

INDEX OF SHEETS		
NO.	SHEET TITLE	REV DATE
S-1A	TOWER ELEVATION AND DESIGN LOADING	0 11-17-11

**NOTES**

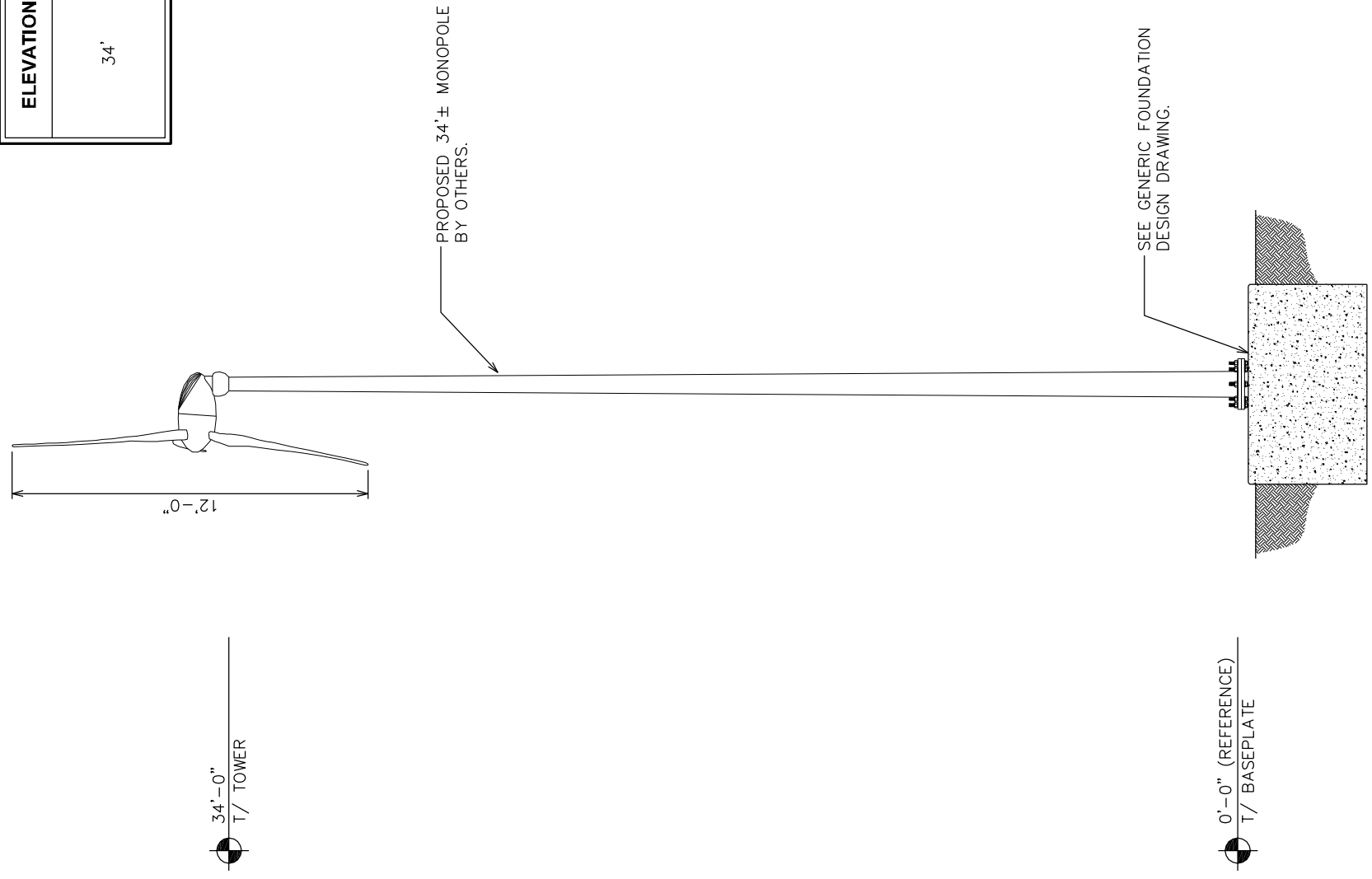
1. REFER TO FOUNDATION DESIGN DRAWINGS FOR FOUNDATION INFORMATION.

2. FOR TOWER AND APPURTENANCE INSTALLATION REFER TO SOUTHWEST WINDPOWER.

**TOWER DESIGN LOADING**

120-MPH THREE-SECOND GUST BASIC WIND SPEED AND 1" RADIAL ICE WITH A 60-MPH THREE-SECOND GUST PER ANSI/TIA-222-G-2-2009, STRUCTURAL STANDARD FOR ANTIENNA SUPPORTING STRUCTURES AND ANTENNAS, ASCE/SEI 7-05, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES AND THE 2009 INTERNATIONAL BUILDING CODE.

ELEVATION	APPURTENANCE DESCRIPTION / PART #
34'	(1) SKYSTREAM 3.7 WIND TURBINE WEIGHT: 207 LBS ROTOR DIAMETER: 12-FT SWEEP AREA: 115.7 FT^2



TOWER REPRESENTATIVE:

MICHEAL SLATTERY  
SOUTHWEST WINDPOWER  
SENIOR DESIGN ENGINEER  
1801 W. ROUTE 66  
FLAGSTAFF, AZ 86001 USA  
(928) 226-6266

TOWER LOCATION:

TO BE DETERMINED  
(SITE-SPECIFIC INSTALLATIONS TO BE EVALUATED BY A PROFESSIONAL ENGINEER)

PLANS PREPARED BY:

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
OFFICE: (919) 661-6351  
FAX: (919) 661-6350

SEAL:

Expires 09/30/2014

November 17, 2011

REV	DATE	ISSUED FOR:
0	11-17-11	-

DRAWN BY: LSB CHECKED BY: REG

SHEET TITLE:

**TOWER ELEVATION & DESIGN LOADING**

SHEET NUMBER:	REVISION:
<b>S-1A</b>	<b>0</b>
TEP#: 110002.30	

**TOWER ELEVATION**  
SCALE: N.T.S.



**ATTENTION**

THE FOUNDATION DESIGNS ARE IN ACCORDANCE WITH THE 2006/2009 INTERNATIONAL BUILDING CODE, TIA-222-G-2-2009 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, AND ASCE 7-05, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES. THE FOUNDATION DESIGNS ARE FOR A 34-FT [10.4M] MONOPOLE (34-17) WITH THE SKYSTREAM 3.7 WIND TURBINE BASED ON THE SOIL INFORMATION LISTED IN TABLE 1804.2/1806.2 (IBC 2006/2009 RESPECTIVELY) REFERENCED ON SHEET S-1 AND THE WIND ZONES DESCRIBED ON SHEET S-2. IT IS THE RESPONSIBILITY OF THE OWNER TO VERIFY BY GEOTECHNICAL INVESTIGATION THAT ACTUAL SOIL PARAMETERS MEET OR EXCEED THOSE SHOWN IN THE REFERENCED TABLE. IF CONDITIONS OTHER THAN THOSE DESCRIBED IN THE REFERENCED TABLE ARE ENCOUNTERED A FOUNDATION ANALYSIS SHOULD BE PERFORMED TO DETERMINE THE STRUCTURAL ADEQUACY OF THE SUBSTRUCTURE.

**INDEX OF SHEETS**

NO.	SHEET TITLE	REV	DATE
T-1	TITLE SHEET	2	11-17-11
N-1	PROJECT NOTES I	2	11-17-11
N-2	PROJECT NOTES II	2	11-17-11
S-1	TABLE 1804.2/1806.2 PRESUMPTIVE LOAD-BEARING VALUES (IBC 2006/2009)	2	11-17-11
S-2	WIND ZONES AND TOWER REACTIONS	2	11-17-11
S-3A	34-FT [10.4M] MONOPOLE (34-17) FOUNDATION - WIND ZONE 2	2	11-17-11
S-3B	34-FT [10.4M] MONOPOLE (34-17) FOUNDATION - WIND ZONE 3	2	11-17-11
S-4	34-FT [10.4M] MONOPOLE (34-17) FOUNDATION (ALTERNATIVE) - PIER	2	11-17-11
S-5	34-FT [10.4M] MONOPOLE (34-17) FOUNDATION DIMENSIONS - PIER	2	11-17-11

SEAL:

Expires 09/30/2014  
*November 17, 2011*

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>T-1</b>	REVISION: <b>2</b>
	TEP#: 110002.30

## GENERAL NOTES:

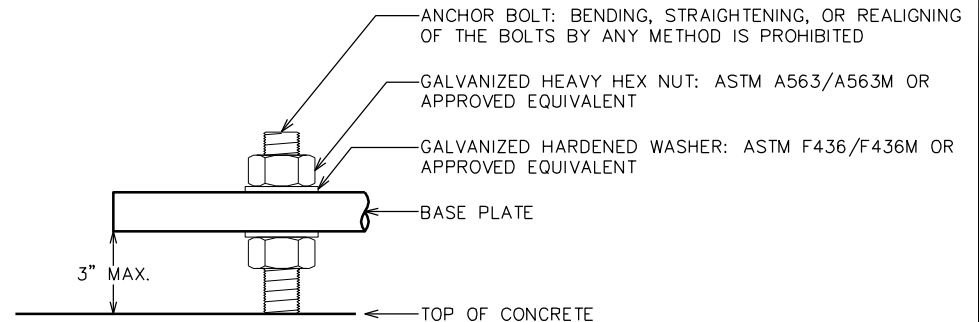
1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE APPLICABLE STATE/TERRITORY.
3. ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
4. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
5. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
7. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK. THE CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNMENTAL AGENCIES. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
8. THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.
9. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.

## CONNECTION NOTES:

1. OVERSIZED (ROUND) BASE PLATE HOLES SHALL HAVE APPROVED F436 (F436M FOR METRIC) WASHERS INSTALLED, BOTH ABOVE AND BELOW THE BASE PLATE, ON EACH ANCHOR.
2. SLOTTED BASE PLATE HOLES SHALL HAVE EITHER APPROVED F436 (F436M FOR METRIC) WASHERS, OR PLATE WASHERS INSTALLED, BOTH ABOVE AND BELOW THE BASE PLATE, ON EACH ANCHOR. WASHERS SHALL BE SIZED TO COVER THE ENTIRE SLOTTED HOLES. PLATE WASHERS SHALL BE OF ASTM A36 MATERIAL (MINIMUM) AND HAVE A MINIMUM THICKNESS OF 5/16" (8mm).
3. AN APPROVED NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL BOLTED CONNECTIONS TO PREVENT NUT LOOSENING.

## BASE INSTALLATION DETAIL:

\*AN APPROVED NUT-LOCKING DEVICE SHALL BE USED.



SEAL:

Expires 09/30/2014  
November 17, 2011

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>N-1</b>	REVISION: <b>2</b>
	TEP#: 110002.30

**REINFORCING STEEL NOTES:**

1. THE REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60 [EU GRADE 420]. IT SHALL BE DEFORMED AND SPLICES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED.
2. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
3. REINFORCING CAGES SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE. WHEN TEMPORARY CASING IS UTILIZED, BRACING SHALL BE ADEQUATE TO RESIST FORCES OCCURRING FROM FLOWING CONCRETE DURING CASING EXTRACTION.
4. SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF TIEBACK REINFORCING TO INSURE CONCENTRIC PLACEMENT OF CAGES IN EXCAVATIONS.
5. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" [75mm] IF CAST IN PLACE AND 2" [50mm] COVER IF FORMWORK IS USED AS DEFINED IN ACI 318 SECTION 7.7.1. APPROVED SPACERS SHALL BE USED TO INSURE APPROPRIATE COVER ON REINFORCEMENT.
6. IN REGIONS OF HIGH SEISMIC RISK, ASSIGNED TO SEISMIC DESIGN CATEGORIES C, D, E, AND F, ADDITIONAL TERMINATION DETAILS ARE REQUIRED FOR STEEL REINFORCING BARS. FURTHER, ADDITIONAL DETAILING REQUIREMENTS MAY BE REQUIRED IN OTHER, LESS PRONE AREAS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION (AHJ).
  - A. SEISMIC HOOKS SHALL BE USED TO TERMINATE STIRRUPS, HOOPS, OR CROSSTIES AS DEFINED PER ACI 318.
  - B. LONGITUDINAL REINFORCING BARS ARE REQUIRED TO HAVE BOTH A STANDARD BEND AND HOOK EXTENSION (MIN. OF 12 BAR DIAMETERS) AT EACH END AS DEFINED PER ACI 318.

**CONCRETE NOTES:**

1. WORK SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE ACI-318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
2. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI [17230 kPa] IN 28-DAYS. HOWEVER, A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI TO 4,500 PSI IN 28-DAYS SHALL BE USED IN LOCATIONS WITH MODERATE TO SEVERE SULFATE EXPOSURE UNLESS OTHERWISE REQUIRED BY THE LOCAL JURISDICTION. IN AREAS OF HIGH SEISMIC RISK AS DEFINED ABOVE, A MINIMUM COMPRESSIVE STRENGTH OF 3,000-PSF SHALL BE ACHIEVED.
3. PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR RESISTANCE TO LOCAL ANTICIPATED AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENTS OF ACI-318 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE.
4. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL, AND OTHER OCCURRENCES THAT MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.
5. FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING THE SIDES OF THE EXCAVATION, FORMWORK, REINFORCING BARS, FORM TIES, CAGE BRACING, OR OTHER OBSTRUCTIONS. UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.
6. THE MAXIMUM SIZE OF THE AGGREGATE SHALL NOT EXCEED A SIZE SUITABLE FOR THE INSTALLATION METHOD UTILIZED OR 1/3-CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING. THE MAXIMUM SIZE MAY BE INCREASED TO 2/3-CLEAR DISTANCE PROVIDED WORKABILITY AND METHODS OF CONSOLIDATION SUCH AS VIBRATING WILL PREVENT HONEYCOMBS AND VOIDS.

**CONCRETE NOTES (CONTINUED):**

7. IF THE FROST LINE IS KNOWN TO BE GREATER THAN THE FOUNDATION DEPTH OR THE WATER TABLE IS LESS THAN THE FOUNDATION DEPTH, THE DESIGN ENGINEER (TOWER ENGINEERING PROFESSIONALS, INC.) SHALL BE NOTIFIED PRIOR TO CONSTRUCTION AND A FOUNDATION ANALYSIS OR RE-DESIGN SHALL BE PERFORMED.

SEAL:

Expires 09/30/2014  
November 17, 2011

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

**SOUTHWEST WINDPOWER**  
1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB		CHECKED BY: REG	
SHEET NUMBER: <b>N-2</b>		REVISION: <b>2</b>	
		TEP#: 110002.30	

**TABLE 1804.2/1806.2 PRESUMPTIVE LOAD-BEARING VALUES (IBC 2006/2009)**

SOIL CLASS	DESCRIPTION	ALLOWABLE FOUNDATION PRESSURE	LATERAL BEARING (BELOW NATURAL GRADE)	LATERAL SLIDING		ASSUMED UNIT WEIGHT W/O WATER	ASSUMED INTERNAL ANGLE OF FRICTION
				COEFF. OF FRICTION	RESISTANCE		
1	CRYSTALLINE BEDROCK	12,000 psf	1,200 psf/ft	0.70	-	140 pcf	0°
		574.56 kPa	188.50 kPa/m			22 kN/m <sup>3</sup>	
2	SEDIMENTARY AND FOLIATED ROCK	4,000 psf	400 psf/ft	0.35	-	130 pcf	0°
		191.52 kPa	62.83 kPa/m			20 kN/m <sup>3</sup>	
3	SANDY GRAVEL AND/OR GRAVEL (GW AND GP)	3,000 psf	200 psf/ft	0.35	-	120 pcf	32°
		143.64 kPa	31.42 kPa/m			19 kN/m <sup>3</sup>	
4	SAND, SILTY SAND, CLAYEY SAND, SILTY GRAVEL, AND CLAYEY GRAVEL (SW,SP,SM,SC,GM AND GC)	2,000 psf	150 psf/ft	0.25	-	100 pcf	26°
		95.76 kPa	23.56 kPa/m			16 kN/m <sup>3</sup>	
5	CLAY, SANDY CLAY, SILTY CLAY, CLAYEY SILT, SILT AND SANDY SILT (CL, ML, MH AND CH)	1,500 psf	100 psf/ft	-	130 psf	90 pcf	0°
		71.82 kPa	15.71 kPa/m		6.22 kPa	14 kN/m <sup>3</sup>	

SEAL:

Expire 09/30/2014  
November 17, 2011

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-1</b>	REVISION: <b>2</b>
	TEP#: 110002.30

REFERENCED DOCUMENTS:

1. TOWER DESIGN DRAWINGS BY A.R.E. DATED MARCH 22, 2010, SWWP PN: 3-CMBP-3218-10, QUOTATION #: W09027, VERSION: E, DESCRIPTION: 34' 3 SECTIONS TOWER
2. DRAWING BY SWWP (NO DATE), DWG. NO.: 3-CMBP-3218-10-SS47-34FT-TOWER
3. DOCUMENT BY SWWP DATED NOVEMBER 10, 2011, TITLE: SKYSTREAM 3.7 TOWER TOP LOAD SUMMARY REV\_D.PDF

**TOWER REACTIONS - 34' [10.4M] MONOPOLE (34-17)**

ZONE	MAXIMUM LOADING CRITERIA	FACTORED ** MOMENT	FACTORED ** SHEAR	FACTORED VERTICAL
2	SKYSTREAM WIND TURBINE 120 MPH & 60 MPH W/ 1"-ICE [54 m/sec & 26.8 m/sec w/ 25.4mm-ICE]	48.6 kip-ft	1.77 kips	0.87 kips
		65.9 kN-m	7.87 kN	3.87 kN
3	SKYSTREAM WIND TURBINE 90 MPH & 60 MPH W/ 1"-ICE [40 m/sec & 26.8 m/sec w/ 25.4mm-ICE]	29.3 kip-ft	1.06 kips	0.87 kips
		39.7 kN-m	4.71 kN	3.87 kN

\*\* THE REACTIONS LISTED ARE FOR REFERENCE ONLY AND SHOULD NOT BE SUBSTITUTED FOR A STRUCTURAL ANALYSIS BASED ON SITE-SPECIFIC DATA.

**WIND ZONES**

ZONE	WIND SPEED
2	90 - 120 MPH [40 - 54 m/sec]
3	≤ 90 MPH [≤ 40 m/sec]

SEAL:

Expires 09/30/2014  
November 17, 2011

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

**SOUTHWEST WINDPOWER**  
1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-2</b>	REVISION: <b>2</b>
	TEP#: 110002.30

**NOTES:**

1. THE FOUNDATION DESIGNS ARE BASED ON THE SOIL INFORMATION LISTED IN TABLE 1804.2/1806.2 (IBC 2006/2009) REFERENCED ON SHEET S-1. IT IS THE RESPONSIBILITY OF THE OWNER TO VERIFY BY GEOTECHNICAL INVESTIGATION THAT ACTUAL SITE SOIL PARAMETERS EQUAL OR EXCEED THOSE SHOWN IN THE REFERENCED TABLE. IF CONDITIONS OTHER THAN THOSE DESCRIBED IN THE REFERENCED TABLE ARE ENCOUNTERED A FOUNDATION ANALYSIS SHOULD BE PERFORMED TO DETERMINE THE STRUCTURAL ADEQUACY OF THE SUBSTRUCTURE.
2. FOUNDATION WIDTH IS BASED ON WIND ZONES 2 AND 3, SEE SHEETS S-3A AND S-3B FOR APPROPRIATE SIZES.
3. IF THE PROPOSED AREA IS FOUND TO CONTAIN FILL MATERIALS, THE EXCAVATION SHALL EXTEND TO THE VIRGIN SAND LAYER AND BE BACKFILLED WITH COMPACTED SAND OR STONE. AFTER EXCAVATION AND PRIOR TO FILL OR CONCRETE PLACEMENT, THE SURFACE OF THE VIRGIN SAND LAYER SHOULD BE MECHANICALLY COMPACTED TO DENSIFY THE SURFACE DISTURBED DURING THE EXCAVATION.
4. ALL BACKFILL SHOULD BE PLACED IN MAXIMUM LOOSE LIFTS OF 8" AND COMPACTED TO A MINIMUM 95% OF ASTM D-1557.
5. TOWER GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH NEC REQUIREMENTS.
6. CONDUIT PLACEMENT SHALL BE IN ACCORDANCE WITH BOTH THE NEC AND SOUTHWEST WINDPOWER REQUIREMENTS.

PROPOSED MONOPOLE TO BE INSTALLED PER SWWP.

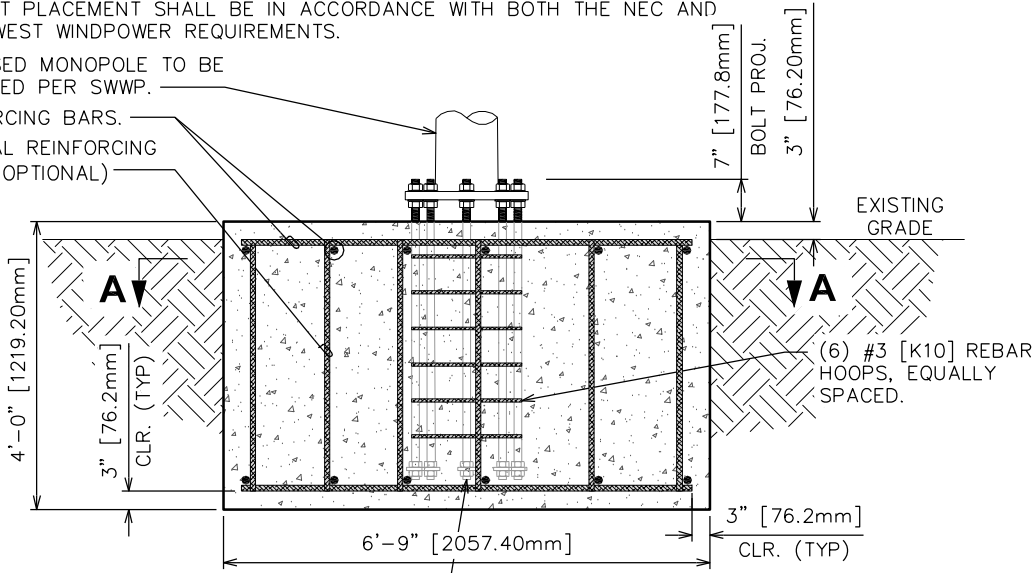
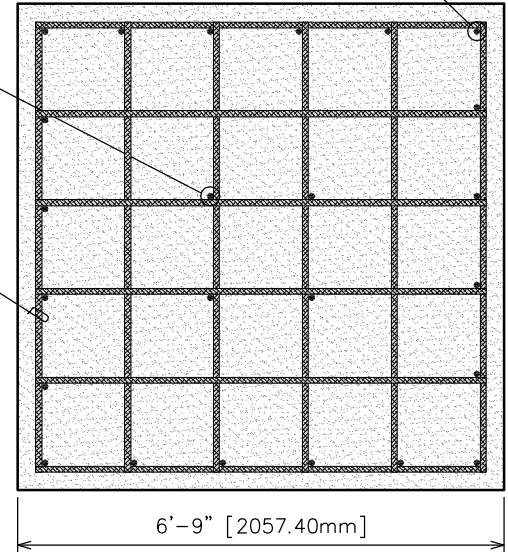
REINFORCING BARS.  
VERTICAL REINFORCING BARS. (OPTIONAL)

DESIGN IS BASED ON SOIL CLASS 5:  
 $q'_{all} = 1500 \text{ psf } [71.82 \text{ kPa}]$

#8 [K25] VERTICAL REINFORCING BARS (OPTIONAL) IN CENTER PLACED AS SHOWN. (4 TOTAL)

(6) #8 [K25] REINFORCING BARS SPACED AS SHOWN EACH WAY, TOP AND BOTTOM (24 TOTAL). ADJUST BARS AS REQUIRED FOR CLEARANCE WITH ANCHOR BOLTS. BAR SPACING SHALL NOT EXCEED 18".

#8 [K25] VERTICAL REINFORCING BARS (OPTIONAL) SPACED EQUALLY AS SHOWN (20 TOTAL) PLACED AS SHOWN.



(8) M33 x 1067mm [1 1/4" x 42"] LONG ANCHOR BOLTS (F1554 GR. 55 OR APPROVED EQUAL) ON 17"  $\phi$  [432mm  $\phi$ ] BOLT CIRCLE. EACH ANCHOR BOLT SHALL BE EMBEDDED WITH A HARDENED WASHER BETWEEN TWO (2) NUTS SECURED BY DEFORMING THREADS. AS A MINIMUM, WASHERS SHALL BE ASTM F436 CIRCULAR WASHERS; MINIMUM O.D.=2 3/4"  $\phi$  [70mm  $\phi$ ], MAX I.D.=1 1/2"  $\phi$  [38mm  $\phi$ ], MINIMUM THICKNESS OF 0.136" [3.45mm].

**SECTION A-A**

SCALE: 3/8" = 1'-0" [9.5mm = 304.8mm]

SEAL:



Expires 09/30/2014

November 17, 2011

**FOUNDATION - WIND ZONE 2**

SCALE: 3/8" = 1'-0" [9.5mm = 304.8mm]

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
MONOPOLE (34-17)  
FOUNDATIONS**  
Skystream 3.7

**SOUTHWEST WINDPOWER**  
1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
www.windenergy.com

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-3A</b>	REVISION: <b>2</b>
	TEP#: 110002.30

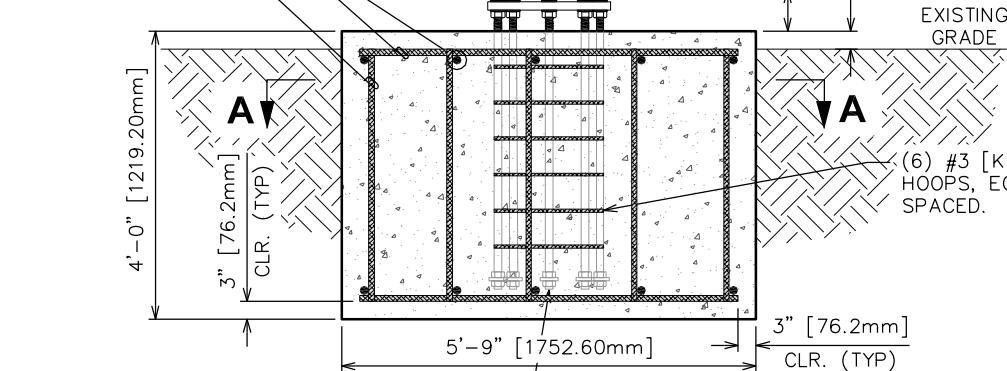
**NOTES:**

1. THE FOUNDATION DESIGNS ARE BASED ON THE SOIL INFORMATION LISTED IN TABLE 1804.2/1806.2 (IBC 2006/2009) REFERENCED ON SHEET S-1. IT IS THE RESPONSIBILITY OF THE OWNER TO VERIFY BY GEOTECHNICAL INVESTIGATION THAT ACTUAL SITE SOIL PARAMETERS EQUAL OR EXCEED THOSE SHOWN IN THE REFERENCED TABLE. IF CONDITIONS OTHER THAN THOSE DESCRIBED IN THE REFERENCED TABLE ARE ENCOUNTERED A FOUNDATION ANALYSIS SHOULD BE PERFORMED TO DETERMINE THE STRUCTURAL ADEQUACY OF THE SUBSTRUCTURE.
2. FOUNDATION WIDTH IS BASED ON WIND ZONES 2 AND 3, SEE SHEETS S-3A AND S-3B FOR APPROPRIATE SIZES.
3. IF THE PROPOSED AREA IS FOUND TO CONTAIN FILL MATERIALS, THE EXCAVATION SHALL EXTEND TO THE VIRGIN SAND LAYER AND BE BACKFILLED WITH COMPACTED SAND OR STONE. AFTER EXCAVATION AND PRIOR TO FILL OR CONCRETE PLACEMENT, THE SURFACE OF THE VIRGIN SAND LAYER SHOULD BE MECHANICALLY COMPACTED TO DENSIFY THE SURFACE DISTURBED DURING THE EXCAVATION.
4. ALL BACKFILL SHOULD BE PLACED IN MAXIMUM LOOSE LIFTS OF 8" AND COMPACTED TO A MINIMUM 95% OF ASTM D-1557.
5. TOWER GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH NEC REQUIREMENTS.
6. CONDUIT PLACEMENT SHALL BE IN ACCORDANCE WITH BOTH THE NEC AND SOUTHWEST WINDPOWER REQUIREMENTS.

PROPOSED MONOPOLE TO BE INSTALLED PER SWWP.

REINFORCING BARS.

VERTICAL REINFORCING BARS. (OPTIONAL)



**FOUNDATION - WIND ZONE 3**

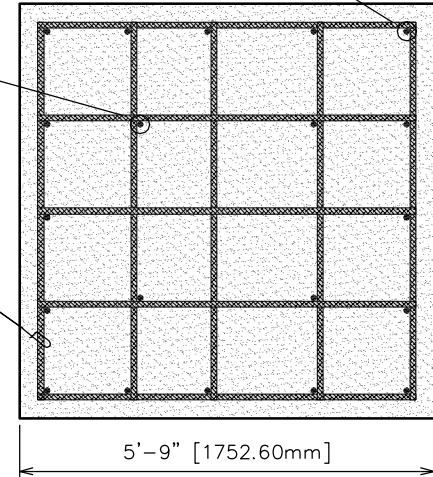
SCALE: 3/8" = 1'-0" [9.5mm = 304.8mm]

DESIGN IS BASED ON SOIL CLASS 5:  
 $q_{all} = 1500 \text{ psf [71.82 kPa]}$

#8 [K25] VERTICAL REINFORCING BARS (OPTIONAL) SPACED EQUALLY AS SHOWN (16 TOTAL) PLACED AS SHOWN.

#8 [K25] VERTICAL REINFORCING BARS (OPTIONAL) IN CENTER PLACED AS SHOWN. (4 TOTAL)

(5) #8 [K25] REINFORCING BARS SPACED EQUALLY EACH WAY, TOP AND BOTTOM (20 TOTAL). ADJUST BARS AS REQUIRED FOR CLEARANCE WITH ANCHOR BOLTS. BAR SPACING SHALL NOT EXCEED 18".



**SECTION A-A**

SCALE: 3/8" = 1'-0" [9.5mm = 304.8mm]

SEAL:

Expires 09/30/2014  
 November 17, 2011

(8) M33 x 1067mm [1 1/4" x 42"] LONG ANCHOR BOLTS (F1554 GR. 55 OR APPROVED EQUAL) ON 17"  $\phi$  [432mm  $\phi$ ] BOLT CIRCLE. EACH ANCHOR BOLT SHALL BE EMBEDDED WITH A HARDENED WASHER BETWEEN TWO (2) NUTS SECURED BY DEFORMING THREADS. AS A MINIMUM, WASHERS SHALL BE ASTM F436 CIRCULAR WASHERS: MINIMUM O.D.=2 3/4"  $\phi$  [70mm  $\phi$ ], MAX I.D.=1 1/2"  $\phi$  [38mm  $\phi$ ], MINIMUM THICKNESS OF 0.136" [3.45mm].

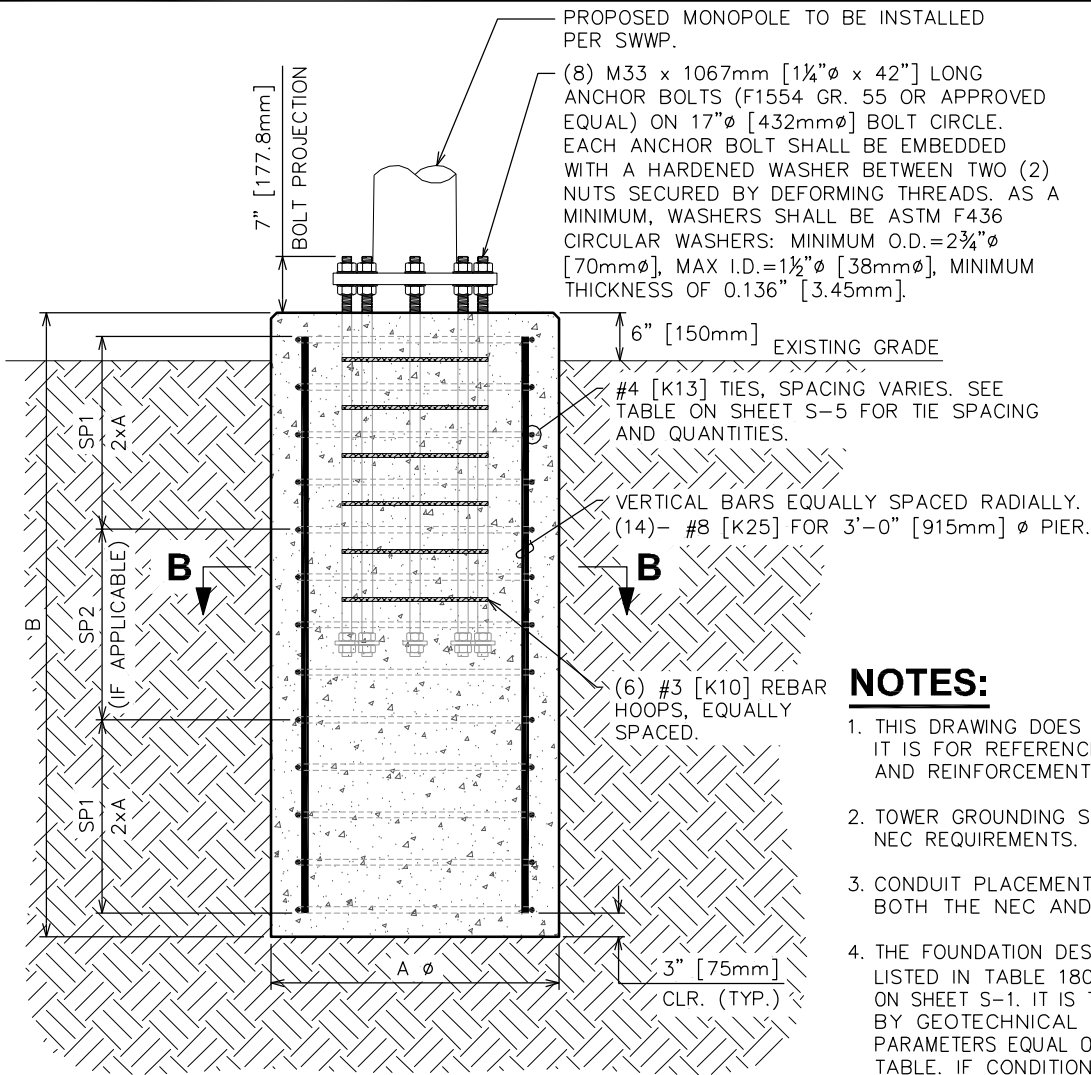
**TOWER ENGINEERING PROFESSIONALS**  
 3703 JUNCTION BOULEVARD  
 RALEIGH, NC 27603-5263  
 (919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
 MONOPOLE (34-17)  
 FOUNDATIONS**  
 Skystream 3.7

**SOUTHWEST WINDPOWER**  
 1801 West Route 66  
 Flagstaff, AZ 86001  
 Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

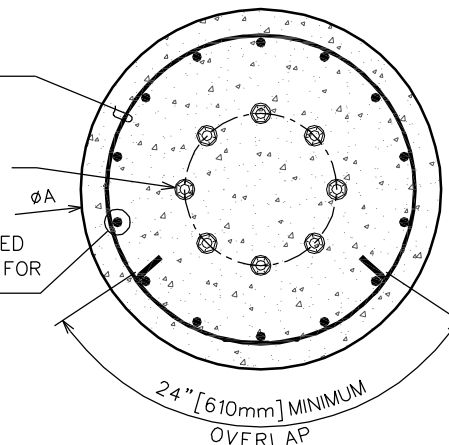
DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-3B</b>	REVISION: <b>2</b>
TEP#: 110002.30	



#4 [K13] TIES, SPACING VARIES. SEE TABLE ON SHEET S-5 FOR TIE SPACING & QUANTITIES.

(8) M33 [1 1/4"Ø] ANCHOR BOLTS ON A 17"Ø [431.8mmØ] BOLT CIRCLE.

VERTICAL BARS EQ. SPACED RADIALLY. (14)-#8 [K25] FOR 3'-0" [915mm] Ø PIER.

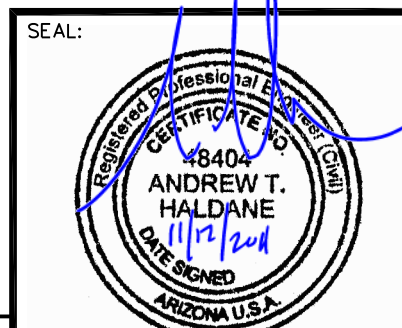


**SECTION B-B**

SCALE: N.T.S.

**NOTES:**

1. THIS DRAWING DOES NOT REPRESENT THE ACTUAL FOUNDATION, IT IS FOR REFERENCE ONLY. SEE SHEET S-5 FOR DIMENSIONS AND REINFORCEMENT QUANTITIES.
2. TOWER GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH NEC REQUIREMENTS.
3. CONDUIT PLACEMENT SHALL BE PLACED IN ACCORDANCE WITH BOTH THE NEC AND SOUTHWEST WINDPOWER REQUIREMENTS.
4. THE FOUNDATION DESIGNS ARE BASED ON THE SOIL INFORMATION LISTED IN TABLE 1804.2/1806.2 (IBC 2006/2009) REFERENCED ON SHEET S-1. IT IS THE RESPONSIBILITY OF THE OWNER TO VERIFY BY GEOTECHNICAL INVESTIGATION THAT ACTUAL SITE SOIL PARAMETERS EQUAL OR EXCEED THOSE SHOWN IN THE REFERENCED TABLE. IF CONDITIONS OTHER THAN THOSE DESCRIBED IN THE REFERENCED TABLE ARE ENCOUNTERED A FOUNDATION ANALYSIS SHOULD BE PERFORMED TO DETERMINE THE STRUCTURAL ADEQUACY OF THE SUBSTRUCTURE.



Expires 09/30/2014

November 17, 2011

**FOUNDATION ALTERNATIVE - PIER**

SCALE: N.T.S.

**TOWER ENGINEERING PROFESSIONALS**  
 3703 JUNCTION BOULEVARD  
 RALEIGH, NC 27603-5263  
 (919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M]  
 MONOPOLE (34-17)  
 FOUNDATIONS**  
 Skystream 3.7

**SOUTHWEST WINDPOWER**  
 1801 West Route 66  
 Flagstaff, AZ 86001  
 Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

REV	DATE
2	11-17-2011
1	11-16-2011
0	12-18-2008

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-4</b>	REVISION: <b>2</b>
TEP#: 110002.30	

34-FT [10.4M] MONOPOLE (34-17) FOUNDATION DIMENSIONS - PIER								
ZONE	SOIL CLASS	DIMENSION		VERTICAL REINF.		TIE SPACING		#4 [K13] TIE QUANTITY
		A	B	SIZE	QTY.	SP1	SP2	
2	3	3'-0" [915mm]	9'-0" [2743mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	18
	4	3'-0" [915mm]	9'-6" [2896mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	19
	5	3'-0" [915mm]	11'-0" [3353mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	22
ZONE	SOIL CLASS	DIMENSION		VERTICAL REINF.		TIE SPACING		#4 [K13] TIE QUANTITY
		A	B	SIZE	QTY.	SP1	SP2	
3	3	3'-0" [915mm]	7'-6" [2286mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	15
	4	3'-0" [915mm]	8'-0" [2438mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	16
	5	3'-0" [915mm]	9'-6" [2896mm]	#8 [K25]	14	6"± [150mm] O.C.	N/A	19

SEAL:

48104  
ANDREW T. HALDANE  
11/17/2011  
DATE SIGNED  
ARIZONA U.S.A.

Expires 09/30/2014  
*November 17, 2011*

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351

PROJECT INFORMATION:  
**34-FT [10.4M] MONOPOLE (34-17) FOUNDATIONS**  
Skystream 3.7

**SOUTHWEST WINDPOWER**  
1801 West Route 66  
Flagstaff, AZ 86001  
Office: (928) 779-9463  
[www.windenergy.com](http://www.windenergy.com)

2	11-17-2011
1	11-16-2011
0	12-18-2008
REV	DATE

DRAWN BY: LSB	CHECKED BY: REG
SHEET NUMBER: <b>S-5</b>	REVISION: <b>2</b>
	TEP#: 110002.30