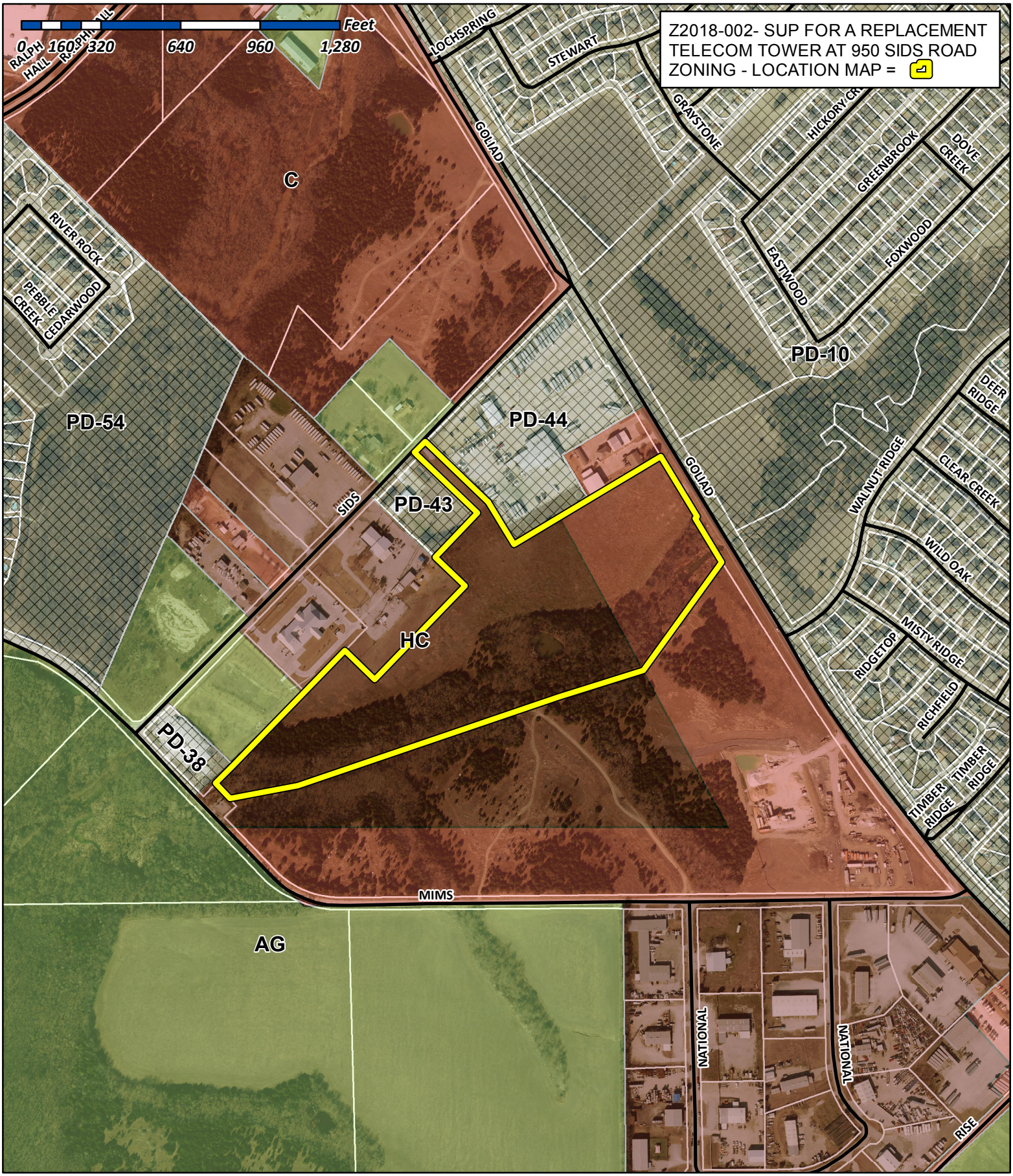
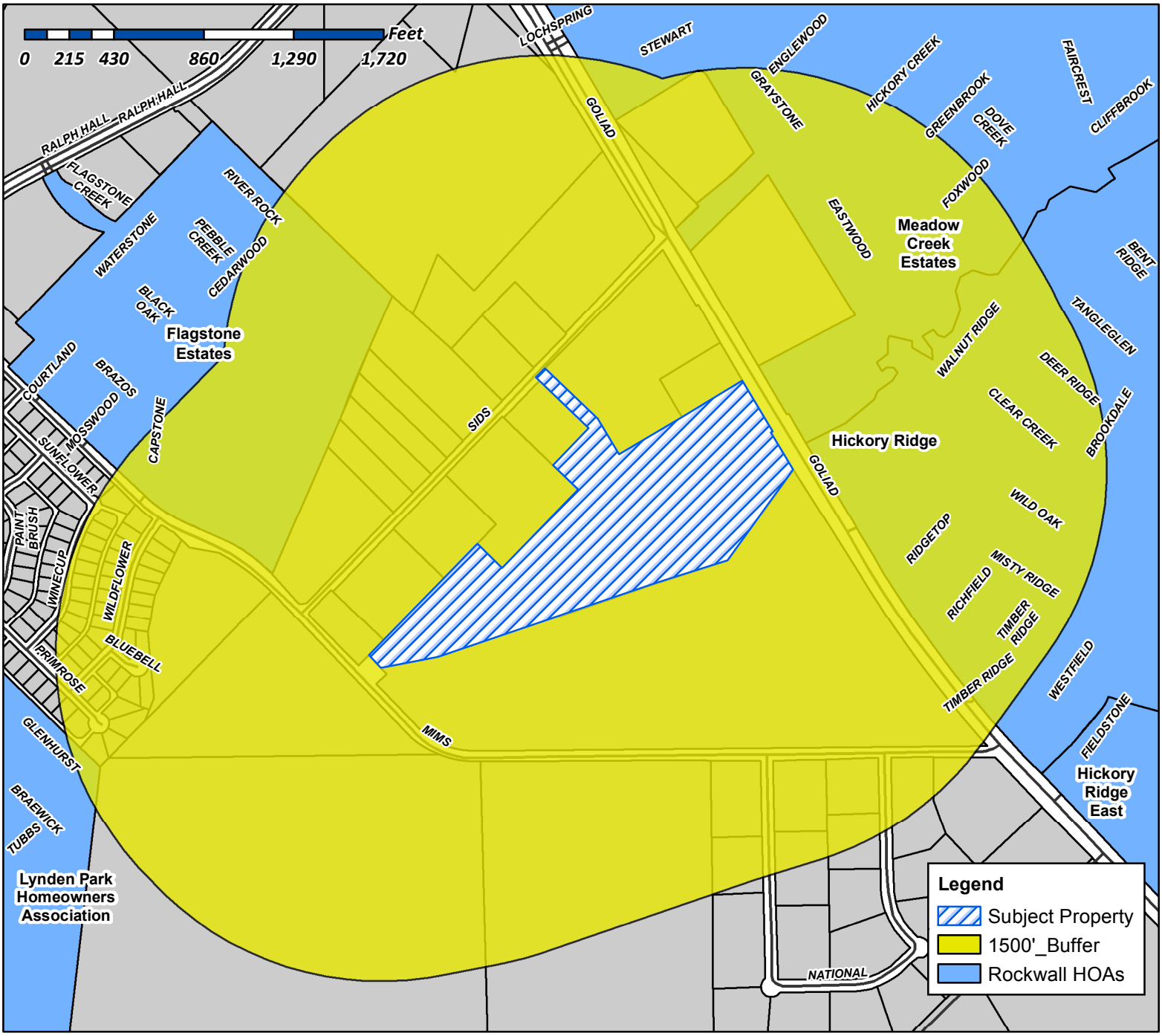


City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75032
(P): (972) 771-7745
(W): www.rockwall.com

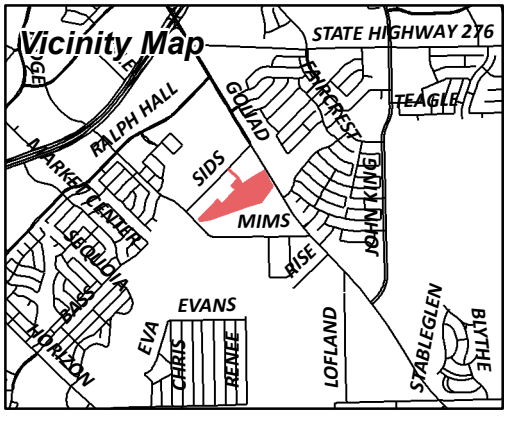
City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
(W): www.rockwall.com



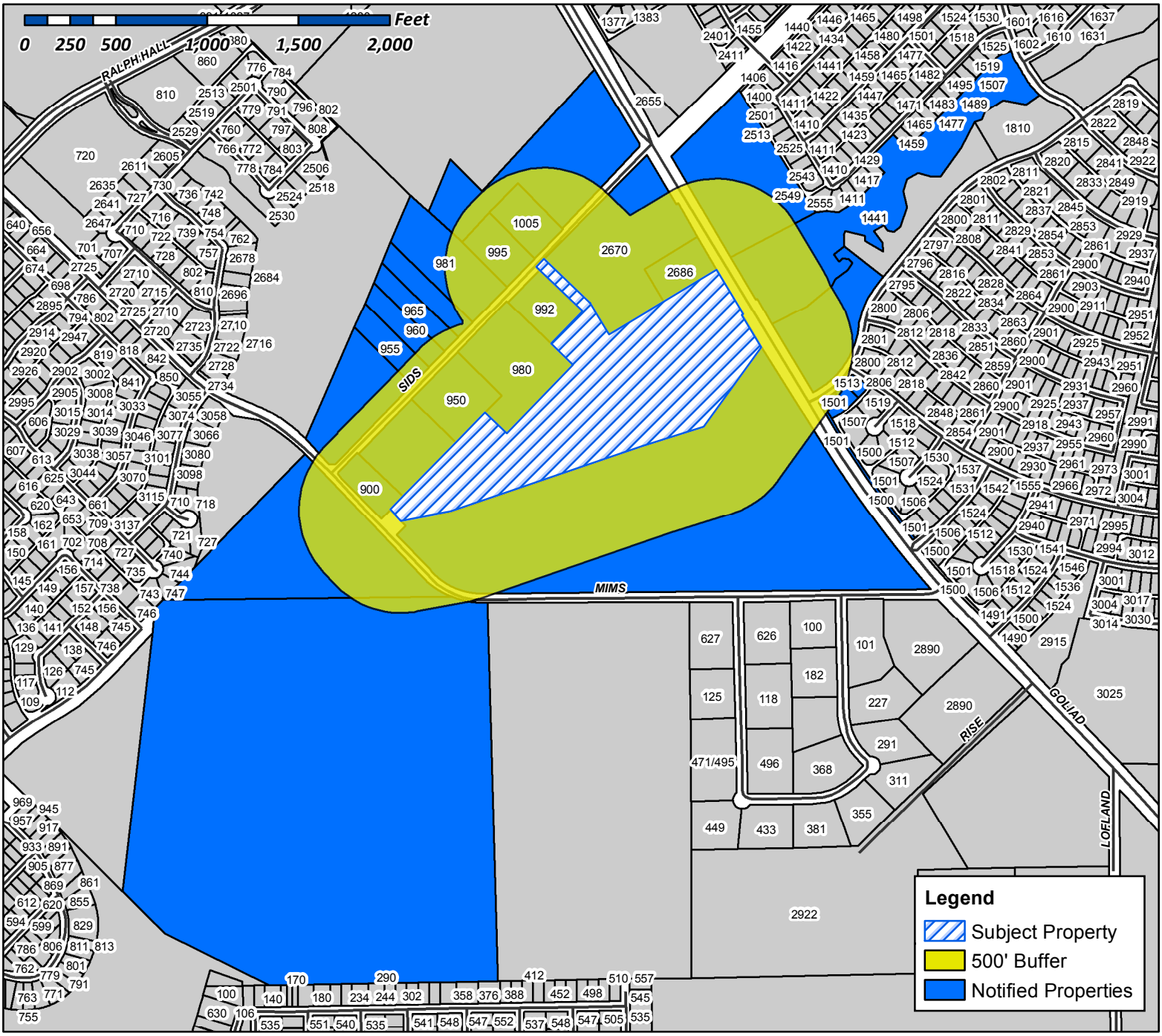
Case Number: Z2018-002
Case Name: SUP for a Replacement Telecommunications Tower at 950 Sids Road
Case Type: Zoning
Zoning: Heavy Commercial (HC) District
Case Address: 950 Sids Road

Date Created: *01/12/2018*
For Questions on this Case Call (972) 771-7745



City of Rockwall

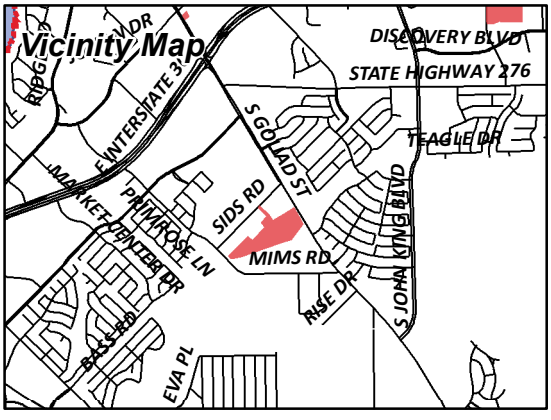
Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
(W): www.rockwall.com



Case Number: Z2018-002
Case Name: SUP for a Replacement Telecommunications Tower at 950 Sids Road
Case Type: Zoning
Zoning: Heavy Commercial (HC) District
Case Address: 950 Sids Road

Date Created: 01/12/2018

For Questions on this Case Call (972) 771-7745



BURKS GLEN
1005 SIDS RD
ROCKWALL, TX 75087

VICMAR I LTD &
E LOFLAND
105 KAUFMAN ST
ROCKWALL, TX 75087

ROCKWALL ISD
1050 WILLIAMS ST
ROCKWALL, TX 75087

DING CHENG LIANG AND LUH LUH TING
1406 ROSALIA AVE
SAN JOSE, CA 95130

MARTINEZ JOSUE
1501 WALNUT RIDGE DR
ROCKWALL, TX 75032

DING CHENG LIANG AND LUH LUH TING
1507 WALNUT RIDGE DR
ROCKWALL, TX 75087

JS CUSTOM HOMES LLC
1509 LEXINGTON DR
GARLAND, TX 75041

RYSZARD PROPERTIES LLC
1513 WALNUT RIDGE DR
ROCKWALL, TX 75087

RYSZARD PROPERTIES LLC
1536 TIMBER RIDGE DR
ROCKWALL, TX 75032

TRANSAM TRUCKING
A MISSOURI CORP
15910 S 169 HWY
OLATHE, KS 66062

BURKS GLEN
1612 AMESBURY LN
ROCKWALL, TX 75087

TRANSAM TRUCKING
2670 S GOLIAD
ROCKWALL, TX 75087

ESTEP KIP
2686 S HWY205
ROCKWALL, TX 75087

CAMPERS 4 RENT LLC
518 WATERVIEW DRIVE
COPPELL, TX 75019

STAGLIANO FAMILY TRUST
5501 ST ANDRES CT
PLANO, TX 75093

ROCKWALL I S D
801 E WASHINGTON ST
ROCKWALL, TX 75087

ROCKWALL HICKORY RIDGE HOMEOWNERS
ASSOC INC
C/O SBB MANAGEMENT COMPANY
8360 LBJ FRWY 0
DALLAS, TX 75243

205 AND 276 PARTNERS
8750 N CENTRAL EXPY 0
DALLAS, TX 75231

SLAUGHTER RICHARD E JR
900 SIDS RD
ROCKWALL, TX 75087

WHITMORE MANUFACTURING CO
930 WHITMORE DRIVE
ROCKWALL, TX 75087

RAYBURN COUNTRY ELECTRIC CORP INC
950 SIDS RD
ROCKWALL, TX 75087

CAMPERS 4 RENT LLC
955 SIDS RD
ROCKWALL, TX 75087

RODD HANNA'S AIR PERFORMANCE
960 SIDS RD
ROCKWALL, TX 75087

ROCKWALL ISD
965 SIDS RD
ROCKWALL, TX 75087

RAYBURN COUNTRY ELECTRIC CORP INC
980 SIDS RD
ROCKWALL, TX 75087

ROCKWALL I S D
981 SIDS RD
ROCKWALL, TX 75087

SRYGLEY JAMES G
992 SIDS RD
ROCKWALL, TX 75032

LOFLAND ROBERT G & BETTY K
995 SIDS RD
ROCKWALL, TX 75032

SLAUGHTER RICHARD E JR
PO BOX 1717
ROCKWALL, TX 75087

ESTEP KIP
PO BOX 2
ROCKWALL, TX 75087

RODD HANNA'S AIR PERFORMANCE
HEATING & A/C INC
PO BOX 208
ROCKWALL, TX 75087

RAYBURN COUNTRY ELECTRIC CORP INC
PO BOX 37
ROCKWALL, TX 75087

RAYBURN ELECTRIC COOPERATIVE

Rayburn Electric Cooperative
P.O. Box 37
Rockwall, TX 75087
(469) 402-2100

January 4, 2018

Ryan Miller
Director of Planning
City of Rockwall
Planning and Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087

Dear Ryan:

Attached is a Specific Use Permit (SUP) Application requesting permission for Rayburn Country Electric Cooperative, Inc. (Rayburn) to replace its existing 320' guyed communications tower with a new 320' self-supported communications tower. I have also enclosed the engineering drawings for the proposed tower.

The new tower will be located immediately to the north of the existing tower. Rayburn has contracted with Huffman Communications for the installation of the new tower and removal of the existing tower. Upon approval of the SUP by the City of Rockwall, construction will begin within 30 days and is expected to last 3-5 months, depending on weather and schedules. Once the equipment has been successfully transferred from the old tower to the new tower and is verified to be operating correctly, we will remove the old tower from the site.

Sincerely,

David Naylor
President / CEO
Rayburn Electric Cooperative
dnaylor@rayburnelectric.com
469.402.2118

Enclosures

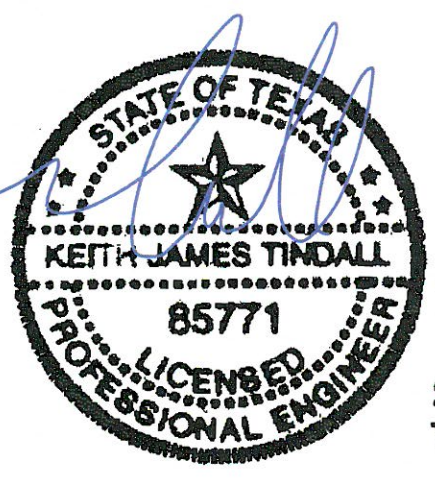
Sabre Industries™
Towers and Poles

Structural Design Report
320' S3TL Series HD1 Self-Supporting Tower
Site: Rockwall, TX

Prepared for: HUFFMAN COMMUNICATIONS
by: Sabre Towers & Poles ™

Job Number: 166942

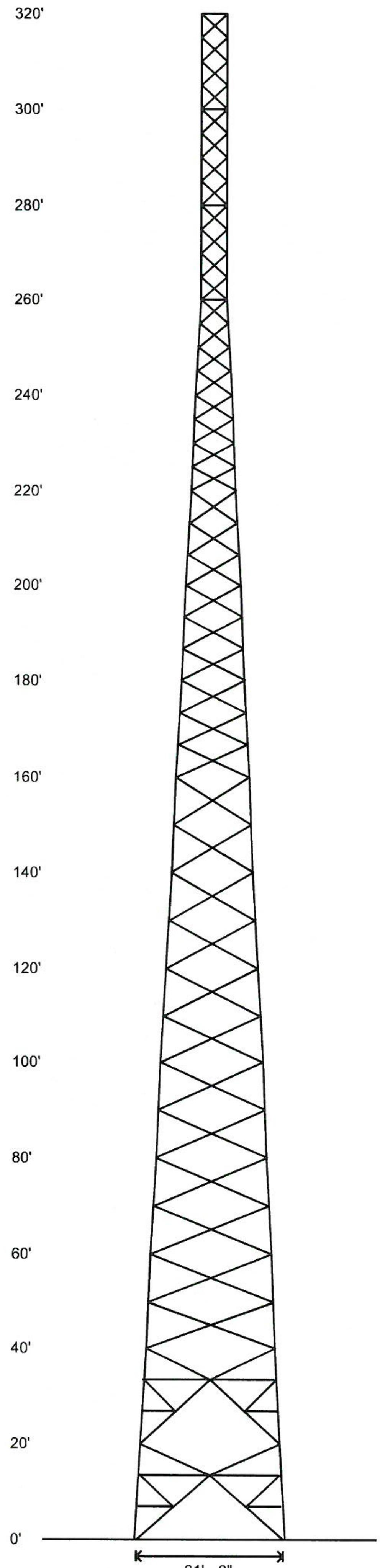
July 18, 2017



7/18/17

Sabre Communications Corporation
Texas Registration Number F-4365

Elevation	Legs	Diagonals	Horizontals	Internals	Sub-Diagonals	Sub-Horizontals	Brace Bolts	Top Face Width	Panel Count/Height	Section Weight
300'–320'	F	L 2 X 2 X 1/8	Q / NONE	NONE	NONE	NONE	(1) 5/8"	5'	20 @ 5'	706
280'–300'	E		Q / NONE							1024
260'–280'	D	N	N / NONE							1490
240'–260'	C	L 2 X 2 X 1/8	Q							1539
220'–240'	5.563 OD X .375							7'		1910
200'–220'		N						9'	9 @ 6.6667'	2067
180'–200'		M						11'		2294
160'–180'	B	L					(1) 3/4"	13'		3130
140'–160'	8.625 OD X .322	K						15'	12 @ 10'	3384
120'–140'		J						17'		3694
100'–120'	8.625 OD X .500	I						19'		4864
80'–100'		L 4 X 4 X 5/16						21'		5468
60'–80'							(2) 5/8"	23'		5742
40'–60'								25'		5932
20'–40'		G	P	R	L	M	(2) 3/4"	27'	U / T	6718
0'–20'	A	H / G	O / I	O / R	O / L	O / S		29'	U / T	7712



Base Reactions

Total Foundation		Individual Footing	
Shear (kips)	94.06	Shear (kips)	56.52
Axial (kips)	249.99	Compression (kips)	577
Moment (ft-kips)	14709	Uplift (kips)	501
Torsion (ft-kips)	-82.2		

Material List

Display	Value
A	10.75 OD X .500
B	5.563 OD X .500
C	4.500 OD X .337
D	4.000 OD X .318
E	2.875 OD X .276
F	2.375 OD X .154
G	L 5 X 3 1/2 X 5/16 (SLV)
H	L 4 X 4 X 5/16
I	L 4 X 4 X 1/4
J	L 4 X 3 1/2 X 1/4 (SLV)
K	L 3 1/2 X 3 X 1/4 (SLV)
L	L 3 X 3 X 3/16
M	L 2 1/2 X 2 1/2 X 3/16
N	L 2 X 2 X 3/16
O	NONE
P	L 3 1/2 X 3 1/2 X 1/4
Q	L 2 X 2 X 1/8
R	L 3 X 3 X 1/4
S	L 2 1/2 X 2 1/2 X 1/4
T	1 @ 13.333'
U	1 @ 6.667'

Notes

1) All legs are A500 (50 ksi Min. Yield).
2) All braces are A572 Grade 50.
3) All brace bolts are A325-X.
4) The tower model is S3TL Series HD1.
5) Transmission lines are to be attached to standard 12 hole waveguide ladders.
6) Azimuths are relative (not based on true north).
7) Foundation loads shown are maximums.
8) (6) 1 1/2" dia. F1554 grade 105 anchor bolts per leg. Minimum 58" embedment from top of concrete to top of nut.
9) All unequal angles are oriented with the short leg vertical.
10) Weights shown are estimates. Final weights may vary.
11) This tower was designed for a basic wind speed of 90 mph with 0" of radial ice, and 30 mph with 3/4" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 1.
12) The foundation loads shown are factored loads.
13) Tower Rating: 99.87%

Sabre Industries Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

Job:	**166942**
Customer:	HUFFMAN COMMUNICATIONS
Site Name:	Rockwall, TX
Description:	320' S3TL
Date:	7/18/2017 By: KJT

Designed Appurtenance Loading

Elev	Description	Tx-Line
330	(12) DB420-A	
320	3V-Boom - 12ft Face - 3ft Standoff	
320		(12) 7/8"
310	(2) 10' Omni	
305	6ft Sidearm	
305		(2) 7/8"
300	(2) Leg Dish Mount	
300	(2) 8' Solid Dish W/ Radome	(2) EP65
280	Flush Mount	
280	Flush Mount	
280	(1) PR-950	(1) 7/8"
280	(1) PR-950	(1) 7/8"
270	(2) Leg Dish Mount	
270	(2) 6' Solid Dish W/ Radome	(2) EP65
250	(2) Leg Dish Mount	
250	(2) 6' Grid Dish	(2) 7/8"
230	Flush Mount	
230	Flush Mount	
230	(1) PR-950	(1) 7/8"
230	(1) PR-950	(1) 7/8"
190	3V-Boom - 12ft Face - 3ft Standoff	
190	(9) RRU (24" x 24" x 12")	(0) "
190	(9) APXV9ERR18-C	(9) 1 5/8"
181	(1) DB224	
180	(2) Leg Dish Mount	

Elev	Description	Tx-Line
180	(2) 6' Solid Dish W/ Radome	(2) EP65
175	(1) 10' Omni	
170	3ft Sidearm	
170	6ft Sidearm	
170	(2) Leg Dish Mount	
170		(1) 7/8"
170		(1) 7/8"
170	(2) 2' Solid Dish	(2) Cat 5
165	(2) Leg Dish Mount	
165	(2) 4' H.P. Dish	(2) EW105
160	(2) Leg Dish Mount	
160	(2) 6' Solid Dish W/ Radome	(2) EP65
155	(2) Leg Dish Mount	
155	(2) 6' Solid Dish W/ Radome	(2) EP65
150	(2) Leg Dish Mount	
150	(2) 4' H.P. Dish	(2) EW105
145	(2) Leg Dish Mount	
145	(2) 6' Grid Dish	(2) EP65
140	(2) Leg Dish Mount	
140	(2) 6' Grid Dish	(2) EP65
131	(2) DB224	
130	(2) Leg Dish Mount	
130	(2) 6' Solid Dish W/ Radome	(2) EP65
120	(2) 3ft Sidearms	
120		(2) 7/8"

Sabre Industries
Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

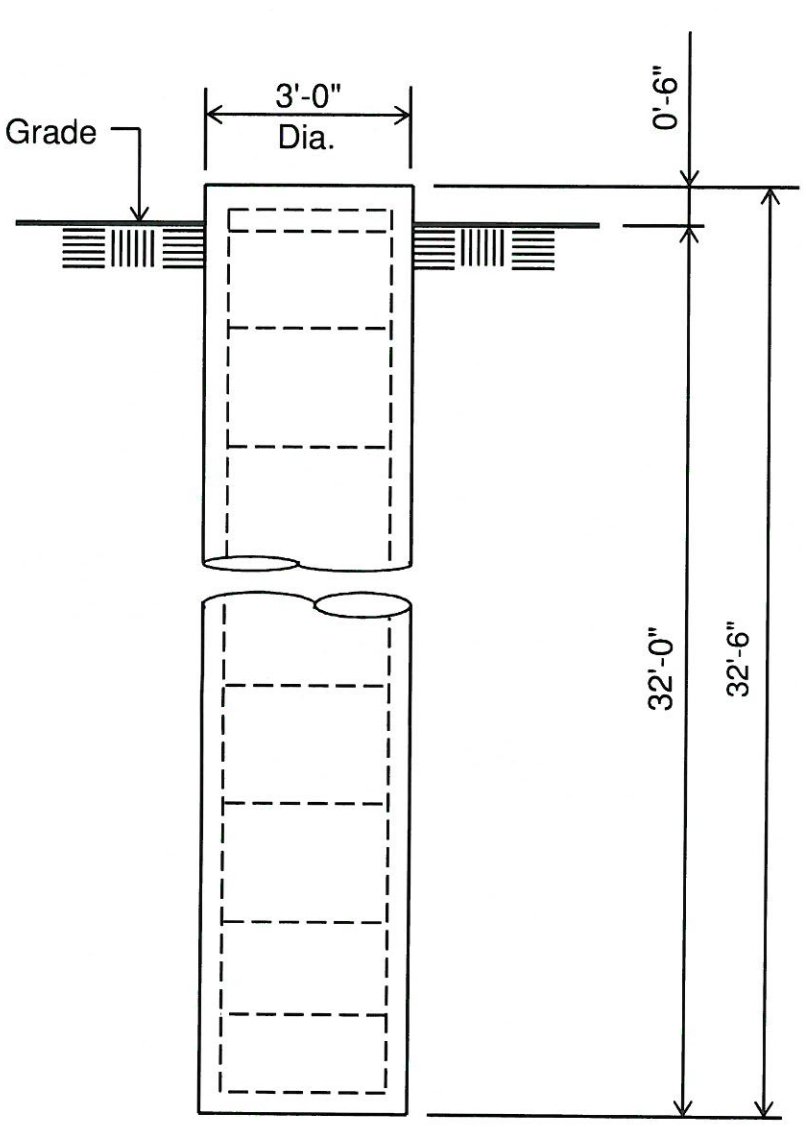
Job:	**166942**
Customer:	HUFFMAN COMMUNICATIONS
Site Name:	Rockwall, TX
Description:	320' S3TL
Date:	7/18/2017 By: KJT

No.: 166942

Date: 7/18/17
By: KJT

Customer: HUFFMAN COMMUNICATIONS
Site: Rockwall, TX

320 ft. Model S3TL Series HD1 Self Supporting Tower At
90 mph Wind with no ice and 30 mph Wind with 0.75 in. Ice per ANSI/TIA-222-G.
Antenna Loading per Page 1



ELEVATION VIEW
(8.51 Cu. Yds. each)
(3 REQUIRED; NOT TO SCALE)

Notes:

1). Concrete shall have a minimum 28-day compressive strength of 4500 PSI, in accordance with ACI 318-11.

2). Rebars to conform to ASTM specification A615 Grade 60.

3). All rebar to have a minimum of 3" concrete cover.

4). All exposed concrete corners to be chamfered 3/4".

5). The foundation design is based on the geotechnical report by Fargo Consultants, Inc., Report No. G14-2258, dated February 21, 2014.

6). See the geotechnical report for drilled pier installation requirements, if specified.

7). The foundation is based on the following factored loads:
Factored uplift (kips) = 501
Factored download (kips) = 577
Factored shear (kips) = 57

Rebar Schedule per Pier	
Pier	(14) #11 vertical rebar w/#4 ties, two (2) within top 5" of pier then 10" C/C

8). The foundations must be socketed at least 11 feet into dark gray shale.

7101 Southbridge Dr - P.O. Box 658 - Sioux City, IA 51102-0658 - Phone 712.258.6690 - Fax 712.258.8250

DRAWFORCE Ver 2.2 (c) Guymast Inc. 2006-2009 Phone:(416) 736-7453 14 jul 2017
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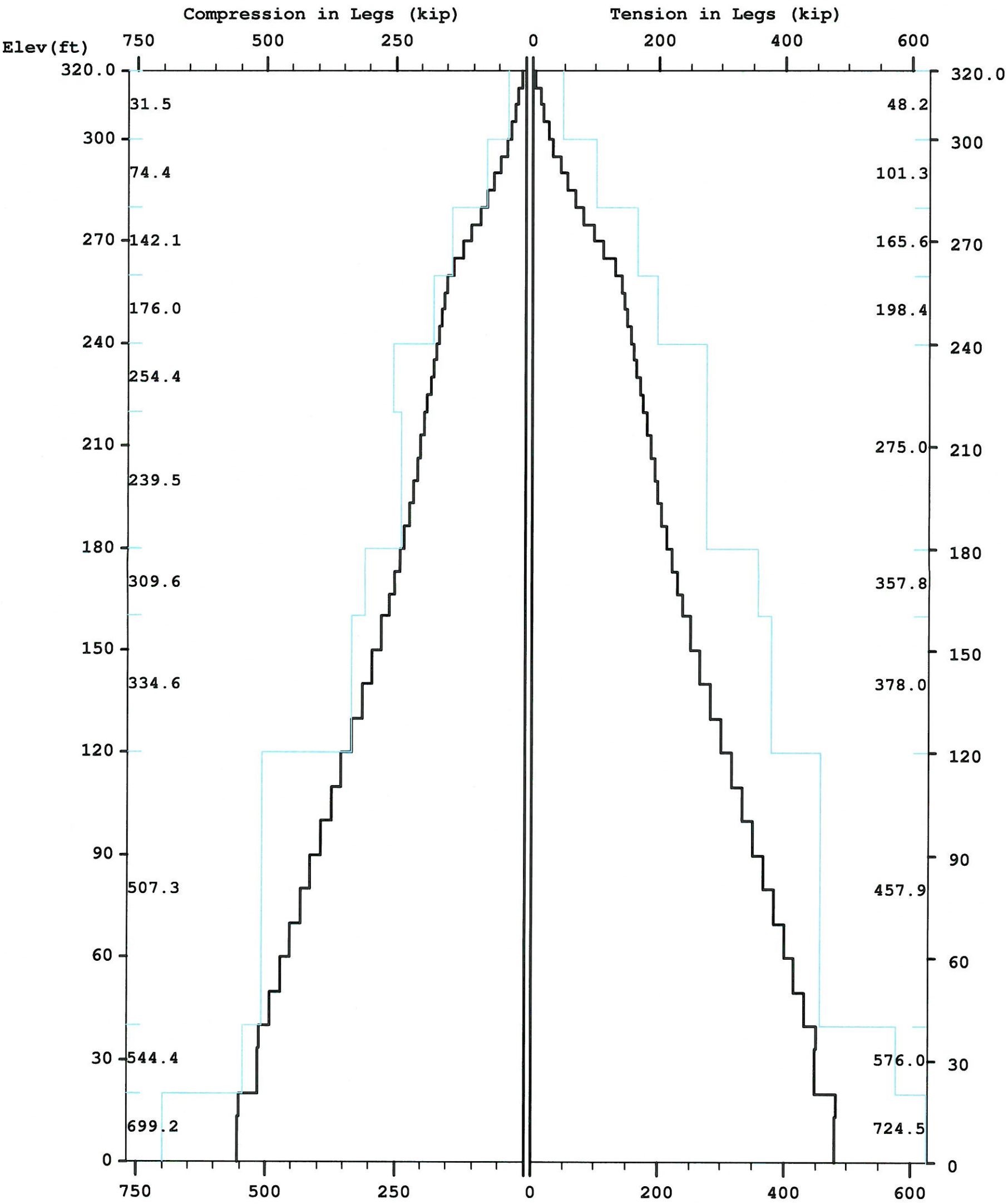
Maximum



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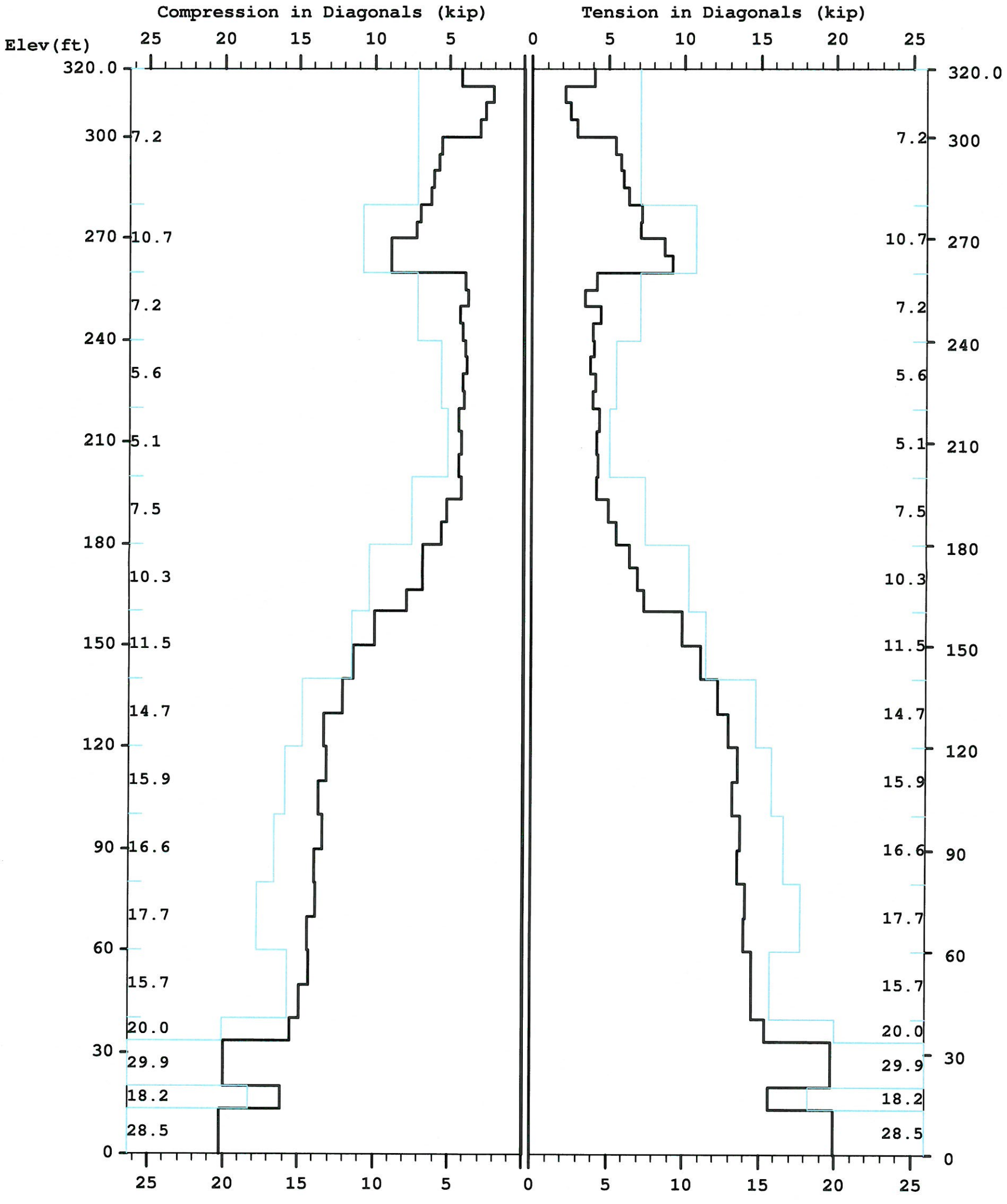
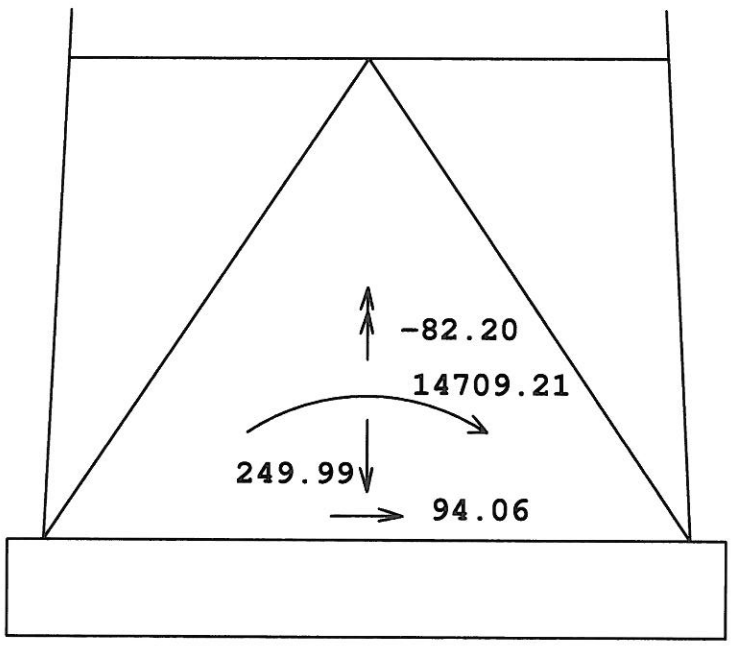
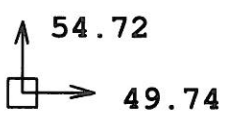


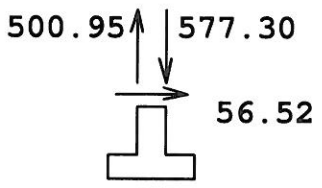
Maximum

TOTAL FOUNDATION LOADS (kip, ft-kip)



INDIVIDUAL FOOTING LOADS (kip)





MAST GEOMETRY (ft)

PANEL TYPE	NO.OF LEGS	ELEV.AT BOTTOM	ELEV.AT TOP	F.W..AT BOTTOM	F.W..AT TOP	TYPICAL PANEL HEIGHT
X	3	315.00	320.00	5.00	5.00	5.00
X	3	300.00	315.00	5.00	5.00	5.00
X	3	295.00	300.00	5.00	5.00	5.00
X	3	280.00	295.00	5.00	5.00	5.00
X	3	275.00	280.00	5.00	5.00	5.00
X	3	260.00	275.00	5.00	5.00	5.00
X	3	255.00	260.00	5.50	5.00	5.00
X	3	240.00	255.00	7.00	5.50	5.00
X	3	220.00	240.00	9.00	7.00	5.00
X	3	200.00	220.00	11.00	9.00	6.67
X	3	180.00	200.00	13.00	11.00	6.67
X	3	160.00	180.00	15.00	13.00	6.67
X	3	140.00	160.00	17.00	15.00	10.00
X	3	120.00	140.00	19.00	17.00	10.00
X	3	100.00	120.00	21.00	19.00	10.00
X	3	80.00	100.00	23.00	21.00	10.00
X	3	60.00	80.00	25.00	23.00	10.00
X	3	40.00	60.00	27.00	25.00	10.00
V	3	33.33	40.00	27.67	27.00	6.67
A	3	20.00	33.33	29.00	27.67	13.33
V	3	13.33	20.00	29.67	29.00	6.67
A	3	0.00	13.33	31.00	29.67	13.33

MEMBER PROPERTIES

MEMBER TYPE	BOTTOM ELEV ft	TOP ELEV ft	X-SECTN AREA in.sq	RADIUS OF GYRAT in	ELASTIC MODULUS ksi	THERMAL EXPANSN /deg
LE	300.00	320.00	1.075	0.787	29000.	0.0000117
LE	280.00	300.00	2.254	0.787	29000.	0.0000117
LE	260.00	280.00	3.678	0.787	29000.	0.0000117
LE	240.00	260.00	4.407	0.787	29000.	0.0000117
LE	180.00	240.00	6.111	0.787	29000.	0.0000117
LE	160.00	180.00	7.952	0.787	29000.	0.0000117
LE	120.00	160.00	8.399	0.787	29000.	0.0000117
LE	20.00	120.00	12.763	0.787	29000.	0.0000117
LE	0.00	20.00	16.101	0.787	29000.	0.0000117
DI	280.00	320.00	0.484	0.626	29000.	0.0000117
DI	260.00	280.00	0.715	0.626	29000.	0.0000117
DI	220.00	260.00	0.484	0.626	29000.	0.0000117
DI	200.00	220.00	0.715	0.626	29000.	0.0000117
DI	180.00	200.00	0.902	0.626	29000.	0.0000117
DI	160.00	180.00	1.090	0.626	29000.	0.0000117
DI	140.00	160.00	1.562	0.626	29000.	0.0000117
DI	120.00	140.00	1.812	0.626	29000.	0.0000117
DI	100.00	120.00	1.938	0.626	29000.	0.0000117
DI	33.33	100.00	2.402	0.626	29000.	0.0000117
DI	20.00	33.33	2.559	0.626	29000.	0.0000117
DI	13.33	20.00	2.402	0.626	29000.	0.0000117
DI	0.00	13.33	2.559	0.626	29000.	0.0000117
HO	315.00	320.00	0.484	0.626	29000.	0.0000117
HO	295.00	300.00	0.484	0.626	29000.	0.0000117
HO	275.00	280.00	0.715	0.626	29000.	0.0000117
HO	255.00	260.00	0.484	0.626	29000.	0.0000117
HO	20.00	33.33	1.688	0.626	29000.	0.0000117
HO	0.00	13.33	1.938	0.626	29000.	0.0000117
BR	20.00	33.33	1.438	0.000	29000.	0.0000117
BR	0.00	13.33	1.438	0.000	29000.	0.0000117

FACTORED MEMBER RESISTANCES

BOTTOM ELEV ft	TOP ELEV ft	LEGS COMP kip	LEGS TENS kip	DIAGONALS COMP kip	DIAGONALS TENS kip	HORIZONTALS COMP kip	HORIZONTALS TENS kip	INT BRACING COMP kip	INT BRACING TENS kip
315.0	320.0	31.48	48.15	7.16	7.16	5.73	5.73	0.00	0.00
300.0	315.0	31.48	48.15	7.16	7.16	0.00	0.00	0.00	0.00
295.0	300.0	74.39	101.25	7.16	7.16	5.73	5.73	0.00	0.00
280.0	295.0	74.39	101.25	7.16	7.16	0.00	0.00	0.00	0.00
275.0	280.0	142.05	165.60	10.74	10.74	8.38	8.38	0.00	0.00
260.0	275.0	142.05	165.60	10.74	10.74	0.00	0.00	0.00	0.00
255.0	260.0	175.98	198.45	7.16	7.16	5.73	5.73	0.00	0.00
240.0	255.0	175.98	198.45	7.16	7.16	0.00	0.00	0.00	0.00
220.0	240.0	254.38	274.95	5.55	5.55	0.00	0.00	0.00	0.00
200.0	220.0	239.46	274.95	5.09	5.09	0.00	0.00	0.00	0.00
180.0	200.0	239.46	274.95	7.47	7.47	0.00	0.00	0.00	0.00
160.0	180.0	309.64	357.75	10.34	10.34	0.00	0.00	0.00	0.00
140.0	160.0	334.65	378.00	11.47	11.47	0.00	0.00	0.00	0.00
120.0	140.0	334.65	378.00	14.74	14.74	0.00	0.00	0.00	0.00
100.0	120.0	507.33	457.90	15.85	15.85	0.00	0.00	0.00	0.00
80.0	100.0	507.33	457.90	16.62	16.62	0.00	0.00	0.00	0.00
60.0	80.0	507.33	457.90	17.72	17.72	0.00	0.00	0.00	0.00
40.0	60.0	507.33	457.90	15.70	15.70	0.00	0.00	0.00	0.00
33.3	40.0	544.40	576.00	20.02	20.02	0.00	0.00	0.00	0.00
20.0	33.3	544.40	576.00	29.94	29.94	11.16	11.16	7.41	7.41
13.3	20.0	699.22	724.50	18.24	18.24	0.00	0.00	0.00	0.00
0.0	13.3	699.22	724.50	28.50	28.50	13.90	13.90	6.59	6.59

==========

* Only 3 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some wind loads may have been derived from full-scale wind tunnel testing

==========

LOADING CONDITION A ==========

90 mph wind with no ice. Wind Azimuth: 0◆ PL - 0

MAST LOADING
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LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	330.0	0.00	0.0	0.0	2.43	0.49	0.00	0.00
C	320.0	0.00	0.0	0.0	1.17	1.60	0.00	0.00
C	310.0	0.00	0.0	0.0	0.23	0.04	0.00	0.00
C	305.0	0.00	0.0	0.0	0.48	0.36	0.00	0.00
C	280.0	0.00	0.0	0.0	0.36	0.11	0.00	0.00
C	280.0	0.00	0.0	0.0	0.36	0.11	0.00	0.00
C	230.0	0.00	0.0	0.0	0.34	0.11	0.00	0.00
C	230.0	0.00	0.0	0.0	0.34	0.11	0.00	0.00
C	190.0	0.00	0.0	0.0	3.06	2.55	0.00	0.00
C	181.0	0.00	0.0	0.0	0.17	0.04	0.00	0.00
C	175.0	0.00	0.0	0.0	0.10	0.02	0.00	0.00
C	170.0	0.00	0.0	0.0	0.39	0.36	0.00	0.00
C	170.0	0.00	0.0	0.0	0.22	0.18	0.00	0.00
C	131.0	0.00	0.0	0.0	0.32	0.08	0.00	0.00
C	120.0	0.00	0.0	0.0	0.41	0.36	0.00	0.00
C	26.7	8.18	180.0	0.0	0.22	0.11	0.00	0.00
C	6.7	8.76	180.0	0.0	0.21	0.12	0.00	0.00
D	320.0	0.00	359.3	0.0	0.12	0.06	0.03	-0.02
D	315.0	0.00	359.3	0.0	0.12	0.06	0.03	-0.02
D	315.0	0.00	359.3	0.0	0.11	0.05	0.03	-0.02
D	305.0	0.00	359.3	0.0	0.11	0.05	0.03	-0.02
D	305.0	0.00	19.8	0.0	0.13	0.06	0.02	0.00
D	300.0	0.00	19.8	0.0	0.13	0.06	0.02	0.00
D	300.0	0.00	24.4	0.0	0.14	0.08	0.02	0.00
D	295.0	0.00	24.4	0.0	0.14	0.08	0.02	0.00
D	295.0	0.00	24.4	0.0	0.13	0.07	0.02	0.00
D	280.0	0.00	24.4	0.0	0.13	0.07	0.02	0.00
D	280.0	0.00	29.4	0.0	0.14	0.10	0.02	0.00
D	260.0	0.00	34.1	0.0	0.13	0.10	0.02	0.00
D	260.0	0.00	34.2	0.0	0.14	0.11	0.02	0.00
D	240.0	0.00	39.2	0.0	0.14	0.10	0.02	0.00
D	240.0	0.00	39.1	0.0	0.15	0.13	0.03	0.01
D	220.0	0.00	43.9	0.0	0.16	0.13	0.03	0.01
D	220.0	0.00	43.8	0.0	0.15	0.14	0.04	0.02
D	200.0	0.00	43.8	0.0	0.16	0.14	0.03	0.01
D	200.0	0.00	43.8	0.0	0.17	0.15	0.05	0.03
D	193.3	0.00	43.8	0.0	0.17	0.15	0.05	0.03
D	193.3	0.00	25.1	0.0	0.18	0.16	0.02	-0.01
D	186.7	0.00	25.1	0.0	0.18	0.16	0.02	-0.01
D	186.7	0.00	313.4	0.0	0.19	0.17	0.02	-0.04
D	180.0	0.00	313.4	0.0	0.19	0.17	0.02	-0.04
D	180.0	0.00	300.1	0.0	0.21	0.21	0.02	-0.04
D	173.3	0.00	300.1	0.0	0.21	0.21	0.02	-0.04
D	173.3	0.00	316.1	0.0	0.22	0.21	0.03	-0.05
D	166.7	0.00	316.1	0.0	0.22	0.21	0.03	-0.05
D	166.7	0.00	329.5	0.0	0.23	0.22	0.05	-0.05
D	160.0	0.00	329.5	0.0	0.23	0.22	0.05	-0.05
D	160.0	0.00	333.9	0.0	0.23	0.23	0.06	-0.06
D	150.0	0.00	333.9	0.0	0.23	0.23	0.06	-0.06
D	150.0	0.00	344.6	0.0	0.24	0.24	0.07	-0.03
D	140.0	0.00	344.6	0.0	0.24	0.24	0.07	-0.03
D	140.0	0.00	356.3	0.0	0.26	0.26	0.07	0.02
D	130.0	0.00	356.3	0.0	0.26	0.26	0.07	0.02
D	130.0	0.00	1.0	0.0	0.26	0.27	0.07	0.03
D	120.0	0.00	1.0	0.0	0.26	0.27	0.07	0.03
D	120.0	0.00	6.6	0.0	0.28	0.33	0.07	0.04
D	100.0	0.00	6.2	0.0	0.28	0.34	0.06	0.04
D	100.0	0.00	7.3	0.0	0.28	0.37	0.07	0.05
D	80.0	0.00	7.0	0.0	0.28	0.37	0.07	0.05
D	80.0	0.00	7.9	0.0	0.28	0.38	0.08	0.05
D	60.0	0.00	7.7	0.0	0.28	0.39	0.08	0.05
D	60.0	0.00	8.4	0.0	0.27	0.39	0.09	0.06
D	40.0	0.00	8.2	0.0	0.27	0.40	0.09	0.06
D	40.0	0.00	8.9	0.0	0.24	0.36	0.10	0.07
D	33.3	0.00	8.9	0.0	0.24	0.36	0.10	0.07
D	33.3	0.00	8.7	0.0	0.27	0.43	0.09	0.07
D	20.0	0.00	8.7	0.0	0.27	0.43	0.09	0.07
D	20.0	0.00	9.2	0.0	0.22	0.41	0.10	0.08
D	13.3	0.00	9.2	0.0	0.22	0.41	0.10	0.08
D	13.3	0.00	9.1	0.0	0.26	0.49	0.10	0.08
D	0.0	0.00	9.1	0.0	0.26	0.49	0.10	0.08

ANTENNA LOADING
===============

.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	300.0	90.0	4.4	120.0	0.25	-0.78	0.40	-2.34
STD+R	300.0	270.0	4.4	240.0	0.25	0.78	0.40	2.34
STD+R	270.0	90.0	4.4	120.0	0.14	-0.43	0.24	-0.97
STD+R	270.0	270.0	4.4	240.0	0.14	0.43	0.24	0.97
GRID	250.0	90.0	5.0	120.0	-0.05	-0.25	0.14	-0.27
GRID	250.0	270.0	5.0	240.0	-0.05	0.25	0.14	0.27
STD+R	180.0	90.0	9.0	120.0	0.13	-0.39	0.24	-0.89
STD+R	180.0	270.0	9.0	240.0	0.13	0.39	0.24	0.89
STD	170.0	90.0	9.6	120.0	0.00	-0.04	0.03	-0.03

STD	170.0	270.0	9.6	240.0	0.00	0.04	0.03	0.03
HP	165.0	90.0	9.9	120.0	-0.05	-0.26	0.20	-0.17
HP	165.0	270.0	9.9	240.0	-0.05	0.26	0.20	0.17
STD+R	160.0	90.0	10.2	120.0	0.13	-0.38	0.24	-0.87
STD+R	160.0	270.0	10.2	240.0	0.13	0.38	0.24	0.87
STD+R	155.0	90.0	10.4	120.0	0.12	-0.38	0.24	-0.86
STD+R	155.0	270.0	10.4	240.0	0.12	0.38	0.24	0.86
HP	150.0	90.0	10.7	120.0	-0.05	-0.26	0.20	-0.16
HP	150.0	270.0	10.7	240.0	-0.05	0.26	0.20	0.16
GRID	145.0	90.0	11.0	120.0	-0.05	-0.22	0.14	-0.24
GRID	145.0	270.0	11.0	240.0	-0.05	0.22	0.14	0.24
GRID	140.0	90.0	11.3	120.0	-0.05	-0.22	0.14	-0.24
GRID	140.0	270.0	11.3	240.0	-0.05	0.22	0.14	0.24
STD+R	130.0	90.0	11.9	120.0	0.12	-0.37	0.24	-0.83
STD+R	130.0	270.0	11.9	240.0	0.12	0.37	0.24	0.83

SUPPRESS PRINTING
==========

	...FOR THIS LOADING..			ALL	.....MAXIMUMS.....		
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS		DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION k ==========

90 mph wind with no ice. Wind Azimuth: 0◆ PL - 0

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	330.0	0.00	0.0	0.0	2.43	0.37	0.00	0.00
C	320.0	0.00	0.0	0.0	1.17	1.20	0.00	0.00
C	310.0	0.00	0.0	0.0	0.23	0.03	0.00	0.00
C	305.0	0.00	0.0	0.0	0.48	0.27	0.00	0.00
C	280.0	0.00	0.0	0.0	0.36	0.08	0.00	0.00
C	280.0	0.00	0.0	0.0	0.36	0.08	0.00	0.00
C	230.0	0.00	0.0	0.0	0.34	0.08	0.00	0.00
C	230.0	0.00	0.0	0.0	0.34	0.08	0.00	0.00
C	190.0	0.00	0.0	0.0	3.06	1.92	0.00	0.00
C	181.0	0.00	0.0	0.0	0.17	0.03	0.00	0.00
C	175.0	0.00	0.0	0.0	0.10	0.01	0.00	0.00
C	170.0	0.00	0.0	0.0	0.39	0.27	0.00	0.00
C	170.0	0.00	0.0	0.0	0.22	0.14	0.00	0.00
C	131.0	0.00	0.0	0.0	0.32	0.06	0.00	0.00
C	120.0	0.00	0.0	0.0	0.41	0.27	0.00	0.00
C	26.7	8.18	180.0	0.0	0.22	0.08	0.00	0.00
C	6.7	8.76	180.0	0.0	0.21	0.09	0.00	0.00
D	320.0	0.00	359.3	0.0	0.12	0.04	0.02	-0.02
D	315.0	0.00	359.3	0.0	0.12	0.04	0.02	-0.02
D	315.0	0.00	359.3	0.0	0.11	0.04	0.02	-0.02
D	305.0	0.00	359.3	0.0	0.11	0.04	0.02	-0.02
D	305.0	0.00	19.8	0.0	0.13	0.04	0.02	0.00
D	300.0	0.00	19.8	0.0	0.13	0.04	0.02	0.00
D	300.0	0.00	24.4	0.0	0.14	0.06	0.02	0.00
D	295.0	0.00	24.4	0.0	0.14	0.06	0.02	0.00
D	295.0	0.00	24.4	0.0	0.13	0.05	0.02	0.00
D	280.0	0.00	24.4	0.0	0.13	0.05	0.02	0.00
D	280.0	0.00	29.4	0.0	0.14	0.08	0.02	0.00
D	260.0	0.00	34.1	0.0	0.13	0.07	0.02	0.00
D	260.0	0.00	34.2	0.0	0.14	0.08	0.02	0.00
D	240.0	0.00	39.2	0.0	0.14	0.08	0.02	0.00
D	240.0	0.00	39.1	0.0	0.15	0.10	0.02	0.01
D	220.0	0.00	43.9	0.0	0.16	0.10	0.02	0.01
D	220.0	0.00	43.8	0.0	0.15	0.10	0.03	0.02
D	200.0	0.00	43.8	0.0	0.16	0.10	0.03	0.01
D	200.0	0.00	43.8	0.0	0.17	0.11	0.04	0.03
D	193.3	0.00	43.8	0.0	0.17	0.11	0.04	0.03
D	193.3	0.00	25.1	0.0	0.18	0.12	0.02	-0.01
D	186.7	0.00	25.1	0.0	0.18	0.12	0.02	-0.01
D	186.7	0.00	313.4	0.0	0.19	0.13	0.01	-0.04
D	180.0	0.00	313.4	0.0	0.19	0.13	0.01	-0.04
D	180.0	0.00	300.1	0.0	0.21	0.15	0.01	-0.04
D	173.3	0.00	300.1	0.0	0.21	0.15	0.01	-0.04
D	173.3	0.00	316.1	0.0	0.22	0.16	0.02	-0.05
D	166.7	0.00	316.1	0.0	0.22	0.16	0.02	-0.05
D	166.7	0.00	329.5	0.0	0.23	0.16	0.04	-0.05
D	160.0	0.00	329.5	0.0	0.23	0.16	0.04	-0.05
D	160.0	0.00	333.9	0.0	0.23	0.17	0.05	-0.06
D	150.0	0.00	333.9	0.0	0.23	0.17	0.05	-0.06
D	150.0	0.00	344.6	0.0	0.24	0.18	0.05	-0.03
D	140.0	0.00	344.6	0.0	0.24	0.18	0.05	-0.03
D	140.0	0.00	356.3	0.0	0.26	0.20	0.05	0.02
D	130.0	0.00	356.3	0.0	0.26	0.20	0.05	0.02
D	130.0	0.00	1.0	0.0	0.26	0.20	0.05	0.03
D	120.0	0.00	1.0	0.0	0.26	0.20	0.05	0.03
D	120.0	0.00	6.6	0.0	0.28	0.25	0.05	0.04
D	100.0	0.00	6.2	0.0	0.28	0.25	0.05	0.04
D	100.0	0.00	7.3	0.0	0.28	0.28	0.06	0.05
D	60.0	0.00	7.7	0.0	0.28	0.29	0.06	0.05
D	60.0	0.00	8.4	0.0	0.27	0.29	0.07	0.06
D	40.0	0.00	8.2	0.0	0.27	0.30	0.06	0.06
D	40.0	0.00	8.9	0.0	0.24	0.27	0.07	0.07
D	33.3	0.00	8.9	0.0	0.24	0.27	0.07	0.07
D	33.3	0.00	8.7	0.0	0.27	0.32	0.07	0.07
D	20.0	0.00	8.7	0.0	0.27	0.32	0.07	0.07
D	20.0	0.00	9.2	0.0	0.22	0.31	0.08	0.08
D	13.3	0.00	9.2	0.0	0.22	0.31	0.08	0.08

D	13.3	0.00	9.1	0.0	0.26	0.37	0.08	0.08
D	0.0	0.00	9.1	0.0	0.26	0.37	0.08	0.08

ANTENNA LOADING
==========

.....ANTENNA.....			ATTACHMENT		.....ANTENNA FORCES.....			
TYPE	ELEV	AZI	RAD	AZI	AXIAL	SHEAR	GRAVITY	TORSION
	ft		ft		kip	kip	kip	ft-kip
STD+R	300.0	90.0	4.4	120.0	0.25	-0.78	0.30	-2.34
STD+R	300.0	270.0	4.4	240.0	0.25	0.78	0.30	2.34
STD+R	270.0	90.0	4.4	120.0	0.14	-0.43	0.18	-0.97
STD+R	270.0	270.0	4.4	240.0	0.14	0.43	0.18	0.97
GRID	250.0	90.0	5.0	120.0	-0.05	-0.25	0.11	-0.27
GRID	250.0	270.0	5.0	240.0	-0.05	0.25	0.11	0.27
STD+R	180.0	90.0	9.0	120.0	0.13	-0.39	0.18	-0.89
STD+R	180.0	270.0	9.0	240.0	0.13	0.39	0.18	0.89
STD	170.0	90.0	9.6	120.0	0.00	-0.04	0.03	-0.03
STD	170.0	270.0	9.6	240.0	0.00	0.04	0.03	0.03
HP	165.0	90.0	9.9	120.0	-0.05	-0.26	0.15	-0.17
HP	165.0	270.0	9.9	240.0	-0.05	0.26	0.15	0.17
STD+R	160.0	90.0	10.2	120.0	0.13	-0.38	0.18	-0.87
STD+R	160.0	270.0	10.2	240.0	0.13	0.38	0.18	0.87
STD+R	155.0	90.0	10.4	120.0	0.12	-0.38	0.18	-0.86
STD+R	155.0	270.0	10.4	240.0	0.12	0.38	0.18	0.86
HP	150.0	90.0	10.7	120.0	-0.05	-0.26	0.15	-0.16
HP	150.0	270.0	10.7	240.0	-0.05	0.26	0.15	0.16
GRID	145.0	90.0	11.0	120.0	-0.05	-0.22	0.11	-0.24
GRID	145.0	270.0	11.0	240.0	-0.05	0.22	0.11	0.24
GRID	140.0	90.0	11.3	120.0	-0.05	-0.22	0.11	-0.24
GRID	140.0	270.0	11.3	240.0	-0.05	0.22	0.11	0.24
STD+R	130.0	90.0	11.9	120.0	0.12	-0.37	0.18	-0.83
STD+R	130.0	270.0	11.9	240.0	0.12	0.37	0.18	0.83

SUPPRESS PRINTING
==========

	...FOR THIS LOADING..				.....MAXIMUMS.....			
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS		ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
	no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION AU ==========

30 mph wind with 0.75 ice. Wind Azimuth: 0♦ PL - 0

MAST LOADING
==========

LOAD	ELEV	APPLY..LOAD..AT		LOAD	.....FORCES.....		.....MOMENTS.....	
TYPE		RADIUS	AZI	AZI	HORIZ	DOWN	VERTICAL	TORSNAL
	ft	ft			kip	kip	ft-kip	ft-kip
C	330.0	0.00	0.0	0.0	1.05	3.34	0.00	0.00
C	320.0	0.00	0.0	0.0	0.22	2.61	0.00	0.00
C	310.0	0.00	0.0	0.0	0.04	0.11	0.00	0.00
C	305.0	0.00	0.0	0.0	0.07	0.73	0.00	0.00
C	280.0	0.00	0.0	0.0	0.17	0.43	0.00	0.00
C	280.0	0.00	0.0	0.0	0.17	0.43	0.00	0.00
C	230.0	0.00	0.0	0.0	0.16	0.42	0.00	0.00
C	230.0	0.00	0.0	0.0	0.16	0.42	0.00	0.00
C	190.0	0.00	0.0	0.0	0.36	6.02	0.00	0.00
C	181.0	0.00	0.0	0.0	0.05	0.22	0.00	0.00
C	175.0	0.00	0.0	0.0	0.02	0.05	0.00	0.00
C	170.0	0.00	0.0	0.0	0.05	0.71	0.00	0.00
C	170.0	0.00	0.0	0.0	0.03	0.36	0.00	0.00
C	131.0	0.00	0.0	0.0	0.09	0.44	0.00	0.00
C	120.0	0.00	0.0	0.0	0.05	0.70	0.00	0.00
C	26.7	8.18	180.0	0.0	0.02	0.11	0.00	0.00
C	6.7	8.76	180.0	0.0	0.02	0.12	0.00	0.00
D	320.0	0.00	354.1	0.0	0.02	0.28	0.15	0.00
D	315.0	0.00	354.1	0.0	0.02	0.28	0.15	0.00
D	315.0	0.00	354.1	0.0	0.02	0.24	0.15	0.00
D	305.0	0.00	354.1	0.0	0.02	0.24	0.15	0.00
D	305.0	0.00	13.3	0.0	0.02	0.28	0.13	0.00
D	300.0	0.00	13.3	0.0	0.02	0.28	0.13	0.00
D	300.0	0.00	20.3	0.0	0.02	0.34	0.12	0.00
D	295.0	0.00	20.3	0.0	0.02	0.34	0.12	0.00
D	295.0	0.00	20.3	0.0	0.02	0.30	0.12	0.00
D	280.0	0.00	20.3	0.0	0.02	0.30	0.12	0.00
D	280.0	0.00	25.7	0.0	0.02	0.38	0.12	0.00
D	275.0	0.00	25.7	0.0	0.02	0.38	0.12	0.00
D	275.0	0.00	25.7	0.0	0.02	0.34	0.12	0.00
D	270.0	0.00	25.7	0.0	0.02	0.34	0.12	0.00
D	270.0	0.00	33.2	0.0	0.02	0.35	0.12	0.00
D	260.0	0.00	33.2	0.0	0.02	0.35	0.12	0.00
D	260.0	0.00	32.9	0.0	0.02	0.39	0.11	0.00
D	255.0	0.00	32.9	0.0	0.02	0.39	0.11	0.00
D	255.0	0.00	32.5	0.0	0.02	0.36	0.10	0.00
D	250.0	0.00	32.5	0.0	0.02	0.36	0.10	0.00
D	250.0	0.00	39.3	0.0	0.02	0.37	0.14	0.00
D	240.0	0.00	39.0	0.0	0.02	0.38	0.13	0.00
D	240.0	0.00	39.9	0.0	0.02	0.41	0.16	0.00
D	230.0	0.00	39.7	0.0	0.02	0.42	0.15	0.00
D	230.0	0.00	46.4	0.0	0.02	0.43	0.19	0.00
D	220.0	0.00	46.2	0.0	0.02	0.44	0.18	0.00
D	220.0	0.00	46.7	0.0	0.02	0.43	0.22	0.00
D	213.3	0.00	46.7	0.0	0.02	0.43	0.22	0.00
D	213.3	0.00	46.5	0.0	0.02	0.43	0.20	0.00
D	206.7	0.00	46.5	0.0	0.02	0.43	0.20	0.00
D	206.7	0.00	46.3	0.0	0.02	0.44	0.18	0.00

D	200.0	0.00	46.3	0.0	0.02	0.44	0.18	0.00
D	200.0	0.00	47.1	0.0	0.02	0.47	0.26	0.00
D	193.3	0.00	47.1	0.0	0.02	0.47	0.26	0.00
D	193.3	0.00	37.0	0.0	0.02	0.51	0.15	0.00
D	186.7	0.00	37.0	0.0	0.02	0.51	0.15	0.00
D	186.7	0.00	1.1	0.0	0.02	0.55	0.07	0.00
D	180.0	0.00	1.1	0.0	0.02	0.55	0.07	0.00
D	180.0	0.00	339.1	0.0	0.02	0.62	0.07	0.00
D	173.3	0.00	339.1	0.0	0.02	0.62	0.07	0.00
D	173.3	0.00	343.5	0.0	0.03	0.65	0.14	0.00
D	166.7	0.00	343.5	0.0	0.03	0.65	0.14	0.00
D	166.7	0.00	346.2	0.0	0.03	0.68	0.25	0.00
D	160.0	0.00	346.2	0.0	0.03	0.68	0.25	0.00
D	160.0	0.00	348.0	0.0	0.03	0.69	0.34	0.00
D	150.0	0.00	348.0	0.0	0.03	0.69	0.34	0.00
D	150.0	0.00	357.1	0.0	0.03	0.73	0.39	0.00
D	140.0	0.00	357.1	0.0	0.03	0.73	0.39	0.00
D	140.0	0.00	11.6	0.0	0.03	0.79	0.37	0.00
D	130.0	0.00	11.6	0.0	0.03	0.79	0.37	0.00
D	130.0	0.00	18.0	0.0	0.03	0.81	0.38	0.00
D	120.0	0.00	18.0	0.0	0.03	0.81	0.38	0.00
D	120.0	0.00	24.0	0.0	0.03	0.89	0.39	0.01
D	100.0	0.00	23.6	0.0	0.03	0.90	0.37	0.00
D	100.0	0.00	24.6	0.0	0.03	0.93	0.43	0.01
D	80.0	0.00	24.4	0.0	0.03	0.94	0.41	0.01
D	80.0	0.00	25.2	0.0	0.03	0.94	0.47	0.01
D	60.0	0.00	25.0	0.0	0.03	0.96	0.45	0.01
D	60.0	0.00	25.8	0.0	0.03	0.95	0.49	0.01
D	40.0	0.00	26.1	0.0	0.03	0.96	0.48	0.01
D	40.0	0.00	25.2	0.0	0.03	0.87	0.54	0.01
D	33.3	0.00	25.2	0.0	0.03	0.87	0.54	0.01
D	33.3	0.00	25.4	0.0	0.03	1.09	0.53	0.01
D	20.0	0.00	25.4	0.0	0.03	1.09	0.53	0.01
D	20.0	0.00	25.0	0.0	0.02	0.94	0.63	0.01
D	13.3	0.00	25.0	0.0	0.02	0.94	0.63	0.01
D	13.3	0.00	25.6	0.0	0.03	1.27	0.83	0.01
D	0.0	0.00	25.6	0.0	0.03	1.27	0.83	0.01

ANTENNA LOADING
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.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	300.0	90.0	4.4	120.0	0.02	-0.06	1.58	-0.18
STD+R	300.0	270.0	4.4	240.0	0.02	0.06	1.58	0.18
STD+R	270.0	90.0	4.4	120.0	0.01	-0.03	0.83	-0.08
STD+R	270.0	270.0	4.4	240.0	0.01	0.03	0.83	0.08
GRID	250.0	90.0	5.0	120.0	0.00	-0.03	0.57	-0.07
GRID	250.0	270.0	5.0	240.0	0.00	0.03	0.57	0.07
STD+R	180.0	90.0	9.0	120.0	0.01	-0.03	0.81	-0.07
STD+R	180.0	270.0	9.0	240.0	0.01	0.03	0.81	0.07
STD	170.0	90.0	9.6	120.0	0.00	0.00	0.10	0.00
STD	170.0	270.0	9.6	240.0	0.00	0.00	0.10	0.00
HP	165.0	90.0	9.9	120.0	0.00	-0.02	0.77	-0.01
HP	165.0	270.0	9.9	240.0	0.00	0.02	0.77	0.01
STD+R	160.0	90.0	10.2	120.0	0.01	-0.03	0.80	-0.07
STD+R	160.0	270.0	10.2	240.0	0.01	0.03	0.80	0.07
STD+R	155.0	90.0	10.4	120.0	0.01	-0.03	0.80	-0.07
STD+R	155.0	270.0	10.4	240.0	0.01	0.03	0.80	0.07
HP	150.0	90.0	10.7	120.0	0.00	-0.02	0.76	-0.01
HP	150.0	270.0	10.7	240.0	0.00	0.02	0.76	0.01
GRID	145.0	90.0	11.0	120.0	0.00	-0.02	0.54	-0.06
GRID	145.0	270.0	11.0	240.0	0.00	0.02	0.54	0.06
GRID	140.0	90.0	11.3	120.0	0.00	-0.02	0.54	-0.06
GRID	140.0	270.0	11.3	240.0	0.00	0.02	0.54	0.06
STD+R	130.0	90.0	11.9	120.0	0.01	-0.03	0.79	-0.07
STD+R	130.0	270.0	11.9	240.0	0.01	0.03	0.79	0.07

SUPPRESS PRINTING
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LOADS INPUT	...FOR THIS LOADING.. DISPL	MEMBER FORCES	FOUNDN LOADS	.....MAXIMUMS..... ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

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MAXIMUM MAST DISPLACEMENTS:
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ELEV ft	------DEFLECTIONS (ft)----- NORTH	EAST	DOWN	--TILTS (DEG)--- NORTH	EAST	TWIST DEG
320.0	5.792 S	5.676 b	0.101 e	2.815 S	2.758 b	-0.784 w
315.0	5.543 S	5.433 b	0.094 e	2.798 S	2.741 b	-0.783 w
310.0	5.301 S	5.196 b	0.088 e	2.756 S	2.700 b	-0.782 w
305.0	5.060 S	4.959 b	0.082 e	2.698 S	2.645 b	-0.780 w
300.0	4.827 S	4.731 b	0.076 e	2.616 S	2.568 b	-0.777 w
295.0	4.598 S	4.506 b	0.070 e	2.565 S	2.520 b	-0.742 w
290.0	4.376 S	4.287 b	0.065 e	2.496 S	2.453 b	-0.706 w
285.0	4.157 S	4.072 b	0.060 e	2.411 S	2.369 b	-0.669 w
280.0	3.949 S	3.868 b	0.055 e	2.306 S	2.266 b	-0.632 w
275.0	3.747 S	3.670 b	0.051 e	2.230 S	2.191 b	-0.606 w
270.0	3.557 S	3.482 b	0.047 e	2.139 S	2.102 b	-0.579 w
265.0	3.369 S	3.298 b	0.044 e	2.035 S	1.999 b	-0.542 w
260.0	3.195 S	3.127 b	0.040 e	1.913 S	1.878 b	-0.503 w
255.0	3.030 S	2.965 b	0.038 e	1.808 S	1.775 b	-0.452 w
250.0	2.878 S	2.816 b	0.035 CB	1.712 S	1.680 b	-0.411 w
245.0	2.730 S	2.671 b	0.035 CB	1.619 S	1.588 b	-0.369 w
240.0	2.593 S	2.536 b	0.034 CB	1.532 S	1.501 b	-0.334 w
235.0	2.460 S	2.406 b	0.034 CB	1.471 S	1.441 b	-0.303 w
230.0	2.334 S	2.282 b	0.033 CB	1.413 S	1.384 b	-0.275 w
225.0	2.211 S	2.162 b	0.033 CB	1.357 S	1.328 b	-0.250 w
220.0	2.093 S	2.047 b	0.032 CB	1.303 S	1.275 b	-0.227 w

213.3	1.944	S	1.901	b	0.031 CB	1.232 AC	1.204 b	-0.209 w
206.7	1.804	S	1.764	b	0.031 CB	1.164 AC	1.137 b	-0.192 w
200.0	1.670	S	1.634	b	0.030 CB	1.097 AC	1.071 b	-0.178 w
193.3	1.545	S	1.513	b	0.029 CB	1.032 AC	1.008 b	-0.167 w
186.7	1.426	S	1.397	b	0.028 CB	0.969 AC	0.946 b	-0.157 w
180.0	1.315	S	1.288	b	0.028 CB	0.907 AC	0.885 b	-0.148 w
173.3	1.210	S	1.186	b	0.027 CB	0.859 AC	0.839 b	-0.139 w
166.7	1.112	S	1.090	b	0.026 CB	0.813 AC	0.795 b	-0.130 w
160.0	1.016	S	0.997	b	0.025 CB	0.767 AC	0.750 b	-0.121 w
150.0	0.886	S	0.869	b	0.024 CB	0.701 AC	0.686 b	-0.110 w
140.0	0.766	S	0.752	b	0.022 CB	0.636 AC	0.623 b	-0.097 w
130.0	0.658	S	0.645	b	0.021 CB	0.570 AC	0.559 b	-0.086 w
120.0	0.560	S	0.550	b	0.019 CB	0.504 AC	0.495 b	-0.075 w
110.0	0.473	S	0.464	b	0.018 CB	0.462 AC	0.453 b	-0.065 w
100.0	0.392	S	0.384	b	0.017 CB	0.419 S	0.410 b	-0.055 w
90.0	0.319	S	0.313	b	0.015 CB	0.375 S	0.368 b	-0.048 w
80.0	0.254	S	0.249	b	0.014 CB	0.332 S	0.325 b	-0.041 w
70.0	0.196	S	0.192	b	0.012 CB	0.289 S	0.283 b	-0.035 w
60.0	0.145	S	0.143	b	0.011 CB	0.245 S	0.240 b	-0.029 w
50.0	0.099	S	0.096	b	0.009 CB	0.201 S	0.196 b	-0.023 w
40.0	0.056	S	0.055	b	0.007 CB	0.156 S	0.152 b	-0.017 w
33.3	0.043	S	0.041	b	0.006 AU	0.128 S	0.125 b	-0.014 w
20.0	0.017	S	0.016	b	0.003 CB	0.069 S	0.067 b	-0.008 w
13.3	0.008	U	0.007	d	0.002 CB	0.046 S	0.045 b	-0.005 w
0.0	0.000	A	0.000	A	0.000 A	0.000 A	0.000 A	0.000 A

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

ELEV ft	AZI deg	TYPE *	.....BEAM DEFLECTIONS (deg)..... PITCH	YAW	ROLL	TOTAL
300.0	90.0	STD+R	-2.616 S	0.777 w	2.568 b	2.616 S
300.0	270.0	STD+R	2.616 S	0.777 w	-2.568 b	2.616 S
270.0	90.0	STD+R	-2.139 S	0.579 w	2.102 b	2.139 S
270.0	270.0	STD+R	2.139 S	0.579 w	-2.102 b	2.139 S
250.0	90.0	GRID	-1.712 S	0.411 w	1.680 b	1.712 S
250.0	270.0	GRID	1.712 S	0.411 w	-1.680 b	1.712 S
180.0	90.0	STD+R	-0.907 AC	0.148 w	0.885 b	0.907 AC
180.0	270.0	STD+R	0.907 AC	0.148 w	-0.885 b	0.907 AC
170.0	90.0	STD	-0.836 AC	0.135 w	0.817 b	0.836 AC
170.0	270.0	STD	0.836 AC	0.135 w	-0.817 b	0.836 AC
165.0	90.0	HP	-0.802 AC	0.128 w	0.784 b	0.802 AC
165.0	270.0	HP	0.802 AC	0.128 w	-0.784 b	0.802 AC
160.0	90.0	STD+R	-0.767 AC	0.121 w	0.750 b	0.767 AC
160.0	270.0	STD+R	0.767 AC	0.121 w	-0.750 b	0.767 AC
155.0	90.0	STD+R	-0.734 AC	0.115 w	0.718 b	0.734 AC
155.0	270.0	STD+R	0.734 AC	0.115 w	-0.718 b	0.734 AC
150.0	90.0	HP	-0.701 AC	0.110 w	0.686 b	0.701 AC
150.0	270.0	HP	0.701 AC	0.110 w	-0.686 b	0.701 AC
145.0	90.0	GRID	-0.669 AC	0.104 w	0.655 b	0.669 AC
145.0	270.0	GRID	0.669 AC	0.104 w	-0.655 b	0.669 AC
140.0	90.0	GRID	-0.636 AC	0.097 w	0.623 b	0.636 AC
140.0	270.0	GRID	0.636 AC	0.097 w	-0.623 b	0.636 AC
130.0	90.0	STD+R	-0.570 AC	0.086 w	0.559 b	0.570 AC
130.0	270.0	STD+R	0.570 AC	0.086 w	-0.559 b	0.570 AC

MAXIMUM TENSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
320.0	----------		1.91 G	0.00 A
	4.76 k	4.10 AA		
315.0	----------		0.30 B	0.00 A
	12.50 l	2.18 T		
310.0	----------		0.10 AC	0.00 A
	17.38 k	2.49 k		
305.0	----------		0.27 A	0.00 A
	24.35 k	2.97 AR		
300.0	----------		0.54 AO	0.00 A
	32.33 k	5.52 M		
295.0	----------		0.32 A	0.00 A
	43.38 w	5.86 b		
290.0	----------		0.04 AO	0.00 A
	54.91 w	5.99 AL		
285.0	----------		0.31 M	0.00 A
	67.42 w	6.32 b		
280.0	----------		0.96 M	0.00 A
	80.07 w	7.17 w		
275.0	----------		0.46 A	0.00 A
	96.40 w	7.14 b		
270.0	----------		0.12 AO	0.00 A
	111.51 w	8.70 w		
265.0	----------		0.44 A	0.00 A
	129.83 w	9.21 b		
260.0	----------		1.45 AO	0.00 A
	140.42 w	4.27 y		
255.0	----------		0.40 M	0.00 A
	146.31 w	3.48 d		
250.0	----------		0.02 AO	0.00 A
	149.91 w	4.51 y		
245.0	----------		0.27 M	0.00 A
	155.67 w	3.99 d		
240.0	----------		0.03 AL	0.00 A
	160.05 w	4.04 y		
235.0	----------		0.16 M	0.00 A
	165.09 w	3.78 d		
230.0	----------		0.08 M	0.00 A
	169.54 w	4.17 y		
225.0	----------		0.12 M	0.00 A
	174.86 w	3.96 d		
220.0	----------		0.09 M	0.00 A
	180.13 w	4.44 y		
213.3	----------		0.15 M	0.00 A
	186.77 w	4.22 d		
206.7	----------		0.08 M	0.00 A

	192.69 w	4.35 y		
200.0	----------		0.13 M	0.00 A
	198.96 w	4.25 d		
193.3	----------		0.05 M	0.00 A
	204.86 w	5.07 y		
186.7	----------		0.11 A	0.00 A
	212.18 w	5.53 AN		
180.0	----------		0.05 b	0.00 A
	220.21 w	6.45 AN		
173.3	----------		0.14 A	0.00 A
	228.69 w	6.98 d		
166.7	----------		0.05 M	0.00 A
	237.68 w	7.41 AN		
160.0	----------		0.12 M	0.00 A
	249.50 w	9.89 d		
150.0	----------		0.11 M	0.00 A
	265.08 w	11.14 AN		
140.0	----------		0.08 A	0.00 A
	281.41 w	12.28 d		
130.0	----------		0.10 M	0.00 A
	298.57 w	12.91 AN		
120.0	----------		0.08 A	0.00 A
	315.72 w	13.52 d		
110.0	----------		0.06 M	0.00 A
	333.12 w	13.23 AN		
100.0	----------		0.07 A	0.00 A
	349.85 w	13.73 d		
90.0	----------		0.06 M	0.00 A
	366.69 w	13.58 AN		
80.0	----------		0.06 A	0.00 A
	383.04 w	14.08 d		
70.0	----------		0.05 M	0.00 A
	399.52 w	14.02 AN		
60.0	----------		0.06 BO	0.00 A
	415.63 w	14.47 d		
50.0	----------		0.08 AO	0.00 A
	431.76 w	14.54 AN		
40.0	----------		0.34 A	0.00 A
	450.50 w	15.34 AN		
33.3	----------		1.05 m	0.00 S
	449.46 w	19.73 d		
20.0	----------		0.10 M	0.00 S
	481.82 w	15.67 AN		
13.3	----------		0.98 m	0.00 s
	480.62 w	19.89 AQ		
0.0	----------		0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
320.0	----------		-1.85 w	0.00 A
	-5.96 S	-4.19 i		
315.0	----------		-0.26 AD	0.00 A
	-14.09 T	-2.12 l		
310.0	----------		-0.11 A	0.00 A
	-19.19 S	-2.57 S		
305.0	----------		-0.23 AC	0.00 A
	-26.71 S	-3.00 P		
300.0	----------		-0.74 C	0.00 A
	-35.22 S	-5.55 b		
295.0	----------		-0.27 AO	0.00 A
	-47.65 e	-5.73 AL		
290.0	----------		-0.05 A	0.00 A
	-59.51 e	-6.10 b		
285.0	----------		-0.29 AO	0.00 A
	-72.84 e	-6.26 AL		
280.0	----------		-0.92 AO	0.00 A
	-86.23 e	-6.91 e		
275.0	----------		-0.43 AO	0.00 A
	-103.48 e	-7.19 AL		
270.0	----------		-0.16 A	0.00 A
	-119.57 e	-8.93 b		
265.0	----------		-0.41 AO	0.00 A
	-139.41 e	-8.91 AL		
260.0	----------		-1.68 A	0.00 A
	-150.22 e	-3.94 g		
255.0	----------		-0.38 AO	0.00 A
	-156.91 e	-3.74 y		
250.0	----------		-0.03 M	0.00 A
	-161.03 e	-4.31 g		
245.0	----------		-0.26 AO	0.00 A
	-167.54 e	-4.09 y		
240.0	----------		-0.03 b	0.00 A
	-172.27 e	-3.92 g		
235.0	----------		-0.15 AO	0.00 A
	-178.06 e	-3.81 y		
230.0	----------		-0.08 AO	0.00 A
	-183.11 e	-4.09 g		
225.0	----------		-0.11 AO	0.00 A
	-189.16 e	-4.00 y		
220.0	----------		-0.09 AO	0.00 A
	-195.04 e	-4.39 g		
213.3	----------		-0.14 AO	0.00 A
	-202.62 e	-4.23 y		
206.7	----------		-0.07 AO	0.00 A
	-209.34 e	-4.35 g		
200.0	----------		-0.12 AO	0.00 A
	-216.57 e	-4.24 d		
193.3	----------		-0.05 AO	0.00 A
	-224.10 e	-5.14 g		
186.7	----------		-0.10 AO	0.00 A
	-233.21 e	-5.55 AN		

180.0	----------		-0.05 AL	0.00 A
	-242.60 e	-6.80 g		
173.3	----------		-0.12 AO	0.00 A
	-252.80 e	-6.78 AN		
166.7	----------		-0.04 AO	0.00 A
	-263.12 e	-7.84 g		
160.0	----------		-0.11 AC	0.00 A
	-277.43 e	-9.95 AN		
150.0	----------		-0.10 AO	0.00 A
	-295.66 e	-11.34 d		
140.0	----------		-0.07 AO	0.00 A
	-314.74 e	-12.06 AN		
130.0	----------		-0.09 AO	0.00 A
	-334.23 e	-13.37 d		
120.0	----------		-0.06 AO	0.00 A
	-354.58 e	-13.14 AN		
110.0	----------		-0.05 AO	0.00 A
	-374.25 e	-13.65 d		
100.0	----------		-0.06 AO	0.00 A
	-394.27 e	-13.43 AN		
90.0	----------		-0.05 AO	0.00 A
	-413.80 e	-13.95 d		
80.0	----------		-0.05 AO	0.00 A
	-433.58 e	-13.83 AN		
70.0	----------		-0.05 AO	0.00 A
	-452.95 e	-14.42 g		
60.0	----------		-0.03 AQ	0.00 A
	-472.56 e	-14.33 d		
50.0	----------		-0.09 M	0.00 A
	-491.83 e	-14.90 g		
40.0	----------		-0.29 AC	0.00 A
	-513.72 e	-15.56 g		
33.3	----------		-1.22 S	0.00 C
	-515.12 e	-19.98 g		
20.0	----------		-0.09 AO	0.00 C
	-552.02 e	-16.17 g		
13.3	----------		-1.15 U	0.00 AR
	-553.60 e	-20.26 g		
0.0	----------		0.00 A	0.00 A

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)

LOAD---COMPONENTS				TOTAL
NORTH	EAST	DOWN	UPLIFT	SHEAR
54.72 S	49.74 e	577.30 e	-500.95 w	56.52 e

MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)

HORIZONTAL			DOWN	OVERTURNING			TORSION
NORTH	EAST	TOTAL @ 119.2		NORTH	EAST	TOTAL @ 119.2	
91.3 AC	85.4 b	94.1 AO	250.0 BD	14012.5 S	13561.1 b	14709.2 e	-82.2 w

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Latticed Tower Analysis (Unguyed) (c)2013 Guymast Inc. 416-736-7453
Processed under license at:

Sabre Towers and Poles on: 14 jul 2017 at: 11:26:06

****
********** Service Load Condition **********
****

* Only 1 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

60 mph wind with no ice. Wind Azimuth: 0♦ PL - 0

MAST LOADING

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	330.0	0.00	0.0	0.0	0.68	0.41	0.00	0.00
C	320.0	0.00	0.0	0.0	0.32	1.34	0.00	0.00
C	310.0	0.00	0.0	0.0	0.06	0.03	0.00	0.00
C	305.0	0.00	0.0	0.0	0.13	0.30	0.00	0.00
C	280.0	0.00	0.0	0.0	0.10	0.09	0.00	0.00
C	280.0	0.00	0.0	0.0	0.10	0.09	0.00	0.00

C	230.0	0.00	0.0	0.0	0.09	0.09	0.00	0.00
C	230.0	0.00	0.0	0.0	0.09	0.09	0.00	0.00
C	190.0	0.00	0.0	0.0	0.85	2.13	0.00	0.00
C	181.0	0.00	0.0	0.0	0.05	0.04	0.00	0.00
C	175.0	0.00	0.0	0.0	0.03	0.01	0.00	0.00
C	170.0	0.00	0.0	0.0	0.11	0.30	0.00	0.00
C	170.0	0.00	0.0	0.0	0.06	0.15	0.00	0.00
C	131.0	0.00	0.0	0.0	0.09	0.07	0.00	0.00
C	120.0	0.00	0.0	0.0	0.11	0.30	0.00	0.00
C	26.7	8.18	180.0	0.0	0.06	0.09	0.00	0.00
C	6.7	8.76	180.0	0.0	0.06	0.10	0.00	0.00
D	320.0	0.00	359.3	0.0	0.03	0.05	0.02	0.00
D	305.0	0.00	359.3	0.0	0.03	0.04	0.02	0.00
D	305.0	0.00	19.8	0.0	0.04	0.05	0.02	0.00
D	300.0	0.00	19.8	0.0	0.04	0.05	0.02	0.00
D	300.0	0.00	24.4	0.0	0.04	0.06	0.02	0.00
D	280.0	0.00	24.4	0.0	0.04	0.06	0.02	0.00
D	280.0	0.00	29.4	0.0	0.04	0.09	0.02	0.00
D	260.0	0.00	34.1	0.0	0.04	0.08	0.02	0.01
D	260.0	0.00	34.2	0.0	0.04	0.09	0.02	0.01
D	240.0	0.00	39.2	0.0	0.04	0.09	0.02	0.01
D	240.0	0.00	39.1	0.0	0.05	0.11	0.03	0.01
D	220.0	0.00	43.9	0.0	0.05	0.11	0.03	0.01
D	220.0	0.00	43.8	0.0	0.05	0.11	0.03	0.01
D	200.0	0.00	43.8	0.0	0.05	0.12	0.03	0.01
D	200.0	0.00	43.8	0.0	0.05	0.13	0.04	0.02
D	193.3	0.00	43.8	0.0	0.05	0.13	0.04	0.02
D	193.3	0.00	25.1	0.0	0.06	0.13	0.02	0.01
D	186.7	0.00	25.1	0.0	0.06	0.13	0.02	0.01
D	186.7	0.00	313.4	0.0	0.06	0.14	0.01	0.00
D	180.0	0.00	313.4	0.0	0.06	0.14	0.01	0.00
D	180.0	0.00	300.1	0.0	0.06	0.17	0.02	0.00
D	166.7	0.00	316.1	0.0	0.07	0.18	0.02	-0.01
D	166.7	0.00	329.5	0.0	0.07	0.18	0.04	-0.01
D	160.0	0.00	329.5	0.0	0.07	0.18	0.04	-0.01
D	160.0	0.00	333.9	0.0	0.07	0.19	0.05	-0.01
D	150.0	0.00	333.9	0.0	0.07	0.19	0.05	-0.01
D	150.0	0.00	344.6	0.0	0.08	0.20	0.06	0.00
D	140.0	0.00	344.6	0.0	0.08	0.20	0.06	0.00
D	140.0	0.00	356.3	0.0	0.08	0.22	0.05	0.01
D	120.0	0.00	1.0	0.0	0.09	0.22	0.06	0.02
D	120.0	0.00	6.6	0.0	0.09	0.28	0.06	0.02
D	100.0	0.00	6.2	0.0	0.09	0.28	0.05	0.02
D	100.0	0.00	7.3	0.0	0.09	0.31	0.06	0.02
D	40.0	0.00	8.2	0.0	0.09	0.33	0.07	0.03
D	40.0	0.00	8.9	0.0	0.07	0.30	0.08	0.03
D	33.3	0.00	8.9	0.0	0.07	0.30	0.08	0.03
D	33.3	0.00	8.7	0.0	0.08	0.36	0.08	0.03
D	20.0	0.00	8.7	0.0	0.08	0.36	0.08	0.03
D	20.0	0.00	9.2	0.0	0.07	0.34	0.09	0.03
D	13.3	0.00	9.2	0.0	0.07	0.34	0.09	0.03
D	13.3	0.00	9.1	0.0	0.08	0.41	0.08	0.02
D	0.0	0.00	9.1	0.0	0.08	0.41	0.08	0.02

ANTENNA LOADING
==========

.....ANTENNA.....			ATTACHMENT		.....ANTENNA FORCES.....			
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	300.0	90.0	4.4	120.0	0.07	-0.22	0.34	-0.65
STD+R	300.0	270.0	4.4	240.0	0.07	0.22	0.34	0.65
STD+R	270.0	90.0	4.4	120.0	0.04	-0.12	0.20	-0.27
STD+R	270.0	270.0	4.4	240.0	0.04	0.12	0.20	0.27
GRID	250.0	90.0	5.0	120.0	-0.01	-0.07	0.12	-0.08
GRID	250.0	270.0	5.0	240.0	-0.01	0.07	0.12	0.08
STD+R	180.0	90.0	9.0	120.0	0.04	-0.11	0.20	-0.25
STD+R	180.0	270.0	9.0	240.0	0.04	0.11	0.20	0.25
STD	170.0	90.0	9.6	120.0	0.00	-0.01	0.03	-0.01
STD	170.0	270.0	9.6	240.0	0.00	0.01	0.03	0.01
HP	165.0	90.0	9.9	120.0	-0.01	-0.07	0.17	-0.05
HP	165.0	270.0	9.9	240.0	-0.01	0.07	0.17	0.05
STD+R	160.0	90.0	10.2	120.0	0.04	-0.11	0.20	-0.24
STD+R	160.0	270.0	10.2	240.0	0.04	0.11	0.20	0.24
STD+R	155.0	90.0	10.4	120.0	0.04	-0.11	0.20	-0.24
STD+R	155.0	270.0	10.4	240.0	0.04	0.11	0.20	0.24
HP	150.0	90.0	10.7	120.0	-0.01	-0.07	0.17	-0.05
HP	150.0	270.0	10.7	240.0	-0.01	0.07	0.17	0.05
GRID	145.0	90.0	11.0	120.0	-0.01	-0.06	0.12	-0.07
GRID	145.0	270.0	11.0	240.0	-0.01	0.06	0.12	0.07
GRID	140.0	90.0	11.3	120.0	-0.01	-0.06	0.12	-0.07
GRID	140.0	270.0	11.3	240.0	-0.01	0.06	0.12	0.07
STD+R	130.0	90.0	11.9	120.0	0.03	-0.10	0.20	-0.23
STD+R	130.0	270.0	11.9	240.0	0.03	0.10	0.20	0.23

SUPPRESS PRINTING
==========

...FOR THIS LOADING..				.....MAXIMUMS.....			
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

MAXIMUM MAST DISPLACEMENTS:
==========

ELEV	------DEFLECTIONS (ft)-----			--TILTS (DEG)---		TWIST
ft	NORTH	EAST	DOWN	NORTH	EAST	DEG
320.0	1.688 S	1.691 b	0.018 e	0.807 S	0.800 b	-0.220 M
315.0	1.617 S	1.621 b	0.018 e	0.802 S	0.795 b	-0.220 M
310.0	1.547 S	1.552 b	0.017 e	0.791 S	0.784 b	-0.219 M
305.0	1.478 S	1.483 b	0.016 e	0.774 S	0.768 b	-0.219 M

300.0	1.411 S	1.417 b	0.016 e	0.752 S	0.747 b	-0.218 M
295.0	1.345 S	1.351 b	0.015 e	0.737 S	0.733 b	-0.208 M
290.0	1.281 S	1.288 b	0.015 e	0.718 S	0.714 b	-0.198 M
285.0	1.218 S	1.225 b	0.014 e	0.694 S	0.691 b	-0.188 M
280.0	1.158 S	1.165 b	0.014 e	0.665 S	0.662 b	-0.177 M
275.0	1.100 S	1.108 b	0.013 e	0.644 S	0.641 b	-0.170 M
270.0	1.045 S	1.053 b	0.013 e	0.618 S	0.616 b	-0.162 M
265.0	0.991 S	0.999 b	0.012 e	0.589 S	0.587 b	-0.152 M
260.0	0.941 S	0.948 b	0.012 e	0.554 S	0.553 b	-0.141 M
255.0	0.893 S	0.901 b	0.012 e	0.525 S	0.524 b	-0.127 M
250.0	0.848 S	0.856 b	0.011 e	0.498 S	0.497 b	-0.115 M
245.0	0.805 S	0.813 b	0.011 e	0.471 S	0.471 b	-0.103 M
240.0	0.765 S	0.773 b	0.011 e	0.447 S	0.446 b	-0.093 M
235.0	0.727 S	0.735 b	0.010 e	0.429 S	0.429 b	-0.084 M
230.0	0.690 S	0.698 b	0.010 e	0.413 S	0.413 b	-0.077 M
225.0	0.654 S	0.662 b	0.010 e	0.397 S	0.397 b	-0.070 M
220.0	0.619 S	0.627 b	0.010 e	0.381 S	0.382 b	-0.063 M
213.3	0.576 S	0.584 b	0.009 e	0.361 S	0.362 b	-0.058 M
206.7	0.534 S	0.542 b	0.009 e	0.341 S	0.342 b	-0.053 M
200.0	0.495 S	0.503 b	0.009 e	0.322 S	0.323 b	-0.049 M
193.3	0.459 S	0.466 b	0.009 e	0.303 S	0.305 b	-0.046 M
186.7	0.424 S	0.431 b	0.008 e	0.285 S	0.287 b	-0.044 M
180.0	0.391 S	0.398 b	0.008 e	0.267 S	0.269 b	-0.041 M
173.3	0.360 S	0.367 b	0.008 e	0.253 S	0.255 b	-0.039 M
166.7	0.331 S	0.338 b	0.008 e	0.240 S	0.242 b	-0.036 M
160.0	0.303 S	0.309 b	0.007 e	0.226 S	0.229 b	-0.033 M
150.0	0.264 S	0.270 b	0.007 e	0.207 S	0.210 b	-0.030 M
140.0	0.229 S	0.234 b	0.006 e	0.188 S	0.191 b	-0.027 M
130.0	0.197 S	0.201 b	0.006 e	0.169 S	0.172 b	-0.024 M
120.0	0.168 S	0.172 b	0.005 e	0.150 S	0.152 b	-0.021 M
110.0	0.142 S	0.145 b	0.005 A	0.137 S	0.140 b	-0.018 P
100.0	0.118 S	0.121 b	0.005 A	0.124 S	0.127 b	-0.016 P
90.0	0.096 S	0.098 b	0.004 A	0.112 S	0.114 b	-0.014 P
80.0	0.076 S	0.078 b	0.004 A	0.099 S	0.101 b	-0.012 P
70.0	0.059 S	0.061 b	0.004 A	0.086 S	0.088 b	-0.011 P
60.0	0.044 S	-0.045 J	0.003 A	0.073 S	0.075 b	-0.009 P
50.0	0.030 S	0.031 b	0.003 A	0.060 S	0.061 b	-0.007 P
40.0	0.017 S	-0.018 J	0.002 A	0.047 S	0.048 b	-0.005 P
33.3	0.013 S	0.013 b	0.002 M	0.038 S	0.039 b	-0.005 P
20.0	0.005 S	0.005 b	0.001 A	0.021 S	0.021 b	-0.003 P
13.3	0.002 U	0.002 d	0.001 A	0.014 S	0.014 b	-0.002 P
0.0	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

ELEV ft	AZI deg	TYPE *	.....BEAM DEFLECTIONS (deg)..... PITCH	YAW	ROLL	TOTAL
300.0	90.0	STD+R	-0.752 S	0.218 M	0.747 b	0.752 S
300.0	270.0	STD+R	0.752 S	0.218 M	-0.747 b	0.752 S
270.0	90.0	STD+R	-0.618 S	0.162 M	0.616 b	0.618 S
270.0	270.0	STD+R	0.618 S	0.162 M	-0.616 b	0.618 S
250.0	90.0	GRID	-0.498 S	0.115 M	0.497 b	0.498 S
250.0	270.0	GRID	0.498 S	0.115 M	-0.497 b	0.498 S
180.0	90.0	STD+R	-0.267 S	0.041 M	0.269 b	0.267 S
180.0	270.0	STD+R	0.267 S	0.041 M	-0.269 b	0.267 S
170.0	90.0	STD	-0.246 S	0.037 M	0.249 b	0.246 S
170.0	270.0	STD	0.246 S	0.037 M	-0.249 b	0.246 S
165.0	90.0	HP	-0.236 S	0.035 M	0.239 b	0.236 S
165.0	270.0	HP	0.236 S	0.035 M	-0.239 b	0.236 S
160.0	90.0	STD+R	-0.226 S	0.033 M	0.229 b	0.226 S
160.0	270.0	STD+R	0.226 S	0.033 M	-0.229 b	0.226 S
155.0	90.0	STD+R	-0.217 S	0.032 M	0.219 b	0.217 S
155.0	270.0	STD+R	0.217 S	0.032 M	-0.219 b	0.217 S
150.0	90.0	HP	-0.207 S	0.030 M	0.210 b	0.207 S
150.0	270.0	HP	0.207 S	0.030 M	-0.210 b	0.207 S
145.0	90.0	GRID	-0.197 S	0.029 M	0.201 b	0.197 S
145.0	270.0	GRID	0.197 S	0.029 M	-0.201 b	0.197 S
140.0	90.0	GRID	-0.188 S	0.027 M	0.191 b	0.188 S
140.0	270.0	GRID	0.188 S	0.027 M	-0.191 b	0.188 S
130.0	90.0	STD+R	-0.169 S	0.024 M	0.172 b	0.169 S
130.0	270.0	STD+R	0.169 S	0.024 M	-0.172 b	0.169 S

MAXIMUM TENSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
320.0	----------		0.55 G	0.00 A
	0.91 A	1.12 Q		
315.0	----------		0.09 B	0.00 A
	2.96 B	0.62 T		
310.0	----------		0.03 S	0.00 A
	4.30 A	0.69 A		
305.0	----------		0.09 A	0.00 A
	6.13 A	0.82 h		
300.0	----------		0.15 G	0.00 A
	8.26 A	1.55 M		
295.0	----------		0.11 A	0.00 A
	11.18 A	1.67 b		
290.0	----------		0.01 e	0.00 A
	14.36 M	1.65 b		
285.0	----------		0.10 A	0.00 A
	17.78 M	1.79 b		
280.0	----------		0.29 M	0.00 A
	21.31 M	2.00 M		
275.0	----------		0.14 A	0.00 A
	25.78 M	2.02 b		
270.0	----------		0.03 e	0.00 A
	29.95 M	2.44 M		
265.0	----------		0.14 A	0.00 A
	35.01 M	2.65 J		
260.0	----------		0.36 e	0.00 A
	38.11 M	1.20 O		
255.0	----------		0.12 M	0.00 A
	39.71 M	1.02 d		

250.0	----------		0.01 e	0.00 A
	40.72 M	1.29 O		
245.0	----------		0.09 M	0.00 A
	42.31 M	1.19 d		
240.0	----------		0.01 J	0.00 A
	43.65 M	1.18 O		
235.0	----------		0.05 M	0.00 A
	45.05 M	1.14 d		
230.0	----------		0.03 M	0.00 A
	46.34 M	1.24 O		
225.0	----------		0.04 M	0.00 A
	47.86 M	1.20 g		
220.0	----------		0.03 M	0.00 A
	49.44 M	1.34 O		
213.3	----------		0.05 M	0.00 A
	51.36 M	1.30 g		
206.7	----------		0.03 M	0.00 A
	53.14 M	1.35 O		
200.0	----------		0.04 M	0.00 A
	54.98 M	1.34 O		
193.3	----------		0.02 M	0.00 A
	56.49 M	1.56 O		
186.7	----------		0.04 A	0.00 A
	58.33 M	1.70 d		
180.0	----------		0.02 b	0.00 A
	60.50 M	1.95 L		
173.3	----------		0.05 A	0.00 A
	62.80 M	2.18 d		
166.7	----------		0.02 M	0.00 A
	65.25 M	2.24 d		
160.0	----------		0.04 M	0.00 A
	68.30 M	3.05 d		
150.0	----------		0.04 M	0.00 A
	72.50 M	3.38 d		
140.0	----------		0.03 A	0.00 A
	76.91 M	3.78 d		
130.0	----------		0.03 M	0.00 A
	81.59 M	3.91 d		
120.0	----------		0.03 A	0.00 A
	86.20 M	4.20 d		
110.0	----------		0.02 M	0.00 A
	91.00 M	4.07 L		
100.0	----------		0.02 A	0.00 A
	95.49 M	4.32 d		
90.0	----------		0.02 M	0.00 A
	100.08 M	4.23 L		
80.0	----------		0.02 A	0.00 A
	104.44 M	4.46 d		
70.0	----------		0.02 M	0.00 A
	108.90 M	4.41 L		
60.0	----------		0.02 R	0.00 A
	113.19 M	4.61 d		
50.0	----------		0.02 e	0.00 A
	117.52 M	4.62 L		
40.0	----------		0.12 A	0.00 A
	122.81 M	4.90 d		
33.3	----------		0.30 A	0.00 X
	121.65 M	6.32 d		
20.0	----------		0.04 M	0.00 X
	131.01 M	5.00 L		
13.3	----------		0.26 C	0.00 I
	129.68 M	6.33 L		
0.0	----------		0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
320.0	----------		-0.50 M	0.00 A
	-2.04 S	-1.20 h		
315.0	----------		-0.06 T	0.00 A
	-4.41 T	-0.58 B		
310.0	----------		-0.03 A	0.00 A
	-5.87 S	-0.73 S		
305.0	----------		-0.05 S	0.00 A
	-8.09 S	-0.85 P		
300.0	----------		-0.24 C	0.00 A
	-10.71 e	-1.55 J		
295.0	----------		-0.06 e	0.00 A
	-14.31 e	-1.56 b		
290.0	----------		-0.02 A	0.00 A
	-17.65 e	-1.74 b		
285.0	----------		-0.07 e	0.00 A
	-21.53 e	-1.74 b		
280.0	----------		-0.24 e	0.00 A
	-25.39 e	-1.99 e		
275.0	----------		-0.11 e	0.00 A
	-30.44 e	-2.01 b		
270.0	----------		-0.05 A	0.00 A
	-35.19 e	-2.55 J		
265.0	----------		-0.10 e	0.00 A
	-41.05 e	-2.47 J		
260.0	----------		-0.54 A	0.00 A
	-44.21 e	-1.19 g		
255.0	----------		-0.10 e	0.00 A
	-46.37 e	-1.08 O		
250.0	----------		-0.01 M	0.00 A
	-47.78 e	-1.30 g		
245.0	----------		-0.06 e	0.00 A
	-49.91 e	-1.17 O		
240.0	----------		-0.01 J	0.00 A
	-51.45 e	-1.20 g		
235.0	----------		-0.04 e	0.00 A

DRILLED STRAIGHT PIER DESIGN BY SABRE TOWERS & POLES

Tower Description 320' S3TL Series HD1
Customer Name HUFFMAN COMMUNICATIONS
Job Number 166942
Date 7/18/2017
Engineer KJT

Factored Uplift (kips)	501
Factored Download (kips)	577
Factored Shear (kips)	57
Ultimate Bearing Pressure	45
Bearing Φs	0.75
Bearing Design Strength (ksf)	33.75
Water Table Below Grade (ft)	999
Bolt Circle Diameter (in)	15.5
Top of Concrete to Top of Bottom Threads (in)	58
Pier Diameter (ft)	3
Ht. Above Ground (ft)	0.5
Pier Length Below Ground (ft)	32
Quantity of Bars	14
Bar Diameter (in)	1.41
Tie Bar Diameter (in)	0.5
Spacing of Ties (in)	10
Area of Bars (in^2)	21.86
Spacing of Bars (in)	6.19
f'c (ksi)	4.5
fy (ksi)	60
Unit Wt. of Concrete (kcf)	0.15
Download Friction Φs	0.75
Uplift Friction Φs	0.75
Volume of Concrete (yd^3)	8.51
Skin Friction Factor for Uplift	1
Ignore Bottom Length in Download?	☐

Anchor Bolt Count (per leg): 6

Minimum Pier Diameter (ft): 2.63

Minimum Area of Steel (in^2): 5.09

Length to Ignore Download (ft): 0

Depth at Bottom of Layer (ft)	Ult. Skin Friction (ksf)	(Ult. Skin Friction)*(Uplift Factor)	γ (kcf)
23	0.00	0.00	0.11
35	9.00	7.50	0.11
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0
0	0.00	0.00	0

Download:

Factored Net Weight of Concrete (kips)	0.6
Bearing Design Strength (kips)	238.6
Skin Friction Design Strength (kips)	572.6
Download Design Strength (kips)	811.1

Factored Net Download (kips): 577.6

DRILLED STRAIGHT PIER DESIGN BY SABRE TOWERS & POLES (CONTINUED)

Uplift:

Nominal Skin Friction (kips)	636.2		
Wc, Weight of Concrete (kips)	34.5		
W_R, Soil Resistance (kips)	1564.7		
ΦsWr+0.9Wc (kips)	1204.5		
Uplift Design Strength (kips)	508.1	Factored Uplift (kips)	501.0

Pier Design:

Design Tensile Strength (kips)	1180.5	Tu (kips)	501.0
ϕV_n (kips)	59.5	V_u (kips)	57.0
$\phi V_c=\phi 2(1+N_u/(500A_g))f'_c{}^{1/2}b_w d$ (kips)	1.8		
V_s (kips)	67.9	*** V_s max = 4 $f'_c{}^{1/2}b_w d$ (kips)	278.2
Maximum Spacing (in)	13.01	(Only if Shear Ties are Required)	
		*** Ref. ACI 11.5.5 & 11.5.6.3	

Anchor Bolt Pull-Out:

$\phi P_c=\phi\lambda(2/3)f'_c{}^{1/2}(2.8A_{SLOPE}+4A_{FLAT})$	153.5	P_u (kips)	501.0
Rebar Development Length (in)	48.96	Required Length of Development (in)	26.76

Condition	1 is OK, 0 Fails
Download	1
Uplift	1
Area of Steel	1
Shear	1
Anchor Bolt Pull-Out	1
Interaction Diagram Visual Check	1