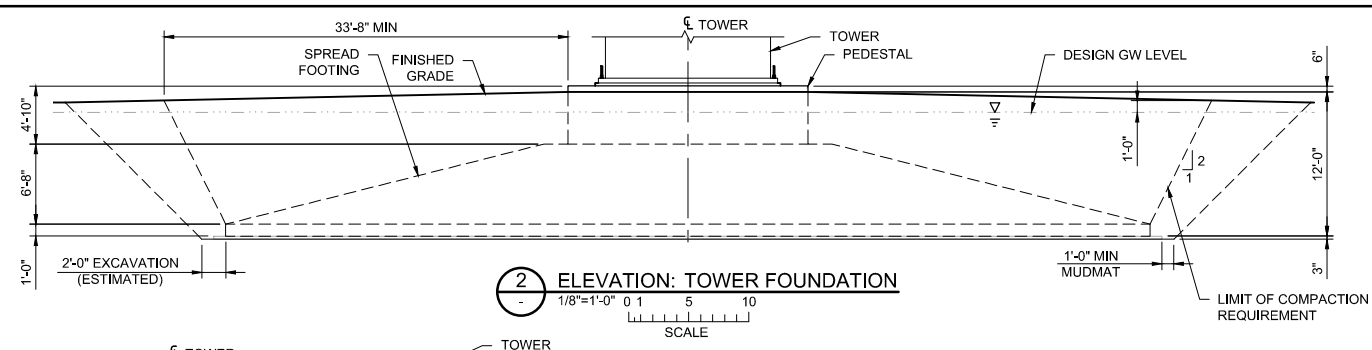
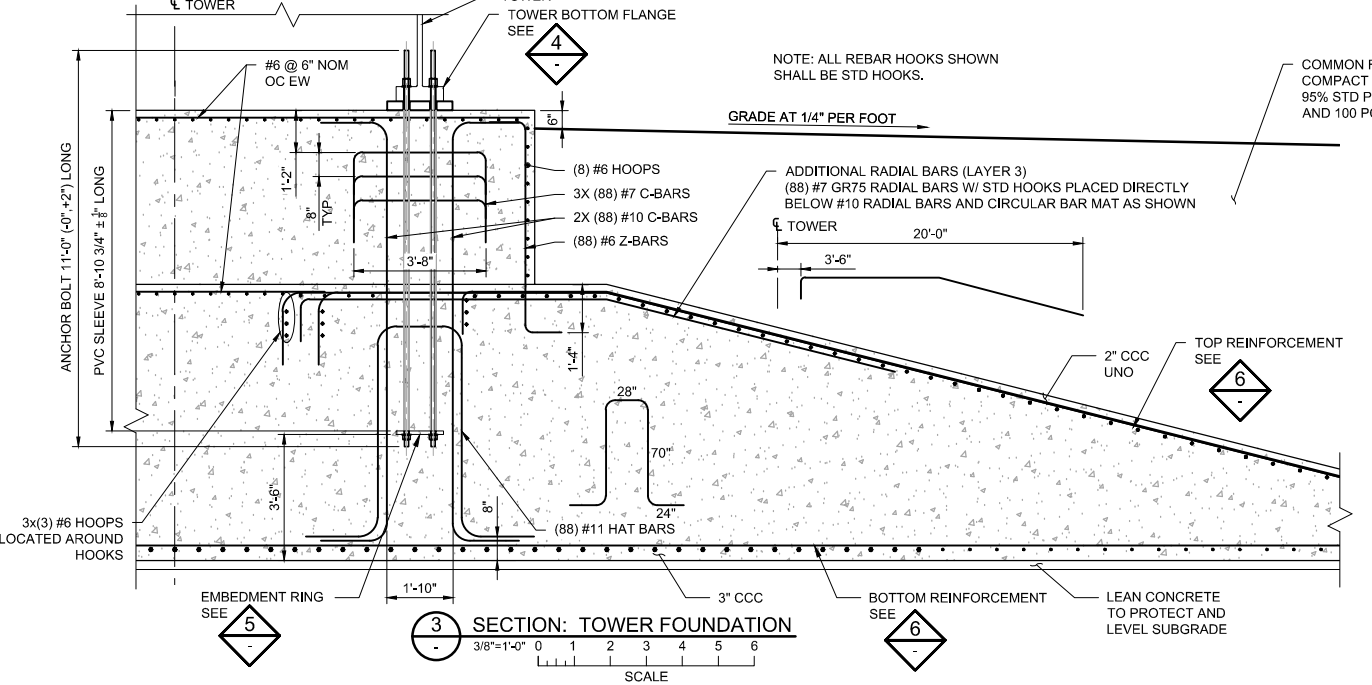


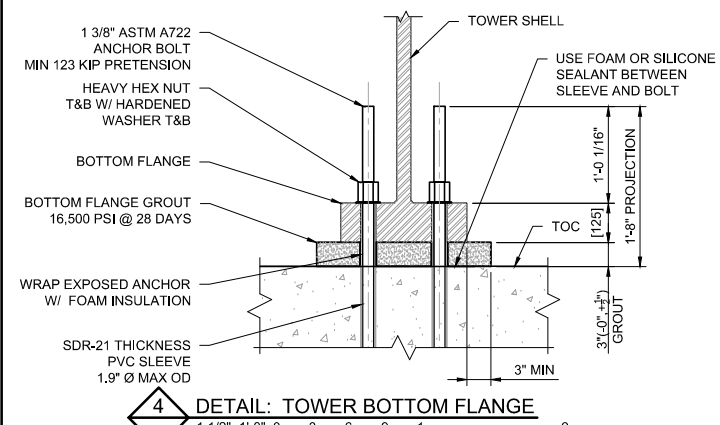
**1 PLAN: TOWER FOUNDATION**  
1/8"=1'-0" 0 1 5 10  
SCALE



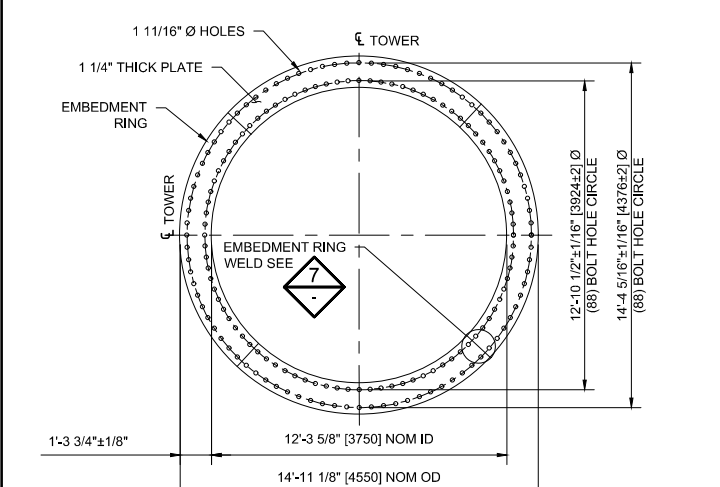
**2 ELEVATION: TOWER FOUNDATION**  
1/8"=1'-0" 0 1 5 10  
SCALE



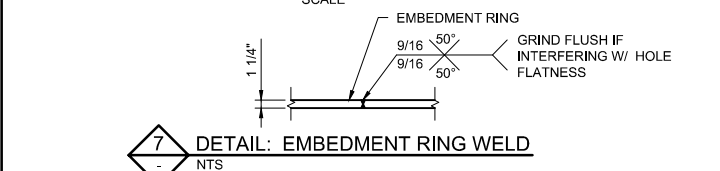
**3 SECTION: TOWER FOUNDATION**  
3/8"=1'-0" 0 1 2 3 4 5 6  
SCALE



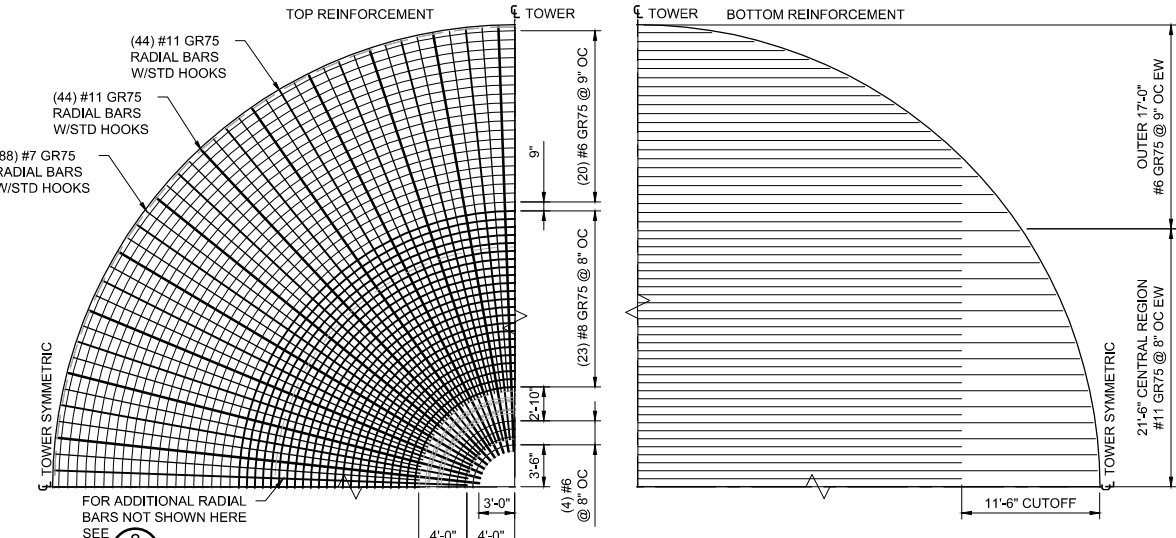
**4 DETAIL: TOWER BOTTOM FLANGE**  
1 1/2"=1'-0" 0 3 6 9 1 2  
SCALE



**5 DETAIL: EMBEDMENT RING**  
1/4"=1'-0" 0 1 5  
SCALE



**7 DETAIL: EMBEDMENT RING WELD**  
NTS



**6 DETAIL: TOP AND BOTTOM REINFORCEMENT**  
1/8"=1'-0" 0 1 5 10  
SCALE

**ABBREVIATIONS:**

Ø	DIAMETER	MIN	MINIMUM
BO	BOTTOM OF	NOM	NOMINAL
CCC	CLEAR CONCRETE COVER	OC	ON CENTER
CL	CENTER LINE	OD	OUTSIDE DIAMETER
EL	ELEVATION	PSF	POUNDS PER SQUARE FOOT
EW	EACH WAY	PSI	POUNDS PER SQUARE INCH
GW	GROUND WATER	PVC	POLYVINYL CHLORIDE
GR	GRADE	R	RADIUS
ID	INSIDE DIAMETER	T&B	TOP AND BOTTOM
KIPS	THOUSAND POUNDS	TOC	TOP OF CONCRETE
KN	KILONEWTON	TYP	TYPICAL
KN-M	KILONEWTON-METER	UNO	UNLESS NOTED OTHERWISE
KSI	KIPS PER SQUARE INCH	STD	STANDARD
MAX	MAXIMUM	W/	WITH

BAR SIZE	BAR MAT	BAR GRADE	MIN CLASS B LAP SPICE PER ACI 318*
#6	TOP MAT	60 KSI	26
#6	TOP MAT	75 KSI	33
#8	TOP MAT	75 KSI	54

NOTE: ALL LAP SPICES ARE PROVIDED FOR CIRCULAR BARS W/ A MINIMUM BAR SPACING OF 6" OC.

**BUILDING AND DESIGN CODES:**  
INTERNATIONAL BUILDING CODE 2015, INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS.  
BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318, 2014, AMERICAN CONCRETE INSTITUTE.

**WIND TURBINE AND TOWER:**  
MANUFACTURER: VESTAS  
MODEL: V150  
POWER OUTPUT: 4.0/4.2 MW  
TURBINE HUB HEIGHT: 105m  
ROTOR DIAMETER: 150m

**DESIGN SERVICE LOADS:**  
UNFACTORED SERVICE LOADS DUE TO EXTREME WIND CONDITION CLASS IEC III-C:  
(APPLY 1.35 LOAD FACTOR TO LOADS SHOWN BELOW TO OBTAIN FACTORED LOADS)  
OVERTURNING MOMENT, MXY = 101,300 KN-M = 74,715 KIP-FT  
HORIZONTAL BASE SHEAR, HXY = 964 KN = 217 KIP  
VERTICAL TOWER LOAD, WZ = 5,246 KN = 1,179 KIP

UNFACTORED SERVICE LOADS DUE TO ABNORMAL EXTREME WIND CONDITION CLASS IEC III-C:  
(APPLY 1.10 LOAD FACTOR TO LOADS SHOWN BELOW TO OBTAIN FACTORED LOADS)  
OVERTURNING MOMENT, MXY = 120,800 KN-M = 89,098 KIP-FT  
HORIZONTAL BASE SHEAR, HXY = 1,176 KN = 264 KIP  
VERTICAL TOWER LOAD, WZ = 5,233 KN = 1,176 KIP

UNFACTORED SERVICE LOADS DUE TO NORMAL OPERATING WIND CONDITION CLASS IEC III-C:  
OVERTURNING MOMENT, MXY = 74,542 KN-M = 54,980 KIP-FT  
HORIZONTAL BASE SHEAR, HXY = 690 KN = 155 KIP  
VERTICAL TOWER LOAD, WZ = 5,262 KN = 1,183 KIP

DESIGN FATIGUE LIFE: 30 YEARS  
**FOUNDATION DESIGN DATA:**  
FACTOR OF SAFETY AGAINST OVERTURNING: >1.5  
MIN FACTOR OF SAFETY AGAINST SLIDING: >1.5  
MIN FACTOR OF SAFETY AGAINST BEARING CAPACITY FAILURE: >2.26 ON EXTREME

**REFERENCE DOCUMENTS:**  
1. VESTAS WIND SYSTEMS A/S, "FOUNDATION LOADS, V150-4.0/4.2MW, MK3E, IEC III-C, 105M (TOWER T96690), 50/60 HZ, GS." VESTAS DOCUMENT: 0069-2467 VER 01, DATED: 2018.05.02.

**MIN 28-DAY COMPRESSIVE STRENGTH CONCRETE:**  
5,500 PSI FOOTING  
7,000 PSI PEDESTAL

**MIN YIELD POINT STRENGTH OF REINFORCING BAR:**  
60 KSI UNO

**MIN STRENGTH OF ANCHOR BOLTS:**  
TENSILE STRENGTH 150 KSI YIELD STRENGTH 120 KSI

**MIN 28-DAY COMPRESSIVE STRENGTH OF NON-SHRINK GROUT:**  
16,500 PSI

**MIN YIELD POINT STRENGTH OF EMBEDMENT PLATE:**  
50 KSI

**VOLUME OF FOUNDATION AS DIMENSIONED:**  
702 CUBIC YARDS FOUNDATION CONCRETE  
+ 56 CUBIC YARDS PEDESTAL CONCRETE  
= 758 CUBIC YARDS TOTAL

**ESTIMATED WEIGHT OF STEEL REINFORCING:**  
45.6 TONS GRADE 75  
+ 13.3 TONS GRADE 60  
= 58.9 TONS TOTAL

**COARSE AGGREGATE GRADATION:**  
ASTM C33 (SIZE 6 OR 67) W/ MIN 2% RETAINED ON THE 3/4-INCH SIEVE.

**MIN REQUIRED GROSS SOIL BEARING CAPACITY:**  
2,400 PSF (NORMAL LOADING)  
2,650 PSF (NORMAL EXTREME LOADING)  
2,850 PSF (ABNORMAL EXTREME LOADING)

**PRELIMINARY  
NOT FOR CONSTRUCTION  
CONFIDENTIAL**  
THIS DRAWING IS THE PROPERTY OF BARR ENGINEERING COMPANY (BARR). NO OTHER USE IS PERMITTED WITHOUT THE WRITTEN PERMISSION OF BARR. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF ILLINOIS.

PRINTED NAME: \_\_\_\_\_  
SIGNATURE: \_\_\_\_\_  
DATE: \_\_\_\_\_ LICENSE # \_\_\_\_\_

CLIENT	DATE

**BARR**  
Project Office:  
BARR ENGINEERING CO.  
4300 MARKETPOINTE DRIVE  
Suite 200  
MINNEAPOLIS, MN 55435  
Corporate Headquarters:  
Minneapolis, Minnesota  
Ph: 1-800-632-2277  
www.barr.com

Scale	AS SHOWN
Date	5/4/2020
Drawn	DMH
Checked	MBJ
Designed	DMH2
Approved	MBJ

**TRI-GLOBAL ENERGY**  
DALLAS, TEXAS

PANTHER GROVE WIND PROJECT WOODFORD COUNTY, ILLINOIS		BARR PROJECT No.
SPREAD FOOTING FOUNDATION PLAN, ELEVATION, SECTION & DETAILS		13/A2-1001
DWG. No.	REV. No.	
S-01	A	

CADD USER: David M. Hermonington FILE: A:\CLIENTS\TRI GLOBAL ENERGY\PANTHER GROVE\38231002 - WTG FOUNDATION - S01.DWG PLOT SCALE: 1:2 PLOT DATE: 5/15/2020 12:43 PM