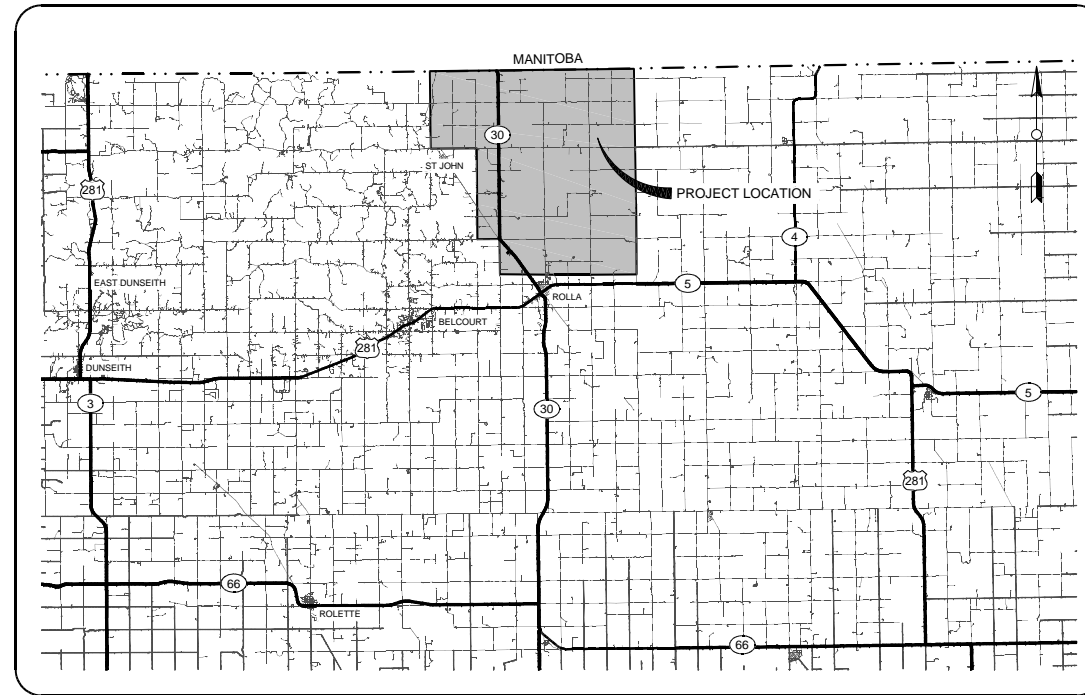
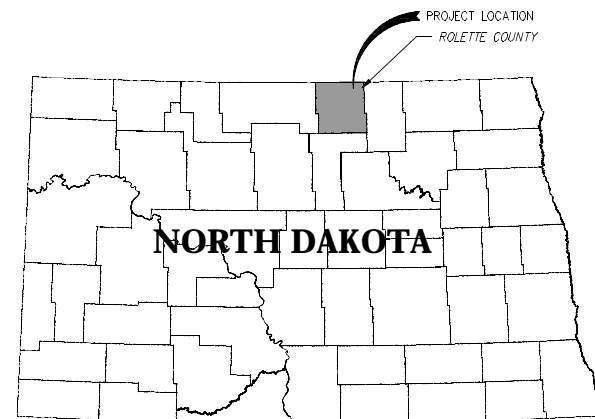


BORDER WINDS - WIND PROJECT

ROLETTE COUNTY, NORTH DAKOTA

CONSTRUCTION CIVIL PLANS
ISSUED 100% FINAL REVIEW



VICINITY MAP - SCALE 1"= 20,000'

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NOTES:

COORDINATE SYSTEM: State Plane, ND North, NAD83 (ND - HPGN) NADCON - International Feet

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Know what's below.
Call before you dig.

[Returns] [Dwg. 03, 2014 - 4:41pm] [U:\MID FILES\USA\North Dakota - Border Winds 23053.DWG Internal\SERIES 3-CONTROLLED DP-AMMS\23053D3501.dwg]

NO	REVISION						NO	REVISION						REFERENCE DRAWINGS			 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT ROLETTE COUNTY, NORTH DAKOTA	THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.	COVER SHEET SHEET 1 OF 25 CIVIL CONSTRUCTION PLANS & DETAILS	ENERGY SUPPLY ENGINEERING & CONSTRUCTION	23053D3501	REV F
	DATE	BY	CHK	ENG	NO	DATE		BY	CHK	ENG	DWG NO.	MANUFACTURER	DESCRIPTION									
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F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN																

PREPARED BY:

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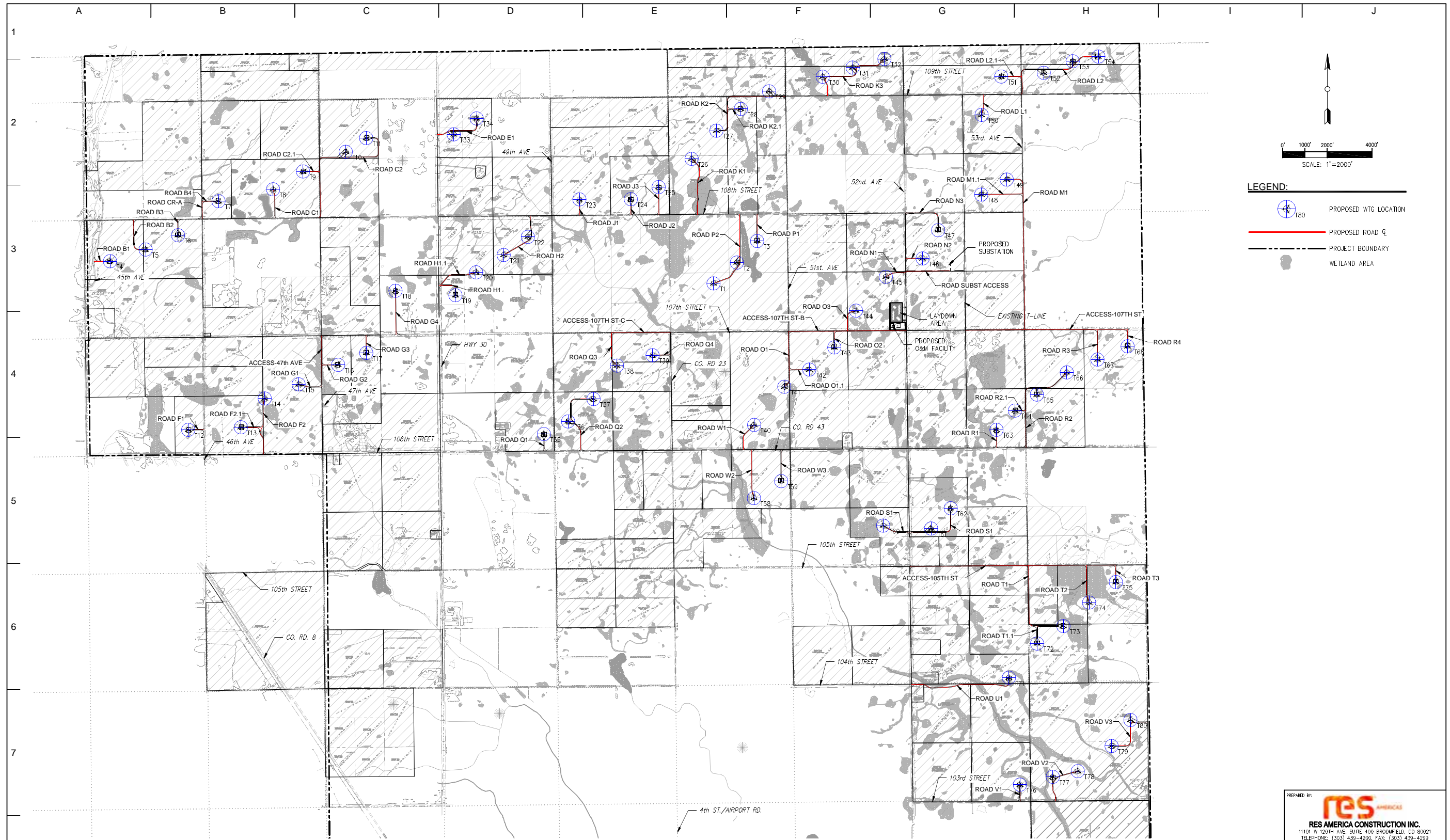
PROJECT NO: 23053 W/G LAYOUT NO: PUSAbdw077

[D:\11101-F-R115-USA-Vierth Dakota - Border Winds - 23053 DWS Internal\SERIES 3\CONTROLLED DR-4-11101-2305303502.dwg] [Date] [Jun 03, 2014 - 3:39pm]

A	B	C	D	E	F	G	H	I	J					
<p>1 GENERAL NOTES</p> <p>1. "SUBCONTRACTOR" SHALL MEAN THE ENTITY PERFORMING THE GRADING AND CONSTRUCTION WORK.</p> <p>2. "RES" SHALL MEAN RENEWABLE ENERGY SYSTEMS AMERICAS OR RES AMERICA CONSTRUCTION, INC.</p> <p>3. PRIOR TO THE START OF CONSTRUCTION, THE SUBCONTRACTOR SHALL ESTIMATE THE EARTHWORK QUANTITIES TO HIS/HER SATISFACTION BASED ON THE SUBCONTRACTOR'S FIELD RECONNAISSANCE, THESE PLANS, AND THE GEOTECHNICAL INVESTIGATION REPORT RECOMMENDATIONS.</p> <p>4. STATIONING HEREON IS ALONG ROAD CENTERLINE UNLESS OTHERWISE SHOWN OR INDICATED.</p> <p>2</p> <p>5. ALL PROPOSED CONTOURS AND SPOT ELEVATIONS ARE SHOWN AT FINISHED GRADE UNLESS OTHERWISE NOTED.</p> <p>6. ANY EARTHWORK QUANTITIES PROVIDED ARE ESTIMATED QUANTITIES AND ARE CALCULATED BASED ON EXISTING GROUND AND FINISHED DESIGNED ROUGH GRADING ELEVATIONS. THE MATERIAL MOVED IN THE FIELD MAY OR MAY NOT CORRESPOND TO THIS CALCULATED AMOUNT DEPENDING ON SUCH VARIABLES AS COMPACTION, SHRINKAGE, SUBCONTRACTOR'S METHOD OF OPERATION, AND ACCURACY OF THE EARTHWORK TAKEOFF.</p> <p>7. LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS. THE SUBCONTRACTOR SHALL VERIFY THE LOCATIONS, ELEVATIONS, AND DIMENSIONS OF ALL EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES AFFECTING THIS WORK PRIOR TO CONSTRUCTION.</p> <p>3</p> <p>8. THE SUBCONTRACTOR SHALL CHECK THE PLANS FOR CONFLICTS AND DISCREPANCIES PRIOR TO CONSTRUCTION. THE SUBCONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS OR DISCREPANCIES BEFORE PERFORMING ANY WORK IN THE AFFECTED AREA.</p> <p>9. THE SUBCONTRACTOR SHALL EXERCISE EXTREME CAUTION IN AREAS OF BURIED UTILITIES, AND SHALL PROVIDE AT LEAST 48 HOURS NOTICE TO THE VARIOUS UTILITY COMPANIES. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITIES. RES WILL ASSIST IN COMMUNICATION WITH LANDOWNER REGARDING PRIVATE UTILITY.</p> <p>10. THE SUBCONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING FACILITIES, ABOVE OR BELOW GROUND, THAT MAY OCCUR AS A RESULT OF THE WORK PERFORMED BY THE SUBCONTRACTOR.</p> <p>4</p> <p>11. ALL UNDERGROUND UTILITIES MUST BE IN PLACE AND TESTED OR INSPECTED PRIOR TO BASE AND SURFACE CONSTRUCTION.</p> <p>12. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PERMIT AND INSPECTION REQUIREMENTS OF THE VARIOUS GOVERNMENTAL AGENCIES. THE SUBCONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION, AND SCHEDULE INSPECTIONS ACCORDING TO AGENCY INSTRUCTION.</p> <p>13. ALL SPECIFICATIONS AND DOCUMENTS REFERRED TO SHALL BE OF LATEST REVISIONS AND/OR LATEST EDITION, UNLESS NOTED OTHERWISE.</p> <p>14. ALL WORK PERFORMED SHALL COMPLY WITH THE REGULATIONS AND ORDINANCES OF THE VARIOUS GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE WORK.</p> <p>5</p> <p>15. THE SUBCONTRACTOR SHALL SUBMIT FOR APPROVAL TO THE ENGINEER, SHOP DRAWINGS ON ALL PRECAST AND MANUFACTURED ITEMS WHICH ARE FROM OR FOR THIS SITE. FAILURE TO OBTAIN APPROVAL BEFORE INSTALLATION MAY RESULT IN REMOVAL AND REPLACEMENT AT THE SUBCONTRACTOR'S EXPENSE. ALL SHOP DRAWINGS ARE TO BE REVIEWED AND APPROVED BY THE SUBCONTRACTOR PRIOR TO SUBMITTAL TO THE ENGINEER.</p> <p>16. AT LEAST TEN (10) WORKING DAYS PRIOR TO CONSTRUCTION, THE SUBCONTRACTOR SHALL NOTIFY THE ENGINEER AND APPROPRIATE AGENCIES, AND SUPPLY THEM WITH ALL REQUIRED SHOP DRAWINGS. THE SUBCONTRACTOR'S NAME, STARTING DATE, PROJECTED SCHEDULE, AND OTHER INFORMATION AS REQUIRED, SHALL BE CLEARLY IDENTIFIED ON EACH SUBMITTAL. ANY WORK PERFORMED PRIOR TO NOTIFYING THE ENGINEER, OR WITHOUT AGENCY INSPECTOR PRESENT, MAY BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE SUBCONTRACTOR'S EXPENSE.</p> <p>6</p> <p>17. WORK PERFORMED UNDER THIS CONTRACT SHALL INTERFACE SMOOTHLY WITH OTHER WORK BEING PERFORMED ON SITE BY OTHER SUBCONTRACTORS AND UTILITY COMPANIES. IT WILL BE NECESSARY FOR THE SUBCONTRACTOR TO COORDINATE AND SCHEDULE HIS ACTIVITIES, WHERE NECESSARY, WITH OTHER SUBCONTRACTORS AND UTILITY COMPANIES.</p> <p>18. SITE WORK CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF AT LEAST 3000 PSI IN 28 DAYS, UNLESS OTHERWISE NOTED.</p> <p>19. REINFORCING SHALL BE BILLET STEEL BARS CONFORMING TO ASTM A615 GRADE OR BETTER WITH A MINIMUM YIELD STRENGTH OF 60 KSI, UNLESS OTHERWISE NOTED.</p> <p>20. IN AREAS OF ACTIVE AGRICULTURE, THE PROPOSED SEED MIX PLANT TYPES SHALL BE APPROVED BY THE OWNER AND REVIEWED BY THE FARMER PRIOR TO USING ON SITE. ALL PRIVATE AND PUBLIC PROPERTY AFFECTED BY THIS WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN EXISTING CONDITIONS UNLESS SPECIFICALLY EXEMPTED BY THE PLANS. ADDITIONAL COSTS ARE INCIDENTAL TO OTHER CONSTRUCTION AND NO EXTRA COMPENSATION IS TO BE ALLOWED.</p> <p>7</p> <p>21. ALL DISTURBED AREAS WHICH ARE NOT TO BE SODED, ARE TO BE SEEDED AND MULCHED PER CONTRACT REQUIREMENTS, AND MAINTAINED UNTIL A SATISFACTORY STAND OF GRASS, ACCEPTABLE TO THE REGULATORY AGENCY AND ENGINEER OF RECORD, HAVE BEEN OBTAINED. ANY WASHOUTS, REGRADING, RESEEDING, AND GRASSING WORK, AND OTHER EROSION WORK REQUIRED, WILL BE PERFORMED BY THE SUBCONTRACTOR, UNTIL THE SYSTEM IS ACCEPTED FOR MAINTENANCE, BY THE REGULATORY AGENCY AND ENGINEER OF RECORD. SEE SEEDING NOTES THIS PAGE FOR ACCEPTANCE CRITERIA.</p>														
<p>22. THE SUBCONTRACTOR SHALL LOCATE AND FLAG ALL PROPERTY CORNERS PRIOR TO FINAL ENGINEERING INSPECTION AND CERTIFICATION. IT SHALL BE THE SUBCONTRACTOR'S RESPONSIBILITY TO HAVE PROPERTY CORNERS WHICH HAVE BEEN LOST DURING CONSTRUCTION, REESTABLISHED BY A PROFESSIONAL LAND SURVEYOR.</p> <p>23. THE TESTING AND INSPECTION AGENCY SHALL SUPPLY THE ENGINEER WITH A COPY OF ALL TESTS RESULTS. THE GEOTECHNICAL ENGINEER SHALL CERTIFY IN WRITING TO THE ENGINEER OF RECORD THAT ALL TESTING REQUIREMENTS, REQUIRED BY THE LOCAL REGULATORY AGENCY FOR THE IMPROVEMENTS, AND AS REQUIRED BY THE ENGINEERING CONSTRUCTION DRAWINGS, HAVE BEEN SATISFIED.</p> <p>24. THE SUBCONTRACTOR IS RESPONSIBLE FOR COORDINATING APPLICABLE TESTING WITH THE GEOTECHNICAL ENGINEER. TESTS WILL BE REQUIRED PURSUANT WITH THE TESTING REQUIREMENTS AS SHOWN ON THE ENGINEERING CONSTRUCTION DRAWINGS AND SPECIFICATIONS. UPON COMPLETION OF THE WORK, THE GEOTECHNICAL ENGINEER SHALL SUBMIT CERTIFICATIONS TO THE ENGINEER, STATING THAT ALL REQUIREMENTS HAVE BEEN MET.</p> <p>25. THE SUBCONTRACTOR SHALL REVIEW THE SOIL REPORTS AND BORINGS PRIOR TO BIDDING THE PROJECT AND COMMENCING CONSTRUCTION.</p> <p>26. THE SUBCONTRACTOR SHALL MAINTAIN A COPY OF THE APPROVED PLANS AND PERMITS AT THE CONSTRUCTION SITE. THE SUBCONTRACTOR SHALL MAINTAIN A "RED LINED" COPY OF THE APPROVED PLANS FOR USE IN PREPARING RECORD PLANS AT THE COMPLETION OF THE PROJECT.</p> <p>27. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. THE SUBCONTRACTOR IS SOLELY RESPONSIBLE FOR MEANS AND METHODS FOR CONSTRUCTION SITE SAFETY AND SHALL MAINTAIN IN COMPLIANCE WITH OSHA AND RES STANDARDS AT ALL TIMES.</p> <p>28. IT SHALL BE THE SOLE RESPONSIBILITY OF THE SUBCONTRACTOR TO COMPLY AND ENFORCE ALL APPLICABLE SAFETY REGULATIONS. THE ABOVE INFORMATION HAS BEEN PROVIDED FOR THE SUBCONTRACTOR'S INFORMATION ONLY AND DOES NOT IMPLY THAT RES OR THE ENGINEER WILL INSPECT AND/OR ENFORCE SAFETY REGULATIONS.</p> <p>CLEARING AND EROSION CONTROL NOTES</p> <p>1. PRIOR TO ANY SITE CLEARING, ALL TREES SHOWN TO REMAIN ON THE CONSTRUCTION PLANS SHALL BE PROTECTED IN ACCORDANCE WITH THE CONTRACT REQUIREMENTS AND DETAILS CONTAINED IN THESE PLANS. IT SHALL BE THE SUBCONTRACTOR'S RESPONSIBILITY TO MAINTAIN THESE TREES IN GOOD CONDITION. NO TREES SHOWN TO REMAIN SHALL BE REMOVED WITHOUT WRITTEN APPROVAL FROM THE OWNER.</p> <p>2. THE SUBCONTRACTOR SHALL CLEAR AND GRUB ONLY THOSE PORTIONS OF THE SITE NECESSARY FOR CONSTRUCTION. DISTURBED AREAS WILL BE SEED, MULCHED, OR PLANTED WITH OTHER APPROVED LANDSCAPE MATERIAL IMMEDIATELY FOLLOWING CONSTRUCTION.</p> <p>3. THE TOPSOIL REMOVED DURING CLEARING AND GRUBBING SHALL BE STOCKPILED AT A SITE DESIGNATED BY RES TO BE USED FOR LANDSCAPING PURPOSES, UNLESS OTHERWISE DIRECTED BY RES.</p> <p>4. DURING REMOVAL, STOCKPILING, AND REPLACEMENT OF TOPSOIL THE SUBCONTRACTOR SHALL EMPLOY MEANS, METHODS AND TRAINED PERSONNEL TO ENSURE THAT NO SUBGRADE MATERIALS ARE MIXED INTO TOPSOIL. TOPSOIL THICKNESS AND QUALITY PRIOR TO CONSTRUCTION SHALL BE REESTABLISHED AT THE COMPLETION OF CONSTRUCTION ACTIVITIES.</p> <p>5. THE SUBCONTRACTOR IS TO OBTAIN ALL NECESSARY PERMITS FOR REMOVING ANY EXISTING STRUCTURES.</p> <p>6. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO NOTIFY ALL UTILITY COMPANIES TO DISCONNECT OR REMOVE THEIR FACILITIES PRIOR TO REMOVING OR DEMOLISHING ANY EXISTING STRUCTURES FROM THE SITE. RES WILL ASSIST IN COMMUNICATION WITH LANDOWNER REGARDING PRIVATE UTILITY.</p> <p>7. THE SUBCONTRACTOR WILL BE RESPONSIBLE FOR MAKING A VISUAL INSPECTION OF THE SITE AND WILL BE RESPONSIBLE FOR THE DEMOLITION AND REMOVAL OF ALL UNDERGROUND AND ABOVE GROUND STRUCTURES THAT WILL NOT BE INCORPORATED WITH THE NEW FACILITIES. SHOULD ANY DISCREPANCIES EXIST WITH THE PLANS, THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR REQUESTING A CLARIFICATION OF THE PLANS FROM THE ENGINEER PRIOR TO DEMOLITION.</p> <p>8. ALL EROSION AND SILTATION CONTROL METHODS SHALL BE IMPLEMENTED PRIOR TO THE START OF CONSTRUCTION AND MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.</p> <p>9. SUBCONTRACTOR IS TO PROVIDE EROSION CONTROL/SEDIMENTATION BARRIER (HAY BALES OR SILTATION CURTAIN) TO PREVENT SILTATION OF ADJACENT PROPERTY, STREETS, STORM SEWERS, WATERWAYS, AND EXISTING WETLANDS. IN ADDITION, THE SUBCONTRACTOR SHALL PLACE STRAW, MULCH, OR OTHER SUITABLE MATERIAL ON THE GROUND IN AREAS WHERE CONSTRUCTION RELATED TRAFFIC IS TO ENTER AND EXIT THE SITE. IF, IN THE OPINION OF THE ENGINEER AND/OR LOCAL AUTHORITIES, EXCESSIVE QUANTITIES OF EARTH ARE TRANSPORTED OFF-SITE EITHER BY NATURAL DRAINAGE OR BY VEHICULAR TRAFFIC, THE SUBCONTRACTOR IS TO REMOVE SAID EARTH TO THE SATISFACTION OF THE ENGINEER AND/OR AUTHORITIES.</p> <p>10. IF WIND EROSION BECOMES SIGNIFICANT DURING CONSTRUCTION, THE SUBCONTRACTOR SHALL STABILIZE THE AFFECTED AREA USING SPRINKLING, IRRIGATION, OR OTHER ACCEPTABLE METHODS.</p> <p>11. THERE IS TO BE NO DISCHARGE (I.E. PUMPING, SHEET FLOW, SWALE, DITCH, ETC.) INTO THE EXISTING STORM WATER MANAGEMENT SYSTEM, UNLESS OTHERWISE ALLOWED BY THE CONTRACT DOCUMENTS. PERMITTED DISCHARGE SHOULD BE IN COMBINATION WITH THE USE OF SETTLING PONDS. A SETTLING POND PLAN MUST BE SUBMITTED AND APPROVED BY THE ENGINEER OF RECORD AND LOCAL REGULATORY AGENCY PRIOR TO CONSTRUCTION IF THE SUBCONTRACTOR DESIRES TO DISCHARGE INTO EXISTING SYSTEMS.</p>					<p>GRADING AND DRAINAGE NOTES AND REQUIREMENTS</p> <p>1. ALL DELETERIOUS SUBSTANCE MATERIAL (I.E. MUCK, PEAT, BURIED DEBRIS) IS TO BE EXCAVATED IN ACCORDANCE WITH THESE PLANS, OR AS DIRECTED BY THE ENGINEER OR SOIL TESTING COMPANY. DELETERIOUS MATERIAL IS TO BE STOCKPILED OR REMOVED FROM THE SITE AS DIRECTED BY RES. EXCAVATED AREAS ARE TO BE BACKFILLED WITH APPROVED MATERIALS AND COMPACTED AS SHOWN ON THESE PLANS.</p> <p>2. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXCAVATIONS AGAINST COLLAPSE AND WILL PROVIDE BRACING, SHEETING, OR SHORING, AS NECESSARY. TRENCHES SHALL BE KEPT DRY WHILE PIPE AND APPURTENANCES ARE BEING PLACED. DEWATERING SHALL BE USED AS REQUIRED.</p> <p>3. ALL DRAINAGE STRUCTURES GRATES AND COVERS WITHIN TRAFFIC AREAS SHALL BE DIRECT TRAFFIC RATED FOR H520 LOADINGS.</p> <p>4. THE STORM DRAINAGE PIPING SHALL BE SUBJECT TO A VISUAL INSPECTION BY THE ENGINEER PRIOR TO THE PLACEMENT OF BACKFILL. THE SUBCONTRACTOR IS TO NOTIFY THE ENGINEER 48 HOURS IN ADVANCE TO SCHEDULE AN INSPECTION.</p> <p>5. THE SUBCONTRACTOR SHALL MAINTAIN THE STORM DRAINAGE SYSTEMS UNTIL FINAL ACCEPTANCE OF THE PROJECT.</p> <p>6. THE SUBCONTRACTOR IS RESPONSIBLE FOR COORDINATING THE APPLICABLE TESTING WITH THE GEOTECHNICAL ENGINEER. TESTS WILL BE REQUIRED PURSUANT WITH THE TESTING SCHEDULE FOUND IN THE ENGINEERING CONSTRUCTION DRAWINGS. UPON COMPLETION OF THE WORK, THE GEOTECHNICAL ENGINEER MUST SUBMIT CERTIFICATIONS TO THE ENGINEER STATING THAT ALL REQUIREMENTS HAVE BEEN MET.</p> <p>7. ALL MATERIAL USED FOR STRUCTURAL FILL AND EMBANKMENT CONSTRUCTION SHOULD BE NON-DISPERSIVE, AND SHOULD BE FREE OF ORGANIC MATERIAL (TREES, STUMPS AND ROOTS), DEBRIS, OR OTHER DELETERIOUS MATTER, AND SHOULD BE PROCESSED BEFORE PLACEMENT SO IT IS REASONABLY UNIFORM IN COMPOSITION AND MOISTURE CONTENT. THE SOIL FILL SHOULD HAVE A PLASTICITY INDEX BETWEEN 5 AND 28 AND A MAXIMUM PARTICLE SIZE OF 3 INCHES, AND CLASSIFY AS AN SC, SM OR CL MATERIAL. SOILS CLASSIFYING AS ML TEND TO BE SUSCEPTIBLE TO EROSION AND DISPERSION, AND SHOULD NOT BE USED AS STRUCTURAL FILL UNLESS BLENDED WITH OTHER ONSITE SOILS TO CREATE A MORE "COHESIVE" SOIL. ROCK FILL SHALL BE WELL GRATED WITH PARTICLES NO GREATER THAN 6".</p> <p>8. SOILS USED FOR ENGINEERED FILL SHOULD BE UNIFORMLY MOISTURE-CONDITIONED TO WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT, PLACED IN HORIZONTAL LIFTS LESS THAN 12 INCHES IN LOOSE THICKNESS (6-INCH COMPACTED THICKNESS), AND COMPACTED TO AT LEAST 90 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557.</p> <p>9. MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT WILL BE DETERMINED THE GEOTECHNICAL TESTING AGENCY AND APPROVED BY RES ENGINEERING FOR EACH TYPE OF FILL MATERIAL ENCOUNTERED.</p> <p>10. SOIL COMPACTION TESTING SHALL BE COMPLETED USING THE METHOD DESCRIBED IN ASTM D638-10 (STANDARD TEST METHOD) FOR IN-PLACE DENSITY AND WATER CONTENT OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS OR OTHER SUITABLE METHOD APPROVED BY ENGINEER USING A PROBE DEPTH OF 12-INCHES OR GREATER.</p> <p>11. WHERE APPLICABLE, SITE DRAINAGE SHALL BE DIRECTED TO EXISTING DRAWS AND DRAINAGE WAYS.</p> <p>12. IN THE CASE NO TOPOGRAPHICAL RELIEF IS AVAILABLE, STORM RUNOFF SHALL BE COLLECTED IN THE DITCHES ALONG THE ROADWAY AND ALLOWED TO INFILTRATE THE GROUND TO THE EXISTING SUBSURFACE DRAINAGE SYSTEM.</p> <p>SEEDING NOTES</p> <p>1. SEED ALL DISTURBED AREAS AS SOON AS POSSIBLE AFTER LAND-DISTURBING ACTIVITIES ARE COMPLETED. SEE STATE AND/OR LOCAL STANDARD SPECIFICATIONS FOR SEEDING REQUIREMENTS.</p> <p>2. PROTECT AND CARE FOR SEEDING AREAS, INCLUDING REQUIREMENT FOR TEMPORARY WATERING UNTIL ACCEPTANCE OF WORK, RESEED AS NECESSARY TO MEET SITE STABILIZATION.</p> <p>3. VEGETATION IS CONSIDERED ESTABLISHED WITH A MINIMUM OF 75% COVERAGE, NO BARE SPOTS EXCEEDING 32 SQUARE FEET AND GRASS IS 1-1/2" TALL.</p> <p>SUBGRADE PREPARATION NOTES:</p> <p>1. TOP SOIL UNDERCUT DEPTH DEPENDS ON SITE CONDITIONS. FOR PROPOSED ROADS, UNDERCUT EXISTING TOP SOIL 4-6 INCHES. IF ROCK PROTRUSIONS ARE PRESENT, LEVEL BY MECHANICAL RIPPING OR HAMMERING.</p> <p>2. WHERE APPLICABLE, THE STRIPPED TOPSOIL AND/OR UNSUITABLE MATERIAL SHALL BE STOCK PILED IN DESIGNATED AREAS FOR FUTURE USE AND SITE RECLAMATION.</p> <p>3. ALL SUB-GRADE SURFACES AND SHOULDERS SHALL BE COMPACTED WITH A SMOOTH DRUM ROLLER.</p> <p>4. COMPACTED SUBGRADE SURFACE SHALL BE CROWNED AND ALLOW FOR POSITIVE DRAINAGE.</p> <p>5. THE SUB-GRADE SURFACE SHALL BE PROOF-ROLLED USING RUBBER TRED EQUIPMENT WEIGHING A MINIMUM OF 25 TONS AND SHALL BE NUCLEAR DENSITY TESTED EVERY 1,000 FT WITH A MINIMUM OF 3 PER ROAD.</p> <p>6. IN THE EVENT THE PROOF-ROLL TEST IS UNACHIEVABLE OR YIELDS EXCESSIVE RUTTING, THE SUB-GRADE CBR VALUE SHALL BE VERIFIED WITH FIELD DCP TESTING OR AN APPROVED ALTERNATIVE METHOD.</p>					<p>•DCP TESTING SHALL OCCUR EVERY 500 FT PER ASTM D6951. ONE TEST IS SUITABLE FOR ROADS SHORTER THAN 500 FT.</p> <p>•SOFT AND UNSUITABLE SUB-GRADES (CBR < 0.9%) SHALL BE STABILIZED USING IMPORTED EARTH FILL OR SCARIFYING, CONDITIONING, AND COMPACTED AS DESCRIBED IN THE GEOTECHNICAL REPORT PRIOR TO PLACING GEOGRID.</p> <p>ROAD CONSTRUCTION NOTES:</p> <p>1. MINIMUM 1.0% ROADWAY CROSS SLOPE TO ALLOW DRAINAGE. ROAD BASE MINIMUM THICKNESS SHALL BE MAINTAINED ACROSS THE ROAD SECTION.</p> <p>2. ALL ROADS TO BE CONSTRUCTED IN LIFTS OF A MAX. THICKNESS UP TO 10 INCHES (AFTER COMPACTION).</p> <p>3. THE ROADBED SHALL BE CONSTRUCTED OF NATIVE MATERIALS EXCAVATED FROM THE ROAD ALIGNMENT, PAD SITES AND WTG FOUNDATIONS.</p> <p>4. THE MAXIMUM STONE SIZE TO BE USED IN EMBANKMENTS SHALL BE 9" OR 1/2 THE FILL HEIGHT, WHICHEVER IS SMALLER.</p> <p>5. ROCK SHALL BE PLACED IN LIFTS NO GREATER THAN 18" AND EACH LIFT SHALL BE THOROUGHLY COMPACTED WITH HEAVY TRACKED EQUIPMENT UNTIL DENSE AND STABLE.</p> <p>6. THE ROADBEDS SHALL BE CONSTRUCTED AND COMPACTED TO SUPPORT WTG COMPONENT DELIVERY TRUCKS, CRANE TRAVEL AND OTHER APPLICABLE LOADS.</p> <p>7. ROAD MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.</p> <p>8. WHERE UNDERGROUND CABLES OR UTILITIES CROSS THE ROAD, THE BACKFILL MATERIAL OVER THE UTILITY SHALL BE COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS PER MODIFIED PROCTOR (ASTM D 1557).</p> <p>9. POST CONSTRUCTION, SUBCONTRACTOR TO SCARIFY AND SEED SHOULDERS PREVIOUSLY USED FOR CRANE WALK.</p> <p>10. WHERE ROAD CROSSES EXISTING BURIED PIPELINE, A MINIMUM OF 4 FT. BACKFILL, COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS PER MODIFIED PROCTOR (ASTM D 1557) OR ENGINEER APPROVED ALTERNATIVE.</p>				

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS			 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROULETTE COUNTY, NORTH DAKOTA</small>	THIS MAP/DRAWING IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.	SHEET 2 OF 25 GENERAL NOTES	REV														
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E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN																												
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN																												
														 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROULETTE COUNTY, NORTH DAKOTA</small>			PROJECT NO: 23053 WTG LAYOUT NO: PUS4bdw077		ENERGY SUPPLY ENGINEERING & CONSTRUCTION		23053D3502	F												

[D:\proj\23053\DWG\Internal\Series 3\CONTROLLED DPA-III\RES-2305303508.dwg] [Date] [Jun 03, 2014 - 3:39pm]



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B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN											
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN											
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN											
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN											
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN											

Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROULETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1"=2000'	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

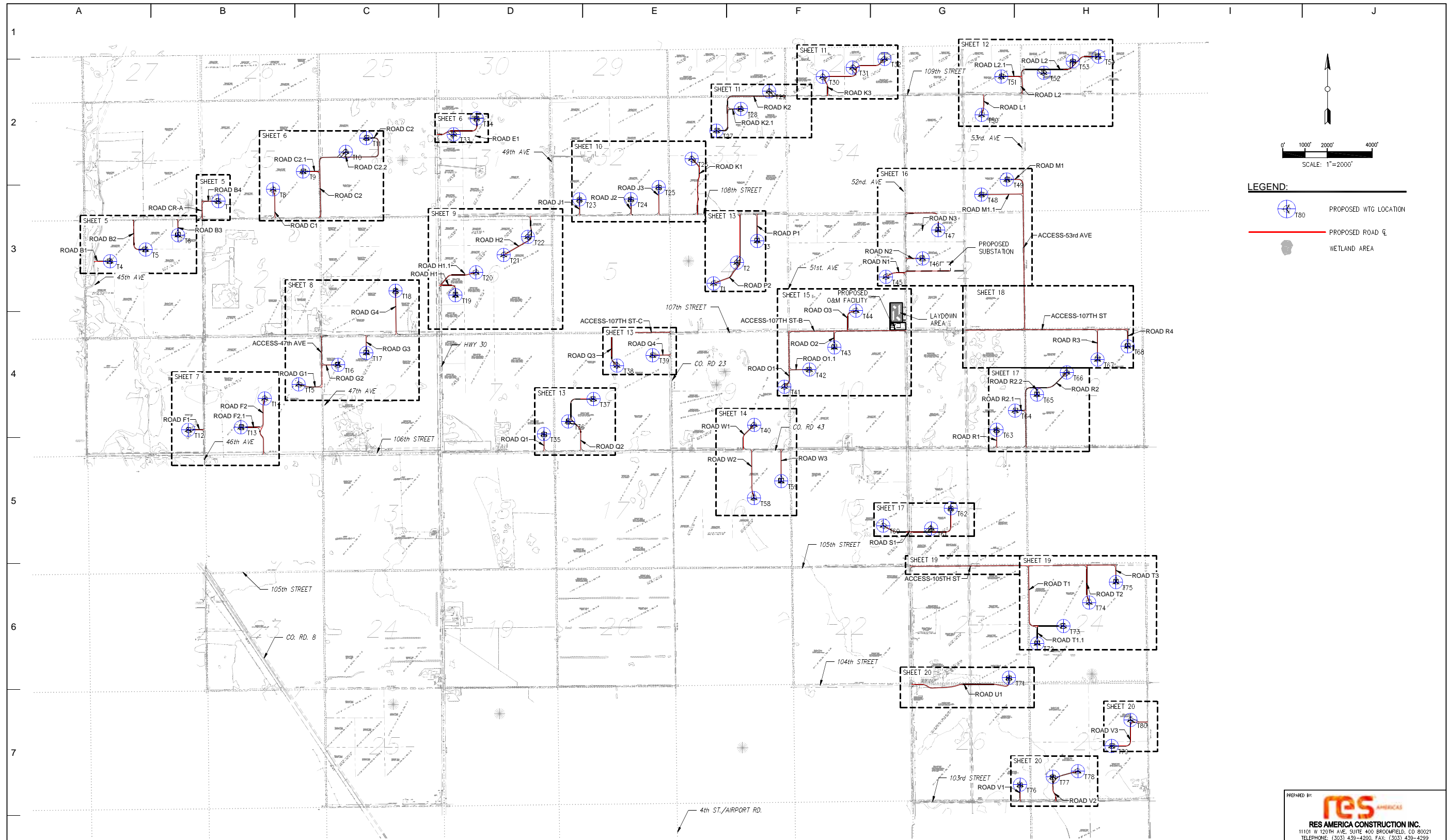
PROJECT NO: 23053 WTG LAYOUT NO: PUS4bdw077

OVERALL SITE PLAN
 SHEET 3 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

23053D3508

REV F

[U:\MID-FARIS\USA\North Dakota - Border Winds\23053\DWG\Internal\SERIES 3\CONTROLLED DRA\1105\2305303509.dwg] [Date] [Jun 03, 2014 - 3:49pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- WETLAND AREA

PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUS4bdw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS			
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B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN											
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN											
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN											
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN											
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN											

Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROULETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
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PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1"=2000'	

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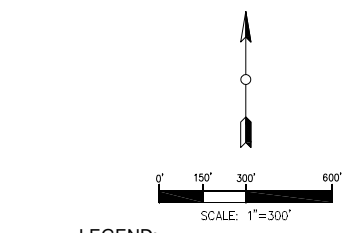
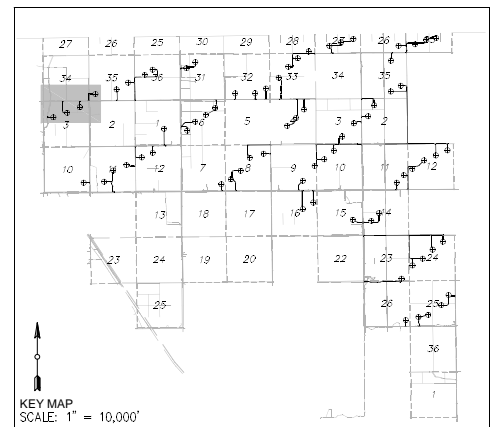
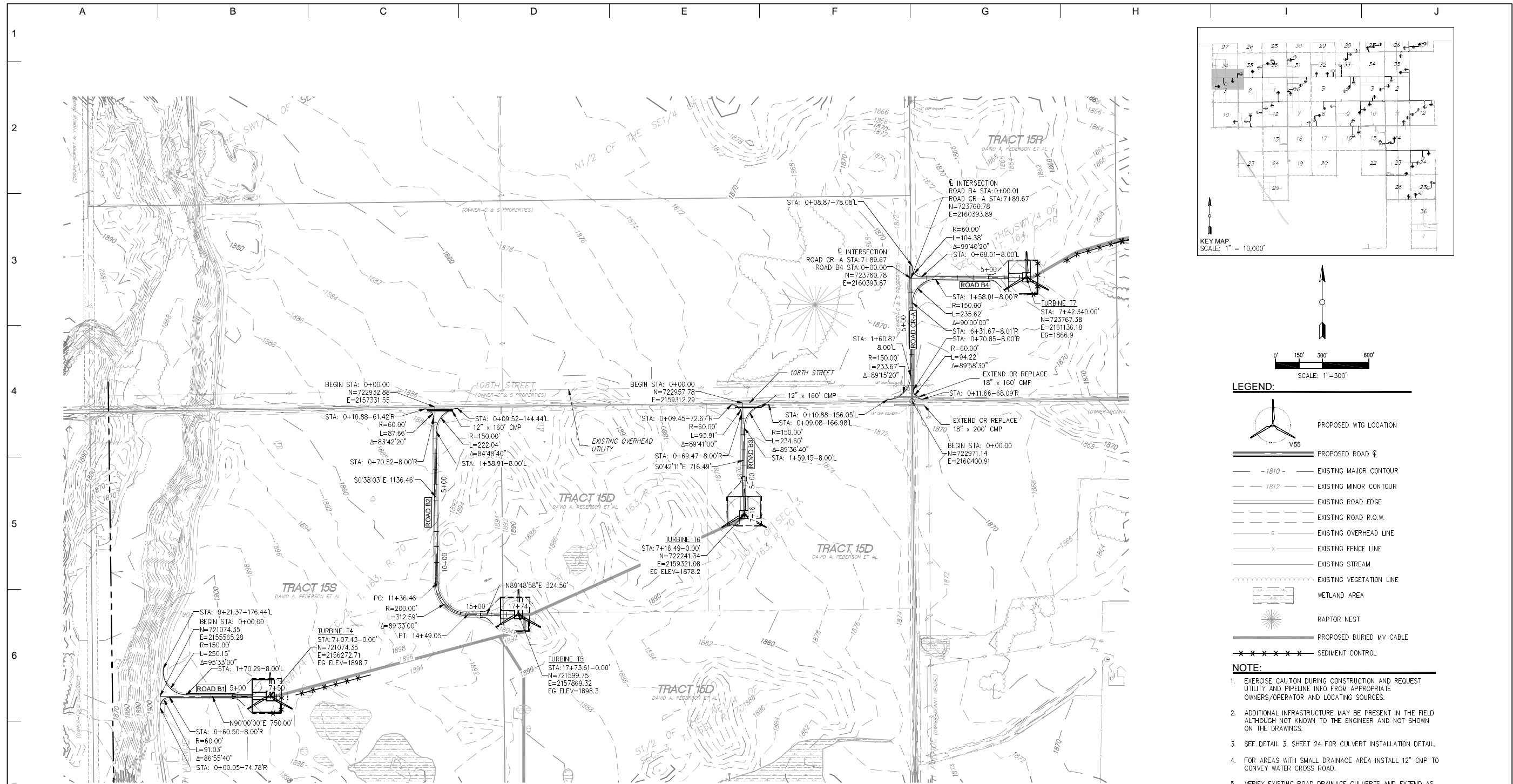
ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3509

SHEET INDEX
 SHEET 4 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

REV F

[U:\MID_F-RIVS\USA\North Dakota - Border Winds_23053\DWG\Interim\Series_3\CONTROLLED-DP\NINGS_23053D3521.dwg] [D:\DWG\2014 - 3-4-14]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

NOTE:

1. EXERCISE CAUTION DURING CONSTRUCTION AND REQUEST UTILITY AND PIPELINE INFO FROM APPROPRIATE OWNERS/OPERATOR AND LOCATING SOURCES.
2. ADDITIONAL INFRASTRUCTURE MAY BE PRESENT IN THE FIELD ALTHOUGH NOT KNOWN TO THE ENGINEER AND NOT SHOWN ON THE DRAWINGS.
3. SEE DETAIL 3, SHEET 24 FOR CULVERT INSTALLATION DETAIL.
4. FOR AREAS WITH SMALL DRAINAGE AREA INSTALL 12" CMP TO CONVEY WATER CROSS ROAD.
5. VERIFY EXISTING ROAD DRAINAGE CULVERTS AND EXTEND AS NEEDED TO ACHIEVE NEW ROAD WIDTH USING EQUAL SIZE PIPES.



PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE. SUITE 400 BROWNFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUSAbw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN										
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN										
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN										
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: PC DATE: 05-22-14 CHK: N/A DATE: N/A
 ENG: MN DATE: 05-22-14 CHK: RB DATE: 05-22-14
 PM: BT DATE: 05-22-14 PROJ. NO: 23053
 APVD: MN DATE: 05-22-14 SCALE: 1" = 300'

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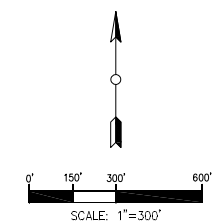
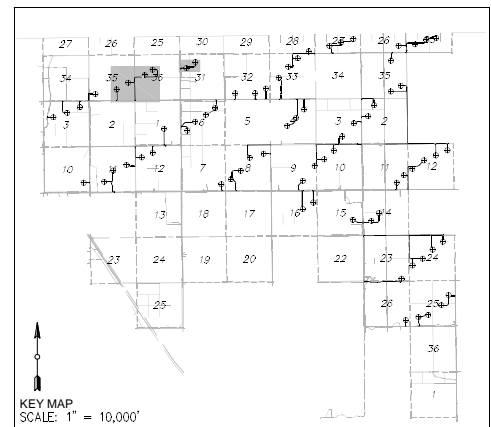
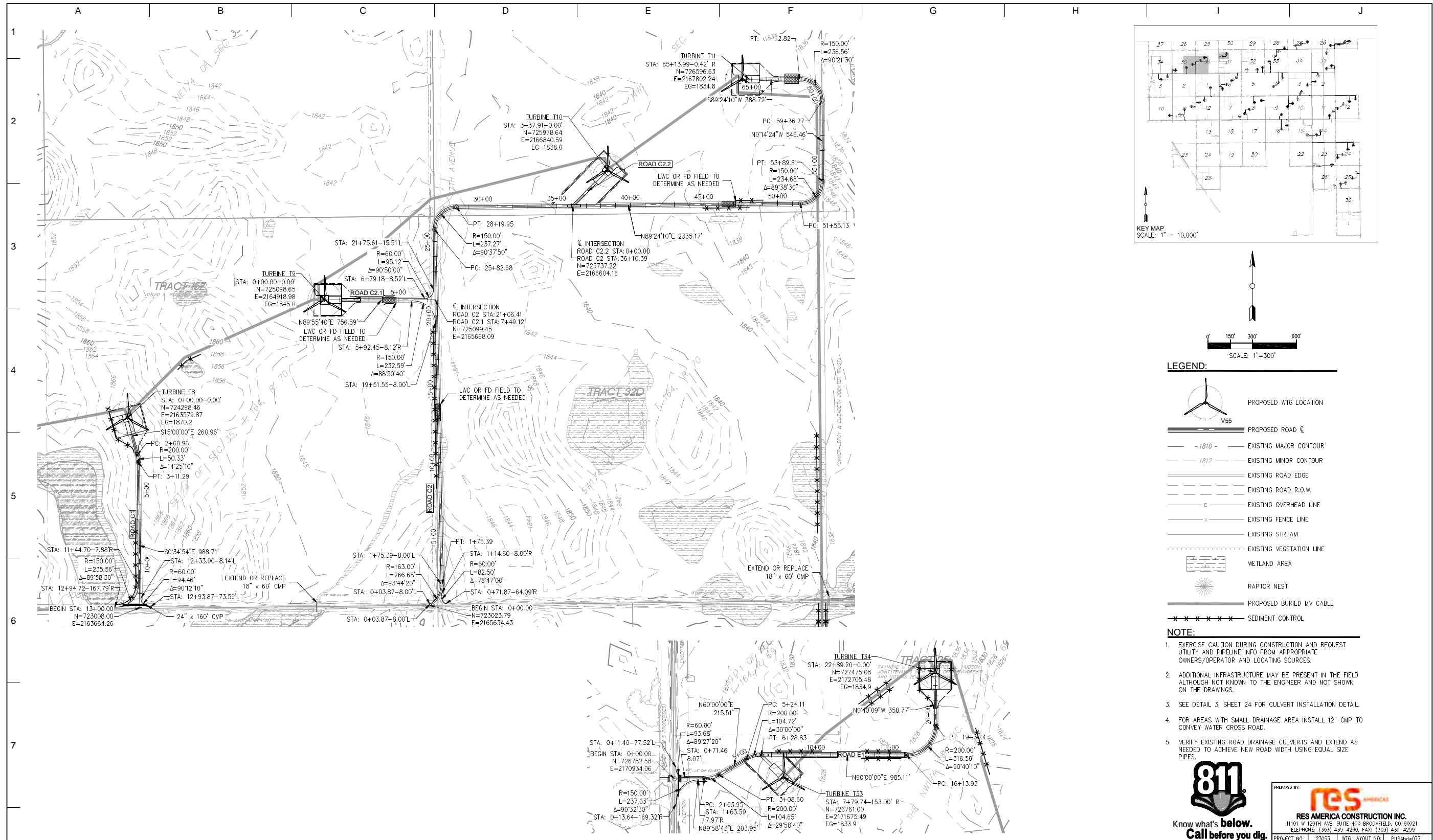
ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3521

ROADS B1-B4_A2-A3_CRA
 SHEET 5 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

REV F

[D:\WIND\F-RUS\USA\North Dakota - Border Winds - Wind Energy\Series 3\CONTROLLED DFN\INNOV_23053\3D52.dwg] [Plot: 03_2014 - 3:45pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

NOTE:

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PREPARED BY:

RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE. SUITE 400 BROWNFIELD, CO 80021
 TELEPHONE: (303) 439-4200 FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUS4h4077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS			
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B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN											
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN											
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN											
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN											
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN											

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

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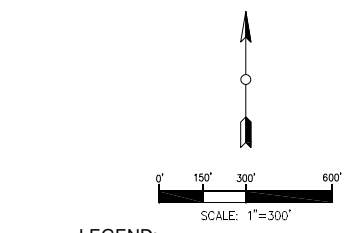
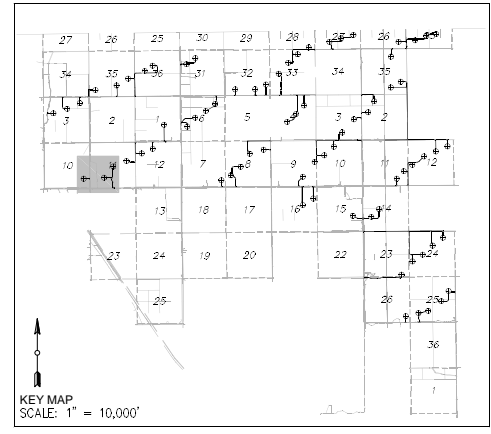
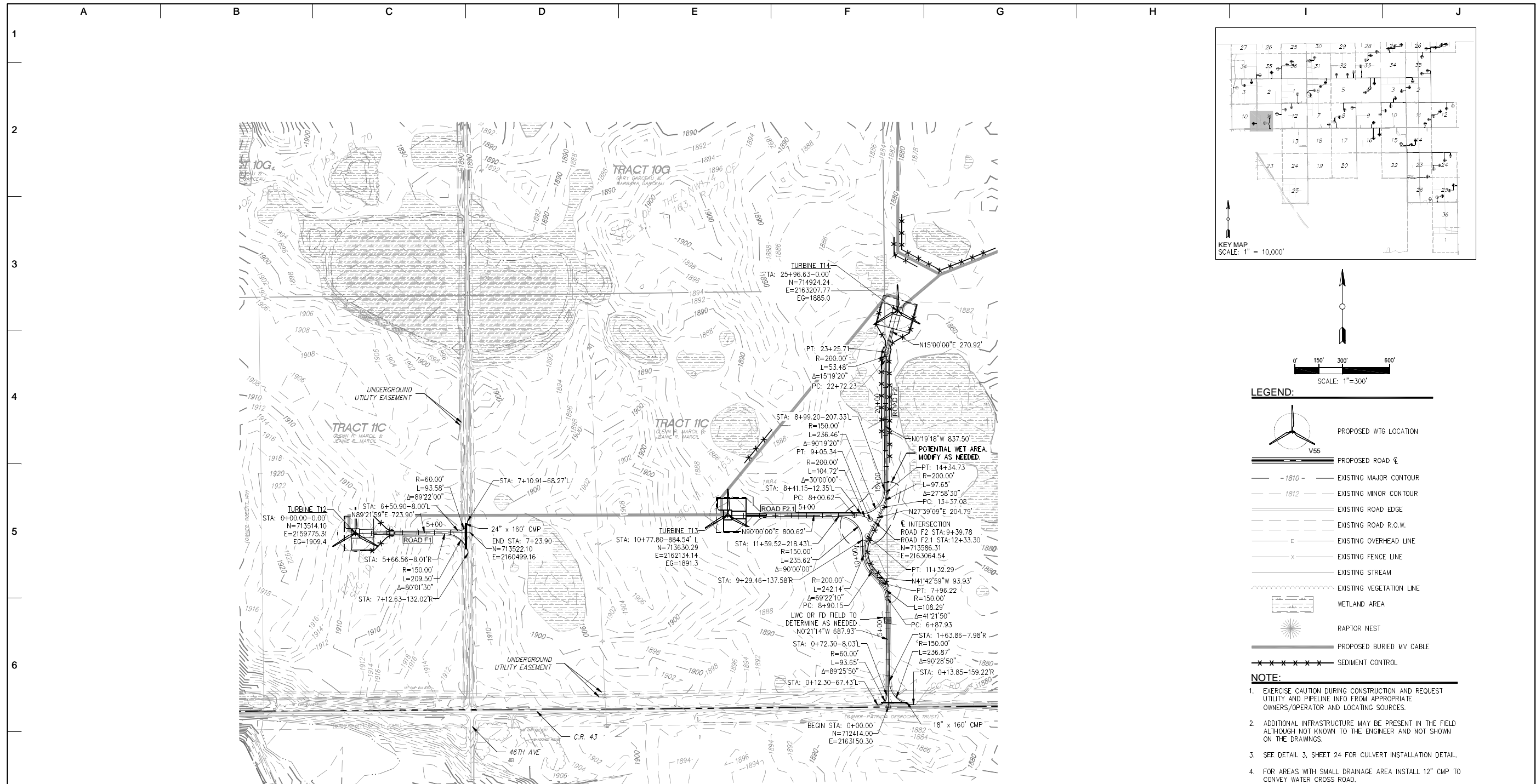
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PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3522

SHEET 6 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS
 REV F

[U:\WIND_FARM\USA\North Dakota - Border Winds_23053\DWG\Internal\Series_3\CONTROLLED DRAWINGS_23053D3523.dwg] [bolder] [Jun 03, 2014 - 3:46pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

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RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROWNFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUSAb4w077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN										
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN										
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

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811
 Know what's below.
 Call before you dig.

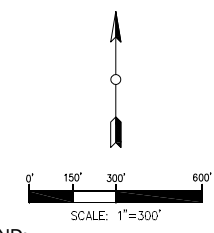
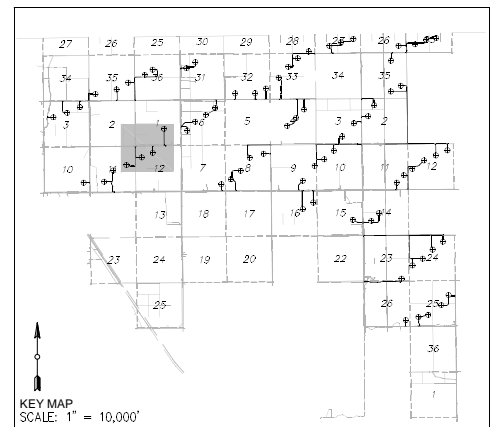
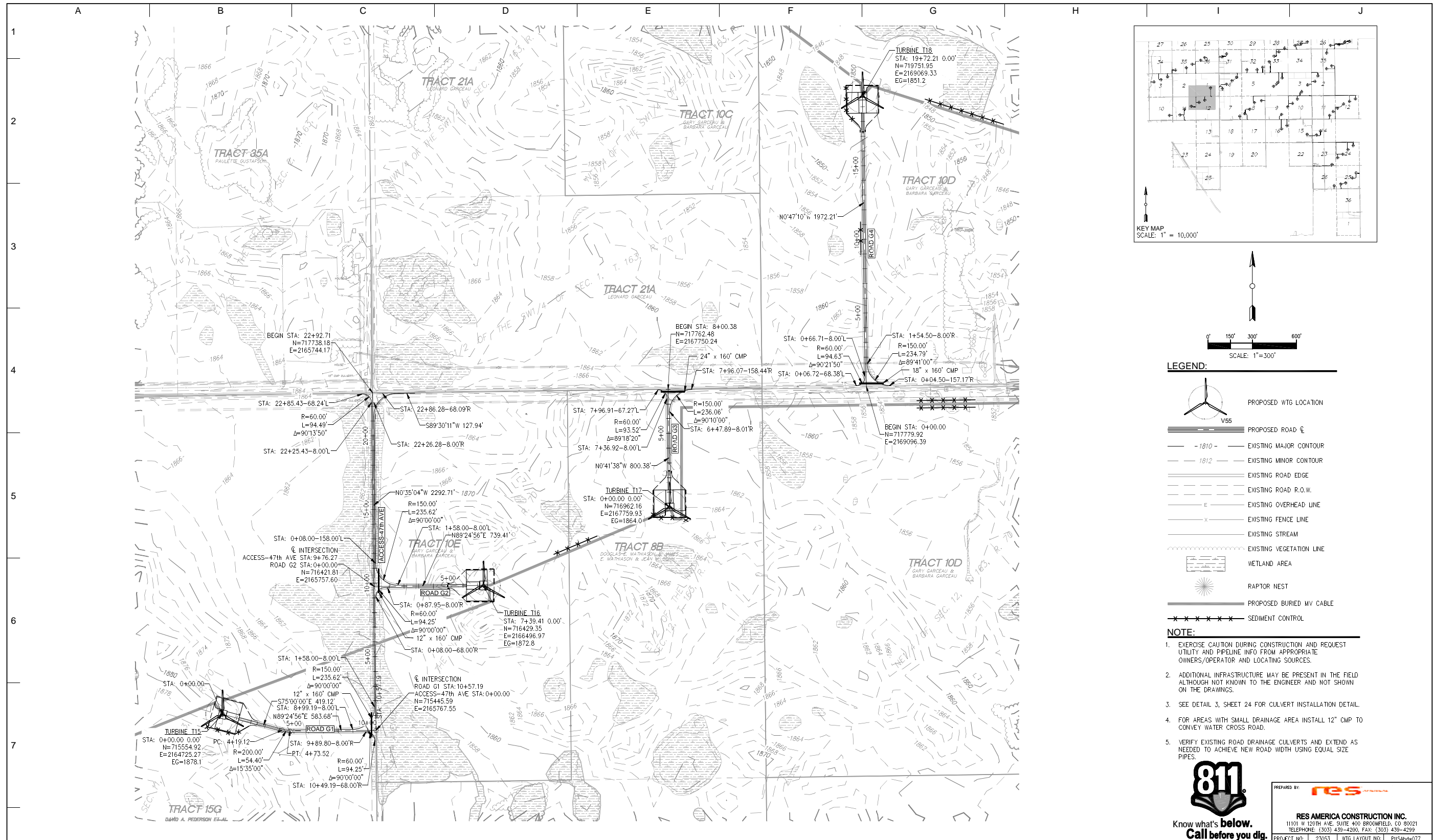
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PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3523

ROADS F1-F2, F2.1
 SHEET 7 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

[U:\WIND\F-RPUS\USA\North Dakota - Border Winds - V55\Internal\Series 3\CONTROLLED DRAWINGS\23053D3524.dwg] [Plotter] [Jun 03, 2014 - 3:47pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C/L
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

NOTE:

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Know what's below.
Call before you dig.

PREPARED BY: **res**
RES AMERICA CONSTRUCTION INC.
11101 W 120TH AVE. SUITE 400 BROWFIELD, CO 80021
TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
PROJECT NO: 23053 WTG LAYOUT NO: PUSAbdw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN										
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D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

DWN: PC DATE: 05-22-14 CHK: N/A DATE: N/A
ENG: MN DATE: 05-22-14 CHK: RB DATE: 05-22-14
PM: BT DATE: 05-22-14 PROJ. NO: 23053
APVD: MN DATE: 05-22-14 SCALE: 1" = 300'

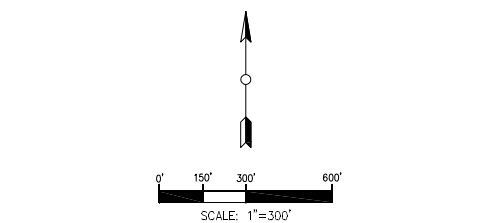
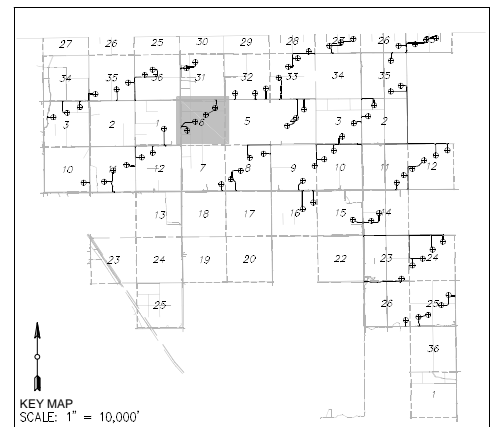
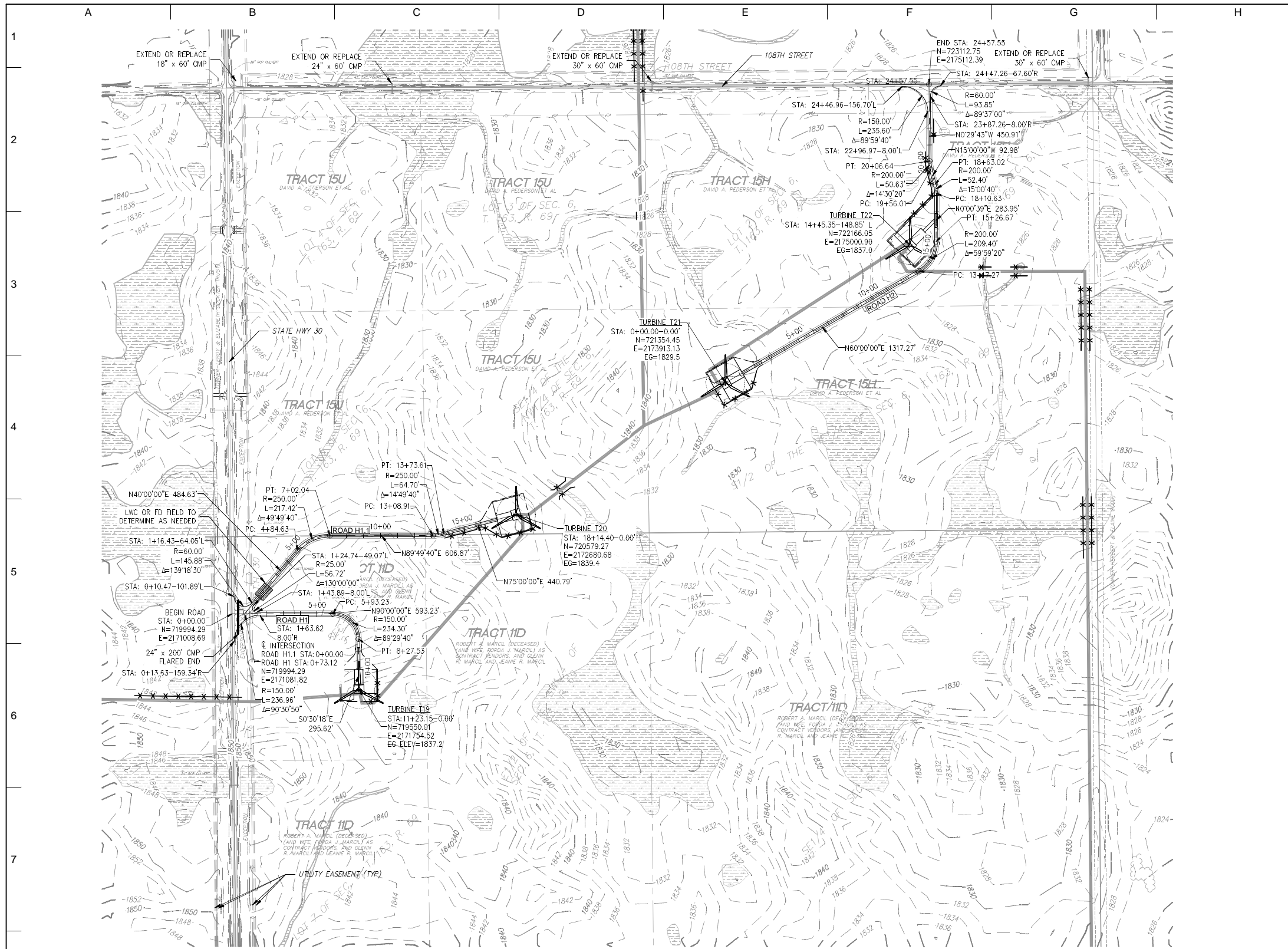
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**8 - ROADS G2-G4
SHEET 8 OF 25
CIVIL CONSTRUCTION PLANS & DETAILS**

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

23053D3524

REV
F



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
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RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE. SUITE 400 BROWNFIELD, CO 80021
 TELEPHONE: (303) 439-4200 FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUS4b4w077

[D:\WIND\F-RUS\USA\North Dakota - Border WINDS_23053\DWG\Internal\SERIES_3\CONTROLLED\DF\ANIMOS_2305303525.dwg] [Plotter] [Sun 03, 2014 - 3:48pm]

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN										
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

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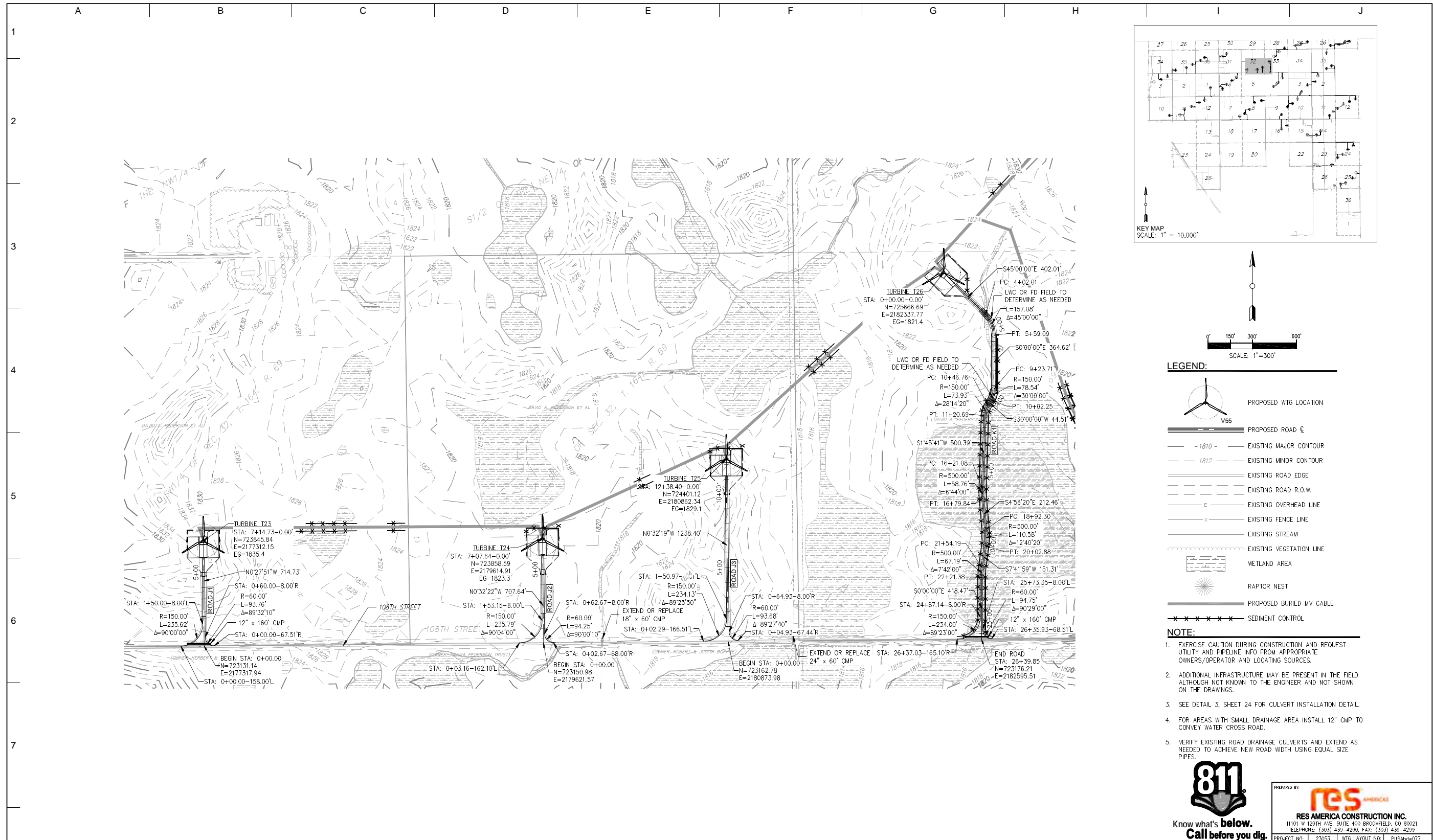
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APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

23053D3525

ROADS H1-H2_H1.1
SHEET 9 OF 25
CIVIL CONSTRUCTION PLANS & DETAILS

[D:\Wind\F-RUS\USA\North Dakota - Border Winds_23053\DWG\Internal\SERIES_3\CONTROLLED_DWG\1005_23053D3526.dwg] [11/03/2014 3:45pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
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 - FOR AREAS WITH SMALL DRAINAGE AREA INSTALL 12" CMP TO CONVEY WATER CROSS ROAD.
 - VERIFY EXISTING ROAD DRAINAGE CULVERTS AND EXTEND AS NEEDED TO ACHIEVE NEW ROAD WIDTH USING EQUAL SIZE PIPES.

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN	
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN	
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN	
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN	
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN	
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN	

REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: PC DATE: 05-22-14 CHK: N/A DATE: N/A
 ENG: MN DATE: 05-22-14 CHK: RB DATE: 05-22-14
 PM: BT DATE: 05-22-14 PROJ. NO: 23053
 APVD: MN DATE: 05-22-14 SCALE: 1"=300'

811
 Know what's below.
 Call before you dig.

PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE. SUITE 400 BROWNFIELD, SD 57021
 TELEPHONE: (503) 439-4200, FAX: (503) 439-4299

PROJECT NO: 23053 WTG LAYOUT NO: PUSAbw077

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

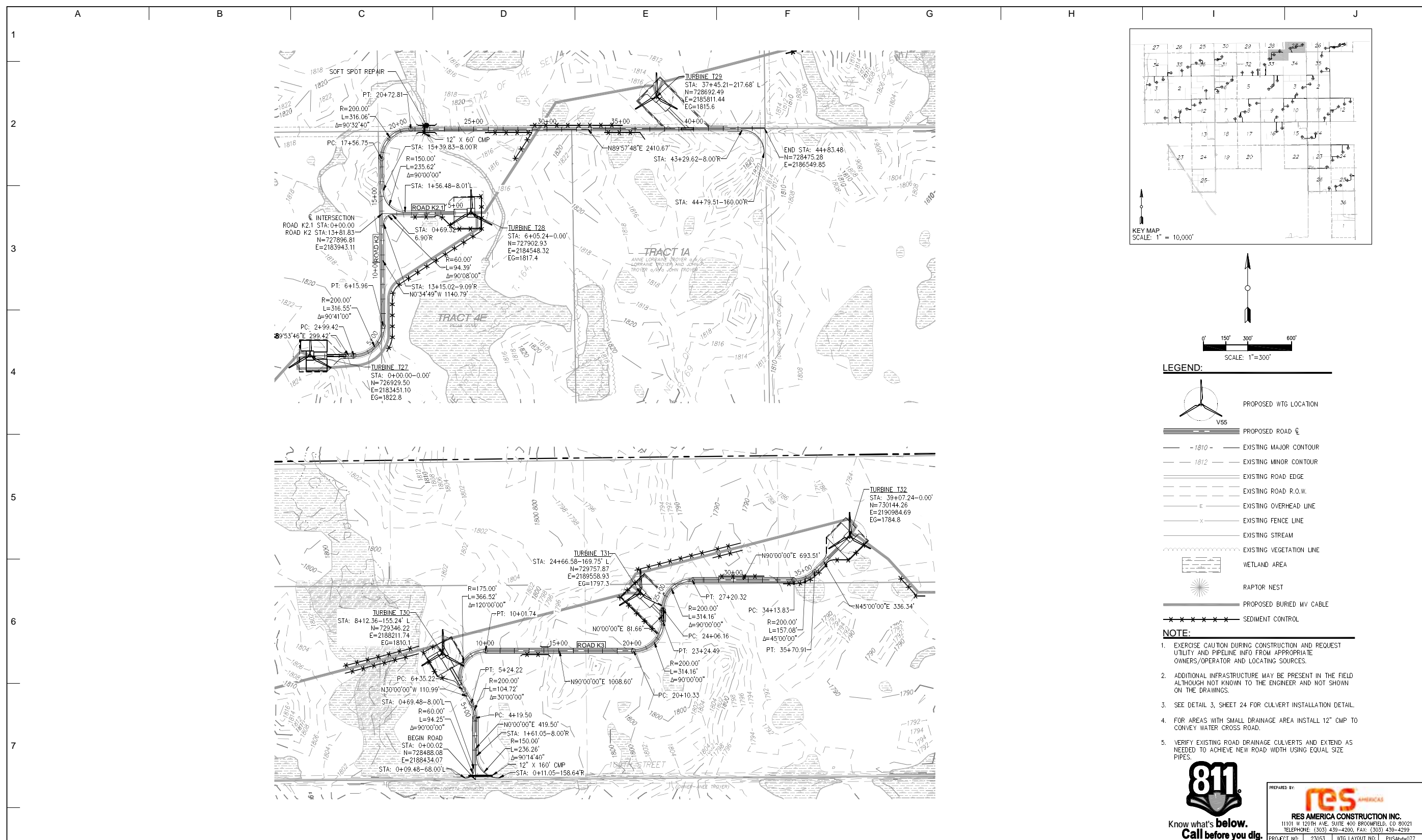
ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3526

ROADS J1-J3_K1
 SHEET 10 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

REV: F

[U:\WIND_F:\RIS\USA\North Dakota - Border Winds - Wind Energy] SERIES: 3, CONTROLLED DRAWINGS, 23053D3527.dwg



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
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11101 W 127TH AVE, SUITE 400 BROWNFIELD, CO 80021

TELEPHONE: (303) 439-4200, FAX: (303) 439-4298

PROJECT NO: 23053 WTG LAYOUT NO: PUSAbdw077

SHEET 11 OF 25

CIVIL CONSTRUCTION PLANS & DETAILS

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN										
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN										
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN										
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER

BORDER WINDS - WIND ENERGY PROJECT

ROLETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

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ENERGY SUPPLY

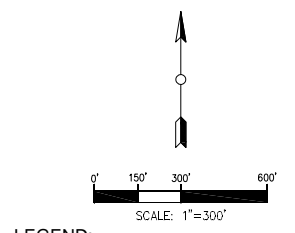
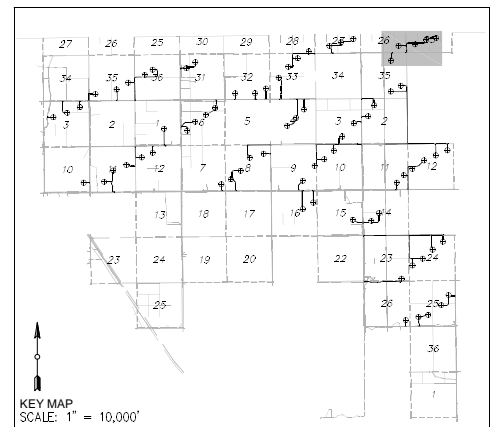
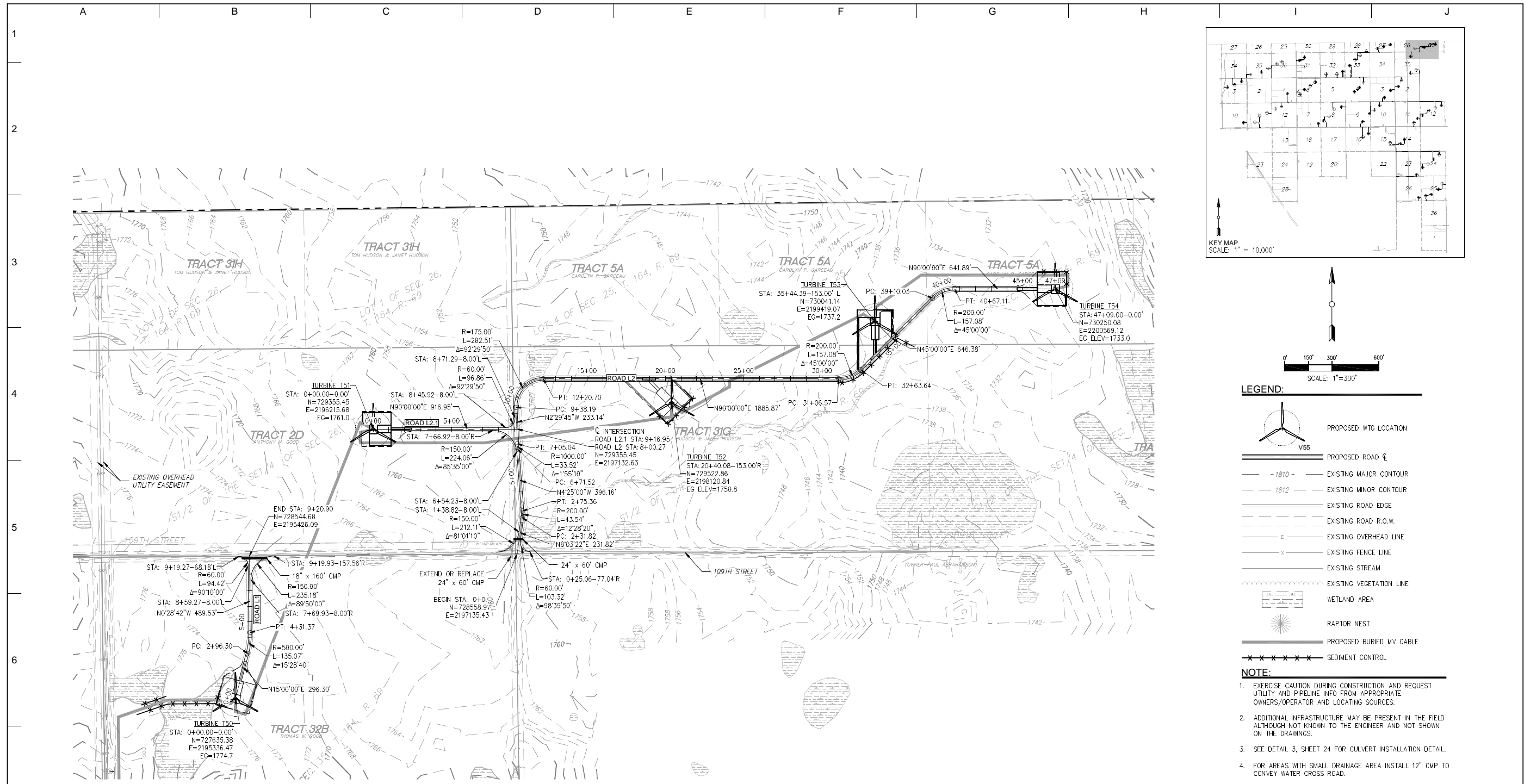
ENGINEERING & CONSTRUCTION

23053D3527

REV

F

[U:\MID F-RHS\USA\North Dakota - Border Winds - Wind Energy\Internal\Series_3\CONTROLLED DRAWINGS\23053D3528.dwg] [Jun 03, 2014 - 4:05pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C/L
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
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 PROJECT NO: 23053 WTG LAYOUT NO: PUSAbdw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
														DWG NO.	MANUFACTURER	DESCRIPTION
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E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

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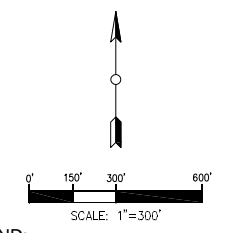
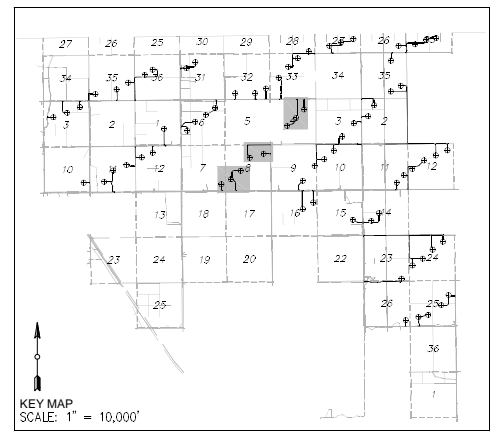
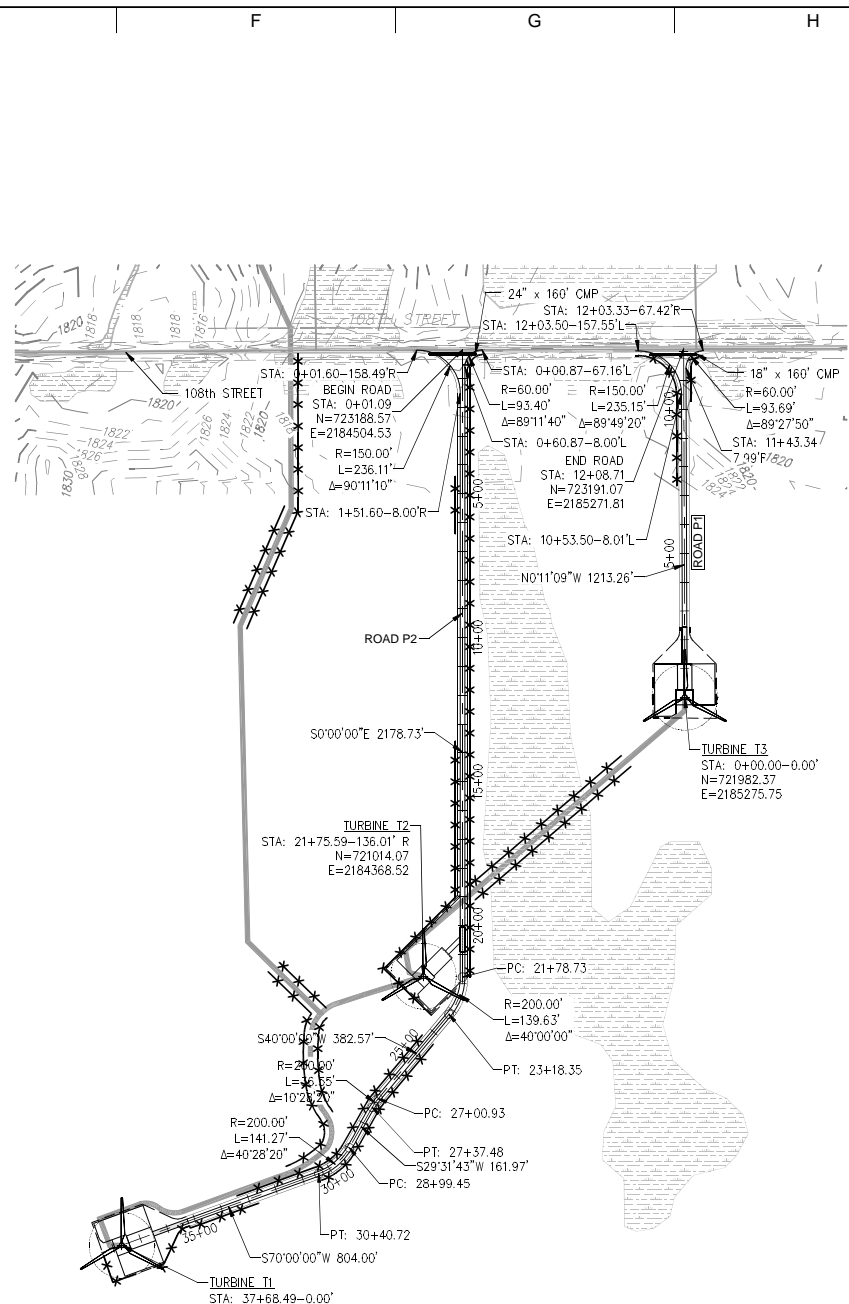
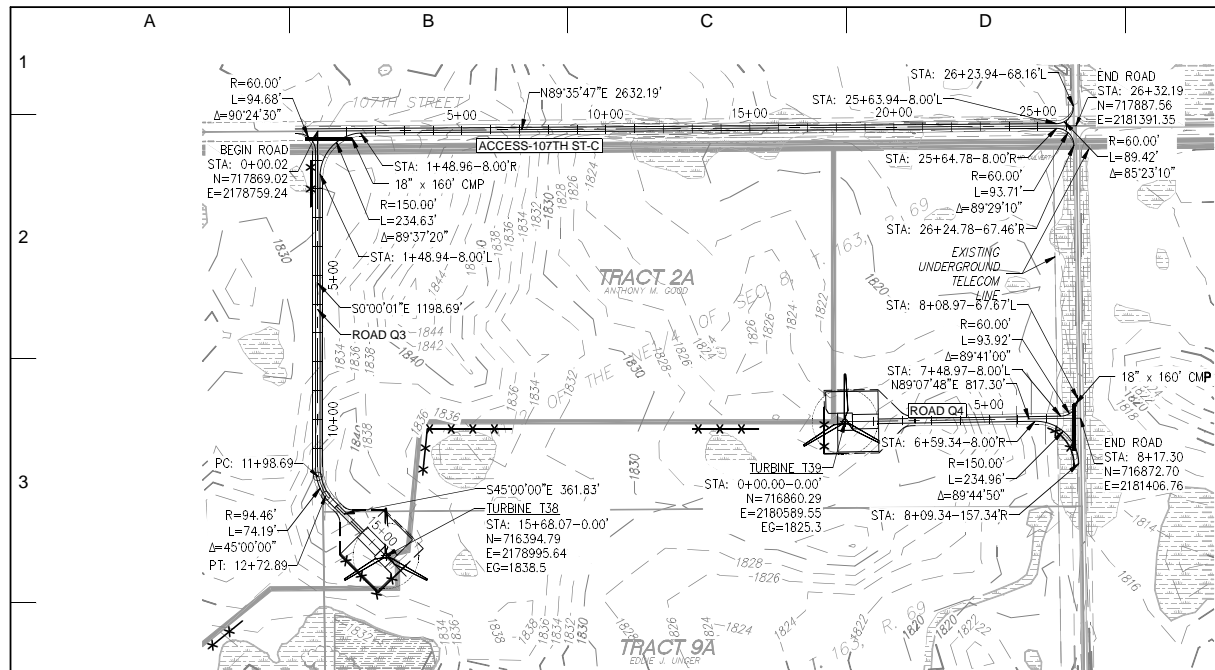
ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

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 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

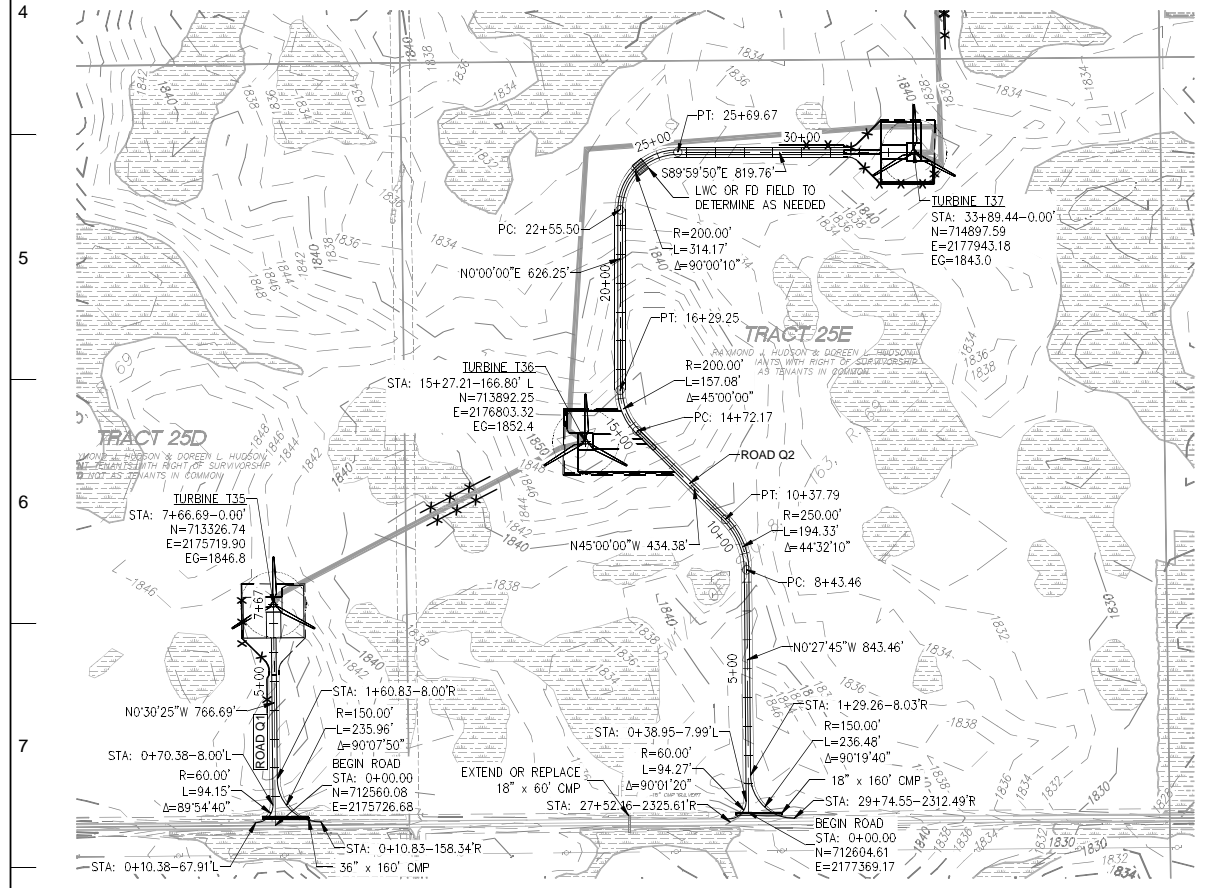
PROJECT NO: 23053 WTG LAYOUT NO: PUSAbdw077

23053D3528

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1"= 300'	



- LEGEND:**
- PROPOSED WTG LOCATION
 - PROPOSED ROAD C
 - EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - EXISTING ROAD EDGE
 - EXISTING ROAD R.O.W.
 - EXISTING OVERHEAD LINE
 - EXISTING FENCE LINE
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A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN							
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D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN							
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN							
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN							

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

811
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PREPARED BY:
RES AMERICA
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROWFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

PROJECT NO: 23053 WTG LAYOUT NO: PUSAbw077

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ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

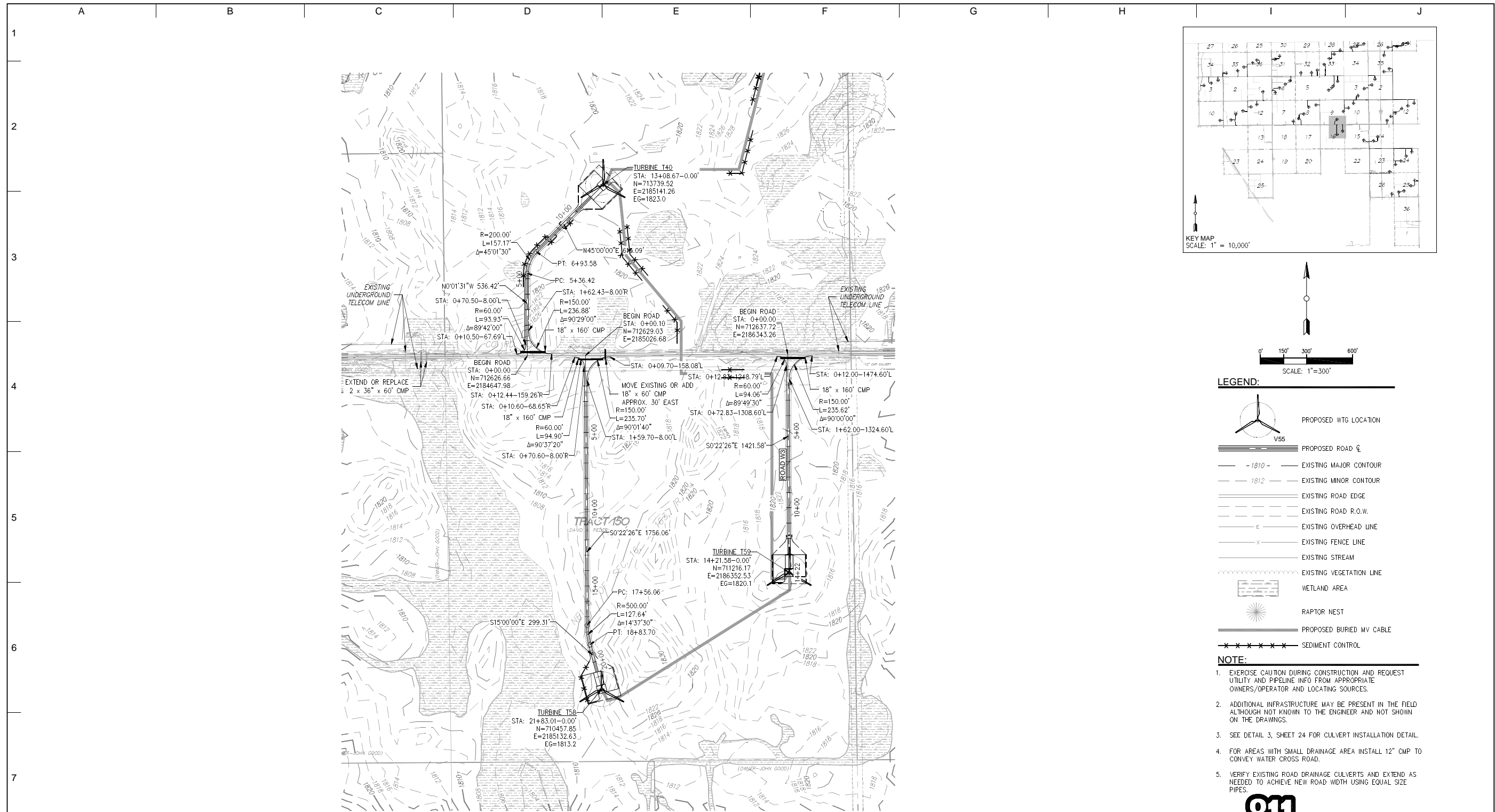
23053D3530

ROADS Q1-Q4_P1 & P2
 SHEET 13 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

REV F

[D:\WIND\F-RUS\USA\North Dakota - Border Winds - Wind Energy\Series 3\CONTROLLED DRAWINGS\23053D3530.dwg] [Plot: Jun 03, 2014 - 3:54pm]

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LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C/L
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
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NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

811
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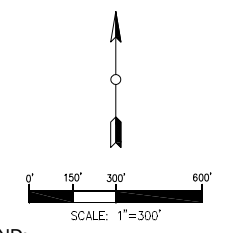
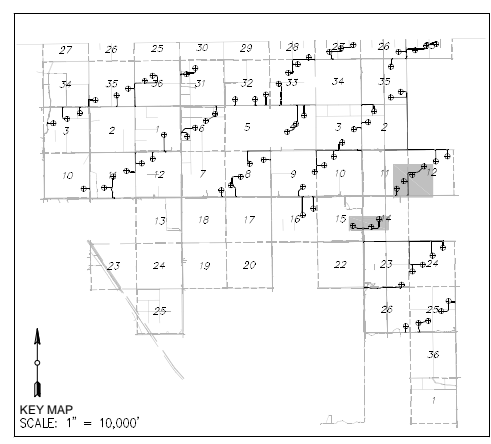
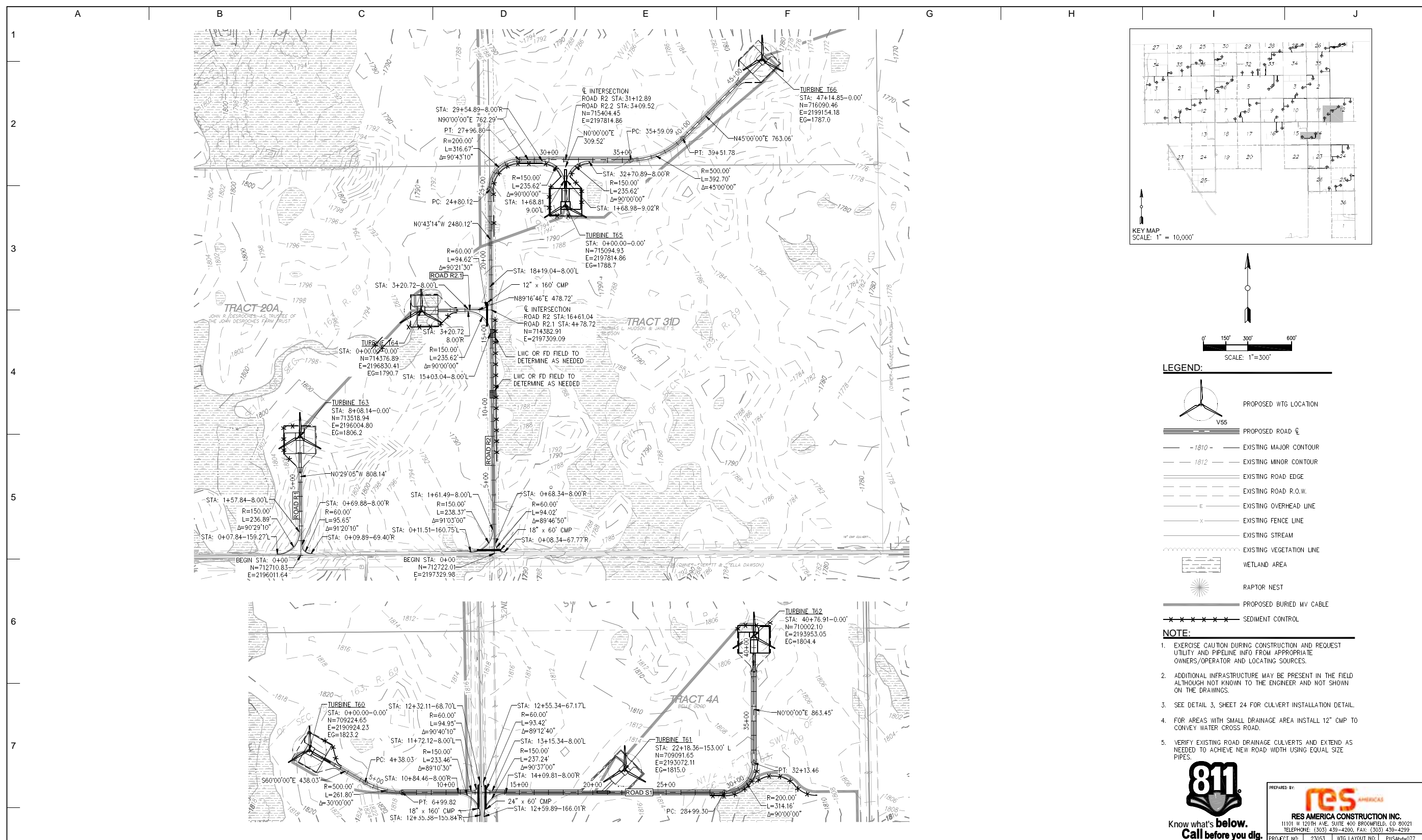
RES AMERICA CONSTRUCTION INC.
11101 W 120TH AVE. SUITE 400 BROWNFIELD, CO 80021
TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

PROJECT NO: 23053 | WTG LAYOUT NO: PUSAbdw077

**ROADS W1-W3
SHEET 14 OF 25
CIVIL CONSTRUCTION PLANS & DETAILS**

23053D3531

[U:\WIND_F:\RIS\USA\North Dakota - Border Winds - Wind Energy\Series 3\CONTROLLED-DRAWINGS\23053D3534.dwg] [D:\w\wind_f_ris\usa\North Dakota - Border Winds - Wind Energy\Series 3\CONTROLLED-DRAWINGS\23053D3534.dwg] [D:\w\wind_f_ris\usa\North Dakota - Border Winds - Wind Energy\Series 3\CONTROLLED-DRAWINGS\23053D3534.dwg]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
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 PROJECT NO: 23053 WTG LAYOUT NO: PUSAbdw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
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NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

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ROADS R1-R2.2, S1
SHEET 17 OF 25
CIVIL CONSTRUCTION PLANS & DETAILS

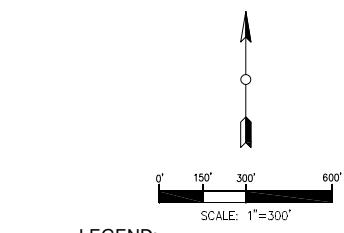
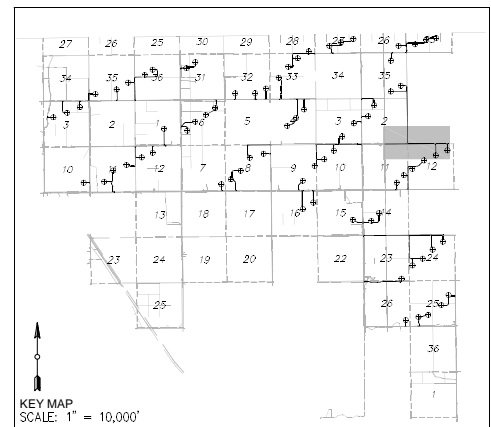
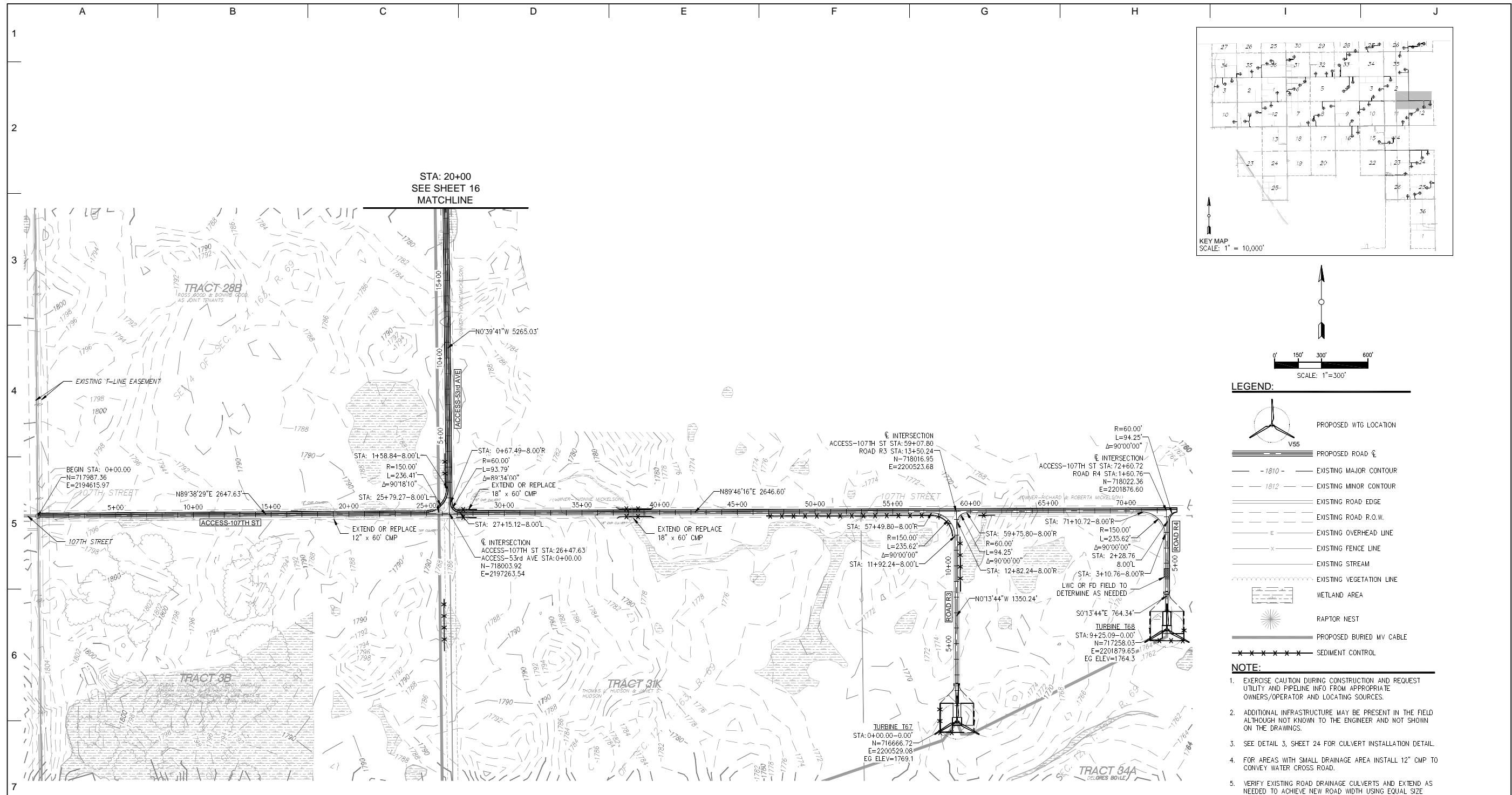
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PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

23053D3534

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[D:\WORK\F-RUS\USA\North Dakota - Border Winds - Wind Internal\Series 3\CONTROLLED DRAWINGS_23053D3535.dwg] [Plot: Jun 03, 2014 - 4:02pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
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NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS			
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Xcel Energy
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 ROLETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

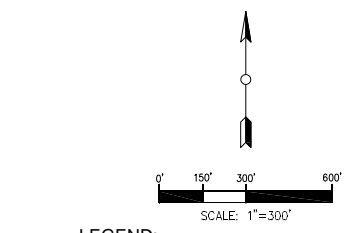
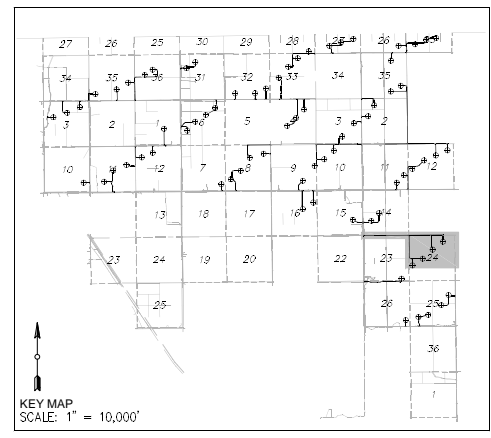
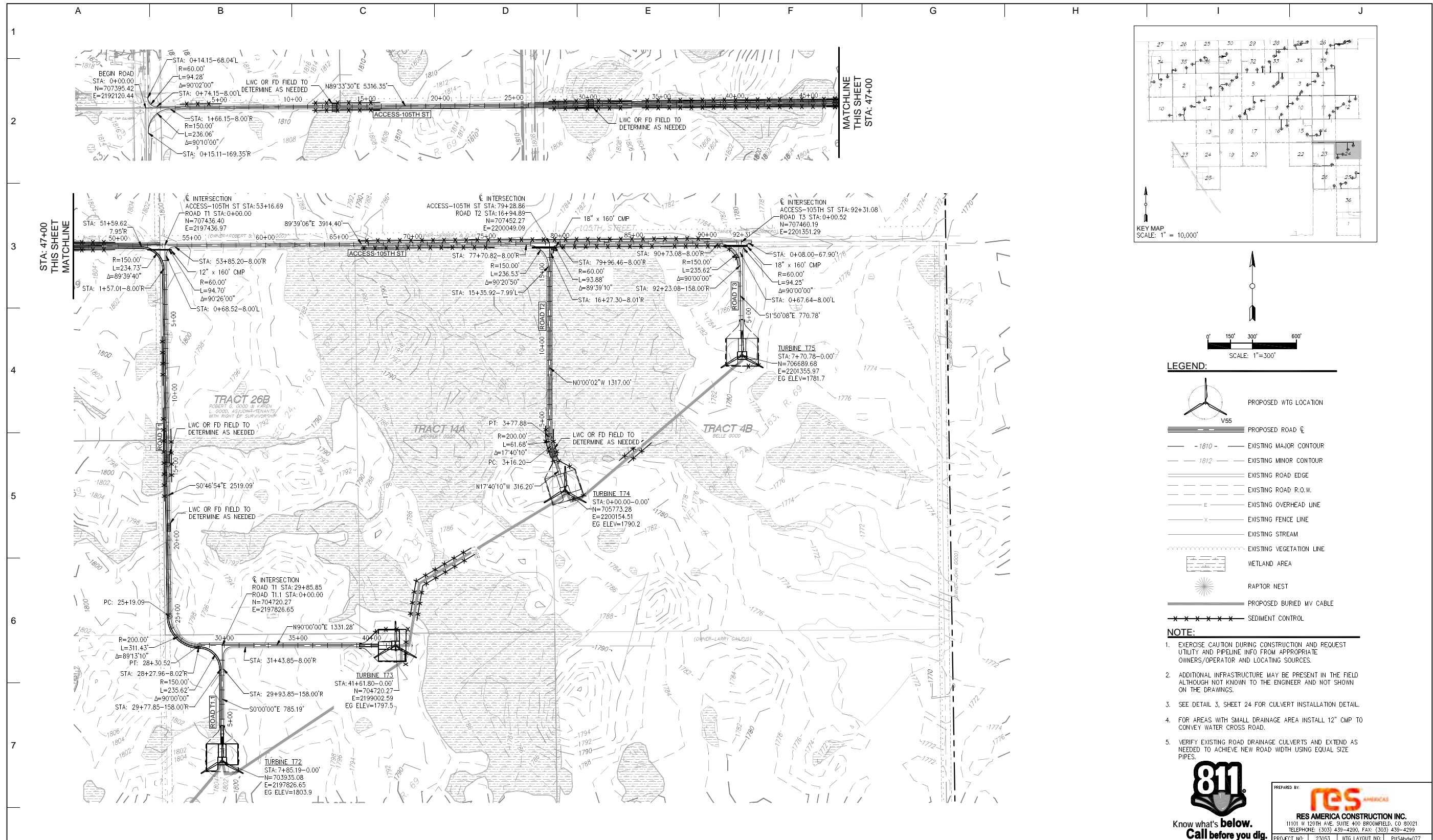
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ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3535

R3-R4 & ACCESS-107TH ST & 53RD AVE
 SHEET 18 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

REV: F



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

NOTE:

1. EXERCISE CAUTION DURING CONSTRUCTION AND REQUEST UTILITY AND PIPELINE INFO FROM APPROPRIATE OWNERS/OPERATOR AND LOCATING SOURCES.
2. ADDITIONAL INFRASTRUCTURE MAY BE PRESENT IN THE FIELD ALTHOUGH NOT KNOWN TO THE ENGINEER AND NOT SHOWN ON THE DRAWINGS.
3. SEE DETAIL 3, SHEET 24 FOR CULVERT INSTALLATION DETAIL.
4. FOR AREAS WITH SMALL DRAINAGE AREA INSTALL 12" CMP TO CONVEY WATER CROSS ROAD.
5. VERIFY EXISTING ROAD DRAINAGE CULVERTS AND EXTEND AS NEEDED TO ACHIEVE NEW ROAD WIDTH USING EQUAL SIZE PIPES.



PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE. SUITE 400 BROWNFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
 PROJECT NO: 23053 WTG LAYOUT NO: PUSAb4w077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS		
														DWG NO.	MANUFACTURER	DESCRIPTION
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN										
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN										
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN										
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN										
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN										
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN										

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

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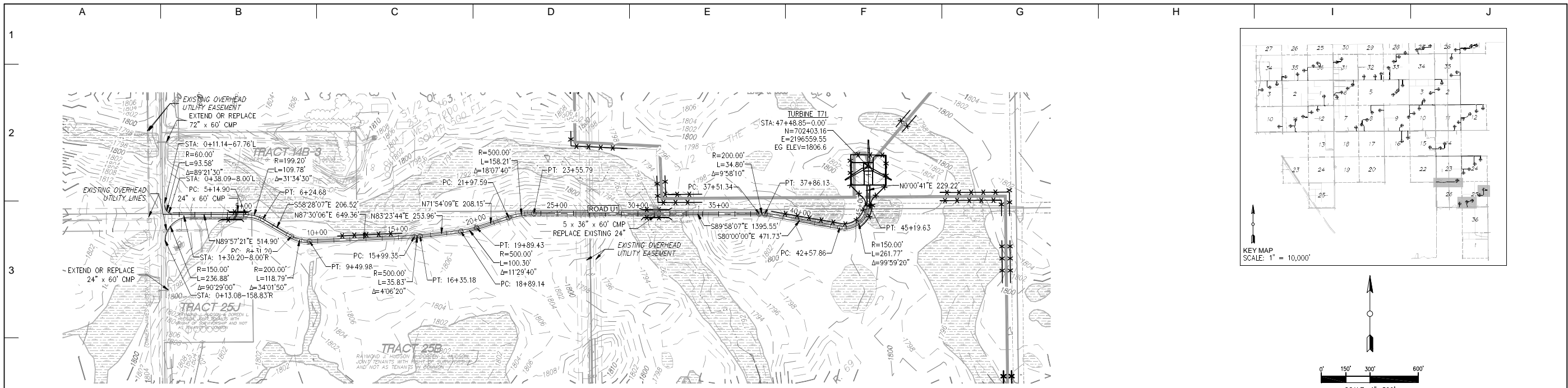
DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1" = 300'	

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

23053D3536

ACCESS-105TH ST-B & ROADS T1-T3, T1.1
 SHEET 19 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

[D:\WIND\F-RUS\USA\North Dakota - Border Winds_23053\DWG Internal\SERIES_3\CONTROLLED DFN\INWG_23053D3536.dwg] [Plot: Jun 03, 2014 - 4:03pm]



LEGEND:

- PROPOSED WTG LOCATION
- PROPOSED ROAD C/L
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING ROAD EDGE
- EXISTING ROAD R.O.W.
- EXISTING OVERHEAD LINE
- EXISTING FENCE LINE
- EXISTING STREAM
- EXISTING VEGETATION LINE
- WETLAND AREA
- RAPTOR NEST
- PROPOSED BURIED MV CABLE
- SEDIMENT CONTROL

NOTE:

- EXERCISE CAUTION DURING CONSTRUCTION AND REQUEST UTILITY AND PIPELINE INFO FROM APPROPRIATE OWNERS/OPERATOR AND LOCATING SOURCES.
- ADDITIONAL INFRASTRUCTURE MAY BE PRESENT IN THE FIELD ALTHOUGH NOT KNOWN TO THE ENGINEER AND NOT SHOWN ON THE DRAWINGS.
- SEE DETAIL 3, SHEET 24 FOR CULVERT INSTALLATION DETAIL.
- FOR AREAS WITH SMALL DRAINAGE AREA INSTALL 12" CMP TO CONVEY WATER CROSS ROAD.
- VERIFY EXISTING ROAD DRAINAGE CULVERTS AND EXTEND AS NEEDED TO ACHIEVE NEW ROAD WIDTH USING EQUAL SIZE PIPES.

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN							
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN							
C	ISSUED FOR 90% DESIGN REVIEW	ALL	04-15-14	PC	RB	MN							
D	ISSUED FOR 100% DESIGN REVIEW	ALL	05-09-14	PC	RB	MN							
E	ISSUED FOR NPDES PERMITTING	ALL	05-22-14	PC	RB	MN							
F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN							

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

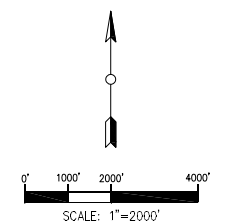
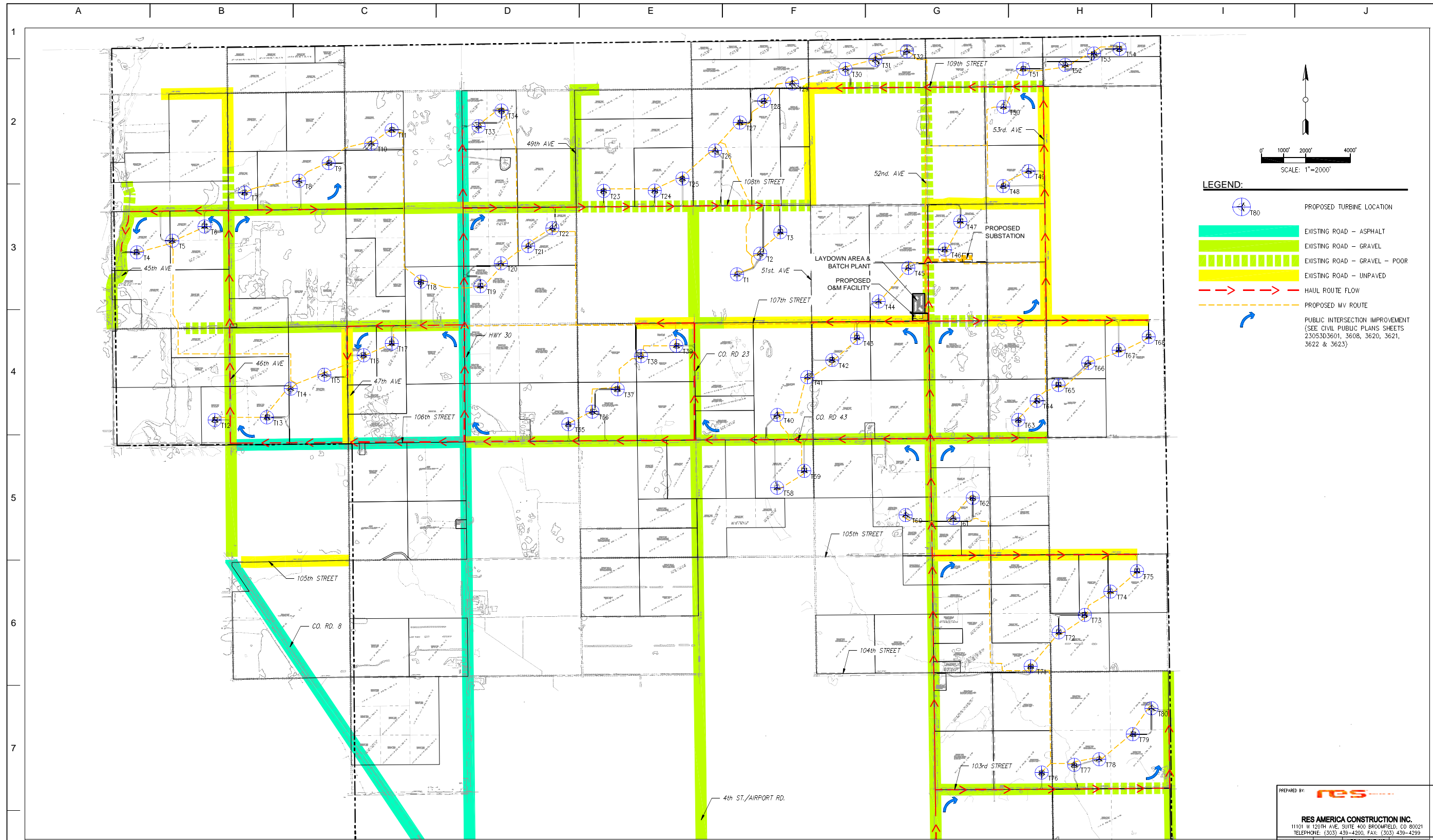
NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROLETTE COUNTY, NORTH DAKOTA</small>			
DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE: 1"=300'	

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ENERGY SUPPLY ENGINEERING & CONSTRUCTION	23053D3537

PREPARED BY: RES AMERICA CONSTRUCTION INC. <small>11101 W 120TH AVE, SUITE 400, BROWNFIELD, CO 80021 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299</small>	PROJECT NO: 23053 WTG LAYOUT NO: PUS4b4w077
ROADS U1_V1_V2_V3 SHEET 20 OF 25 CIVIL CONSTRUCTION PLANS & DETAILS	REV: F

[D:\winds\USA\North Dakota - Border Winds\Drawings\Series 3\CONTROLLED DRAWINGS\23053D3537.dwg] [P:\wind\FRUS\USA\North Dakota - Border Winds\Drawings\Series 3\CONTROLLED DRAWINGS\23053D3537.dwg]

[U:\MID-FARMS\USA\North Dakota - Border\mxd\230533\DWG\Internal\SERIES 3\CONTROLLED DRA\11065\2305330310.dwg] [Date] [Jun 03, 2014 - 4:05pm]



- LEGEND:**
- PROPOSED TURBINE LOCATION
 - EXISTING ROAD - ASPHALT
 - EXISTING ROAD - GRAVEL
 - EXISTING ROAD - GRAVEL - POOR
 - EXISTING ROAD - UNPAVED
 - HAUL ROUTE FLOW
 - PROPOSED MV ROUTE
 - PUBLIC INTERSECTION IMPROVEMENT (SEE CIVIL PUBLIC PLANS SHEETS 2305303601, 3608, 3620, 3621, 3622 & 3623)

PREPARED BY: **res**

RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

PROJECT NO: 23053 DWG LAYOUT NO: PUSAgw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS			
														DWG NO.	MANUFACTURER	DESCRIPTION	
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-13-14	PC	MA	MN											
B	ISSUED FOR 60% DESIGN REVIEW	ALL	03-17-14	PC	MA	MN											
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Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROULETTE COUNTY, NORTH DAKOTA

DWN: PC	DATE: 05-22-14	CHK: N/A	DATE: N/A
ENG: MN	DATE: 05-22-14	CHK: RB	DATE: 05-22-14
PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE:	

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HAUL ROUTE & EXISTING ROAD CONDITIONS
 SHEET 21 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

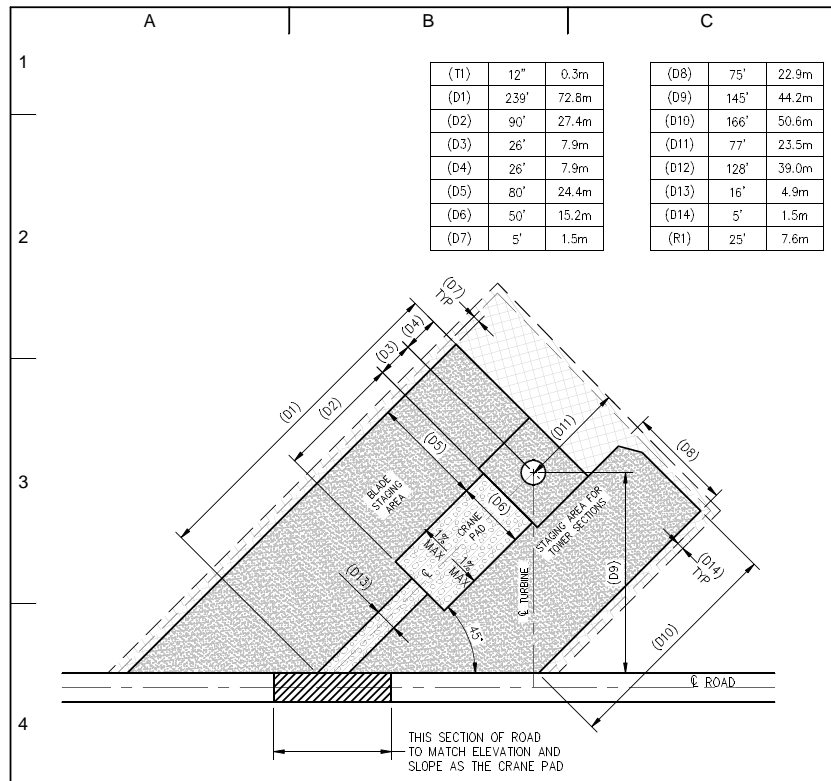
ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3510

REV F

[\\u:\MID-FARMS\USA\North Dakota - Border Winds-23053\DWG\Internal\SERIES-3\CONTROLLED DRAWINGS\2305303503.dwg] [Date] [Jun 03, 2014 - 4:09pm]

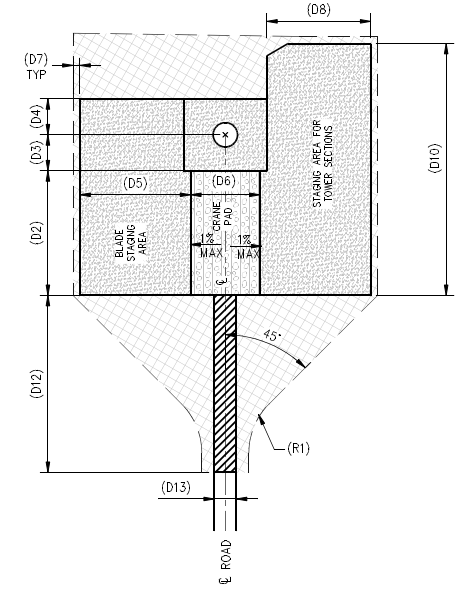
<p>NOTES:</p> <ol style="list-style-type: none"> DITCH BACKSLOPE 2:1 MAXIMUM, UNLESS OTHERWISE APPROVED BY THE SOILS OR GEOTECHNICAL ENGINEER. ADDITIONAL WIDENING ON CURVES AND INTERSECTIONS REQUIRED AS SHOWN ON ROAD DETAIL SHEET. MINIMUM 1% ROADWAY CROSS SLOPE TO ALLOW DRAINAGE. PROOF ROLL AND COMPACT SUBGRADE TO DETECT SOFT AREAS. USE DCP TO ESTIMATE SUBGRADE CBR VALUES. AFTER COMPACTING/PREPARING SUBGRADE, INSTALL GEOGRID IN AREAS WITH CBR < 1.5. <p>SECTION A-A</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(L1)</td><td>36'</td></tr> <tr><td>(L2)</td><td>16'</td></tr> <tr><td>(L3)</td><td>8'</td></tr> <tr><td>(L4)</td><td>10'</td></tr> <tr><td>(D1)</td><td>2"</td></tr> <tr><td>(D2)</td><td>7"</td></tr> <tr><td>(D3)</td><td>2"</td></tr> </table> <p>1 DETAIL: ACCESS ROAD (FLAT SITE WITH CRANE WALK) Scale: N.T.S.</p>	(L1)	36'	(L2)	16'	(L3)	8'	(L4)	10'	(D1)	2"	(D2)	7"	(D3)	2"	<p>NOTES:</p> <ol style="list-style-type: none"> DITCH BACKSLOPE 2:1 MAXIMUM, UNLESS OTHERWISE APPROVED BY THE SOILS OR GEOTECHNICAL ENGINEER. ADDITIONAL WIDENING ON CURVES AND INTERSECTIONS REQUIRED AS SHOWN ON ROAD DETAIL SHEET. MINIMUM 1% ROADWAY CROSS SLOPE TO ALLOW DRAINAGE. PROOF ROLL AND COMPACT SUBGRADE TO DETECT SOFT AREAS. USE DCP TO ESTIMATE SUBGRADE CBR VALUES. AFTER COMPACTING/PREPARING SUBGRADE, INSTALL GEOGRID IN AREAS WITH CBR < 1.5. <p>SECTION A-A</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(L1)</td><td>36'</td></tr> <tr><td>(L2)</td><td>16'</td></tr> <tr><td>(L3)</td><td>8'</td></tr> <tr><td>(L4)</td><td>10'</td></tr> <tr><td>(D1)</td><td>2"</td></tr> <tr><td>(D2)</td><td>7"</td></tr> <tr><td>(D3)</td><td>2"</td></tr> </table> <p>2 DETAIL: ACCESS ROAD (FLAT SITE WITHOUT CRANE WALK) Scale: N.T.S.</p>	(L1)	36'	(L2)	16'	(L3)	8'	(L4)	10'	(D1)	2"	(D2)	7"	(D3)	2"	<p>NOTES:</p> <ol style="list-style-type: none"> CURVES SHARPER THAN 90 DEGREES AND REVERSE COMPOUND CURVES MUST BE CUSTOM DESIGNED IN DETAIL WITH REFERENCE TO THE ACTUAL TRANSPORT EQUIPMENT. ASSUMPTIONS: <ul style="list-style-type: none"> BLADE TRUCK MAXIMUM LENGTH = 185' BLADE TRUCK REAR AXLE IS LOCKED <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(T1)</td><td>25'</td></tr> <tr><td>(W1)</td><td>20'</td></tr> <tr><td>(W2)</td><td>24'</td></tr> <tr><td>(W3)</td><td>50'</td></tr> <tr><td>(R1)</td><td>150'</td></tr> <tr><td>(R2)</td><td>160'</td></tr> <tr><td>(R3)</td><td>170'</td></tr> </table> <p>3 DETAIL: MINIMUM ROAD CURVE RADII Scale: N.T.S.</p>	(T1)	25'	(W1)	20'	(W2)	24'	(W3)	50'	(R1)	150'	(R2)	160'	(R3)	170'	<p>NOTE:</p> <p>AFTER COMPLETION OF DELIVERY AND TURBINE ERECTION, SHOULDERS SHALL BE RESTORED.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(W1)</td><td>20'</td></tr> <tr><td>(W2)</td><td>16'</td></tr> <tr><td>(W3)</td><td>400'</td></tr> <tr><td>(W4)</td><td>50'</td></tr> <tr><td>(R1)</td><td>200'</td></tr> <tr><td>(R2)</td><td>60'</td></tr> </table> <p>4 DETAIL: SITE TO EXISTING ROAD INTERSECTION Scale: N.T.S.</p>	(W1)	20'	(W2)	16'	(W3)	400'	(W4)	50'	(R1)	200'	(R2)	60'																																																																										
(L1)	36'																																																																																																																																		
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<p>NOTES:</p> <ol style="list-style-type: none"> SUB-CONTRACTOR TO REMOVE TEMPORARY TURN-AROUND AFTER PROJECT COMPLETION AND RESTORE AREA TO THE DESIGN CRITERIA. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(D1)</td><td>110'</td><td>33.5m</td></tr> <tr><td>(R1)</td><td>200'</td><td>61.0m</td></tr> <tr><td>(R2)</td><td>150'</td><td>45.7m</td></tr> <tr><td>(R3)</td><td>200'</td><td>61.0m</td></tr> </table> <p>5 DETAIL: TEMPORARY TURN-AROUND Scale: N.T.S.</p>	(D1)	110'	33.5m	(R1)	200'	61.0m	(R2)	150'	45.7m	(R3)	200'	61.0m	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>(R1)</td><td>1640'</td><td>500m</td></tr> <tr><td>(L1)</td><td>50'</td><td>15.2m</td></tr> <tr><td>(D1)</td><td>6"</td><td>0.15m</td></tr> </table> <p>6 DETAIL: VERTICAL CURVE AND BUMP/DIP REQUIREMENTS Scale: N.T.S.</p>	(R1)	1640'	500m	(L1)	50'	15.2m	(D1)	6"	0.15m	<p>NOTES:</p> <ol style="list-style-type: none"> CONTACT UTILITY PRIOR TO CROSSING. OSHA CLEARANCE REQUIREMENTS SHALL BE FOLLOWED FOR ALL UTILITY CROSSINGS. WARNING SIGNS SHALL BE ERECTED ACCORDING TO THE DIAGRAM BELOW PRIOR TO CROSSING UNDERNEATH POWERLINES. ALL EQUIPMENT OPERATORS AND MACHINERY MUST REMAIN A MINIMUM OF 15 FEET (4.5 M) AWAY FROM TRANSMISSION LINES AND POLES AT ALL TIMES. IN THE EVENT THAT CONTACT IS MADE WITH A TRANSMISSION LINE, THE EQUIPMENT OPERATOR WILL CONTACT A SUPERVISOR IMMEDIATELY AND FOLLOW SAFE WORK PRACTICES. TREAT ANY AND ALL POWER LINES AS LIVE. <p>7 DETAIL: REQ. FOR CROSSING/OPERATING NEAR POWERLINES Scale: N.T.S.</p>																																																																																																												
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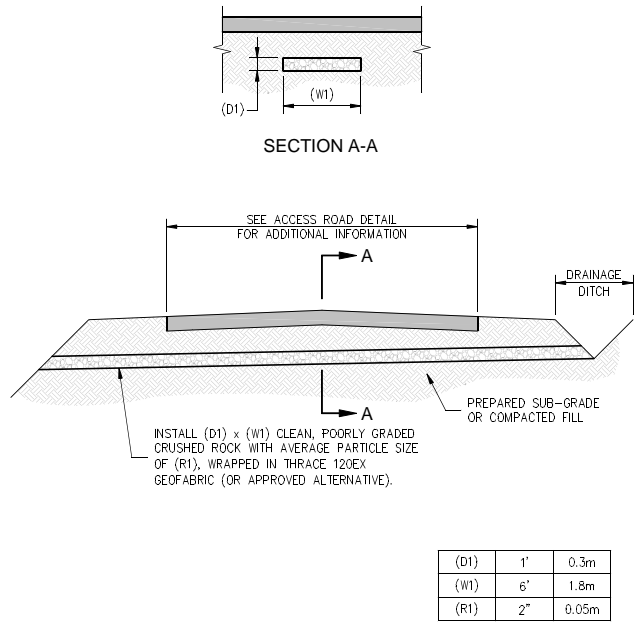
1 DETAIL: TYPICAL CRANE PAD ARRANGEMENT (SINGLE BLADE ASSY.) Scale: N.T.S.

- NOTES:**
- TURBINE DOOR SHOULD ALWAYS BE DOWNWIND AND TOWARDS THE CRANE PAD. WHEN BOTH REQUIREMENTS ARE NOT AVAILABLE, TOWARDS THE CRANE PAD SUPERCEDES DUE TO EMERGENCY PERSONNEL BEING ABLE TO LOCATE THE DOOR WHEN APPROACHING THE TURBINE.
 - CRANE PAD SHOULD BE FLAT FROM EDGE OF CRANE PAD TO ROAD. CRANE PAD SHALL BE CROWNED AT A MAX. OF 1%.
 - DIMENSIONS AND ARRANGEMENT SHOWN ARE FOR ILLUSTRATIVE PURPOSES AND ARE SUBJECT TO CHANGE BASED ON SITE CONDITIONS.
 - ADJUST PADS AND LAYDOWN AREAS FOR SITE CONDITIONS. CLEAR VEGETATION ADJACENT TO SITE FOR TURBINE ASSEMBLY AND LAYDOWN AREAS AS SHOWN.
 - RELATIVE DISTANCE BETWEEN ROAD AND TURBINE MAY VARY DEPENDING ON SITE CONDITIONS.
 - REFER TO ROAD SECTIONS DETAIL SHEET FOR GENERAL GRADING NOTES.
 - TOPSOIL UNDERCUT DEPTH DEPENDS ON SITE CONDITIONS. FOR CRANEPAD UNDERCUT EXISTING TOP SOIL DOWN TO NATIVE SOIL AND AN ADDITIONAL 3". FOR AREAS WITH DEEP TOPSOIL (I.E. > 8") CUT TO NATIVE SOIL ONLY.
 - ALL SUB-GRADE SURFACES SHALL BE PROOF-ROLLED TO DETECT SOFT AREAS.
 - WHERE REQUIRED THE TOPSOIL IS TO BE STRIPPED TO THE LEVEL OF A SUITABLE FORMATION, EXCAVATED MATERIAL IS TO BE STOCKPILED ON SITE IN DESIGNATED AREAS AS SPECIFIED BY RES.
 - IF ROTOR ASSEMBLY OCCURS ON THE GROUND, IT REQUIRES A CLEARED AREA FOR THE HUB INCLUDING BLADES WITH A MAXIMUM GRADIENT OF 1:20 OR 5%.
 - CRANE PAD AND STAGING AREAS SHOULD PROVIDE A MINIMUM 4,200 PSF BEARING PRESSURE.
 - MAXIMUM GRADIENT/SLOPE OF STAGING AREAS SHOULD BE APPROXIMATELY 2%.
 - STAGING AREAS AREA COMPACTED NATIVE MATERIAL. IN THE EVENT THESE AREAS ARE USABLE DUE TO EXCESSIVE RAIN, ROAD BASE WILL BE PLACED AND COMPACTED.
 - FOR EROSION CONTROL AND CONSTRUCTION ENTRANCE DETAIL, PLEASE REFER TO SWPPP DOCUMENTS PREPARED UNDER SEPARATE COVER.

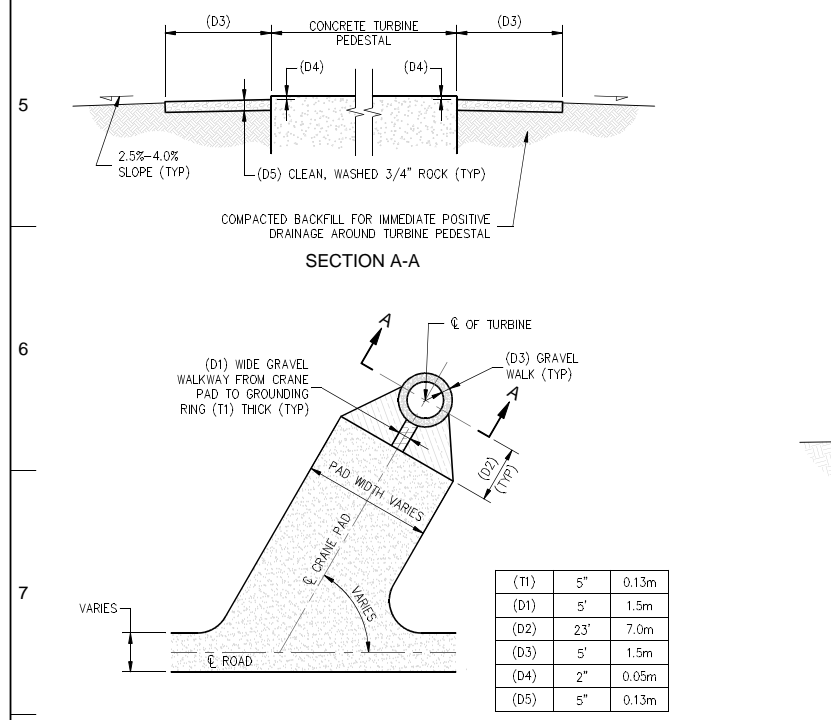
- LEGEND:**
- (T1) MIN. COMPACTED THICKNESS OF GRAVEL ON CRANE PADS (TYP). CRANES TO USE TIMBER MATS FOR ALL HEAVY LIFTS. (SEE CRANE PAD DETAIL)
 - COMPACTED SUBGRADE
 - AREA TO BE CLEARED AND LEVELED FOR CRANE PAD
 - AREA TO BE GRUBBED AND CLEARED



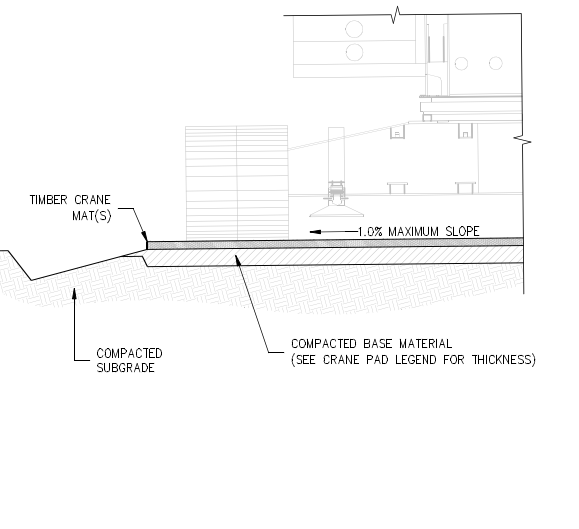
2 DETAIL: TYPICAL CRANE PAD ARRANGEMENT- END (SINGLE BLADE ASSY.) Scale: N.T.S.



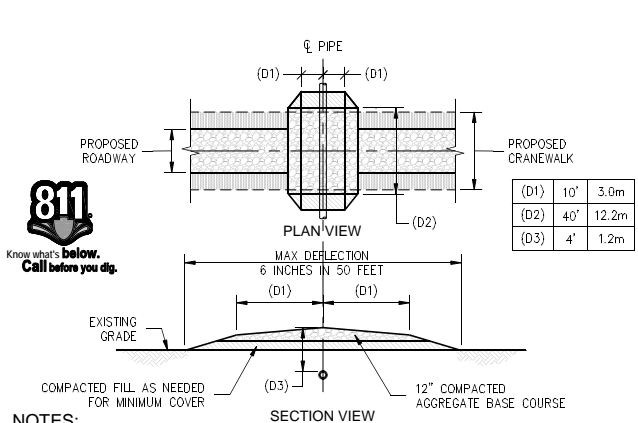
3 DETAIL: FRENCH DRAIN Scale: N.T.S.



4 DETAIL: TURBINE PAD AFTER CONSTRUCTION Scale: N.T.S.

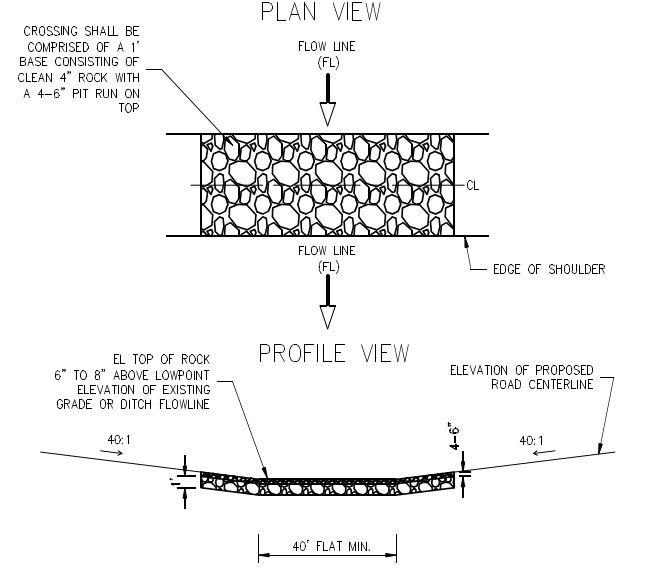


5 DETAIL: CRANE PAD Scale: N.T.S.



- NOTES:**
- AS A MINIMUM, THE SUBCONTRACTOR SHALL PROVIDE THE FOLLOWING:
 - THIS GAS LINE CROSSING DETAIL SHALL BE USED FOR ALL ACCESS ROADS AND CRANE WALKS THAT CROSS UNDERGROUND GAS UTILITIES.
 - UTILITY/OWNER SHALL BE NOTIFIED PRIOR TO CROSSING.
 - PRIOR TO CONSTRUCTION OF CROSSING, SUBCONTRACTOR SHALL CALL FOR UTILITY LOCATES USING STATE CALL (811).
 - THE DEPTH OF COVER OVER THE PIPELINE SHALL MEET THE MINIMUM SPECIFIED IN THE DETAIL ABOVE. THE COVER OVER THE PIPELINE SHALL BE COMPOSED OF BOTH COMPACTED FILL AND AGGREGATE. THIS MINIMUM DEPTH OF COVER SHALL BE MAINTAINED OVER THE PIPELINE FOR THE LIFE OF THE TEMPORARY ROAD CROSSING.
 - INSTALL FILL IN THE LOW AREAS ALONG THE LENGTH OF THE TEMPORARY ROAD CROSSING. FILL SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH ASTM D1557.
 - INSTALL A 12" THICK LAYER OF AGGREGATE BASE COURSE COMPACTED TO 95% MODIFIED PROCTOR (ASTM 1557).
 - IF SEVERE RUTTING OCCURS, TIMBER MATS MAY BE USED TO MAINTAIN THE MINIMUM DEPTH OF COVER OVER THE PIPELINE.
 - CRANE TO CROSS UNDERGROUND UTILITY AS CLOSE TO 90 DEGREES AS POSSIBLE.
 - THIS MITIGATION SHALL BE PERFORMED WHILE MAINTAINING A VERTICAL CURVE RADIUS OF 500 METERS (1640FT.) AND 6 INCHES MAXIMUM BUMP IN 50 FT. OF ROAD.

6 DETAIL: GAS LINE ROADWAY & CRANEWALK CROSSING Scale: N.T.S.



7 DETAIL: LOW WATER CROSSINGS FOR ROAD FILL ON SAG CURVE Scale: N.T.S.

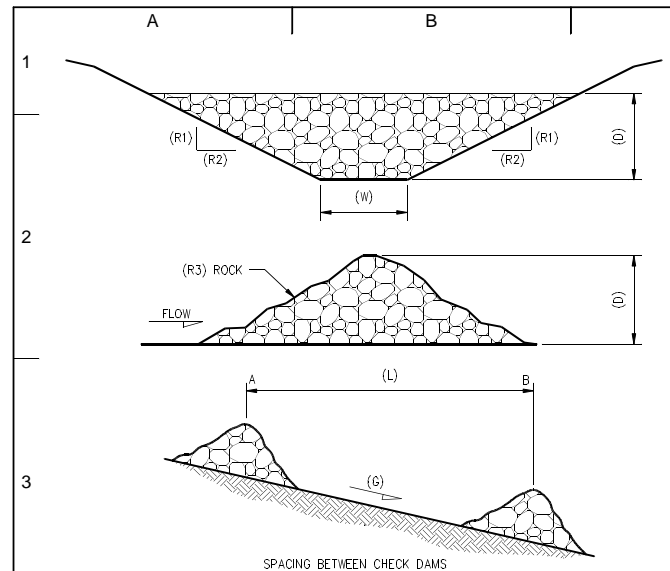
NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO
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F	ISSUED FOR 100% FINAL REVIEW	ALL	06-03-14	LB	RB	MN	

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NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROULETTE COUNTY, NORTH DAKOTA</small>		ROAD AND CRANE PAD DETAILS SHEET 23 OF 25 CIVIL CONSTRUCTION PLANS & DETAILS	
DWN: PC ENG: MN PM: BT APVD: MN	DATE: 05-22-14 DATE: 05-22-14 DATE: 05-22-14 DATE: 05-22-14	CHK: N/A CHK: RB DATE: 05-22-14 SCALE:	PROJECT NO: 23053 WTG LAYOUT NO: PUS4bdw077 RES AMERICAS RES AMERICA CONSTRUCTION INC. <small>11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299</small> 23053D3505

[U:\IND_F4RUS\USA\North Dakota - Border Winds - 23053 D3505 Internal SERIES 3\CONTROLLED DRA\INDOS\23053D3505.dwg] [Jun 03, 2014 4:51:17pm]

[Date] [Jun 03, 2014 - 4:05pm] [U:\MID-FARMS\USA\North Dakota - Border\mids-23053\DWG\Internal\SERIES 3\CONTROLLED DR-11105-2305303506.dwg]

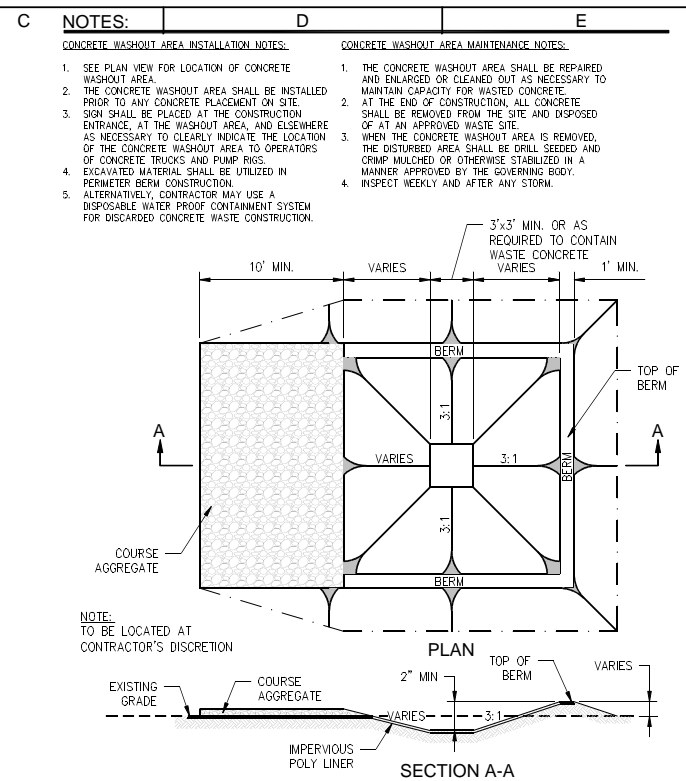


DEFINITION—SMALL DAM CONSTRUCTED ACROSS A SWALE OR DRAINAGE DITCH.
PURPOSE—TO REDUCE THE VELOCITY OF STORMWATER FLOWS AND EROSION OF THE SWALE OR DITCH.

(G) GRADE (%)	(L) LENGTH (FT)	(L) LENGTH (m)	(D) DEPTH	1.5'	0.5m
7-9	60	18.3	(W) WIDTH	1'	0.3m
9-11	35	10.7	(R1) RISE	1'	0.3m
11-21*	20	6.1	(R2) RUN	2.0'	0.6m
			(R3) ROCK	4-6 IN	0.1-0.15m

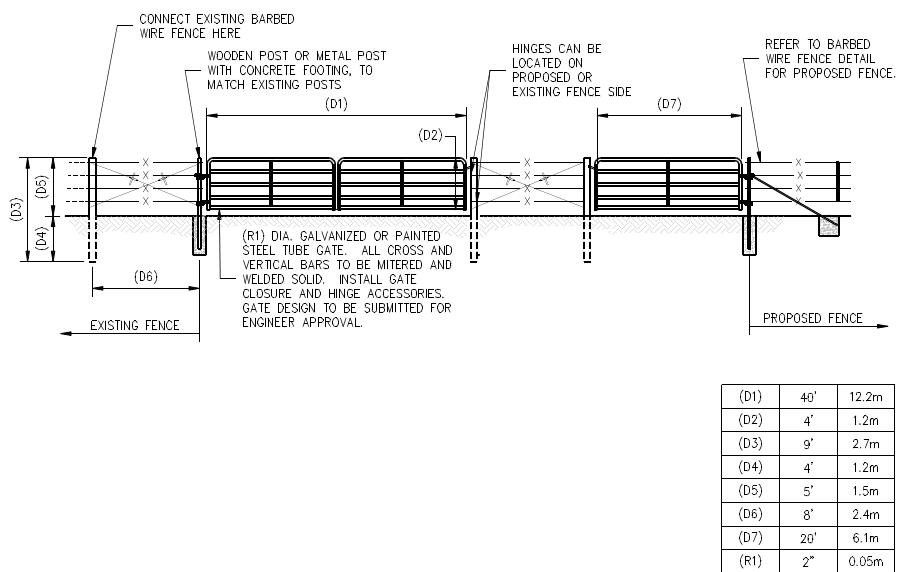
* SLOPES GREATER THAN 14% MAY UTILIZE A RIP RAP LINED CHANNEL AS AN ALTERNATIVE TO CHECK DAMS

1 **DETAIL: CHECK DAM** Scale: N.T.S.

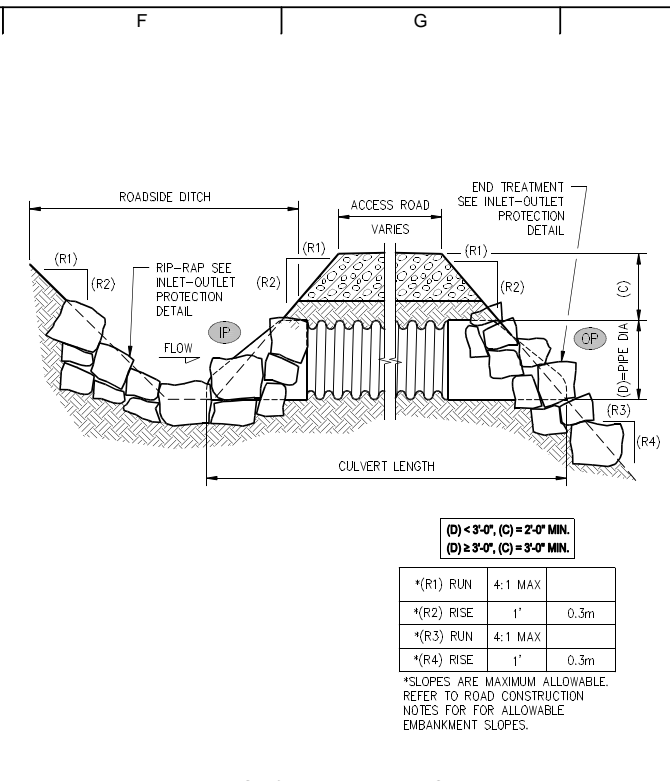


2 **DETAIL: CONCRETE WASHOUT** Scale: N.T.S.

NOTES:
 FOR ROADS WITHOUT CRANE WALK INSTALL 20' GATE - ONLY.



6 **DETAIL: METAL CRANE PATH GATE** Scale: N.T.S.

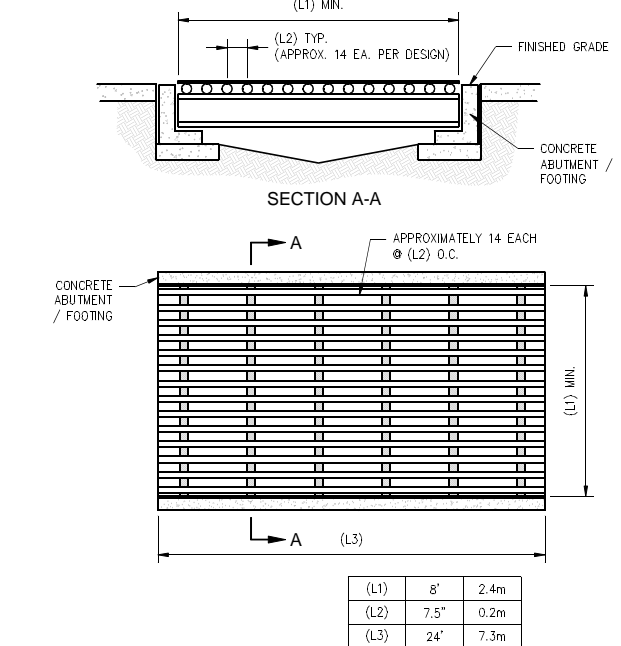


3 **DETAIL: DRAINAGE CULVERT WITH FES** Scale: N.T.S.

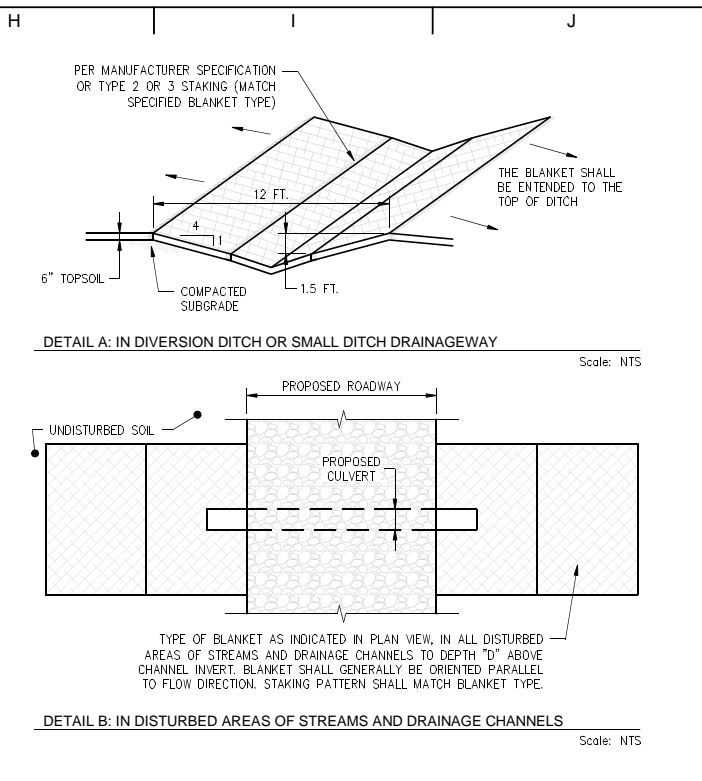
(D) < 3'-0"	(C) = 2'-0" MIN.
* (R1) RUN	4:1 MAX
* (R2) RISE	1' 0.3m
* (R3) RUN	4:1 MAX
* (R4) RISE	1' 0.3m

* SLOPES ARE MAXIMUM ALLOWABLE. REFER TO ROAD CONSTRUCTION NOTES FOR ALLOWABLE EMBANKMENT SLOPES.

NOTES:
 1. CATTLE GUARD SHALL BE DESIGNED AND INSTALLED BY OTHERS.
 2. CATTLE GUARD SHALL BE DESIGNED TO MEET THE LOADS BASED ON HS20 LOADING.
 3. DIMENSIONS PROVIDED FOR ILLUSTRATION AND GUIDELINES ONLY.



7 **DETAIL: CATTLE GUARD** Scale: N.T.S.



4 **DETAIL: EROSION CONTROL BLANKET (1 OF 2)** Scale: N.T.S.

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NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROULETTE COUNTY, NORTH DAKOTA

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PM: BT	DATE: 05-22-14	PROJ. NO: 23053	
APVD: MN	DATE: 05-22-14	SCALE:	

ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D3506

PREPARED BY:

RES AMERICAS CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
 TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

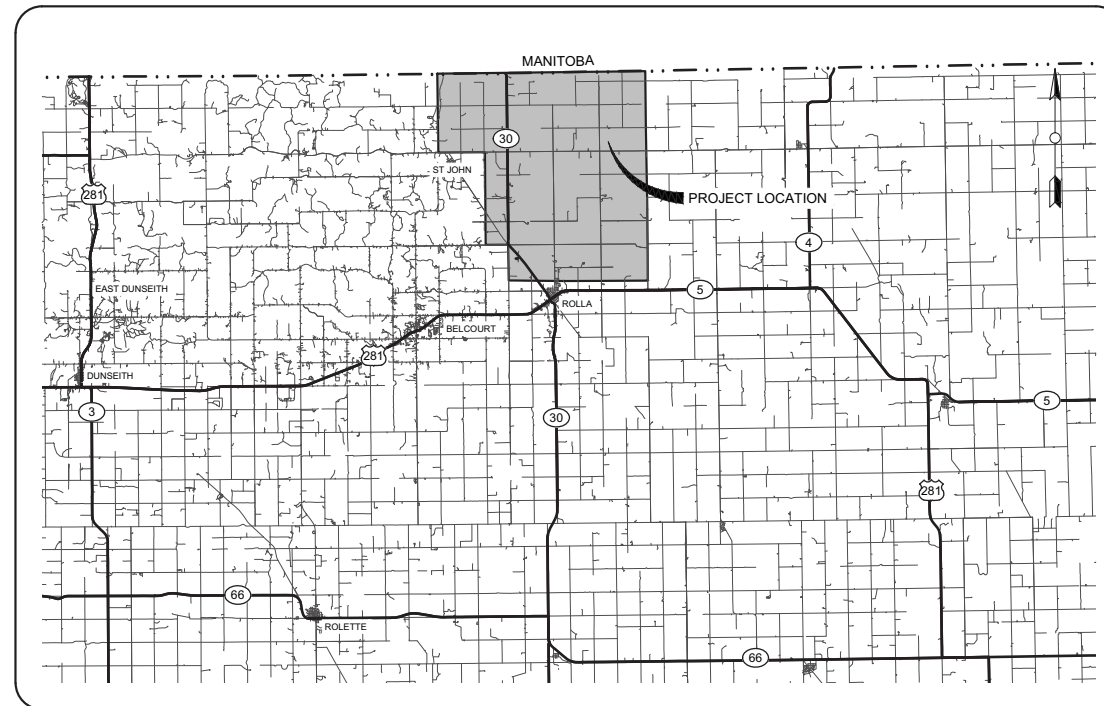
PROJECT NO: 23053 WTS LAYOUT NO: PUS4bdw077

EROSION CONTROL DETAILS
 SHEET 24 OF 25
 CIVIL CONSTRUCTION PLANS & DETAILS

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BORDER WINDS - WIND PROJECT ROLETTE COUNTY, NORTH DAKOTA

100% COLLECTION SYSTEM DESIGN REVIEW



VICINITY MAP - SCALE 1"= 20,000'

NOTES:

COORDINATE SYSTEM: State Plane, ND North, NAD83 (ND-HPGN) NADCON - International Feet
VERTICAL DATUM: -----

LIST OF CONTACTS:

OWNER
BORDER WINDS, LLC

ELECTRICAL ENGINEER- TECHNICAL DESIGN
RES(CONSTRUCTION) LP.
11101 W. 120TH AVE. SUITE 400
BROOMFIELD, CO 80021
CONTACT: KYLER LEEN
PHONE: 303-439-4200

SURVEYOR
JOHN F. WATSON & COMPANY
200 N. LORRAINE
SUITE 220
MIDLAND, TX 79701
CONTACT: JOHN WATSON, RPLS
PHONE: 432-520-2400

GEOTECHNICAL ENGINEER
RENEWABLE RESOURCE CONSULTANTS, LLC.
2251 DOUBLE CREEK DRIVE, SUITE 602
ROUND ROCK, TX 78664
PHONE: 512-992-2087

REFERENCE DOCS:

- GEOTECHNICAL REPORT: BORDER WINDS - WIND ENERGY PROJECT, ROLETTE COUNTY, NORTH DAKOTA; PREPARED BY: RENEWABLE RESOURCE CONSULTANTS, LLC. DATED: DECEMBER 19TH, 2013
- DRAFT ALTA/ACSM LAND TITLE SURVEY: UNDER PREPARATION

TURBINE STATISTICS:

FOUNDATION TYPE	MANUFACTURER AND MODEL	RATED POWER	HUB HEIGHT (M)	ROTOR DIAMETER (M)
A	VESTAS V100	2.0 MW	95	100

DRAWING INDEX:

Sheet Number	Sheet Title
D4000	COVER SHEET
D4201	WTG CONDUIT PLAN AND LAYOUT
D4202	WTG GROUNDING INSTALLATION DETAIL
D4308	MV CABLE LAYOUT
D4310	MV SINGLE LINE DIAGRAM - CIRCUITS 1-4
D4311	MV SINGLE LINE DIAGRAM - CIRCUITS 5-6
D4315	GROUNDING SINGLE LINE DIAGRAM - CIRCUITS 1-2
D4316	GROUNDING SINGLE LINE DIAGRAM - CIRCUITS 3-4
D4317	GROUNDING SINGLE LINE DIAGRAM - CIRCUITS 5-6
D4320	MV CABLE TRENCH SECTIONS
D4505	SCADA ARCHITECTURE
D4506	OPTIC CABLE ROUTING - CIRCUITS 1-3
D4507	OPTIC CABLE ROUTING - CIRCUITS 4-6
D4601	MV JUNCTION BOX GROUNDING
D4602	MV JUNCTION BOX INSTALLATION
D4603	BELOW GRADE MV SPLICE GROUNDING DETAIL



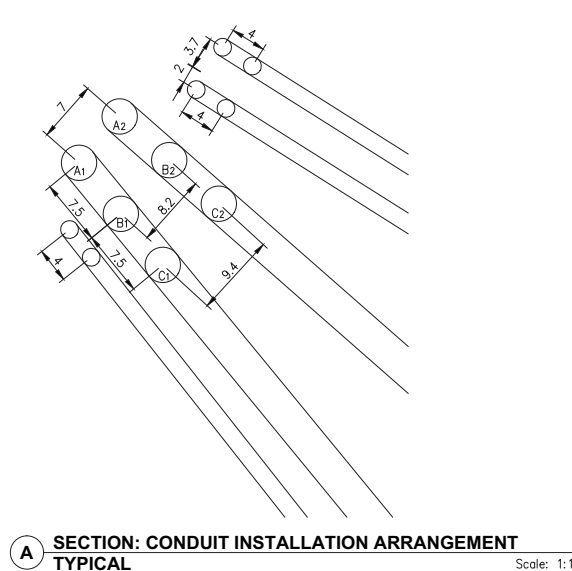
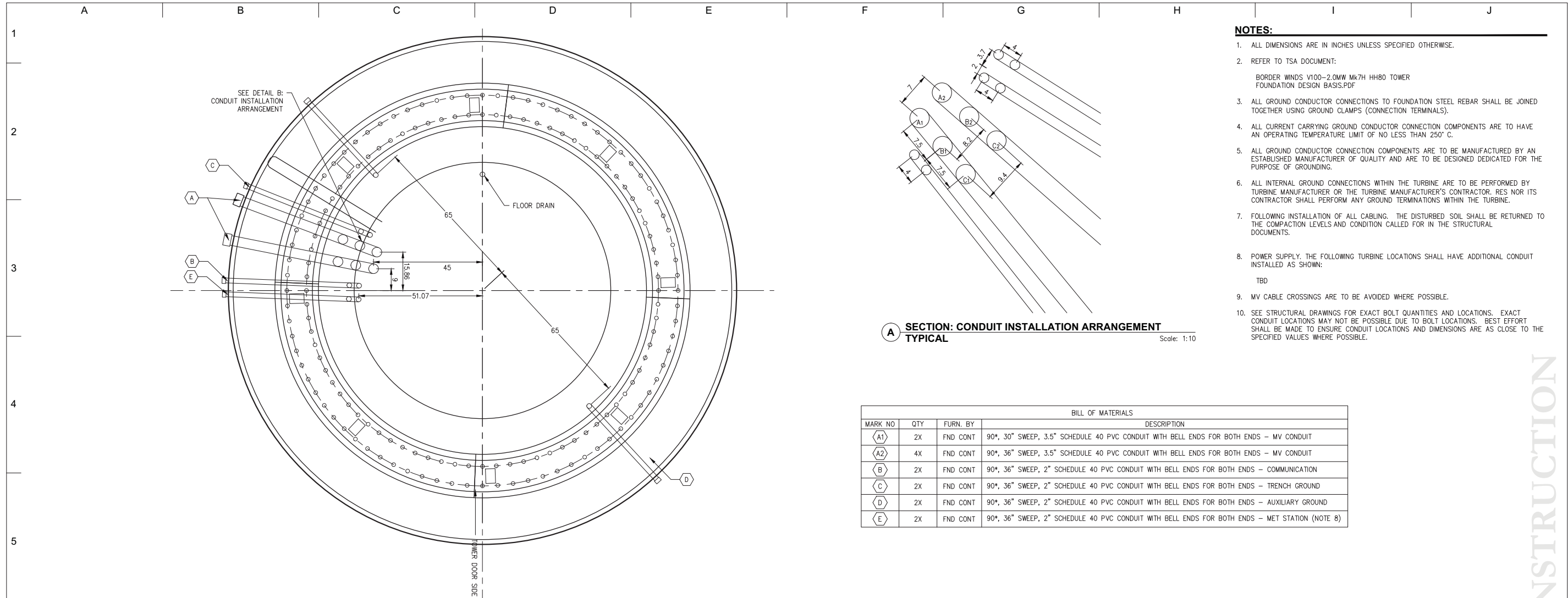
NO	REVISION						NO	REVISION						NO	REFERENCE DRAWINGS			INFORMATION SHOWN IS SUBJECT TO CHANGE. NOT FOR CONSTRUCTION	 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT ROLETTE COUNTY, NORTH DAKOTA	THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.	ENERGY SUPPLY ENGINEERING & CONSTRUCTION	COVER SHEET ELECTRICAL DESIGN PLANS 23053D4000	REV D
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TELEPHONE: (303) 439-4200, FAX: (303) 439-4299
PROJECT NO: 23053 | WTG LAYOUT NO: FUSAbw077

[skeletal] Jun 06, 2014 - 4:55pm [U:\WIND_FARM\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES 4\CONTROLLED DRAWINGS\23053D4000.dwg]

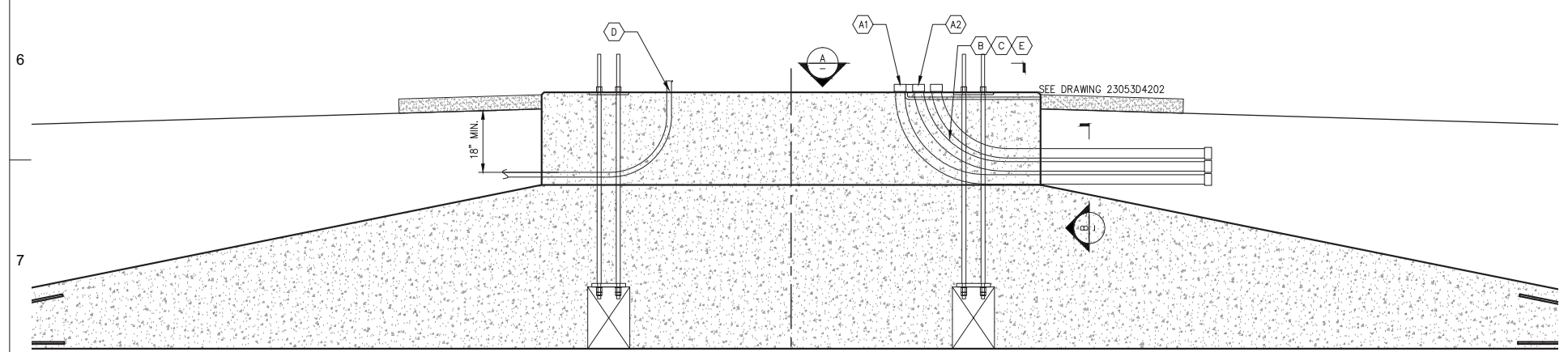
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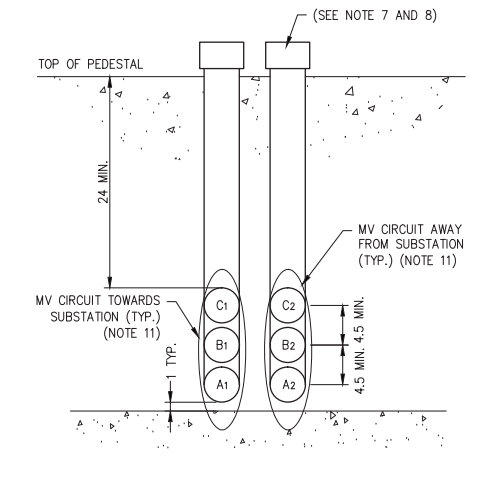
- NOTES:**
1. ALL DIMENSIONS ARE IN INCHES UNLESS SPECIFIED OTHERWISE.
 2. REFER TO TSA DOCUMENT:
BORDER WINDS V100-2.0MW Mk7H HH80 TOWER FOUNDATION DESIGN BASIS.PDF
 3. ALL GROUND CONDUCTOR CONNECTIONS TO FOUNDATION STEEL REBAR SHALL BE JOINED TOGETHER USING GROUND CLAMPS (CONNECTION TERMINALS).
 4. ALL CURRENT CARRYING GROUND CONDUCTOR CONNECTION COMPONENTS ARE TO HAVE AN OPERATING TEMPERATURE LIMIT OF NO LESS THAN 250° C.
 5. ALL GROUND CONDUCTOR CONNECTION COMPONENTS ARE TO BE MANUFACTURED BY AN ESTABLISHED MANUFACTURER OF QUALITY AND ARE TO BE DESIGNED DEDICATED FOR THE PURPOSE OF GROUNDING.
 6. ALL INTERNAL GROUND CONNECTIONS WITHIN THE TURBINE ARE TO BE PERFORMED BY TURBINE MANUFACTURER OR THE TURBINE MANUFACTURER'S CONTRACTOR. RES NOR ITS CONTRACTOR SHALL PERFORM ANY GROUND TERMINATIONS WITHIN THE TURBINE.
 7. FOLLOWING INSTALLATION OF ALL CABLING, THE DISTURBED SOIL SHALL BE RETURNED TO THE COMPACTION LEVELS AND CONDITION CALLED FOR IN THE STRUCTURAL DOCUMENTS.
 8. POWER SUPPLY. THE FOLLOWING TURBINE LOCATIONS SHALL HAVE ADDITIONAL CONDUIT INSTALLED AS SHOWN:
TBD
 9. MV CABLE CROSSINGS ARE TO BE AVOIDED WHERE POSSIBLE.
 10. SEE STRUCTURAL DRAWINGS FOR EXACT BOLT QUANTITIES AND LOCATIONS. EXACT CONDUIT LOCATIONS MAY NOT BE POSSIBLE DUE TO BOLT LOCATIONS. BEST EFFORT SHALL BE MADE TO ENSURE CONDUIT LOCATIONS AND DIMENSIONS ARE AS CLOSE TO THE SPECIFIED VALUES WHERE POSSIBLE.

BILL OF MATERIALS				
MARK NO	QTY	FURN. BY	DESCRIPTION	
(A1)	2X	FND CONT	90°, 30° SWEEP, 3.5" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - MV CONDUIT	
(A2)	4X	FND CONT	90°, 36° SWEEP, 3.5" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - MV CONDUIT	
(B)	2X	FND CONT	90°, 36° SWEEP, 2" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - COMMUNICATION	
(C)	2X	FND CONT	90°, 36° SWEEP, 2" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - TRENCH GROUND	
(D)	2X	FND CONT	90°, 36° SWEEP, 2" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - AUXILIARY GROUND	
(E)	2X	FND CONT	90°, 36° SWEEP, 2" SCHEDULE 40 PVC CONDUIT WITH BELL ENDS FOR BOTH ENDS - MET STATION (NOTE 8)	

1 TOP VIEW: PEDESTAL Scale: 1:20



2 SIDE VIEW: FOUNDATION AND PEDESTAL Scale: 1:30



B SECTION: CONDUIT INSTALLATION ARRANGEMENT TYPICAL Scale: 1:10

NO	REVISION						NO	REVISION						REFERENCE DRAWINGS		
	ZONE	DATE	BY	CHK	ENG	NO		ZONE	DATE	BY	CHK	ENG	DWG NO.	MANUFACTURER	DESCRIPTION	
A	ALL	02-05-14	SMK	GP	KL											
B	ALL	04-15-14	SMK	GP	KL											
C	ALL	05-08-14	SMK	GP	KL											
D	ALL	06-05-14	SMK	GP	KL											

Xcel Energy
NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE:	

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PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
TELEPHONE: (303) 439-4200, FAX: (303) 439-4299

PROJECT NO: 23053 | WTG LAYOUT NG: PUSAbdw077

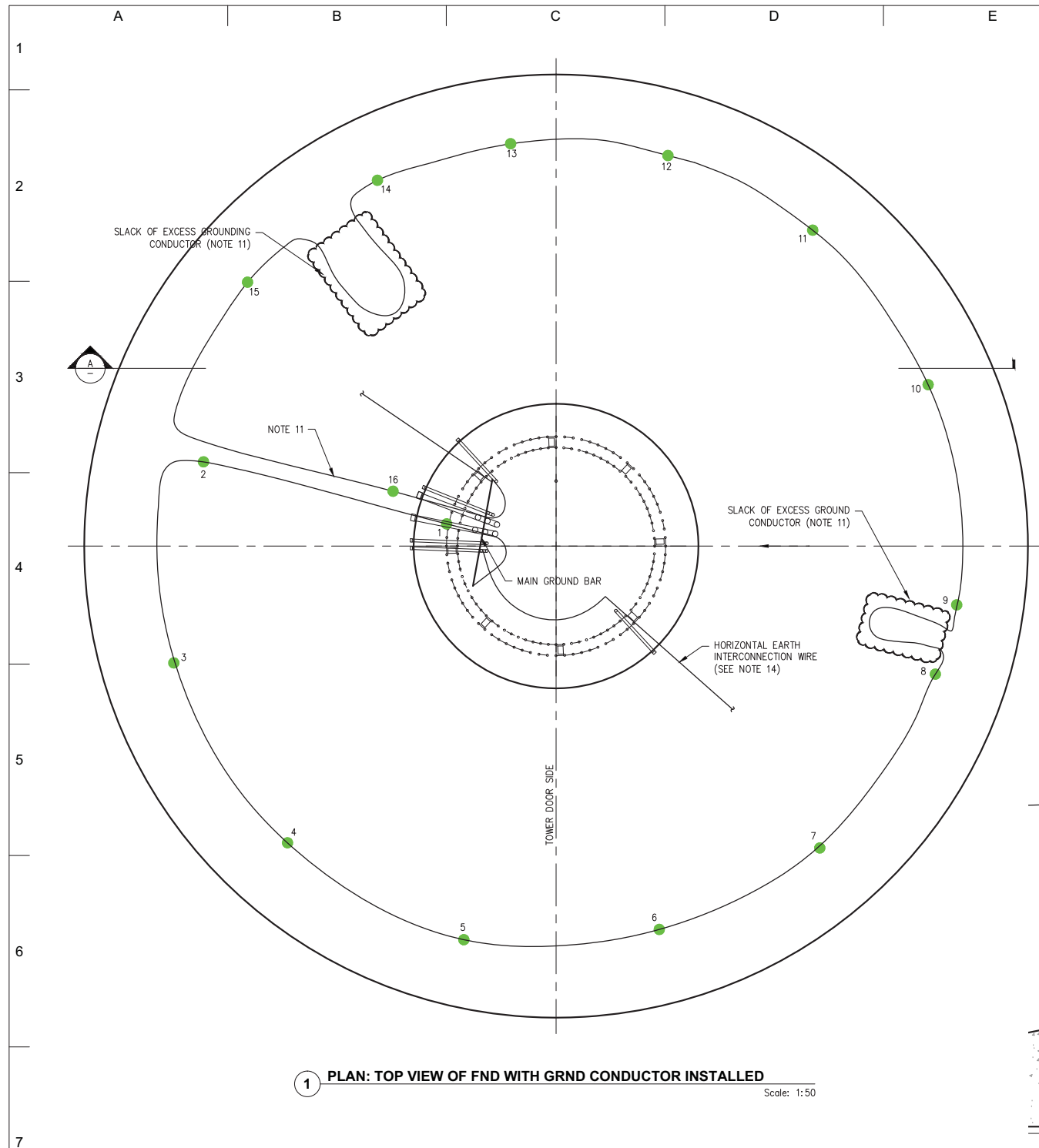
TURBINE CONDUIT PLAN AND LAYOUT
(VESTAS V100 - 2.0 - 150MW)

23053D4201

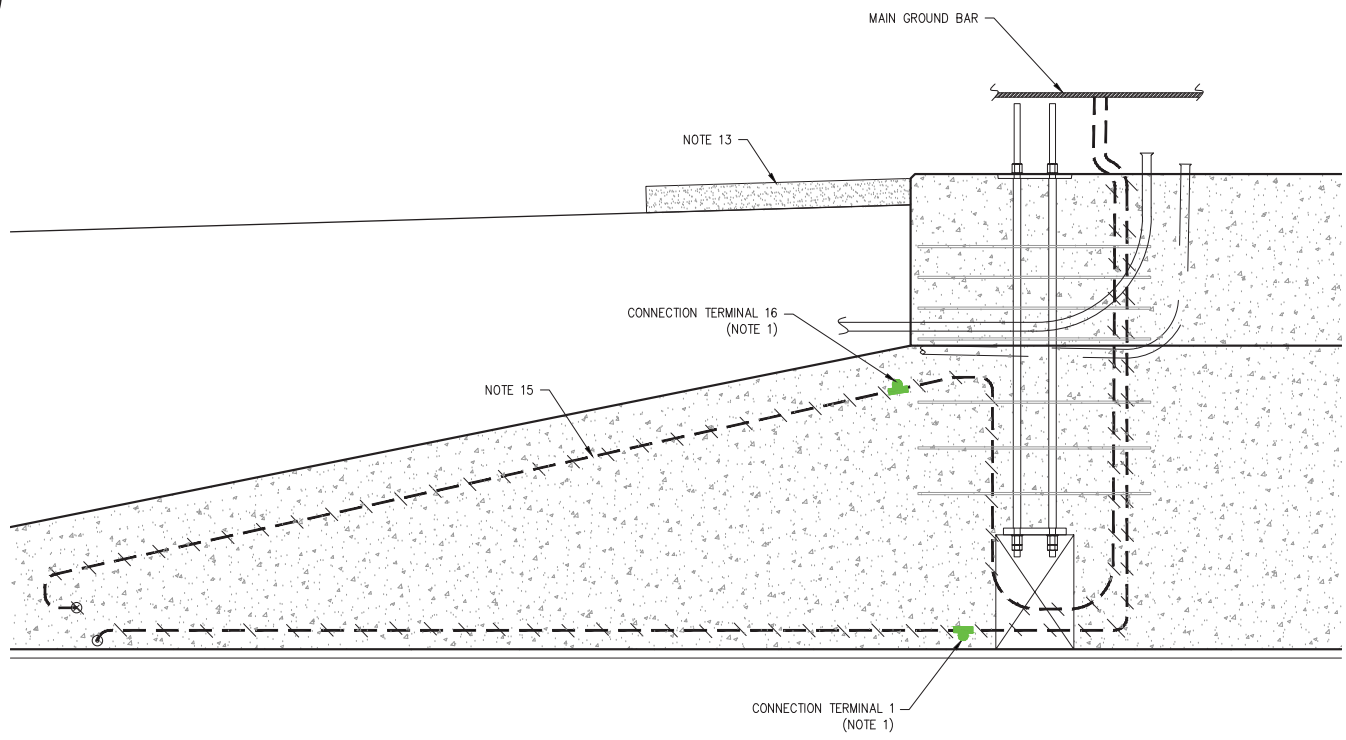
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[U:\WIND_FARM\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES 4\CONTROLLED DRAWINGS\23053D4202.dwg] [skuter] [Jun 06, 2014 - 5:16pm]



1 PLAN: TOP VIEW OF FND WITH GRND CONDUCTOR INSTALLED
Scale: 1:50



A SIDE VIEW OF FND WITH GROUND CONDUCTOR INSTALLED
Scale: 1:20

NOTES:

1. REFER TO TSA DOCUMENTS
 964756 FOUNDATION EARTHING WORK DESCRIPTION OF FOUNDATION EARTHING ON NORTH AMERICAN SPREAD.PDF
 964770 VESTAS EARTHING SYSTEM DESCRIPTION OF NORTH AMERICAN SPREAD FOUNDATION.PDF
 0000-3388 VESTAS EARTHING SYSTEM GENERAL DESCRIPTION.PDF
 961636 EQUIPOTENTIAL CONNECTIONS ON CABLES ENTERING WIND TURBINE.PDF
2. ALL GROUND CONDUCTOR CONNECTIONS TO FOUNDATION STEEL REBAR SHALL BE JOINED TOGETHER USING GROUND CLAMPS (CONNECTION TERMINALS).
3. REBAR GROUND CLAMPS SHALL BE LISTED FOR EMBEDMENT IN CONCRETE.
4. ALL CURRENT CARRYING GROUND CONDUCTOR COMPONENTS ARE TO HAVE AN OPERATING TEMPERATURE LIMIT OF NO LESS THAN 250C.
5. ALL INTERNAL GROUND CONNECTIONS WITHIN THE TURBINE ARE TO BE PERFORMED BY THE TURBINE MANUFACTURER OR THE TURBINE MANUFACTURER'S CONTRACTOR. RES NOR ITS CONTRACTOR(S) SHALL PERFORM ANY GROUND TERMINATIONS WITHIN THE TURBINE.
6. ALL GROUND CONDUCTOR CONNECTION COMPONENTS ARE TO BE MANUFACTURED BY AN ESTABLISHED MANUFACTURER OF QUALITY AND ARE TO BE DESIGNED AND DEDICATED FOR THE PURPOSE OF GROUNDING.
7. THE GROUND CONDUCTOR SHALL BE INSTALLED ALONG THE INNER SIDE OF THE EDGE OF THE REINFORCEMENT STEEL (ALL THE WAY AROUND THE ENTIRE CIRCUMFERENCE.)
8. THE CONNECTION TERMINALS ARE MARKED AND NUMBERED 1 TO 16. STARTED AT ONE END, INSTALL THE CONNECTION TERMINAL EVERY 15 FEET ALONG THE GROUNDING CONDUCTOR. INSTALL THE CONNECTION TERMINALS NUMBERED 1 TO 15 FIRST.
9. NUMBER 16 MUST BE INSTALLED ALONG THE UPPER LAYER OF THE REINFORCEMENT STEEL.
10. THIS PART OF THE GROUNDING CONDUCTOR SHALL BE CONNECTED TO THE UPPER REINFORCEMENT WHEN IN PLACE.
11. ANY EXCESSIVE GROUNDING CONDUCTOR SHALL NOT BE CUT OFF. IT MUST BE DISTRIBUTED INSIDE THE STEEL REINFORCEMENT SHOWN IN THE DRAWING AS SLACK AND TIED TO ALL STEEL REINFORCEMENT CROSSINGS.
12. TURBINES MAY NEED TO BE SURROUNDED BY 5 FEET WIDE, 6 INCH DEEP LAYER OF CLEAN CRUSHED ROCK 3/4" TO 1 INCH GRADE, LOCATIONS TBD.
13. ONE GROUNDING CABLE SHALL GENERALLY FOLLOW THE MV CABLE ROUTING (FROM FOUNDATION TO THE MBB TO TOWER WALL). WHEN THE GROUNDING CONDUCTOR ENTERS THE RING OF THE TOWER, THEY ARE TO BE ROUTED TO THE EXTREME, FAR ENDS OF THE TOWER. THE GROUNDING CONDUCTORS SHALL BE MECHANICALLY ATTACHED TO THE TOWER.
14. IF THE SOIL RESISTIVITY IS LESS THAN 2,000 Ohms THE LENGTH OF THE HORIZONTAL MAY BE 50m. IF GREATER THAN 2,000 Ohms THE LENGTH OF THE CABLE MUST BE 80m (REFER TO DOCUMENT 959021)
15. SEE NOTE 7.1 REINFORCING STEEL PLACEMENT TOLERANCES FOR MINIMUM SPACING FROM STRUCTURAL FOUNDATION PLANS DRAWING, 25053D3001A.

NOT FOR CONSTRUCTION

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-04-14	MRW	GP	KL	
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	MRW	GP	KL	
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	KL	
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL	

REVISION	ZONE	DATE	BY	CHK	ENG	NO

REFERENCE DRAWINGS	DWG NO.	MANUFACTURER	DESCRIPTION

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BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE:	

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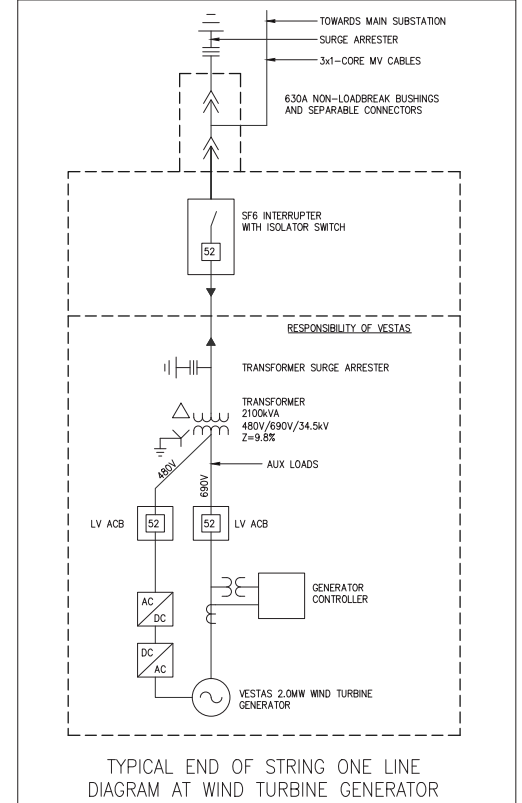
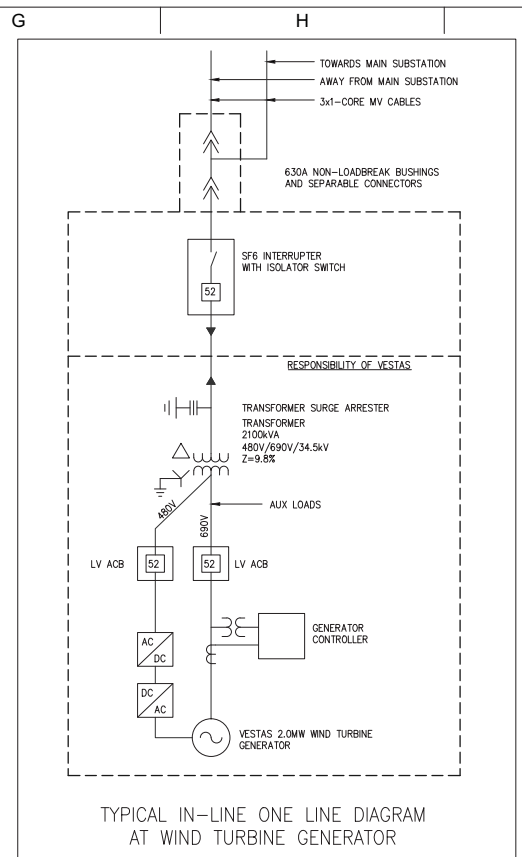
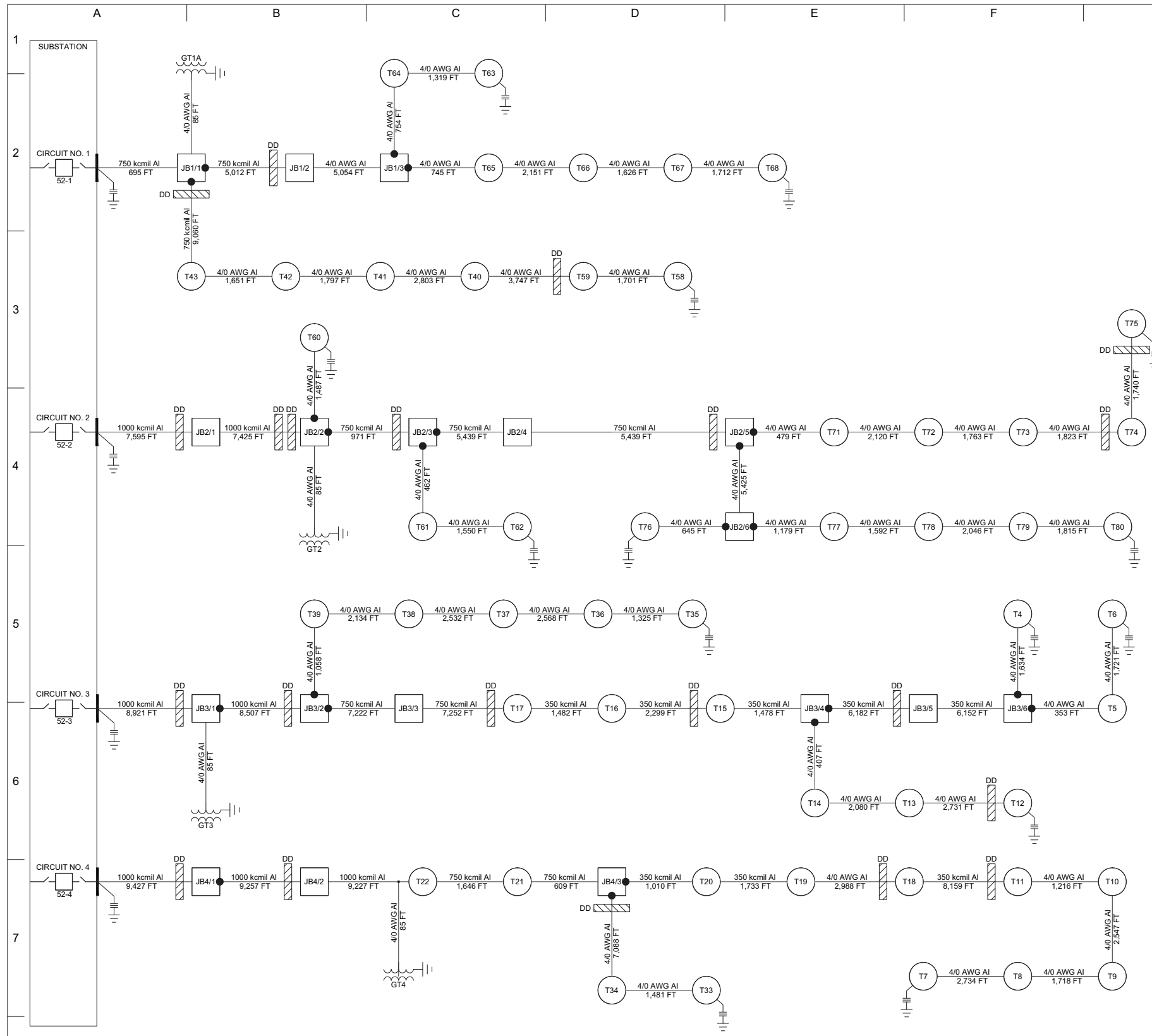
PREPARED BY: **RES AMERICAS**
RES AMERICA CONSTRUCTION INC.
 11101 W 120TH AVE, SUITE 400 BROOMFIELD, CO 80021
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 PROJECT NO: 23053 | WTG LAYOUT NO: PUS4dw077

TURBINE GROUNDING INSTALLATION DETAIL
 (VESTAS V100 - 2.0 - 150MW)

23053D4202

REV D

[s:\winds\wind_farms\usa\North Dakota - Border Winds\Drawings\Internal\Series 4\CONTROLLED DRAWINGS\23053D4310.dwg] [Jun 06, 2014 4:47pm]



- LEGEND:**
- 34.5kV UNDERGROUND CABLE
 - VESTAS V100-2.0MW WIND TURBINE
 - 34.5kV ABOVE GROUND JUNCTION BOX
 - SURGE ARRESTER
 - 34.5 kV RISER STRUCTURE
 - DIRECTIONAL DRILL
 - DIRECTIONAL FAULT CURRENT INDICATORS

- NOTE:**
1. TURBINE TRANSFORMER DETAILS TO BE CONFIRMED BY MANUFACTURER'S DRAWINGS AND DATA SHEETS.
 2. ALL CABLE TO BE INSTALLED AT A DEPTH OF 4FT UNLESS OTHERWISE INDICATED.
 3. SURGE ARRESTOR LOCATION AND RATINGS TO BE FINALIZED.

NOT FOR CONSTRUCTION

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS
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A	ISSUED FOR 30% DESIGN REVIEW	ALL	01-17-14	MRW	GP	KL								
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	KL								
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	KL								
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL								

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BORDER WINDS - WIND ENERGY PROJECT
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DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE: N.T.S.	

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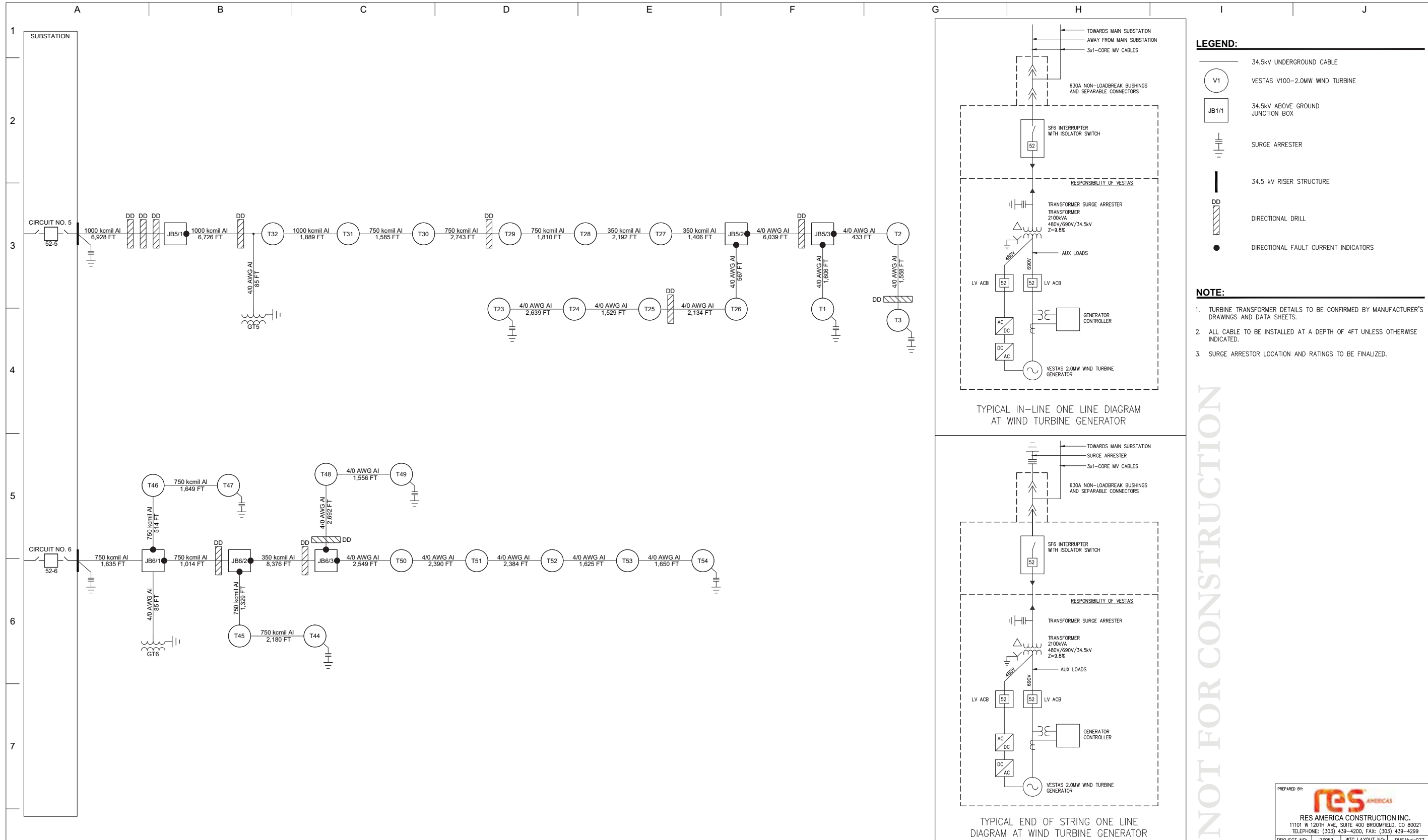
MV SINGLE LINE DIAGRAM (CIRCUITS 1-4)
 (VESTAS V100 - 2.0 - 150MW)

23053D4310

ENERGY SUPPLY ENGINEERING & CONSTRUCTION

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[skeletal] Jun 06, 2014 - 4:13pm [U:\WIND FARMS\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES 4\CONTROLLED DRAWINGS\23053D4311.dwg]



- LEGEND:**
- 34.5kV UNDERGROUND CABLE
 - V1 VESTAS V100-2.0MW WIND TURBINE
 - JB1/1 34.5kV ABOVE GROUND JUNCTION BOX
 - SURGE ARRESTER
 - 34.5 kV RISER STRUCTURE
 - DD DIRECTIONAL DRILL
 - DIRECTIONAL FAULT CURRENT INDICATORS

- NOTE:**
1. TURBINE TRANSFORMER DETAILS TO BE CONFIRMED BY MANUFACTURER'S DRAWINGS AND DATA SHEETS.
 2. ALL CABLE TO BE INSTALLED AT A DEPTH OF 4FT UNLESS OTHERWISE INDICATED.
 3. SURGE ARRESTOR LOCATION AND RATINGS TO BE FINALIZED.

NOT FOR CONSTRUCTION

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR 30% DESIGN REVIEW	ALL	01-17-14	MRW	GP	KL							
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	KL							
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	KL							
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL							

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BORDER WINDS - WIND ENERGY PROJECT
ROLETTE COUNTY, NORTH DAKOTA

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE: N.T.S.	

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PROJECT NO: 23053 | WTG LAYOUT NO: PUS46dw077

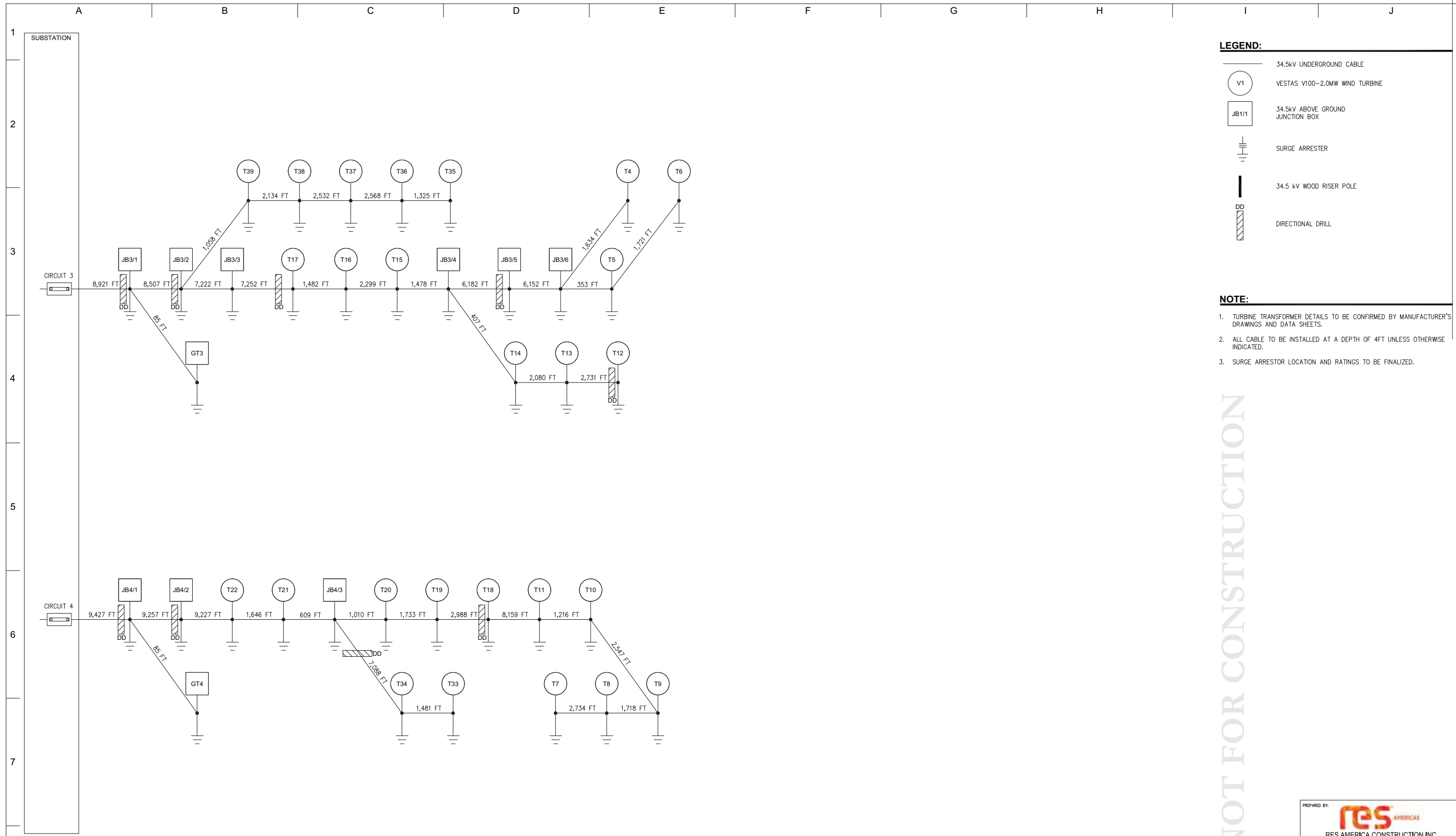
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RES AMERICA CONSTRUCTION INC.
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MV SINGLE LINE DIAGRAM (CIRCUITS 5-6)
(VESTAS V100 - 2.0 - 150MW)

23053D4311

REV D

[U:\WIND_FARMS\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES A\CONTROLLED DRAWINGS\23053D4316.dwg] [Jun 06, 2014 - 4:05pm] [mheadford]



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													DWG NO.	MANUFACTURER						
A	ISSUED FOR 30% DESIGN REVIEW	ALL	01-17-14	MRW	GP	KL														
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	KL														
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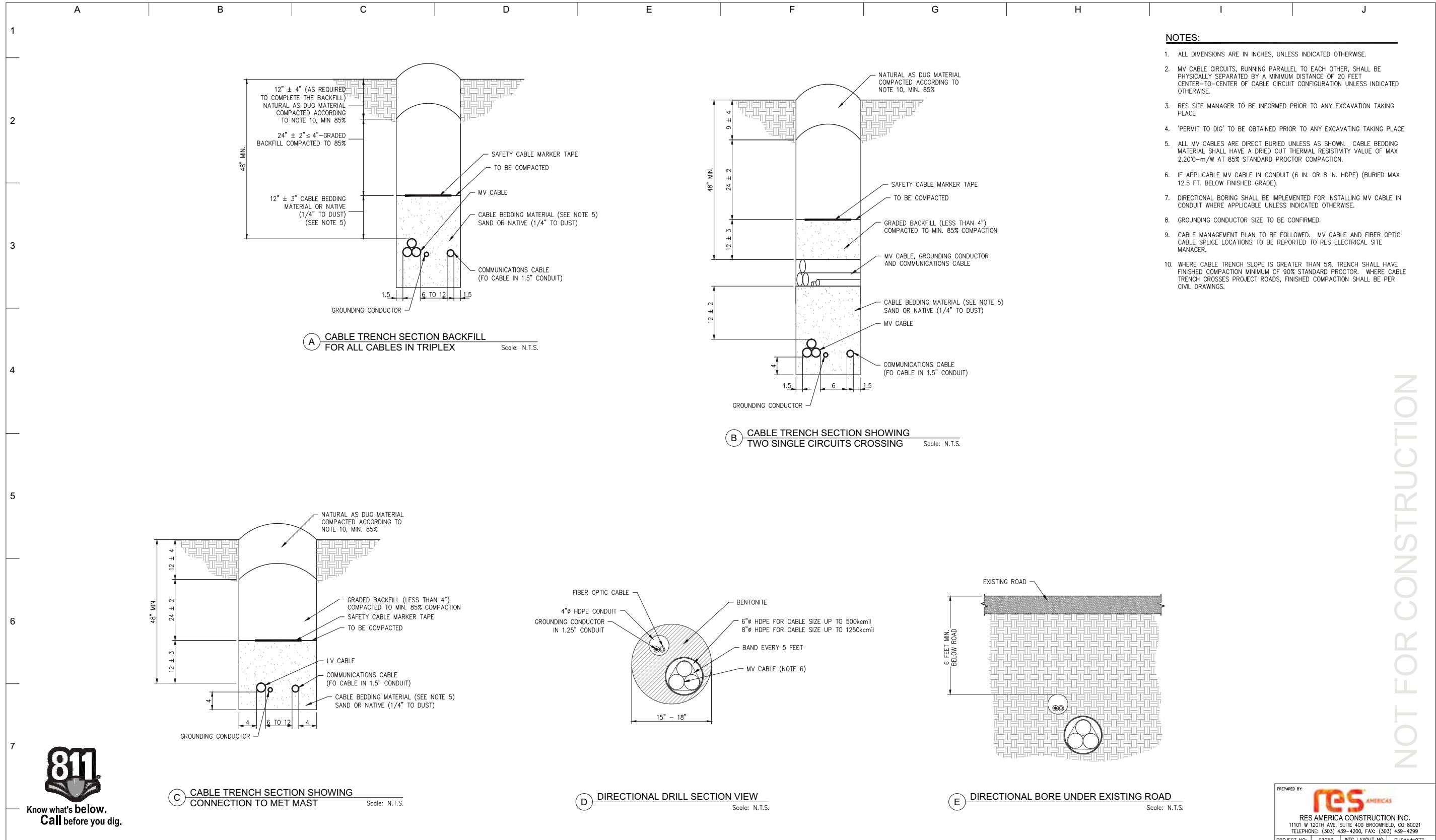
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 PROJECT NO: 23053 | WTG LAYOUT NO: PUSAbdw077

GROUNDING SINGLE LINE DIAGRAM (CIRCUITS 3-4)
 (VESTAS 2.0MW - 150MW)

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE: N.T.S.	

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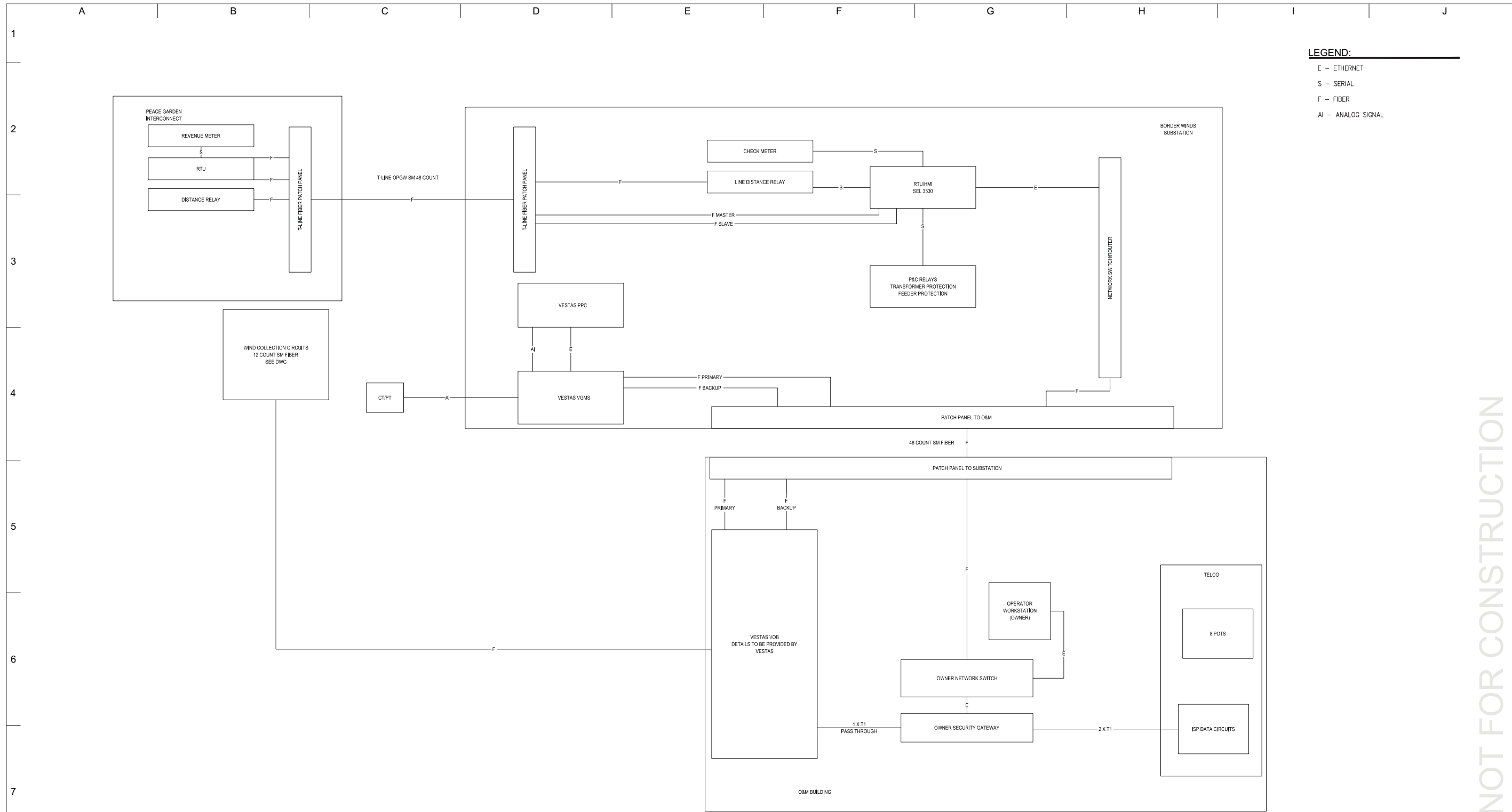


NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS	INFORMATION SHOWN IS SUBJECT TO CHANGE. NOT FOR CONSTRUCTION	 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROLETTE COUNTY, NORTH DAKOTA</small>	<small>THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.</small>	ENERGY SUPPLY <small>ENGINEERING & CONSTRUCTION</small>	23053D4320	<small>REV</small> D
													DWG NO.	MANUFACTURER						
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-04-14	SMK	GP	KL														
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	KL														
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	KL														
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL														

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 PROJECT NO: 23053 | WTG LAYOUT NO: PUSAbw077

MV CABLE TRENCH SECTIONS
 (VESTAS V100 - 2.0 - 150MW)

[s:\euler] [Jun 06, 2014 - 5:19pm] [U:\WIND FARMS\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES 4\CONTROLLED DRAWINGS\23053D4505.dwg]



LEGEND:
 E - ETHERNET
 S - SERIAL
 F - FIBER
 AI - ANALOG SIGNAL

NOT FOR CONSTRUCTION

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO
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B	ISSUED FOR 30% DESIGN REVIEW	ALL	02-04-14	SMK	GP	DM	
C	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	MG	GP	DM	
D	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	DM	
E	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL	

REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

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BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE: N.T.S.	

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 PROJECT NO: 23053 | WTG LAYOUT NO: PUS46dw077

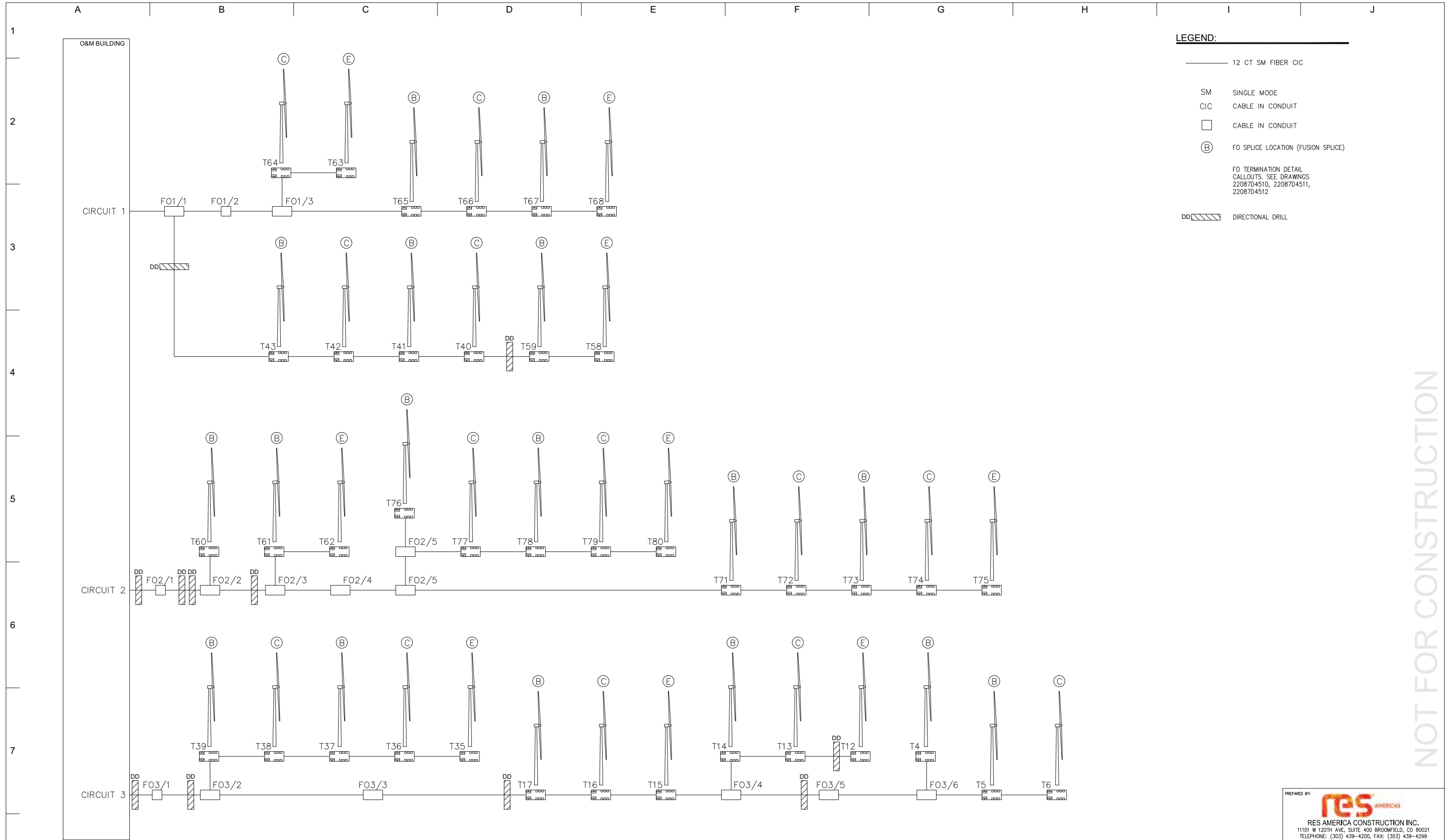
SCADA ARCHITECTURE
 (VESTAS V100 - 2.0 - 150MW)

ENERGY SUPPLY
 ENGINEERING & CONSTRUCTION

23053D4505

REV E

[U:\WIND FARMS\USA\North Dakota - Border Winds\DWG\Internal\SERIES A\CONTROLLED DRAWINGS\23053D4506.dwg] [Jun 06, 2014 - 4:38pm] [unhead]



- LEGEND:**
- 12 CT SM FIBER CIC
 - SM SINGLE MODE
 - CIC CABLE IN CONDUIT
 - CABLE IN CONDUIT
 - ⊕ FO SPlice LOCATION (FUSION SPlice)
 - FO TERMINATION DETAIL
CALLOUTS. SEE DRAWINGS
22087D4510, 22087D4511,
22087D4512
 - DD DIRECTIONAL DRILL

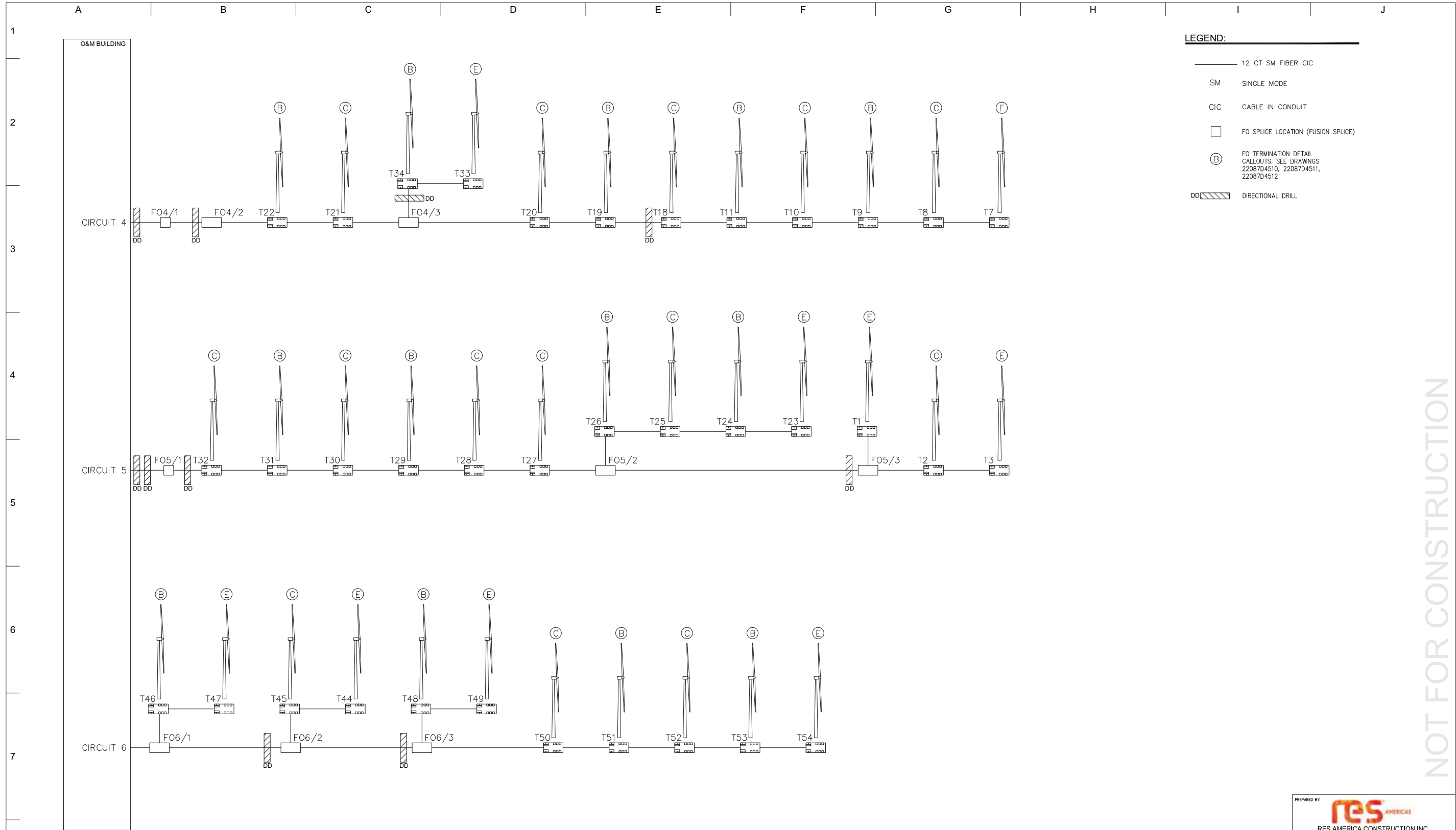
NOT FOR CONSTRUCTION

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG	REFERENCE DRAWINGS	INFORMATION SHOWN IS SUBJECT TO CHANGE. NOT FOR CONSTRUCTION	 NORTHERN STATES POWER BORDER WINDS - WIND ENERGY PROJECT <small>ROLETTE COUNTY, NORTH DAKOTA</small>	<small>THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.</small>	ENERGY SUPPLY <small>ENGINEERING & CONSTRUCTION</small>	23053D4506	<small>REV</small> D
													DWG NO.	MANUFACTURER						
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-05-14	SMK	GP	DM														
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	DM														
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	DM														
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL														

PREPARED BY: RES AMERICAS
 RES AMERICA CONSTRUCTION INC.
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 PROJECT NO: 23053 | WTG LAYOUT NO: FUS4506W77

OPTIC CABLE ROUTING - CIRCUITS 1-3
 (VESTAS V100 - 2.0 - 150MW)

[U:\WIND_FARMS\USA\North Dakota - Border Winds\DWG\Internal\SERIES A\CONTROLLED DRAWINGS\23053D4507.dwg] [Jun 06, 2014 - 4:38pm] [mheadford]



- LEGEND:**
- 12 CT SM FIBER CIC
 - SM SINGLE MODE
 - CIC CABLE IN CONDUIT
 - FO SPLICE LOCATION (FUSION SPLICE)
 - ⓑ FO TERMINATION DETAIL CALLOUTS. SEE DRAWINGS 22087D4510, 22087D4511, 22087D4512
 - ▨▨▨▨ DIRECTIONAL DRILL

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 PROJECT NO: 23053 | WTG LAYOUT NO: PUS4dw077

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO
A	ISSUED FOR 30% DESIGN REVIEW	ALL	02-05-14	SMK	GP	DM	
B	ISSUED FOR 60% DESIGN REVIEW	ALL	04-15-14	SMK	GP	DM	
C	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	DM	
D	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL	

REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

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Xcel Energy
 NORTHERN STATES POWER
BORDER WINDS - WIND ENERGY PROJECT
 ROLETTE COUNTY, NORTH DAKOTA

DWN: SMK	DATE: 06-05-14	CHK: N/A	DATE: N/A
ENG: KL	DATE: 06-05-14	CHK: GP	DATE: 06-05-14
PM: BT	DATE: 06-05-14	PROJ. NO: 23053	
APVD: GP	DATE: 06-05-14	SCALE: N.T.S.	

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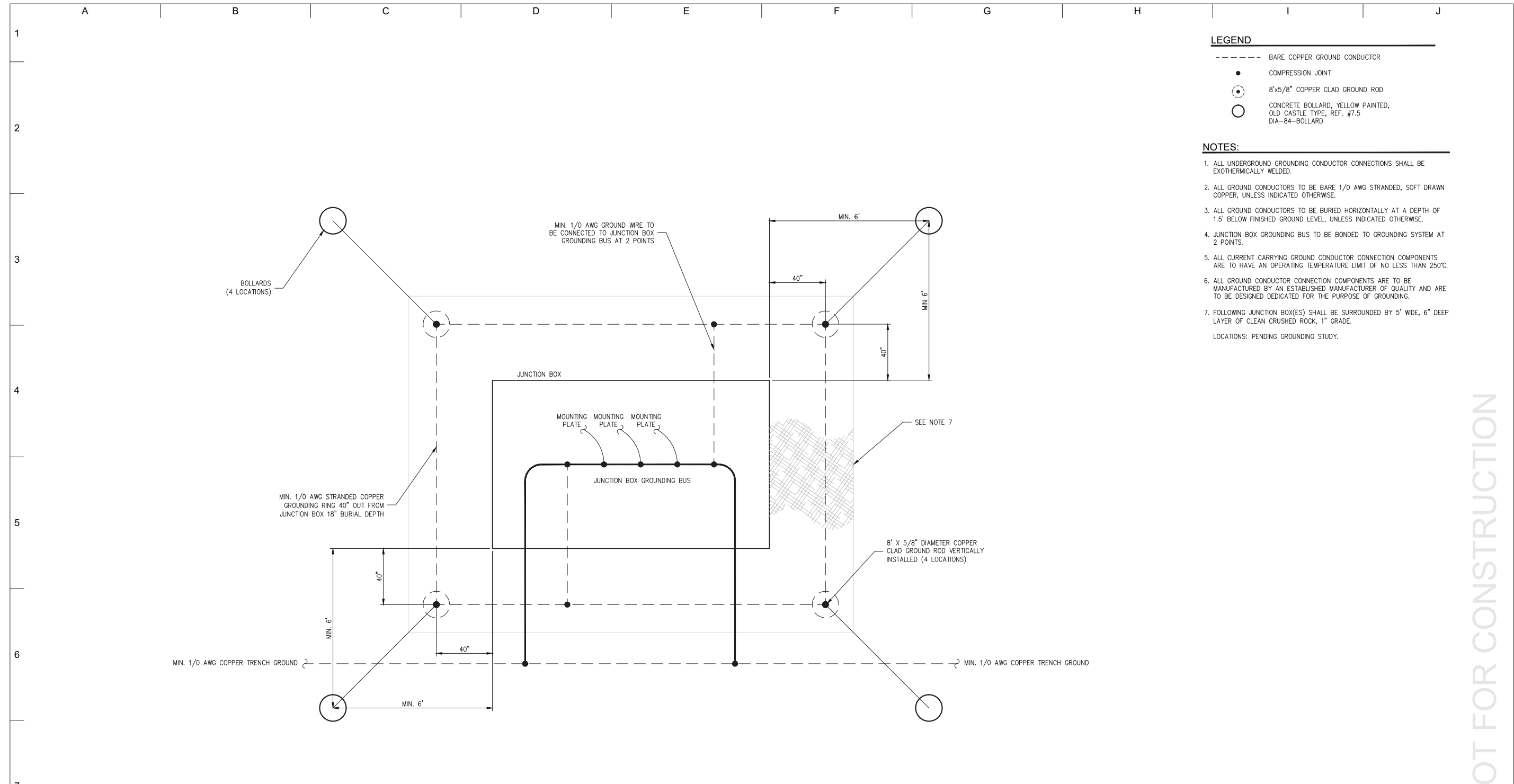
ENERGY SUPPLY ENGINEERING & CONSTRUCTION

23053D4507

OPTIC CABLE ROUTING - CIRCUITS 4-6
 (VESTAS V100 - 2.0 - 150MW)

REV D

[sketcher] [Jun 06, 2014 - 4:40pm] [U:\WIND FARMS\USA\North Dakota - Border Winds 23053\DWG\Internal\SERIES 4\CONTROLLED DRAWINGS\23053D4601.dwg]



- LEGEND**
- BARE COPPER GROUND CONDUCTOR
 - COMPRESSION JOINT
 - 8"x5/8" COPPER CLAD GROUND ROD
 - CONCRETE BOLLARD, YELLOW PAINTED, OLD CASTLE TYPE, REF. #7.5 DIA-84-BOLLARD

- NOTES:**
1. ALL UNDERGROUND GROUNDING CONDUCTOR CONNECTIONS SHALL BE EXOTHERMICALLY WELDED.
 2. ALL GROUND CONDUCTORS TO BE BARE 1/0 AWG STRANDED, SOFT DRAWN COPPER, UNLESS INDICATED OTHERWISE.
 3. ALL GROUND CONDUCTORS TO BE BURIED HORIZONTALLY AT A DEPTH OF 1.5' BELOW FINISHED GROUND LEVEL, UNLESS INDICATED OTHERWISE.
 4. JUNCTION BOX GROUNDING BUS TO BE BONDED TO GROUNDING SYSTEM AT 2 POINTS.
 5. ALL CURRENT CARRYING GROUND CONDUCTOR CONNECTION COMPONENTS ARE TO HAVE AN OPERATING TEMPERATURE LIMIT OF NO LESS THAN 250°C.
 6. ALL GROUND CONDUCTOR CONNECTION COMPONENTS ARE TO BE MANUFACTURED BY AN ESTABLISHED MANUFACTURER OF QUALITY AND ARE TO BE DESIGNED DEDICATED FOR THE PURPOSE OF GROUNDING.
 7. FOLLOWING JUNCTION BOX(ES) SHALL BE SURROUNDED BY 5' WIDE, 6" DEEP LAYER OF CLEAN CRUSHED ROCK, 1" GRADE.
- LOCATIONS: PENDING GROUNDING STUDY.

NOT FOR CONSTRUCTION

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B	ISSUED FOR 90% DESIGN REVIEW	ALL	05-08-14	SMK	GP	KL	
C	ISSUED FOR 100% DESIGN REVIEW	ALL	06-05-14	SMK	GP	KL	

REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

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MV JUNCTION BOX GROUNDING
 (VESTAS V100 - 2.0 - 150MW)

23053D4601

REV C

