	JURISDICTIONAL - ARMY CORPS (RESTRICTED ACCESS ALLOWED)
	NON-JURISDICTIONAL - (ACCESS ALLOWED)



DRAWING INDEX			
DRAWING NAME	DESCRIPTION	DATE	REV
RUG-E-515-01	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-02	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-03	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-04	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-05	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-06	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-07	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-08	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-09	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-10	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-515-11	PLAN & PROFILE 230kV TRANSMISSION LINE	4/16/10	2
RUG-E-517-00	PHASING DIAGRAM - 230kV TRANSMISSION LINE	4/16/10	1
HF-TAN	STRUCTURE FRAMING - H-FRAME TANGENT	4/16/10	1
HF-TAN-OPGW-S	STRUCTURE FRAMING - H-FRAME TANGENT W/OPGW SPLICE	4/16/10	1
3P-SM-ANG	STRUCTURE FRAMING - 3-POLE SMALL ANGLE - 2'-10"	4/16/10	1
3P-ANG	STRUCTURE FRAMING - 3-POLE RUNNING ANGLE - 10'-30"	4/16/10	1
3P-DE	STRUCTURE FRAMING - 3-POLE DEADEND - 60'-90"	4/16/10	1
5P-DE	STRUCTURE FRAMING - 5-POLE DEADEND	4/16/10	1
RUG-HLK-SUB	HERD LAKE SUBSTATION CONNECTION DETAIL	4/16/10	1
RUG-OTP-SUB	OTTERTAIL POWER'S RUGBY SUBSTATION CONNECTION DETAIL	4/16/10	1
GUYING	GUYING DETAILS	4/16/10	1
TM-16	GUIDE FOR INSTALLING WOOD POLE NUMBERING	4/16/10	1
DAMPER	DAMPER DETAILS	4/16/10	1
EMBED	EMBEDMENT DETAILS - WOOD POLES	4/16/10	1
GND DETAILS	GROUNDING DETAILS - WOOD POLES	4/16/10	1
OPGW-S	OPGW SPLICE DETAILS	4/16/10	1
EROSION	EROSION CONTROL AT US FISH AND WILDLIFE WETLANDS	4/16/10	1
C-6	EROSION CONTROL DETAILS (FOR REFERENCE)	4/16/10	1

Rev	Date	By
0 - REVISED SINCE BID	03-04-09	SPT
1 - STR #82 & 83 MOVE	05-15-09	SPT
2 - RECORD DRAWING	04-16-10	

EXISTING XCEL ENERGY TRANSMISSION LINE

PROPOSED RUGBY WIND FARM 230kV TRANSMISSION LINE

GENERAL NOTES:

- CONDUCTOR:
 - 954 kcmil 45/7 ACSR "RAIL" (3) PHASE, SINGLE CONDUCTOR - 9.96 MILES
 - CONDUCTOR SAG SHOWN AT 212 DEGREES FAHRENHEIT FINAL
 - DESIGN TENSION SHOWN AT NESC HEAVY, UNLESS NOTED OTHERWISE.
- SHIELD WIRE: TENSION BASED ON 80% OF FINAL CONDUCTOR SAG AT 60 DEGREES FAHRENHEIT
 - SHIELD WIRE #1: 0.496" 24 FIBER OPGW - 9.96 MILES
 - OPGW DEADEND SPLICE BOXES: 4 TOTAL, LOCATED AT TERMINATIONS AT EACH SUBSTATION AND AT 2 STRUCTURES AS SHOWN ON THESE PLAN AND PROFILE DRAWINGS.
 - SHIELD WIRE #2: 3/8" 7-STRAND EHS STEEL - 9.96 MILES
 - SHIELD WIRE SAG SHOWN AT -20 DEGREES FAHRENHEIT INITIAL
- MINIMUM GROUND CLEARANCE IS 24.9' PER RUS.
- STRUCTURE GROUNDING PER "GND DETAILS"
- SECTION LINES, PROPERTY LINES, AND PUBLIC ROW SHOWN PER WESTWOOD PROFESSIONAL SERVICES SURVEY.
- EMBEDMENT IS 10%+2' UNLESS NOTED OTHERWISE ON PLAN AND PROFILE.
- CONTRACTOR NOT TO ENTER THE JURISDICTIONAL US FISH AND WILDLIFE WETLANDS FOR ANY REASON.

CONDUCTOR INFORMATION

SHIELDWIRE		230kV CONDUCTOR	
0.496" 24 FIBER OPGW		795 kcmil 26/7 ACSR "DRAKE"	
STR #	DESIGN TENSION (R.S.)	STR #	DESIGN TENSION (R.S.)
SUB-1	1000# @ 137' R.S.	SUB-1	1000# @ 137' R.S.
1-22	4115 @ 674' R.S.	1-46	9191# @ 654' R.S.
22-46	4021# @ 636' R.S.	46-52	8927# @ 584' R.S.
46-52	3863# @ 587' R.S.	52-82	9227# @ 674' R.S.
52-56	3986# @ 619' R.S.	82-83	8035# @ 380' R.S.
56-82	4125# @ 680' R.S.	83-84	8164# @ 405' R.S.
82-83	3192# @ 380' R.S.	84-SUB	1000# @ 120' R.S.
83-84	3380# @ 447' R.S.		
84-SUB	1000# @ 141' R.S.		

3/8" EHS	
STR #	DESIGN TENSION (R.S.)
SUB-1	1000# @ 137' R.S.
1-46	3848# @ 654' R.S.
46-52	3632# @ 582' R.S.
52-82	3894# @ 676' R.S.
82-83	2975# @ 380' R.S.
83-84	2950# @ 362' R.S.
84-SUB	1000# @ 98' R.S.



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 Drawn By: LAS
 Checked By: MPM
 Approved By: SPT

230kV
ROUTE MAP