



***MEMORIA DE CÁLCULO
EVALUACION ESTRUCTURAL.
TORRE CUADRADA SECCION
VARIABLE $H=50.0$ m.
ANCHO DE PATA = 7.15m
ESTACION: CERRÓ BAÑADEROS.
Municipio de Hato Nuevo.
Departamento de La Guajira.***

Abril 2016.

Rev. 1. Mayo 2016.

INFORME TECNICO.

Para la Condición Nueva (Futura), Se requiere refuerzo.

***Eficiencia General Condición Nueva (Futura): Montantes
84.2%, Diagonales 77.5%, Horizontales 72.3% y Tornillos
75.6%. Deflexión Máxima = 144.99 mm < 300 mm. oK.***

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INTRODUCCION

1.1 OBJETO

El objeto de este documento es la verificación del diseño estructural de la torre metálica cuadrada de sección variable de 50.0 metros de altura. Ubicada en la estación: **CERRÓ BAÑADEROS**, Municipio de Hato Nuevo, Departamento de La Guajira. Que soporta antenas de MW y Omni.

La torre es de sección cuadrada, montantes, diagonales y horizontales a base de ángulos de lados iguales, el ancho de la pata es de 7.15 m. Esta medida es variable hasta llegar a una altura de 28.0 m, donde es 1.90 m. Continuando en sección constante hasta los 50.0 m.

-La torre presenta refuerzo en los montantes desde el nivel 0.0m hasta el nivel 34.0m.

CONDICION ACTUAL (Antenas existentes):

1 CARGA POR MANTENIMIENTO (4 personas) – NIVEL 50.0
m 1 ANTENA OMNI – NIVEL 48.0 m – B
1 ANTENA OMNI – NIVEL 48.0 m – C
1 ANTENA MW Ø3.70m – NIVEL 48.0 m – D
1 ANTENA GRID Ø1.20m – NIVEL 48.0 m – B
1 ANTENA GRID Ø1.80m – NIVEL 48.0 m – A
1 ANTENA MW Ø1.20m – NIVEL 46.0 m – C
1 ANTENA GRID Ø1.80m – NIVEL 46.0 m – D
1 ANTENA OMNI – NIVEL 42.0 m – A
1 ANTENA OMNI – NIVEL 42.0 m – B
1 ANTENA MW Ø1.20m – NIVEL 40.5 m – C
1 ANTENA MW Ø3.70m – NIVEL 39.0 m – D
1 ANTENA MW Ø1.20m – NIVEL 38.0 m – C
1 ANTENA MW Ø1.20m – NIVEL 25.0 m – A
1 ANTENA MW Ø1.20m – NIVEL 15.5 m – D
10 CABLES Ø7/8", PARA ANTENAS MW y GRID
4 CABLES Ø1/2", PARA ANTENAS OMNI
2 ANTENAS MW Ø3.70m – NIVEL 50.0 m – C y D.
2 ANTENAS OMNI (TIPO VELA) – NIVEL 50.0 m – B.
2 CABLE Ø7/8", PARA ANTENAS MW.
2 CABLES Ø1/2", PARA ANTENAS OMNI.

CONDICION NUEVA (FUTURA): RTVC 6:4:4:

1 EXTENSION DE 10.0m – NIVEL + 50.0 AL NIVEL + 60.0m.
1 ANTENA PANEL (1.0x0.50x0.19m) – NIVEL 60.0m D.
3 ANTENAS PANEL (1.0x0.50x0.19m) – NIVEL 59.0m B, C y D.
3 ANTENAS PANEL (1.0x0.50x0.19m) – NIVEL 58.0m B, C y D.
3 ANTENAS PANEL (1.0x0.50x0.19m) – NIVEL 57.0m B, C y D.
3 ANTENAS PANEL (1.0x0.50x0.19m) – NIVEL 56.0m B, C y D.
1 ANTENAS PANEL (1.0x0.50x0.19m) – NIVEL 55.0m D.



NOTA:

A CONTINUACION SE MUESTRAN LOS AZIMUT DE LAS CARAS DE LA TORRE:

AZIMUT DE LA CARA A: 90°

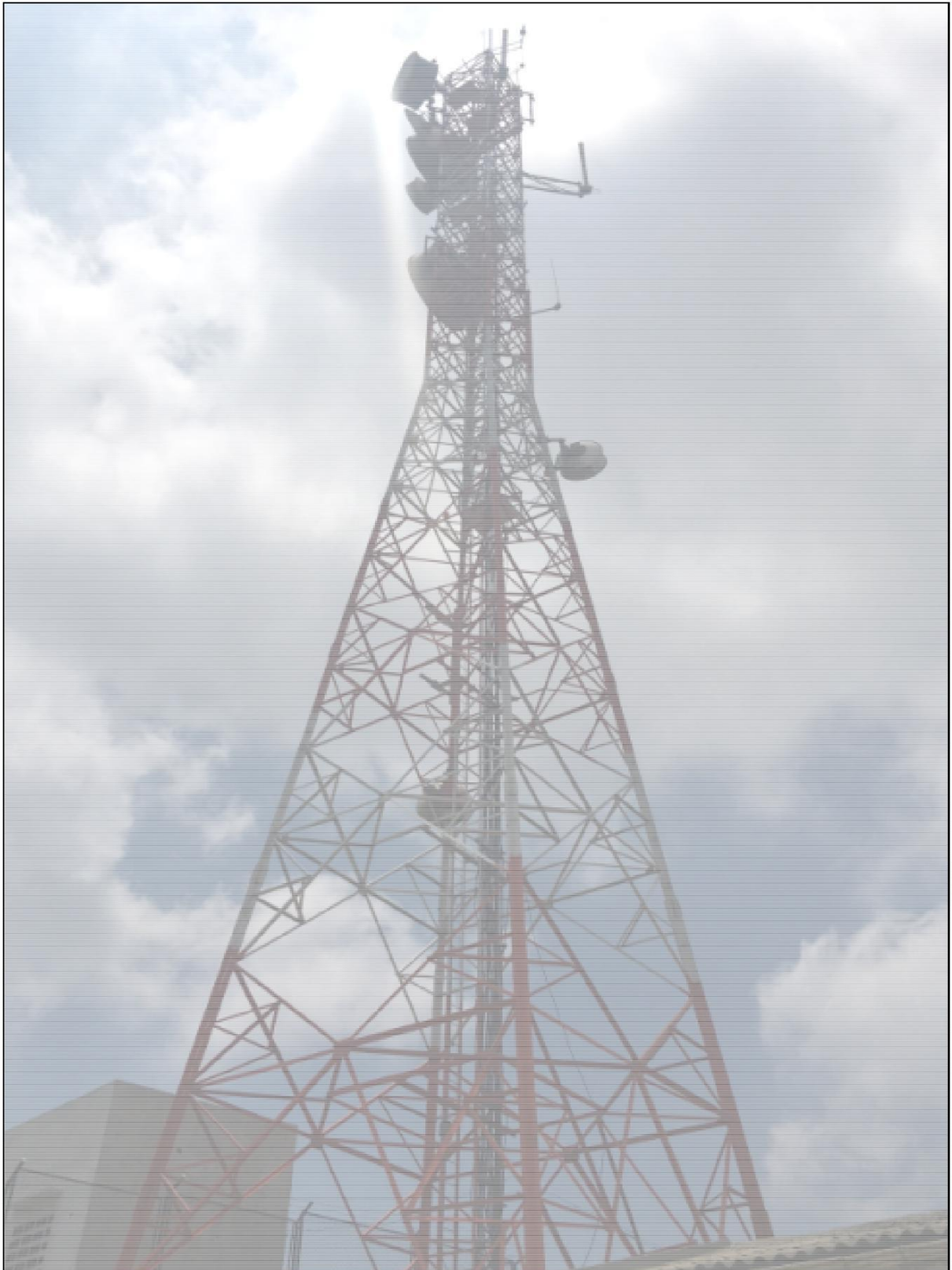
AZIMUT DE LA CARA B: 180°

AZIMUT DE LA CARA C: 270°

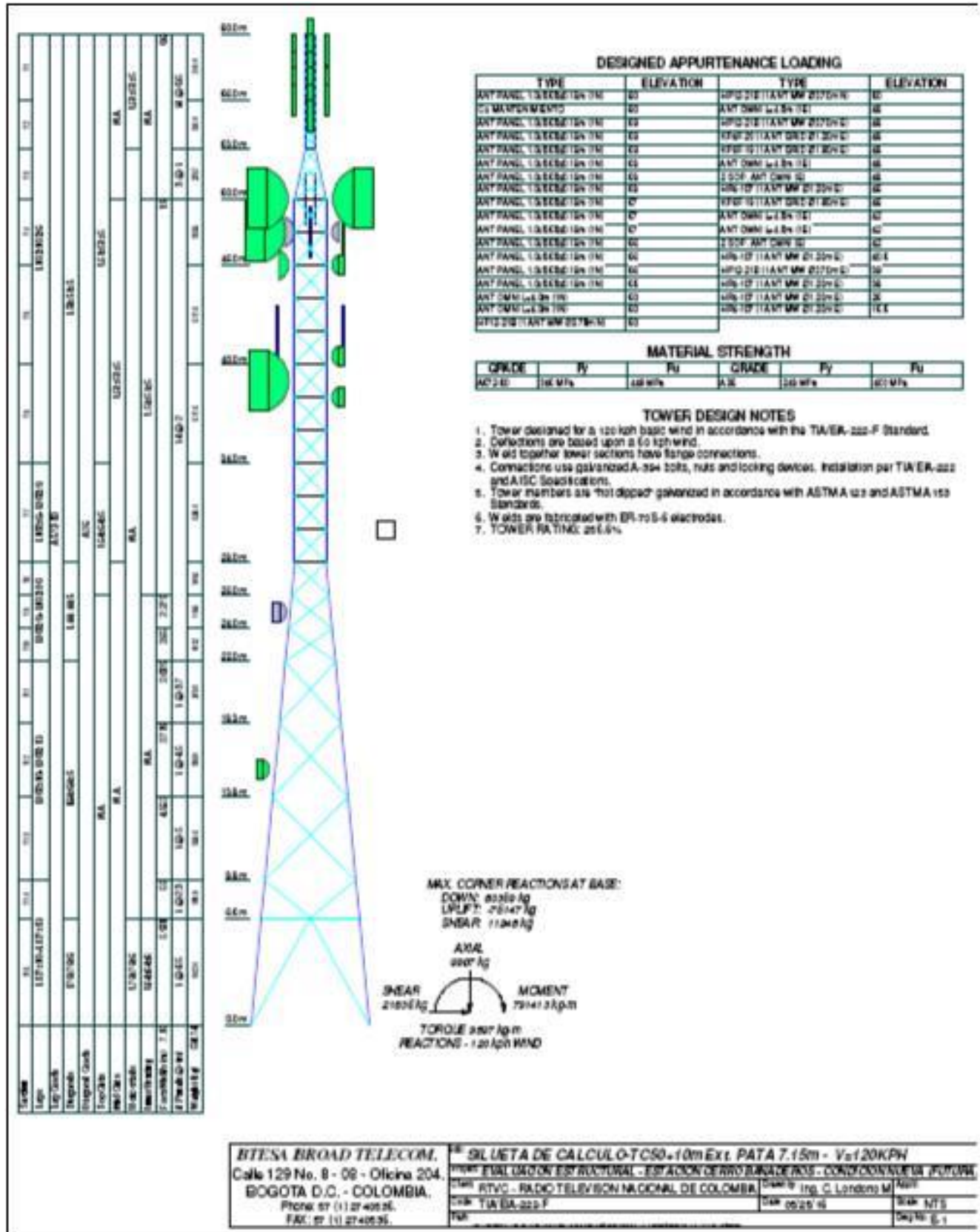
AZIMUT DE LA CARA D: 360°



PANORAMICA TC50m – ESTADO ACTUAL.



SILUETA DE CALCULO CONDICION NUEVA.



1.2 CODIGOS Y NORMAS:

NSR-10
AISC
TIA/EIA 222-F
ASCE, Report 52
ANSI/ASCE 10-90
ANDREWS, Bulletin 1015F
ASTM (normas aplicables)
ACI 318 última edición
AWS

1.3 MATERIALES ESTRUCTURALES:

Perfiles estructurales de montantes:	ASTM A-572 Gr. 50.
Perfiles estructurales de diagonales, horizontales redundantes y laminas:	ASTM A –36.
Tornillos:	ASTM A-394 T0.
Anclajes:	CON STUB.
Soldadura:	AWS.

1.4 DOCUMENTOS DE REFERENCIA

Esquemas de diseño del levantamiento de la estructura de la torre.

1.5 CARGAS

Las siguientes cargas serán consideradas en el análisis estructural.

-Cargas muertas, CM, correspondientes a los pesos propios de la estructura, plataformas de operación, revestimientos y accesorios.

-Cargas vivas, 4 personas de 80 Kg. Cada una por mantenimiento, CV.

-Cargas de viento, CW.

Las combinaciones de estas cargas para incluirlas en los análisis y diseños Estructurales estarán de acuerdo con la Norma TIA/EIA-222-F.

1.6 SISTEMAS DE MEDIDA

Longitud	m, mm
Coordenadas	m
Áreas	m ² , cm ²
Fuerza	Kg.
Presión	kgm
Esfuerzo	kPa
Momentos	Kg-m
Modulo	kPa
Propiedades	mm
Deflexiones	mm

En caso contrario se indicara el tipo de unidad utilizado. De todas maneras las unidades empleadas para un evento determinado serán compatibles entre sí.



1.0 CARGAS MUERTAS, CM

Las cargas muertas corresponderán a los pesos propios de los elementos estructurales, revestimiento, escaleras de acceso y guía de ondas, soportes de antenas y demás accesorios.

El cálculo de los pesos de los elementos estructurales los realiza internamente el programa, incluyendo un factor de 1.50, de sobre peso por elementos redundantes, platinas, tornillos y galvanizado, y lo distribuye sobre los nudos correspondientes.

2.0 CARGAS VIVAS

La carga viva considerada consistirá en 4 personas de 80 Kg. Cada una por mantenimiento.

3.0 CARGAS DE VIENTO

Las cargas de viento se calcularan de acuerdo a la norma TIA/EIA 222 F-1996.

Velocidad básica de viento,

V = 120 KPH (Zona 4)

Deflexiones se calculan con Velocidad de viento,

V = 60 KPH.

5.0 ANALISIS Y DISEÑOS ESTRUCTURALES

5.1 ANALISIS ESTRUCTURAL

En la Fig. 1 del Anexo se presenta la silueta del análisis y diseño estructural de la torre de sección cuadrada de 50.0 m. De altura, objeto de este documento.

Se consideran siete hipótesis de carga:

- 1- Carga Muerta*
- 2- Viento (120 KPH) Carga Muerta + Viento en dirección normal de una cara de la torre, dirección Z, ángulo de incidencia 0°.*
- 3- Viento (120 KPH) Carga Muerta + Viento en dirección diagonal, sobre un vértice de la torre, ángulo de incidencia de 45°.*
- 4- Viento (120 KPH) Carga Muerta + Viento en dirección normal de una cara de la torre, dirección Z, ángulo de incidencia 90°.*
- 5- Viento (60 KPH) Carga Muerta + Viento en dirección normal de una cara de la torre, dirección Z, ángulo de incidencia 0°, con cargas de operación.*
- 6- Viento (60 KPH) Carga Muerta + Viento en dirección diagonal, sobre un vértice de la torre, ángulo de incidencia de 45°, con cargas de operación.*
- 7- Viento (60 KPH) Carga Muerta + Viento en dirección normal de una cara de la torre, dirección Z, ángulo de incidencia 90°, con cargas de operación.*

Igualmente en el ANEXO A se presentan los datos de entrada y los resultados del análisis estructural para los diferentes elementos que conforman la torre de sección cuadrada, realizado por el programa para diseño de torres RISATower, Versión 5.4.1.8 – 8 de Abril de 2010, de RISA TECHNOLOGIES.

También se incluye un control de deflexiones en la parte superior de la torre (Nivel 50.0 + 10.0 m) de tal manera que cumpla con el requisito de que, la deflexión en este punto, a 60 KPH, sea menor o igual a $h/200$.



5.2 DISEÑOS ESTRUCTURALES

Con base en el dimensionamiento y en los resultados de modelo, se evalúan las cargas máximas actuantes y admisibles en cada tramo, considerando los efectos simultáneos de Axial y de Flexión. Para una mayor precisión, se consideran también los efectos de segundo orden (P-Delta)

En la fase, para el caso de cargas de diseño, se verifica que en los elementos estructurales no se sobrepasen sus capacidades admisibles de compresión y tracción establecidas por la norma.

También se verifica que en las conexiones propuestas tampoco se sobrepasen sus capacidades admisibles de corte y aplastamiento establecidas por la norma.

Anexos:

Siluetas del levantamiento y refuerzo.

Ver salida 1 – Condición Actual.

Ver salida 2 – Condición Nueva (Futura).

Ver salida 3 – Condición Nueva (Futura) + Refuerzo, datos de entrada y salida de los resultados del análisis y los diseños.

6.0 CONCLUSIONES:

En la **CONDICION ACTUAL**, con las antenas relacionadas y las características estructurales de la torre para una velocidad de viento de 120 Kph. Después del análisis y verificación de esfuerzos de los materiales de la estructura de la torre de 50.0m, de la **ESTACION: CERRÓ BAÑADEROS** – Ubicada en Municipio de Hato Nuevo, Departamento de La Guajira, tenemos: **LA TORRE CUMPLE**.

Porcentaje máximo de utilización Diagonal (T4) 98.4% < 100%. **Ok. Cumple.**

PORCENTAJE DE USO DE ELEMENTOS CONDICION ACTUAL.

Section Capacity Table								
Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass Fail
T1	50 - 46	Leg	L102x102x6	3	-1075.29	24666.48	4.4	Pass
		Diagonal	L51x51x5	21	-1478.64	3793.35	39.0	Pass
		Top Girt	L51x51x5	8	2.73	5664.74	0.2	Pass
		Mid Girt	L51x51x5	13	77.05	7553.57	1.0	Pass
		Inner Bracing	L51x51x5	5	1.51	7005.28	0.2	Pass
T2	46 - 40	Leg	L102x102x6	33	-8559.43	24666.48	34.7	Pass
		Diagonal	L51x51x5	46	-1984.73	3793.35	52.3	Pass
		Top Girt	L51x51x5	37	-159.53	1999.13	8.0	Pass
		Mid Girt	L51x51x5	41	-658.70	1999.13	32.9	Pass
		Inner Bracing	L51x51x5	35	36.79	7005.28	0.5	Pass
T3	40 - 34	Leg	L102x102x6	75	-21135.96	24666.48	85.7	Pass
		Diagonal	L51x51x5	88	-3577.35	3793.35	94.3	Pass
		Top Girt	L51x51x5	79	-1038.69	1999.13	52.0	Pass
		Mid Girt	L64x64x5	83	-2116.34	3980.69	53.2	Pass
		Inner Bracing	L51x51x5	77	60.90	7005.28	0.9	Pass
T4	34 - 28	Leg	L102x6+L102x8	117	-38327.70	64094.13	59.8	Pass
		Diagonal	L51x51x5	142	-3732.86	3795.04	98.4	Pass
		Top Girt	L64x64x5	121	-1838.19	3980.69	46.2	Pass
		Mid Girt	L64x64x5	137	-1587.29	3982.47	39.9	Pass
		Inner Bracing	L51x51x5	120	77.76	9338.04	0.8	Pass
T5	28 - 26	Leg	L102x8+L102x10	159	-42100.96	77341.76	54.4	Pass
		Diagonal	L44x44x5	170	-1800.43	4353.83	79.1 (b)	Pass
		Top Girt	L64x64x5	163	-137.96	3982.47	3.5	Pass
		Inner Bracing	L51x51x5	161	-111.33	2372.84	4.7	Pass
		Leg	L102x8+L102x10	177	-42206.46	77341.76	54.6	Pass
T6	26 - 24	Diagonal	L44x44x5	184	-1256.05	3830.97	32.8	Pass
		Leg	L102x8+L102x10	189	-41580.78	77341.76	53.8	Pass
T7	24 - 22	Diagonal	L44x44x5	196	-889.34	3252.62	27.3	Pass
		Leg	L102x10+L102x13	201	-40709.70	99380.24	41.0	Pass
T8	22 - 18.3	Diagonal	L64x64x5	208	-866.48	4389.55	19.7	Pass
		Leg	L102x10+L102x13	213	-40515.92	93003.12	43.6	Pass
T9	18.3 - 13.8	Diagonal	L64x64x5	220	-549.91	2916.58	18.9	Pass
		Leg	L102x10+L102x13	225	-41117.43	88712.00	46.3	Pass
T10	13.8 - 8.8	Diagonal	L64x64x5	234	-627.92	2186.77	28.7	Pass
		Leg	L127x10+L127x13	237	-40759.78	126063.56	32.3	Pass
T11	8.8 - 6.5	Diagonal	L64x64x5	243	-879.67	2559.39	34.4	Pass
		Leg	L127x10+L127x13	253	-40740.82	121363.09	33.6	Pass
T12	6.5 - 0	Diagonal	L76x76x6	256	-1441.66	3435.72	42.0	Pass
		Horizontal	L76x76x6	239	-450.78	8593.67	5.2	Pass
		Summary						
Leg (T3)							85.7	Pass
Diagonal (T4)							98.4	Pass
Horizontal (T12)							8.2	Pass
Top Girt (T3)							52.0	Pass
Mid Girt (T3)							53.2	Pass
Bolt Checks							79.1	Pass
RATING =							98.4	Pass

Ver Salida 1 – Condición Actual.

En la **CONDICION NUEVA (FUTURA)**, con las antenas relacionadas (Existentes), más una (1) Extensión de 10.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 60.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 59.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 58.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 57.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 56.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 55.0m y las características estructurales de la torre para una velocidad de viento de 120 Kph. Después del análisis y verificación de esfuerzos de los materiales de la estructura de la torre de 50.0+10m de extensión, de la **ESTACION: CERRÓ BAÑADEROS** – Ubicada en Municipio de Hato Nuevo, Departamento de La Guajira, tenemos: **LA TORRE NO CUMPLE**. Fallan los Montantes (T10, T9, T8, T7, T6 y T5), las Diagonales (T7, T6, T5 y T4) y las Horizontales (T7, T6 y T5). Porcentaje máximo de utilización Horizontal (T6) 256.6% > 100%. **NO Cumple**.

PORCENTAJE DE USO DE ELEMENTOS CONDICION NUEVA.

Section Capacity Table								
Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{max} kg	% Capacity	Pass/Fail
T1	60 - 56	Leg	L102x102x6	3	-2224.90	27574.13	8.1	Pass
		Diagonal	L51x51x5	9	715.56	7551.09	9.5	Pass
		Horizontal	L51x51x5	13	-523.53	7940.84	6.6	Pass
T2	56 - 53	Leg	L102x102x6	71	-6752.00	27574.13	24.5	Pass
		Diagonal	L51x51x5	77	1186.30	7551.09	15.7	Pass
		Horizontal	L51x51x5	81	-878.35	7940.84	11.1	Pass
T3	53 - 50	Leg	L102x102x6	123	-5851.93	24358.30	24.0	Pass
		Diagonal	L51x51x5	150	-1025.60	6787.37	15.1	Pass
		Leg	L102x102x6	155	-11164.77	24666.48	45.3	Pass
T4	50 - 46	Diagonal	L51x51x5	168	-4388.05	3793.35	115.7	Fail X
		Mid Girt	L51x51x5	163	-753.31	1999.13	37.7	Pass
		Leg	L102x102x6	185	-31189.29	24666.48	126.4	Fail X
T5	46 - 40	Diagonal	L51x51x5	200	-5267.48	3793.35	138.9	Fail X
		Top Girt	L51x51x5	189	-1461.57	1999.13	73.1	Pass
		Mid Girt	L51x51x5	193	-2878.06	1999.13	144.0	Fail X
T6	40 - 34	Leg	L102x102x6	227	-56842.40	24666.48	230.4	Fail X
		Diagonal	L51x51x5	242	-8124.66	3793.35	214.2	Fail X
		Top Girt	L51x51x5	231	-3731.15	1999.13	186.6	Fail X
T7	34 - 28	Mid Girt	L51x51x5	235	-5128.95	1999.13	256.6	Fail X
		Leg	L102x6+L102x8	269	-89039.75	64094.13	138.9	Fail X
		Diagonal	L51x51x5	284	-7530.00	3795.04	198.4	Fail X
T8	28 - 26	Top Girt	L64x64x5	273	-4094.27	3980.69	102.9	Fail X
		Mid Girt	L51x51x5	289	-3865.66	2000.02	193.3	Fail X
		Leg	L102x8+L102x10	311	-94925.12	77341.76	122.7	Fail X
T9	26 - 24	Leg	L102x8+L102x10	311	-94925.12	77341.76	122.7	Fail X
		Diagonal	L44x44x5	324	-4172.98	4353.83	95.8	Pass
		Top Girt	L64x64x5	317	-309.97	3982.47	7.8	Pass
T10	24 - 22	Leg	L102x8+L102x10	329	-93020.03	77341.76	120.3	Fail X
		Diagonal	L44x44x5	336	-3679.55	3830.97	96.0	Pass
		Leg	L102x8+L102x10	341	-89790.90	77341.76	116.1	Fail X
T11	22 - 18.3	Diagonal	L44x44x5	348	-2763.96	3252.62	85.0	Pass
		Leg	L102x10+L102x13	353	-85777.06	99380.24	86.3	Pass
		Diagonal	L64x64x5	360	-2824.04	4389.55	64.3	Pass
T12	18.3 - 13.8	Leg	L102x10+L102x13	365	-82913.53	93003.12	89.2	Pass
		Diagonal	L64x64x5	372	-2077.05	2916.58	71.2	Pass
		Leg	L102x10+L102x13	377	-81756.42	88712.00	92.2	Pass
T13	13.8 - 8.8	Diagonal	L64x64x5	384	-1252.54	2186.77	57.3	Pass
		Leg	L127x10+L127x13	389	-79217.66	126063.56	62.8	Pass
		Diagonal	L64x64x5	395	-1670.65	2559.39	65.3	Pass
T14	8.8 - 6.5	Leg	L127x10+L127x13	405	-79165.05	121363.09	65.2	Pass
		Diagonal	L76x76x6	410	-1835.16	3435.72	53.4	Pass
		Horizontal	L76x76x6	391	-873.86	8593.67	10.2	Pass
T15	6.5 - 0	Leg	L76x76x6	391	-873.86	8593.67	10.2	Pass
		Diagonal	L76x76x6	391	-873.86	8593.67	10.2	Pass
		Horizontal	L76x76x6	391	-873.86	8593.67	10.2	Pass
Summary								
Leg (T6)							230.4	Fail X
Diagonal (T6)							214.2	Fail X
Horizontal (T15)							13.4	Pass
Top Girt (T6)							186.6	Fail X
Mid Girt (T6)							256.6	Fail X
Bolt Checks							178.4	Fail X
RATING =							256.6	Fail X

Ver Salida 2 – Condición Nueva.

En la **CONDICION NUEVA (FUTURA) + REFUERZO**, con las antenas relacionadas (Existentes) más una (1) Extensión de 10.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 60.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 59.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 58.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 57.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 56.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 55 y las características estructurales de la torre para una velocidad de viento de 120 Kph. Después del análisis y verificación de esfuerzos de los materiales de la estructura de la torre de 50.0m, de la **ESTACION: CERRÓ BAÑADEROS** – Ubicada en Municipio de Hato Nuevo, Departamento de La Guajira, tenemos: **LA TORRE CUMPLE**. Porcentaje máximo de utilización Montante (T4) 81.0% < 100%. **OK. Cumple.**

PORCENTAJE DE USO DE ELEMENTOS CONDICION NUEVA+REFUERZO.

Section Capacity Table								
Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass/Fail
T1	60 - 56	Leg	L102x102x6	3	-2166.09	27574.13	7.9	Pass
		Diagonal	L51x51x5	9	703.12	8462.46	8.3	Pass
		Horizontal	L51x51x5	13	-515.22	7940.84	6.5	Pass
		Top Girt	L51x51x5	6	-23.44	7940.84	0.3	Pass
T2	56 - 53	Leg	L102x102x6	71	-6633.52	27574.13	24.1	Pass
		Diagonal	L51x51x5	77	1169.87	8462.46	13.8	Pass
		Horizontal	L51x51x5	81	-866.37	7940.84	10.9	Pass
		Top Girt	L51x51x5	73	-597.17	7940.84	7.5	Pass
T3	53 - 50	Leg	L102x102x6	123	-5739.49	24358.30	23.6	Pass
		Diagonal	L51x51x5	151	1037.71	8462.46	12.3	Pass
		Top Girt	L51x51x5	126	-710.61	7940.84	8.9	Pass
T4	50 - 46	Leg	L102x102x6	155	-9273.43	24666.48	37.6	Pass
		Diagonal	L64x64x5	168	-3292.48	7528.12	43.7	Pass
		Top Girt	L51x51x5	159	-910.06	1999.13	45.5	Pass
		Mid Girt	L51x51x5	163	-811.38	1999.13	40.6	Pass
T5	46 - 40	Leg	L102x6+L102x6	185	-26177.78	57300.83	45.7	Pass
		Diagonal	L64x64x5	200	-3896.11	7531.14	51.7	Pass
		Top Girt	L51x51x5	189	-1028.86	1999.13	51.5	Pass
		Mid Girt	L64x64x6	193	-1660.30	5169.46	32.1	Pass
T6	40 - 34	Leg	L102x6+L102x6	227	-48231.40	57300.83	84.2	Pass
		Diagonal	L64x64x5	242	-5835.20	7531.14	77.5	Pass
		Top Girt	L64x64x5	231	-2025.23	3982.47	50.9	Pass
		Mid Girt	L64x64x6	235	-3301.87	5169.46	63.9	Pass
T7	34 - 28	Leg	L102x6+L102x8+L102x6	269	-75212.89	92744.33	81.1	Pass
		Diagonal	L64x64x5	284	-6343.72	8249.09	76.9	Pass
		Top Girt	L64x64x5	273	-2878.81	3982.47	72.3	Pass
		Mid Girt	L64x64x6	289	-3031.54	5782.65	52.4	Pass
T8	28 - 26	Leg	L102x8+L102x10+L102x6	311	-80437.37	105866.81	76.0	Pass
		Diagonal	L44x44x5	324	-3294.51	4602.07	71.6	Pass
		Top Girt	L64x64x5	317	-515.07	4454.86	11.6	Pass
T9	26 - 24	Leg	L102x8+L102x10+L102x6	329	-78388.04	105866.81	74.0	Pass
		Diagonal	L44x44x5	336	-2856.36	4077.10	70.1	Pass
T10	24 - 22	Leg	L102x8+L102x10+L102x6	341	-75850.19	105866.81	71.6	Pass
		Diagonal	L44x44x5	348	-2171.61	3481.66	62.4	Pass
T11	22 - 18.3	Leg	L102x10+L102x13	353	-72544.86	99380.24	73.0	Pass
		Diagonal	L64x64x5	360	-2142.72	4389.55	48.8	Pass
T12	18.3 - 13.8	Leg	L102x10+L102x13	365	-70573.10	93009.12	75.9	Pass
		Diagonal	L64x64x5	372	-1506.06	2916.58	51.6	Pass
T13	13.8 - 8.8	Leg	L102x10+L102x13	377	-69968.00	88712.00	78.9	Pass
		Diagonal	L64x64x5	386	-921.58	2186.77	42.1	Pass
T14	8.8 - 6.5	Leg	L127x10+L127x13	389	-68207.16	126063.56	54.1	Pass
		Diagonal	L64x64x5	395	-1364.72	2559.39	53.3	Pass
T15	6.5 - 0	Leg	L127x10+L127x13	405	-68163.16	121363.09	56.2	Pass
		Diagonal	L76x76x6	410	-1492.88	3435.72	43.5	Pass
		Horizontal	L76x76x6	391	-772.54	8593.67	9.0	Pass
		Summary						
Leg (T6)							84.2	Pass
Diagonal (T6)							77.5	Pass
Horizontal (T15)							12.5	Pass
Top Girt (T7)							72.3	Pass
Mid Girt (T6)							63.9	Pass
Bot Checks							75.6	Pass
RATING =							84.2	Pass

Ver Salida 3 – Condición Nueva + Refuerzo.

7.0 RECOMENDACIONES:

-La torre en la Condición Actual soporta las antenas existentes. El refuerzo existente de los montantes en varios nudos se encuentra suelto y debe ser reparado.

-La torre para la Condición Nueva (Futura) debe ser reforzada.

Como la torre actual ya presenta refuerzo. Para la Condición Nueva (Futura) solo se permitirá la instalación una (1) Extensión de 10.0m, una (1) Antena MW Ø3.70m, en el nivel 50.0m y dos (2) antenas Omni (Tipo Vela) en el nivel 50.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 60.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 59.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 58.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 57.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 56.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 55.0m. Esto con el fin de no hacer refuerzo sobre refuerzo.

REFUERZO MONTANTES:



Foto 1. Nivel 0.0m



Foto 2. Nivel 0.0m

-Nivel 0.0m, Montante (T15), en L127x127x12.7H. Instalar una (1) nueva silleta en la cara opuesta de los cuatro (4) Montantes, con cuatro (4) tornillos Ø15.9 A-394 T0. Uniendo la punta suelta del ángulo de refuerzo con los tornillos de la diagonal, mejorando la transmisión de esfuerzos en el nudo y tener continuidad del anclaje de la cimentación. (Ver fotos 1 – 2 y silueta de refuerzo plano No. 2/2)



Foto 3. Unión Cuello – Nivel 28.0m (El refuerzo esta suelto)

-Nivel 28.0m, Montantes Refuerzo (T7 y T8), que llegan al cuello de la torre están sueltos y no están transmitiendo las cargas a este nudo (la estructura en este punto puede colapsar). Así que este refuerzo solo esta como contrapeso. Teniendo en cuenta que la longitud de el tramo recto de la torre es bien considerable (22.0 m) y que se requieren más tornillos en este punto, se deben instalar dos (2) silletas por cada montante de refuerzo en L102x102x9.5H, fijándolas a las láminas (E6A) de unión de los montantes existentes con igual cantidad de tornillos (8 por montante). (Ver foto 3 y silueta de refuerzo plano No. 2/2).



Foto 4. Nieve 34.0m (El refuerzo esta suelto)

-Nivel 34.0m, Montantes del Refuerzo (T7), que llegan a este punto de la torre están sueltos y no están transmitiendo las cargas a este nudo. Así que este refuerzo solo esta como contrapeso. Se deben instalar dos (2) silletas por cada montante de refuerzo en L102x102x7.9H, fijándolas a las láminas (E7A) de unión de los montantes existentes con igual cantidad de tornillos (6 por montante). (Ver foto 4 y silueta de refuerzo plano No. 2/2).

-Desde el nivel 34.0m al nivel 46.0m (T6 y T5), con un (1) L102x102x6.4H. Paralelo que tenga continuidad con el montante existente. (Ver silueta de refuerzo plano No. 2/2).

REFUERZO DIAGONALES:

-Desde el nivel 28.0m al nivel 46.0m (T7, T6 y T5), Reemplazar el diagonal existente (L51x51x4.8), por un (1) L64x64x4.8H. (Ver silueta de refuerzo plano No. 2/2)

REFUERZO HORIZONTALES:

-Desde el nivel 30.0m al nivel 44.0m (T7, T6 y T5), Reemplazar el Horizontal existente (L51x51x4.8), por un (1) L64x64x6.4H. (Ver silueta de refuerzo plano No. 2/2)

Una vez realizadas las reparaciones en el refuerzo existente, se puede proceder con la instalación del nuevo refuerzo. Luego se procederá con la instalación de la nueva extensión de 10.0 metros. Una vez ejecutadas las actividades de reparación, refuerzo y montaje de la extensión, se puede proceder a la instalación de las nuevas antenas: Una (1) antena panel (1.0x0.50x0.19m), en el nivel 60.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 59.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 58.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 57.0m, tres (3) antenas panel (1.0x0.50x0.19m), en el nivel 56.0m, una (1) antena panel (1.0x0.50x0.19m), en el nivel 55.0m, una (1) antena MW Ø3.70m, en el nivel 50.0m y dos (2) antenas Omni (Vela) de longitud 4.0 m.

MATERIAL APROXIMADO DE EXTENSION (FUTURA) H=10.0m:	
Montantes (T3, T2 y T1) en L102x102x6.4H	450 Kg
Diagonales (T3, T2 y T1) en L51x51x4.8H	350 Kg
Horizontales (T3, T2 y T1) en L51x51x4.8H	150 Kg
Lámina de uniones (T2 y T3) en Lámina de 6.4mm	20 Kg
Lámina de uniones (T2 y T3) en Lámina de 7.9mm	100 Kg
Tornillos en la extensión	80 Kg
Peso aproximado de la Extensión	1150 Kg

MATERIAL APROXIMADO DE REFUERZO EN TORRE:	
Refuerzo Montantes (Reparar) (T15) en L 127x127x12.7H, en el Nivel 0.0m	15 Kg
Refuerzo Montantes (Reparar) (T8 y T7) en L 102x102x9.5H, en el Nivel 28.0m	25 Kg
Refuerzo Montantes (Reparar) (T7) en L 102x102x7.9H, en el Nivel 34.0m	10 Kg
Refuerzo Montantes (T6 y T5) en L 102x102x6.4H, desde el Nivel 34.0m hasta el Nivel 46.0m	430 Kg
Refuerzo Montantes (T6 y T5) en Lámina de 6.4mm, desde el Nivel 34.0m hasta el Nivel 46.0m	20 Kg
Refuerzo Montantes (T10, T9, T8 y T7) en L 102x6.4H, desde el Nivel 22.0m hasta el Nivel 34.0m	500 Kg
Refuerzo Montantes (T10, T9, T8 y T7) en Lámina de 7.9mm, desde el Nivel 22.0m hasta el Nivel 34.0m	120 Kg
Refuerzo Diagonales (T7, T6 y T5) en L 64x64x4.8H, desde el Nivel 28.0 al Nivel 46.0m	950 Kg
Refuerzo Horizontales (T7, T6 y T5) en L 64x64x6.4H, desde el Nivel 36.0 al Nivel 44.0m	400 Kg
Tornillos en refuerzo de Montantes, Diagonales y Horizontales	220 Kg
Peso aproximado del Refuerzo	2690 Kg

RESUMEN DE PORCENTAJE DE USO DE LOS ELEMENTOS DE LA TORRE			
ELEMENTO:	C. ACTUAL	C. NUEVA	C. NUEVA+REF
MONTANTE	(T3) 85.7%	(T6) 230.4%	(T8) 84.2%
DIAGONAL	(T4) 98.4%	(T6) 214.2%	(T7) 77.5%
HORIZONTAL	(T3) 53.2%	(T6) 256.6%	(T7) 72.3%
TORNILLOS	79.1%	178.4%	75.6%

8.0 CIMENTACION:

Tipo zapata aislada.

De acuerdo a las excavaciones se determinaron zapatas de 4.5x4.5x0.60m de espesor, pedestales de 1.0x1.0x3.50 m de profundidad, los cuales sobresalen 0.30m.

Con las reacciones para la condición Nueva + Refuerzo, la cimentación cumple para los chequeos de Arrancamiento y Capacidad.

Anexo memoria de la verificación de la cimentación.

Anclajes con Stub (Angulo de espera).

9.0 INSPECCION TECNICA.

PINTURA: *En buen estado.*

ESCALERA DE ACCESO: *Por el centro de la torre y sin línea de vida.*

LINEA DE VIDA: *No se tiene línea de vida. Se recomienda la instalación de una línea de vida que cumpla con los sistemas de seguridad.*

ESCALERA DE CABLES: *Una (1) por el centro de la torre en un 80% de uso.*

LUCES DE OBSTRUCCION: *No están funcionando, se recomienda su mantenimiento.*

SISTEMA DE TIERRAS: *En buen estado.*

PARARRAYOS: *En buen estado y funcionando.*

TORNILLOS: *ASTM A-394 T0, en buen estado, se recomienda torque general de la tornillería. En caso de llevarse a cabo el refuerzo se debe cambiar la tornillería que resulte afectada, usando tornillos ASTM A-394 Tipo 0.*

Anexos:

Registro Fotográfico.



CONDICION ACTUAL.
ESTACION: CERRÓ BAÑADEROS.

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SALIDA 1 – CONDICION ACTUAL.

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 50.0000 m above the ground line.

The base of the tower is set at an elevation of 0.0000 m above the ground line.

The face width of the tower is 1.9000 m at the top and 7.1500 m at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 120 kph.

Deflections calculated using a wind speed of 60 kph.

Weld together tower sections have flange connections.

Connections use galvanized A-394 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.

Welds are fabricated with ER-70S-6 electrodes.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

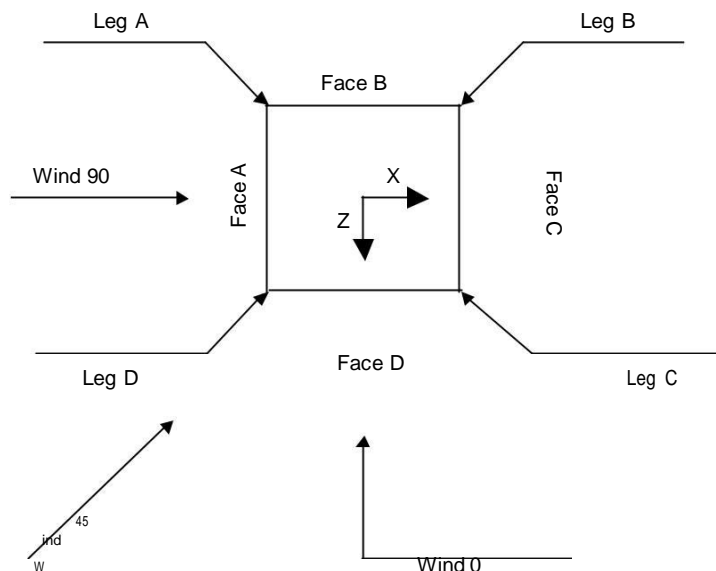
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	√ Distribute Leg Loads As Uniform	√ Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	√ Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

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Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	m			m		m
T1	50.0000-46.0000			19000	1	40000
T2	46.0000-40.0000			19000	1	60000
T3	40.0000-34.0000			19000	1	60000
T4	34.0000-28.0000			19000	1	60000
T5	28.0000-26.0000			19000	1	20000
T6	26.0000-24.0000			22750	1	20000
T7	24.0000-22.0000			26500	1	20000
T8	22.0000-18.3000			30250	1	37000
T9	18.3000-13.8000			37190	1	45000
T10	13.8000-8.8000			45630	1	50000
T11	8.8000-6.5000			55000	1	23000
T12	6.5000-0.0000			59310	1	65000

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	m	m				mm	mm
T1	50.0000-46.0000	20000	X Brace	No	No	0	0
T2	46.0000-40.0000	20000	X Brace	No	No	0	0
T3	40.0000-34.0000	20000	X Brace	No	No	0	0

T4	34.0000-28.0000	2.0000	X Brace	No	No	0	0
T5	28.0000-26.0000	2.0000	X Brace	No	No	0	0
T6	26.0000-24.0000	2.0000	X Brace	No	No	0	0
T7	24.0000-22.0000	2.0000	X Brace	No	No	0	0

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Tower Section	Tower Elevation <i>m</i>	Diagonal Spacing <i>m</i>	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset <i>mm</i>	Bottom Girt Offset <i>mm</i>
T8	22.0000-18.3000	3.7000	X Brace	No	No	0	0
T9	18.3000-13.8000	4.5000	X Brace	No	No	0	0
T10	13.8000-8.8000	5.0000	X Brace	No	No	0	0
T11	8.8000-6.5000	2.3000	K Brace Up	No	Yes	0	0
T12	6.5000-0.0000	6.5000	K Brace Down	No	Yes	0	0

Tower Section Geometry (cont'd)

Tower Elevation <i>m</i>	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 50.0000-46.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T2 46.0000-40.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T3 40.0000-34.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T4 34.0000-28.0000	Arbitrary Shape	L102x6+L102x8	A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T5 28.0000-26.0000	Arbitrary Shape	L102x8+L102x10	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T6 26.0000-24.0000	Arbitrary Shape	L102x8+L102x10	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T7 24.0000-22.0000	Arbitrary Shape	L102x8+L102x10	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T8 22.0000-18.3000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T9 18.3000-13.8000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T10 13.8000-8.8000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T11 8.8000-6.5000	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T12 6.5000-0.0000	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation <i>m</i>	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 50.0000-46.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T2 46.0000-40.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T3 40.0000-34.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T4 34.0000-28.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T5 28.0000-26.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)

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Tower Section Geometry (cont'd)

Tower Elevation m	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 50.0000-46.0000	1	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T2 46.0000-40.0000	2	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T3 40.0000-34.0000	2	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A36 (248 MPa)
T4 34.0000-28.0000	2	Equal Angle	L64x64x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T11 8.8000-6.5000	None	Equal Angle		A36 (248 MPa)	Solid Round	8	A36 (248 MPa)
T12 6.5000-0.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 50.0000-46.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T2 46.0000-40.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T3 40.0000-34.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T4 34.0000-28.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T5 28.0000-26.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T12 6.5000-0.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L64x64x6	A36 (248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	Gusset Area (per face) m ²	Gusset Thickness mm	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals mm	Double Angle Stitch Bolt Spacing Horizontals mm
T1 50.0000-46.0000	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T2 46.0000-40.0000	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T3 40.0000-34.0000	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals mm	Double Angle Stitch Bolt Spacing Horizontals mm
m	m ²	mm						
T4 34.0000-28.00 00	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T5 28.0000-26.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T6 26.0000-24.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T7 24.0000-22.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T8 22.0000-18.30 00	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T9 18.3000-13.80 00	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T10 13.8000-8.800 0	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T11 8.8000-6.5000	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T12 6.5000-0.0000	0.0000	0	A36 (248 MPa)	1.5	1	1.5	0	0

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1 50.0000-46.00 00	No	No	0.5	1 1	1 1	1 1	1 1	1 1	1 1	1 0.5
T2 46.0000-40.00 00	No	No	0.5	1 1	1 1	1 1	1 1	1 1	1 1	1 0.5
T3 40.0000-34.00 00	No	No	0.5	1 1	1 1	1 1	1 1	1 1	1 1	1 0.5
T4 34.0000-28.00 00	No	No	0.5	1 1	1 1	1 1	1 1	1 1	1 1	1 0.5
T5 28.0000-26.00 00	No	No	0.5	1 0.25	1 1	1 1	1 1	1 1	1 1	1 0.5
T6 26.0000-24.00 00	No	No	0.5	1 0.25	1 1	1 1	1 1	1 1	1 1	1 1
T7 24.0000-22.00 00	No	No	0.5	1 0.25	1 1	1 1	1 1	1 1	1 1	1 1

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Tower Elevation m	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T8 22.0000-18.30 00	No	No	0.25	1 0.25	1 1	1 1	1 1	1 1	1 1	1 1
T9 18.3000-13.80 00	No	No	0.25	1 0.25	1 1	1 1	1 1	1 1	1 1	1 1
T10 13.8000-8.800 0	No	No	0.25	1 0.25	1 1	1 1	1 1	1 1	1 1	1 1
T11 8.8000-6.5000	No	No	0.5	1 1	1 0.5	1 1	1 1	1 1	1 1	1 1
T12 6.5000-0.0000	No	No	0.2	1 1	0.4 0.4	1 1	1 1	1 0.5	1 1	1 0.5

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation m	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Deduct mm	Width U	Net Deduct mm	Width U	Net Deduct mm	Width U	Net Deduct mm	Width U	Net Deduct mm	Width U	Net Deduct mm	Width U	Net Deduct mm	Width U
T1 50.0000-46.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T2 46.0000-40.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T3 40.0000-34.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T4 34.0000-28.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T5 28.0000-26.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T6 26.0000-24.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T7 24.0000-22.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T8 22.0000-18.30 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T9 18.3000-13.80 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75

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Tower Elevation m	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U
T10 13.8000-8.8000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T11 8.8000-6.5000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T12 6.5000-0.0000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75

Tower Section Geometry (cont'd)

Tower Elevation m	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.
T1 50.0000-46.0000	Sleeve SS	16 A394T0	6	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T2 46.0000-40.0000	Sleeve SS	16 A394T0	6	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T3 40.0000-34.0000	Sleeve SS	16 A394T0	8	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T4 34.0000-28.0000	Sleeve SS	16 A394T0	12	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T5 28.0000-26.0000	Sleeve SS	16 A394T0	8	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T6 26.0000-24.0000	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T7 24.0000-22.0000	Sleeve SS	16 A394T0	16	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T8 22.0000-18.3000	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T9 18.3000-13.8000	Sleeve SS	16 A394T0	24	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T10 13.8000-8.8000	Sleeve SS	16 A394T0	24	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T11 8.8000-6.5000	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T12 6.5000-0.0000	Sleeve SS	16 A394T0	32	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	1	16 A394T0	0

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Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement m	Total Number	Number Per Row	Clear Spacing mm	Width or Diameter mm	Perimeter mm	Weight kg/m
1/2 (2 ANT OMNI E)	B	No	Ar(CfAe)	48.0000 - 0.0000	2	2	15	15		0.37
7/8 (2 ANT GRID E)	B	No	Ar(CfAe)	48.0000 - 0.0000	2	2	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	48.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT GRID E)	B	No	Ar(CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
1/2 (2 ANT OMNI E)	B	No	Ar(CfAe)	42.0000 - 0.0000	2	2	15	15		0.37
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	40.5000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	39.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	38.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	25.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	15.5000 - 0.0000	1	1	28	28		0.80

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation m	Face	AR m²	AF m²	CAA In Face m²	CAA Out Face m²	Weight kg
T1	50.0000-46.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.228	0.000	0.000	0.000	6.31
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T2	46.0000-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.096	0.000	0.000	0.000	30.46
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T3	40.0000-34.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.622	0.000	0.000	0.000	45.09
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T4	34.0000-28.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.707	0.000	0.000	0.000	47.50
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T5	28.0000-26.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.569	0.000	0.000	0.000	15.83
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T6	26.0000-24.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.597	0.000	0.000	0.000	16.64
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T7	24.0000-22.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.625	0.000	0.000	0.000	17.44
		C	0.000	0.000	0.000	0.000	0.00

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Tower Section	Tower Elevation m	Face	AR m ²	AF m ²	CAAA In Face m ²	CAAA Out Face m ²	Weight kg
T8	22.0000-18.3000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.157	0.000	0.000	0.000	32.27
		C	0.000	0.000	0.000	0.000	0.00
T9	18.3000-13.8000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.455	0.000	0.000	0.000	40.61
		C	0.000	0.000	0.000	0.000	0.00
T10	13.8000-8.8000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.704	0.000	0.000	0.000	47.62
		C	0.000	0.000	0.000	0.000	0.00
T11	8.8000-6.5000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	0.784	0.000	0.000	0.000	21.91
		C	0.000	0.000	0.000	0.000	0.00
T12	6.5000-0.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	2.216	0.000	0.000	0.000	61.91
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00

User Defined Loads

Description	Elevation m	Offset From Centroid m	Azimuth Angle °	Weight kg	F _x kg	F _z kg	Wind Force kg	CAAC m ²
C x MANTENIMIENTO	50.0000	0.0000	0.0000	No Ice Service 320.00	0.00	0.00	0.00	0.0000
2 SOP. ANT OMNI (E)	48.0000	0.0000	0.0000	No Ice Service 240.00	40.00	-40.00	0.00	0.0000
2 SOP. ANT OMNI (E)	42.0000	0.0000	0.0000	No Ice Service 240.00	10.00	-10.00	0.00	0.0000
				No Ice Service 240.00	40.00	-40.00	0.00	0.0000
				No Ice Service 240.00	10.00	-10.00	0.00	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	Placement m	CAAA Front m ²	CAAA Side m ²	Weight kg
ANT OMNI L=4.0m (IE)	B	From Face	0.0000 0.0000 0.0000	0.0000	48.0000	No Ice 13000	0.5500	60.00
ANT OMNI L=4.0m (IE)	C	From Leg	1.5000 0.0000 0.0000	0.0000	48.0000	No Ice 13000	0.5500	60.00
ANT OMNI L=4.0m (IE)	A	From Leg	1.5000 0.0000 0.0000	0.0000	42.0000	No Ice 13000	0.5500	60.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	Placement m	CAAA Front m ²	CAAA Side m ²	Weight kg
ANT OMNI L=4.0m (1E)	B	From Leg	15000 0.0000 0.0000	0.0000	42.0000No Ice	13000	0.5500	60.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert m	Azimuth Adjustment °	3 dB Beam Width °	Elevation m	Outside Diameter m	Aperture Area m ²	Weight kg
HP12-21 B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.8000 0.0000 0.0000	Worst		48.0000	3.6576	No Ice 10.5064	385.55
KP4F-23 (1 ANT GRID Ø1.20m E)	B	Grid	From Leg	0.5000 0.0000 0.0000	Worst		48.0000	1.2192	No Ice 0.9337	23.13
KP6F-19 (1 ANT GRID Ø1.80m E)	A	Grid	From Leg	0.0000 0.0000 0.0000	Worst		48.0000	1.8288	No Ice 2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.2192	No Ice 1.1678	35.83
KP6F-19 (1 ANT GRID Ø1.80m E)	D	Grid	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.8288	No Ice 2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		40.5000	1.2192	No Ice 1.1678	35.83
HP12-21 B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		39.0000	3.6576	No Ice 10.5064	385.55
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		38.0000	1.2192	No Ice 1.1678	35.83
HP4-107 (1 ANT MW Ø1.20m E)	A	Paraboloid w/Shroud (HP)	From Leg	0.3000 0.0000 0.0000	Worst		25.0000	1.2192	No Ice 1.1678	35.83
HP4-107 (1 ANT MW Ø1.20m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		15.5000	1.2192	No Ice 1.1678	35.83

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Tower Pressures - No Ice

$$G_H = 1.127$$

Section Elevation m	z m	K _Z	q _Z MPa	A _G m ²	F a c e	A _F m ²	A _R m ²	A _{leg} m ²	Leg %	C _{AA} In Face m ²	C _{AA} Out Face m ²
T1 50.0000-46.0000	48.0000	1.563	0.00	7.824	A	1.679	0.000	0.813	48.42	0.000	0.000
					B	1.679	0.228		42.63	0.000	0.000
					C	1.679	0.000		48.42	0.000	0.000
					D	1.679	0.000		48.42	0.000	0.000
T2 46.0000-40.0000	43.0000	1.514	0.00	11.737	A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	1.096		33.74	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000
					D	2.518	0.000		48.42	0.000	0.000
T3 40.0000-34.0000	37.0000	1.451	0.00	11.737	A	2.568	0.000	1.219	47.47	0.000	0.000
					B	2.568	1.622		29.09	0.000	0.000
					C	2.568	0.000		47.47	0.000	0.000
					D	2.568	0.000		47.47	0.000	0.000
T4 34.0000-28.0000	31.0000	1.379	0.00	12.012	A	1.252	0.000	0.000	0.00	0.000	0.000
					B	1.252	1.707		0.00	0.000	0.000
					C	1.252	0.000		0.00	0.000	0.000
					D	1.252	0.000		0.00	0.000	0.000
T5 28.0000-26.0000	27.0000	1.326	0.00	4.380	A	0.431	0.000	0.000	0.00	0.000	0.000
					B	0.431	0.569		0.00	0.000	0.000
					C	0.431	0.000		0.00	0.000	0.000
					D	0.431	0.000		0.00	0.000	0.000
T6 26.0000-24.0000	25.0000	1.297	0.00	5.130	A	0.325	0.000	0.000	0.00	0.000	0.000
					B	0.325	0.597		0.00	0.000	0.000
					C	0.325	0.000		0.00	0.000	0.000
					D	0.325	0.000		0.00	0.000	0.000
T7 24.0000-22.0000	23.0000	1.267	0.00	5.880	A	0.358	0.000	0.000	0.00	0.000	0.000
					B	0.358	0.625		0.00	0.000	0.000
					C	0.358	0.000		0.00	0.000	0.000
					D	0.358	0.000		0.00	0.000	0.000
T8 22.0000-18.3000	20.1500	1.22	0.00	12.855	A	0.865	0.000	0.000	0.00	0.000	0.000
					B	0.865	1.157		0.00	0.000	0.000
					C	0.865	0.000		0.00	0.000	0.000
					D	0.865	0.000		0.00	0.000	0.000
T9 18.3000-13.8000	16.0500	1.143	0.00	19.096	A	1.063	0.000	0.000	0.00	0.000	0.000
					B	1.063	1.455		0.00	0.000	0.000
					C	1.063	0.000		0.00	0.000	0.000
					D	1.063	0.000		0.00	0.000	0.000
T10 13.8000-8.8000	11.3000	1.034	0.00	25.670	A	1.238	0.000	0.000	0.00	0.000	0.000
					B	1.238	1.704		0.00	0.000	0.000
					C	1.238	0.000		0.00	0.000	0.000
					D	1.238	0.000		0.00	0.000	0.000
T11 8.8000-6.5000	7.6500	1	0.00	13.439	A	0.627	0.000	0.000	0.00	0.000	0.000
					B	0.627	0.784		0.00	0.000	0.000
					C	0.627	0.000		0.00	0.000	0.000
					D	0.627	0.000		0.00	0.000	0.000
T12 6.5000-0.0000	3.2500	1	0.00	43.342	A	2.335	0.000	0.000	0.00	0.000	0.000
					B	2.335	2.216		0.00	0.000	0.000
					C	2.335	0.000		0.00	0.000	0.000
					D	2.335	0.000		0.00	0.000	0.000

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 12 of 41
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.	Date 11:07:31 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Pressure - Service

$$G_H = 1.127$$

Section Elevation m	z m	K _Z	q _Z MPa	A _G m ²	F a c e	A _F m ²	A _R m ²	A _{leg} m ²	Leg %	C _{AA} In Face m ²	C _{AA} Out Face m ²
T1 50.0000-46.0000	48.0000	1.563	0.00	7.824	A	1.679	0.000	0.813	48.42	0.000	0.000
					B	1.679	0.228		42.63	0.000	0.000
					C	1.679	0.000		48.42	0.000	0.000
					D	1.679	0.000		48.42	0.000	0.000
T2 46.0000-40.0000	43.0000	1.514	0.00	11.737	A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	1.096		33.74	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000
					D	2.518	0.000		48.42	0.000	0.000
T3 40.0000-34.0000	37.0000	1.451	0.00	11.737	A	2.568	0.000	1.219	47.47	0.000	0.000
					B	2.568	1.622		29.09	0.000	0.000
					C	2.568	0.000		47.47	0.000	0.000
					D	2.568	0.000		47.47	0.000	0.000
T4 34.0000-28.0000	31.0000	1.379	0.00	12.012	A	1.252	0.000	0.000	0.00	0.000	0.000
					B	1.252	1.707		0.00	0.000	0.000
					C	1.252	0.000		0.00	0.000	0.000
					D	1.252	0.000		0.00	0.000	0.000
T5 28.0000-26.0000	27.0000	1.326	0.00	4.380	A	0.431	0.000	0.000	0.00	0.000	0.000
					B	0.431	0.569		0.00	0.000	0.000
					C	0.431	0.000		0.00	0.000	0.000
					D	0.431	0.000		0.00	0.000	0.000
T6 26.0000-24.0000	25.0000	1.297	0.00	5.130	A	0.325	0.000	0.000	0.00	0.000	0.000
					B	0.325	0.597		0.00	0.000	0.000
					C	0.325	0.000		0.00	0.000	0.000
					D	0.325	0.000		0.00	0.000	0.000
T7 24.0000-22.0000	23.0000	1.267	0.00	5.880	A	0.358	0.000	0.000	0.00	0.000	0.000
					B	0.358	0.625		0.00	0.000	0.000
					C	0.358	0.000		0.00	0.000	0.000
					D	0.358	0.000		0.00	0.000	0.000
T8 22.0000-18.3000	20.1500	1.22	0.00	12.855	A	0.865	0.000	0.000	0.00	0.000	0.000
					B	0.865	1.157		0.00	0.000	0.000
					C	0.865	0.000		0.00	0.000	0.000
					D	0.865	0.000		0.00	0.000	0.000
T9 18.3000-13.8000	16.0500	1.143	0.00	19.096	A	1.063	0.000	0.000	0.00	0.000	0.000
					B	1.063	1.455		0.00	0.000	0.000
					C	1.063	0.000		0.00	0.000	0.000
					D	1.063	0.000		0.00	0.000	0.000
T10 13.8000-8.8000	11.3000	1.034	0.00	25.670	A	1.238	0.000	0.000	0.00	0.000	0.000
					B	1.238	1.704		0.00	0.000	0.000
					C	1.238	0.000		0.00	0.000	0.000
					D	1.238	0.000		0.00	0.000	0.000
T11 8.8000-6.5000	7.6500	1	0.00	13.439	A	0.627	0.000	0.000	0.00	0.000	0.000
					B	0.627	0.784		0.00	0.000	0.000
					C	0.627	0.000		0.00	0.000	0.000
					D	0.627	0.000		0.00	0.000	0.000
T12 6.5000-0.0000	3.2500	1	0.00	43.342	A	2.335	0.000	0.000	0.00	0.000	0.000
					B	2.335	2.216		0.00	0.000	0.000
					C	2.335	0.000		0.00	0.000	0.000
					D	2.335	0.000		0.00	0.000	0.000

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 13 of 41
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.	Date 11:07:31 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1 50.0000-46.0000	6.31	351.45	A	0.215	2.918	0.593	1	1	1.679	622.28	155.57	B
			B	0.244	2.8	0.6	1	1	1.816			
			C	0.215	2.918	0.593	1	1	1.679			
			D	0.215	2.918	0.593	1	1	1.679			
T2 46.0000-40.0000	30.46	512.59	A	0.215	2.918	0.593	1	1	2.518	971.45	161.91	B
			B	0.308	2.563	0.618	1	1	3.196			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T3 40.0000-34.0000	45.09	534.18	A	0.219	2.9	0.594	1	1	2.568	982.84	163.81	B
			B	0.357	2.403	0.635	1	1	3.598			
			C	0.219	2.9	0.594	1	1	2.568			
			D	0.219	2.9	0.594	1	1	2.568			
T4 34.0000-28.0000	47.50	544.97	A	0.104	3.428	0.576	1	1	1.252	686.46	114.41	B
			B	0.246	2.789	0.601	1	1	2.278			
			C	0.104	3.428	0.576	1	1	1.252			
			D	0.104	3.428	0.576	1	1	1.252			
T5 28.0000-26.0000	15.83	190.60	A	0.098	3.458	0.575	1	1	0.431	228.97	114.49	B
			B	0.228	2.861	0.597	1	1	0.770			
			C	0.098	3.458	0.575	1	1	0.431			
			D	0.098	3.458	0.575	1	1	0.431			
T6 26.0000-24.0000	16.64	119.94	A	0.063	3.642	0.572	1	1	0.325	210.52	105.26	B
			B	0.18	3.069	0.586	1	1	0.675			
			C	0.063	3.642	0.572	1	1	0.325			
			D	0.063	3.642	0.572	1	1	0.325			
T7 24.0000-22.0000	17.44	131.21	A	0.061	3.656	0.572	1	1	0.358	224.17	112.08	B
			B	0.167	3.125	0.584	1	1	0.723			
			C	0.061	3.656	0.572	1	1	0.358			
			D	0.061	3.656	0.572	1	1	0.358			
T8 22.0000-18.3000	32.27	275.05	A	0.067	3.621	0.572	1	1	0.865	466.30	126.03	B
			B	0.157	3.171	0.583	1	1	1.539			
			C	0.067	3.621	0.572	1	1	0.865			
			D	0.067	3.621	0.572	1	1	0.865			
T9 18.3000-13.8000	40.61	335.99	A	0.056	3.684	0.572	1	1	1.063	561.43	124.76	B
			B	0.132	3.292	0.579	1	1	1.905			
			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T10 13.8000-8.8000	47.62	389.65	A	0.048	3.725	0.571	1	1	1.238	607.31	121.46	B
			B	0.115	3.376	0.577	1	1	2.221			
			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T11 8.8000-6.5000	21.91	196.86	A	0.047	3.734	0.571	1	1	0.627	289.19	125.74	B
			B	0.105	3.425	0.576	1	1	1.078			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T12 6.5000-0.0000	61.91	1062.44	A	0.054	3.694	0.571	1	1	2.335	968.51	149.00	B
			B	0.105	3.425	0.576	1	1	3.611			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	383.59	4644.92						OTM	176518 kg-m	6819.44		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 14 of 41
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.	Date 11:07:31 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1 50.0000-46.0000	6.31	351.45	A	0.215	2.918	0.593	1.161	1.161	1.949	736.02	184.00	B
			B	0.244	2.8	0.6	1.183	1.183	2.147			
			C	0.215	2.918	0.593	1.161	1.161	1.949			
			D	0.215	2.918	0.593	1.161	1.161	1.949			
T2 46.0000-40.0000	30.46	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	1165.74	194.29	B
			B	0.308	2.563	0.618	1.2	1.2	3.835			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T3 40.0000-34.0000	45.09	534.18	A	0.219	2.9	0.594	1.164	1.164	2.990	1179.40	196.57	B
			B	0.357	2.403	0.635	1.2	1.2	4.318			
			C	0.219	2.9	0.594	1.164	1.164	2.990			
			D	0.219	2.9	0.594	1.164	1.164	2.990			
T4 34.0000-28.0000	47.50	544.97	A	0.104	3.428	0.576	1.078	1.078	1.350	813.29	135.55	B
			B	0.246	2.789	0.601	1.185	1.185	2.699			
			C	0.104	3.428	0.576	1.078	1.078	1.350			
			D	0.104	3.428	0.576	1.078	1.078	1.350			
T5 28.0000-26.0000	15.83	190.60	A	0.098	3.458	0.575	1.074	1.074	0.463	268.18	134.09	B
			B	0.228	2.861	0.597	1.171	1.171	0.902			
			C	0.098	3.458	0.575	1.074	1.074	0.463			
			D	0.098	3.458	0.575	1.074	1.074	0.463			
T6 26.0000-24.0000	16.64	119.94	A	0.063	3.642	0.572	1.048	1.048	0.340	238.91	119.45	B
			B	0.18	3.069	0.586	1.135	1.135	0.766			
			C	0.063	3.642	0.572	1.048	1.048	0.340			
			D	0.063	3.642	0.572	1.048	1.048	0.340			
T7 24.0000-22.0000	17.44	131.21	A	0.061	3.656	0.572	1.046	1.046	0.374	252.27	126.14	B
			B	0.167	3.125	0.584	1.125	1.125	0.814			
			C	0.061	3.656	0.572	1.046	1.046	0.374			
			D	0.061	3.656	0.572	1.046	1.046	0.374			
T8 22.0000-18.3000	32.27	275.05	A	0.067	3.621	0.572	1.05	1.05	0.909	521.31	140.90	B
			B	0.157	3.171	0.583	1.118	1.118	1.721			
			C	0.067	3.621	0.572	1.05	1.05	0.909			
			D	0.067	3.621	0.572	1.05	1.05	0.909			
T9 18.3000-13.8000	40.61	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	616.96	137.10	B
			B	0.132	3.292	0.579	1.099	1.099	2.094			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T10 13.8000-8.8000	47.62	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	659.52	131.90	B
			B	0.115	3.376	0.577	1.086	1.086	2.412			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T11 8.8000-6.5000	21.91	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	311.96	135.64	B
			B	0.105	3.425	0.576	1.079	1.079	1.163			
			C	0.047	3.734	0.571	1.035	1.035	0.649			
			D	0.047	3.734	0.571	1.035	1.035	0.649			
T12 6.5000-0.0000	61.91	1062.44	A	0.054	3.694	0.571	1.04	1.04	2.429	1044.78	160.74	B
			B	0.105	3.425	0.576	1.079	1.079	3.895			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	383.59	4644.92						OTM	206963 kg-m	7808.34		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 15 of 41
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.	Date 11:07:31 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1 50.0000-46.0000	6.31	351.45	A	0.215	2.918	0.593	1	1	1.679	155.57	38.89	B
			B	0.244	2.8	0.6	1	1	1.816			
			C	0.215	2.918	0.593	1	1	1.679			
			D	0.215	2.918	0.593	1	1	1.679			
T2 46.0000-40.0000	30.46	512.59	A	0.215	2.918	0.593	1	1	2.518	242.86	40.48	B
			B	0.308	2.563	0.618	1	1	3.196			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T3 40.0000-34.0000	45.09	534.18	A	0.219	2.9	0.594	1	1	2.568	245.71	40.95	B
			B	0.357	2.403	0.635	1	1	3.598			
			C	0.219	2.9	0.594	1	1	2.568			
			D	0.219	2.9	0.594	1	1	2.568			
T4 34.0000-28.0000	47.50	544.97	A	0.104	3.428	0.576	1	1	1.252	171.62	28.60	B
			B	0.246	2.789	0.601	1	1	2.278			
			C	0.104	3.428	0.576	1	1	1.252			
			D	0.104	3.428	0.576	1	1	1.252			
T5 28.0000-26.0000	15.83	190.60	A	0.098	3.458	0.575	1	1	0.431	57.24	28.62	B
			B	0.228	2.861	0.597	1	1	0.770			
			C	0.098	3.458	0.575	1	1	0.431			
			D	0.098	3.458	0.575	1	1	0.431			
T6 26.0000-24.0000	16.64	119.94	A	0.063	3.642	0.572	1	1	0.325	52.63	26.32	B
			B	0.18	3.069	0.586	1	1	0.675			
			C	0.063	3.642	0.572	1	1	0.325			
			D	0.063	3.642	0.572	1	1	0.325			
T7 24.0000-22.0000	17.44	131.21	A	0.061	3.656	0.572	1	1	0.358	56.04	28.02	B
			B	0.167	3.125	0.584	1	1	0.723			
			C	0.061	3.656	0.572	1	1	0.358			
			D	0.061	3.656	0.572	1	1	0.358			
T8 22.0000-18.3000	32.27	275.05	A	0.067	3.621	0.572	1	1	0.865	116.57	31.51	B
			B	0.157	3.171	0.583	1	1	1.539			
			C	0.067	3.621	0.572	1	1	0.865			
			D	0.067	3.621	0.572	1	1	0.865			
T9 18.3000-13.8000	40.61	335.99	A	0.056	3.684	0.572	1	1	1.063	140.36	31.19	B
			B	0.132	3.292	0.579	1	1	1.905			
			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T10 13.8000-8.8000	47.62	389.65	A	0.048	3.725	0.571	1	1	1.238	151.83	30.37	B
			B	0.115	3.376	0.577	1	1	2.221			
			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T11 8.8000-6.5000	21.91	196.86	A	0.047	3.734	0.571	1	1	0.627	72.30	31.43	B
			B	0.105	3.425	0.576	1	1	1.078			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T12 6.5000-0.0000	61.91	1062.44	A	0.054	3.694	0.571	1	1	2.335	242.13	37.25	B
			B	0.105	3.425	0.576	1	1	3.611			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	383.59	4644.92						OTM	44129 kg-m	1704.86		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 16 of 41
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.	Date 11:07:31 05/24/16
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Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1 50.0000-46.0000	6.31	351.45	A	0.215	2.918	0.593	1.161	1.161	1.949	184.00	46.00	B
			B	0.244	2.8	0.6	1.183	1.183	2.147			
			C	0.215	2.918	0.593	1.161	1.161	1.949			
			D	0.215	2.918	0.593	1.161	1.161	1.949			
T2 46.0000-40.0000	30.46	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	291.43	48.57	B
			B	0.308	2.563	0.618	1.2	1.2	3.835			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T3 40.0000-34.0000	45.09	534.18	A	0.219	2.9	0.594	1.164	1.164	2.990	294.85	49.14	B
			B	0.357	2.403	0.635	1.2	1.2	4.318			
			C	0.219	2.9	0.594	1.164	1.164	2.990			
			D	0.219	2.9	0.594	1.164	1.164	2.990			
T4 34.0000-28.0000	47.50	544.97	A	0.104	3.428	0.576	1.078	1.078	1.350	203.32	33.89	B
			B	0.246	2.789	0.601	1.185	1.185	2.699			
			C	0.104	3.428	0.576	1.078	1.078	1.350			
			D	0.104	3.428	0.576	1.078	1.078	1.350			
T5 28.0000-26.0000	15.83	190.60	A	0.098	3.458	0.575	1.074	1.074	0.463	67.05	33.52	B
			B	0.228	2.861	0.597	1.171	1.171	0.902			
			C	0.098	3.458	0.575	1.074	1.074	0.463			
			D	0.098	3.458	0.575	1.074	1.074	0.463			
T6 26.0000-24.0000	16.64	119.94	A	0.063	3.642	0.572	1.048	1.048	0.340	59.73	29.86	B
			B	0.18	3.069	0.586	1.135	1.135	0.766			
			C	0.063	3.642	0.572	1.048	1.048	0.340			
			D	0.063	3.642	0.572	1.048	1.048	0.340			
T7 24.0000-22.0000	17.44	131.21	A	0.061	3.656	0.572	1.046	1.046	0.374	63.07	31.53	B
			B	0.167	3.125	0.584	1.125	1.125	0.814			
			C	0.061	3.656	0.572	1.046	1.046	0.374			
			D	0.061	3.656	0.572	1.046	1.046	0.374			
T8 22.0000-18.3000	32.27	275.05	A	0.067	3.621	0.572	1.05	1.05	0.909	130.33	35.22	B
			B	0.157	3.171	0.583	1.118	1.118	1.721			
			C	0.067	3.621	0.572	1.05	1.05	0.909			
			D	0.067	3.621	0.572	1.05	1.05	0.909			
T9 18.3000-13.8000	40.61	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	154.24	34.28	B
			B	0.132	3.292	0.579	1.099	1.099	2.094			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T10 13.8000-8.8000	47.62	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	164.88	32.98	B
			B	0.115	3.376	0.577	1.086	1.086	2.412			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T11 8.8000-6.5000	21.91	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	77.99	33.91	B
			B	0.105	3.425	0.576	1.079	1.079	1.163			
			C	0.047	3.734	0.571	1.035	1.035	0.649			
			D	0.047	3.734	0.571	1.035	1.035	0.649			
T12 6.5000-0.0000	61.91	1062.44	A	0.054	3.694	0.571	1.04	1.04	2.429	261.19	40.18	B
			B	0.105	3.425	0.576	1.079	1.079	3.895			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	383.59	4644.92						OTM	51741	1952.09		
									kg-m			

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50m PATA 7.15m - V=120KPH	Page 17 of 41
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Mast Vectors - No Ice

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	50.0000-46.0000	0	Wind Normal	622.28	0.00	-622.28	-29870	0	0
		45	Wind 90	736.02	520.44	-520.44	-24981	-24981	0
		90	Wind Normal	622.28	622.28	0.00	0	-29870	0
T2	46.0000-40.0000	0	Wind Normal	971.45	0.00	-971.45	-41772	0	0
		45	Wind 90	1165.74	824.30	-824.30	-35445	-35445	0
		90	Wind Normal	971.45	971.45	0.00	0	-41772	0
T3	40.0000-34.0000	0	Wind Normal	982.84	0.00	-982.84	-36365	0	0
		45	Wind 90	1179.40	833.96	-833.96	-30857	-30857	0
		90	Wind Normal	982.84	982.84	0.00	0	-36365	0
T4	34.0000-28.0000	0	Wind Normal	686.46	0.00	-686.46	-21280	0	0
		45	Wind 90	813.29	575.08	-575.08	-17827	-17827	0
		90	Wind Normal	686.46	686.46	0.00	0	-21280	0
T5	28.0000-26.0000	0	Wind Normal	228.97	0.00	-228.97	-6182	0	0
		45	Wind 90	268.18	189.63	-189.63	-5120	-5120	0
		90	Wind Normal	228.97	228.97	0.00	0	-6182	0
T6	26.0000-24.0000	0	Wind Normal	210.52	0.00	-210.52	-5263	0	0
		45	Wind 90	238.91	168.93	-168.93	-4223	-4223	0
		90	Wind Normal	210.52	210.52	0.00	0	-5263	0
T7	24.0000-22.0000	0	Wind Normal	224.17	0.00	-224.17	-5156	0	0
		45	Wind 90	252.27	178.38	-178.38	-4103	-4103	0
		90	Wind Normal	224.17	224.17	0.00	0	-5156	0
T8	22.0000-18.3000	0	Wind Normal	466.30	0.00	-466.30	-9396	0	0
		45	Wind 90	521.31	368.62	-368.62	-7428	-7428	0
		90	Wind Normal	466.30	466.30	0.00	0	-9396	0
T9	18.3000-13.8000	0	Wind Normal	561.43	0.00	-561.43	-9011	0	0
		45	Wind 90	616.96	436.26	-436.26	-7002	-7002	0
		90	Wind Normal	561.43	561.43	0.00	0	-9011	0
T10	13.8000-8.8000	0	Wind Normal	607.31	0.00	-607.31	-6863	0	0
		45	Wind 90	659.52	466.35	-466.35	-5270	-5270	0
		90	Wind Normal	607.31	607.31	0.00	0	-6863	0
T11	8.8000-6.5000	0	Wind Normal	289.19	0.00	-289.19	-2212	0	0
		45	Wind 90	311.96	220.59	-220.59	-1688	-1688	0
		90	Wind Normal	289.19	289.19	0.00	0	-2212	0
T12	6.5000-0.0000	0	Wind Normal	968.51	0.00	-968.51	-3148	0	0
		45	Wind 90	1044.78	738.77	-738.77	-2401	-2401	0
		90	Wind Normal	968.51	968.51	0.00	0	-3148	0

Mast Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-6819.44	-176518	0	0
45	5521.33	-5521.33	-146345	-146345	0
90	6819.44	0.00	0	-176518	0

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Mast Vectors - Service

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	50.0000-46.0000	0	Wind Normal	155.57	0.00	-155.57	-7467	0	0
		45	Wind 90	184.00	130.11	-130.11	-6245	-6245	0
		90	Wind Normal	155.57	155.57	0.00	0	-7467	0
T2	46.0000-40.0000	0	Wind Normal	242.86	0.00	-242.86	-10443	0	0
		45	Wind 90	291.43	206.08	-206.08	-8861	-8861	0
		90	Wind Normal	242.86	242.86	0.00	0	-10443	0
T3	40.0000-34.0000	0	Wind Normal	245.71	0.00	-245.71	-9091	0	0
		45	Wind 90	294.85	208.49	-208.49	-7714	-7714	0
		90	Wind Normal	245.71	245.71	0.00	0	-9091	0
T4	34.0000-28.0000	0	Wind Normal	171.62	0.00	-171.62	-5320	0	0
		45	Wind 90	203.32	143.77	-143.77	-4457	-4457	0
		90	Wind Normal	171.62	171.62	0.00	0	-5320	0
T5	28.0000-26.0000	0	Wind Normal	57.24	0.00	-57.24	-1546	0	0
		45	Wind 90	67.05	47.41	-47.41	-1280	-1280	0
		90	Wind Normal	57.24	57.24	0.00	0	-1546	0
T6	26.0000-24.0000	0	Wind Normal	52.63	0.00	-52.63	-1316	0	0
		45	Wind 90	59.73	42.23	-42.23	-1056	-1056	0
		90	Wind Normal	52.63	52.63	0.00	0	-1316	0
T7	24.0000-22.0000	0	Wind Normal	56.04	0.00	-56.04	-1289	0	0
		45	Wind 90	63.07	44.60	-44.60	-1026	-1026	0
		90	Wind Normal	56.04	56.04	0.00	0	-1289	0
T8	22.0000-18.3000	0	Wind Normal	116.57	0.00	-116.57	-2349	0	0
		45	Wind 90	130.33	92.16	-92.16	-1857	-1857	0
		90	Wind Normal	116.57	116.57	0.00	0	-2349	0
T9	18.3000-13.8000	0	Wind Normal	140.36	0.00	-140.36	-2253	0	0
		45	Wind 90	154.24	109.06	-109.06	-1750	-1750	0
		90	Wind Normal	140.36	140.36	0.00	0	-2253	0
T10	13.8000-8.8000	0	Wind Normal	151.83	0.00	-151.83	-1716	0	0
		45	Wind 90	164.88	116.59	-116.59	-1317	-1317	0
		90	Wind Normal	151.83	151.83	0.00	0	-1716	0
T11	8.8000-6.5000	0	Wind Normal	72.30	0.00	-72.30	-553	0	0
		45	Wind 90	77.99	55.15	-55.15	-422	-422	0
		90	Wind Normal	72.30	72.30	0.00	0	-553	0
T12	6.5000-0.0000	0	Wind Normal	242.13	0.00	-242.13	-787	0	0
		45	Wind 90	261.19	184.69	-184.69	-600	-600	0
		90	Wind Normal	242.13	242.13	0.00	0	-787	0

Mast Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-1704.86	-44129	0	0
45	1380.33	-1380.33	-36586	-36586	0
90	1704.86	0.00	0	-44129	0

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Discrete Appurtenance Pressures - No Ice $G_H = 1.127$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _z MPa	C _A A _c Front m ²	C _A A _c Side m ²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
Sum		240.00							
Weight:									

Discrete Appurtenance Vectors - No Ice

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	159.14	0.00	0.00	-159.14	-7696	0	0
45	112.53	47.61	47.61	-112.53	-5458	-2285	-45
90	0.00	67.33	67.33	0.00	-57	-3232	-64

ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	112.53	47.61	-45.91	-113.24	-5315	2083	135
45	0.00	67.33	47.61	-47.61	-2165	-2406	191
90	112.53	47.61	113.24	45.91	2324	-5556	135

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	108.32	45.83	-44.19	-109.00	-4699	1977	-130
45	0.00	64.81	45.83	-45.83	-2045	-1804	-184
90	108.32	45.83	109.00	44.19	1735	-4457	-130

ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	108.32	45.83	44.19	-109.00	-4699	-1977	130
45	153.19	0.00	108.32	-108.32	-4670	-4670	0
90	108.32	45.83	109.00	-44.19	-1977	-4699	-130

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Discrete Appurtenance Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-45.91	-490.37	-22408	2083	135
45	249.36	-314.28	-14338	-11165	-38
90	398.56	45.91	2026	-17944	-189

Discrete Appurtenance Pressures - Service

$G_H = 1.127$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _z MPa	C _{AAC} Front m ²	C _{AAC} Side m ²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
Sum Weight:		240.00							

Discrete Appurtenance Vectors - Service

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	39.79	0.00	0.00	-39.79	-1967	0	0
45	28.13	11.90	11.90	-28.13	-1407	-571	-1
90	0.00	16.83	16.83	0.00	-57	-808	-16

ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	28.13	11.90	-11.48	-28.31	-1238	430	34
45	0.00	16.83	11.90	-11.90	-451	-692	48
90	28.13	11.90	28.31	11.48	672	-1479	34

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	27.08	11.46	-11.05	-27.25	-1265	585	-33
45	0.00	16.20	11.46	-11.46	-602	-361	-46
90	27.08	11.46	27.25	11.05	343	-1024	-33

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ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	27.08	11.46	11.05	-27.25	-1265	-585	33
45	38.30	0.00	27.08	-27.08	-1258	-1258	0
90	27.08	11.46	27.25	-11.05	-585	-1265	-33

Discrete Appurtenance Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-11.48	-122.59	-5735	430	34
45	62.34	-78.57	-3718	-2882	-10
90	99.64	11.48	373	-4576	-47

Dish Pressures - No Ice

Elevation m	Dish Description	Aiming Azimuth	Weight kg	Offset _x m	Offset _z m	K _z	A _A m²	q _z MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
		Sum	1153.00					
		Weight:						

Dish Vectors - No Ice

HP12-21B - Elevation 48 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	1622.78	0.00	0.00	0.00	-1622.78	-77309	584	-2460
45	0.003230	0.000000	0.000000	1622.78	0.00	0.00	1147.48	-1147.48	-54494	-54494	0
90	0.003230	0.000000	0.000000	1622.78	0.00	0.00	1622.78	0.00	584	-77309	2460

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KP4F-23 - Elevation 48 - From Leg B											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	67.87	0.00	0.00	0.00	-67.87	-3288	-30	88
45	0.001520	0.000000	0.000000	67.87	0.00	0.00	47.99	-47.99	-2334	-2334	0
90	0.001520	0.000000	0.000000	67.87	0.00	0.00	67.87	0.00	-30	-3288	-88

KP6F-19 - Elevation 48 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	152.75	0.00	0.00	0.00	-152.75	-7417	85	-145
45	0.001520	0.000000	0.000000	152.75	0.00	0.00	108.01	-108.01	-5270	-5099	-205
90	0.001520	0.000000	0.000000	152.75	0.00	0.00	152.75	0.00	-85	-7247	-145

HP4-107 - Elevation 46 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	178.19	0.00	0.00	0.00	-178.19	-8150	-47	232
45	0.003230	0.000000	0.000000	178.19	0.00	0.00	126.00	-126.00	-5749	-5843	329
90	0.003230	0.000000	0.000000	178.19	0.00	0.00	178.19	0.00	47	-8244	232

KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	150.90	0.00	0.00	0.00	-150.90	-6824	117	-197
45	0.001520	0.000000	0.000000	150.90	0.00	0.00	106.70	-106.70	-4791	-4791	0
90	0.001520	0.000000	0.000000	150.90	0.00	0.00	150.90	0.00	117	-6824	197

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	171.83	0.00	0.00	0.00	-171.83	-6912	-47	224
45	0.003230	0.000000	0.000000	171.83	0.00	0.00	121.50	-121.50	-4874	-4967	317
90	0.003230	0.000000	0.000000	171.83	0.00	0.00	171.83	0.00	47	-7006	224

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1529.30	0.00	0.00	0.00	-1529.30	-59140	503	-1994
45	0.003230	0.000000	0.000000	1529.30	0.00	0.00	1081.38	-1081.38	-41671	-41671	0
90	0.003230	0.000000	0.000000	1529.30	0.00	0.00	1529.30	0.00	503	-59140	1994

HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	168.73	0.00	0.00	0.00	-168.73	-6365	-47	220
45	0.003230	0.000000	0.000000	168.73	0.00	0.00	119.31	-119.31	-4487	-4580	311
90	0.003230	0.000000	0.000000	168.73	0.00	0.00	168.73	0.00	47	-6458	220

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HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	149.70	0.00	0.00	0.00	-149.70	-3794	52	-216
45	0.003230	0.000000	0.000000	149.70	0.00	0.00	105.86	-105.86	-2698	-2595	-306
90	0.003230	0.000000	0.000000	149.70	0.00	0.00	149.70	0.00	-52	-3691	-216

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	130.59	0.00	0.00	0.00	-130.59	-1935	89	-323
45	0.003230	0.000000	0.000000	130.59	0.00	0.00	92.34	-92.34	-1343	-1343	0
90	0.003230	0.000000	0.000000	130.59	0.00	0.00	130.59	0.00	89	-1935	323

Dish Totals - No Ice

Wind Azimuth °	Vx	Vz	OTMx	OTMz	Torque
	kg	kg	kg-m	kg-m	kg-m
0	0.00	-4322.64	-181136	1259	-4570
45	3056.57	-3056.57	-127712	-127718	446
90	4322.64	0.00	1266	-181142	5200

Dish Pressures - Service

Elevation m	Dish Description	Aiming Azimuth °	Weight kg	Offsetx m	Offsetz m	Kz	AA m ²	qz MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
	Sum		1153.00					
	Weight:							

Dish Vectors - Service

HP12-21B - Elevation 48 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	405.69	0.00	0.00	0.00	-405.69	-18889	584	-615
45	0.003230	0.000000	0.000000	405.69	0.00	0.00	286.87	-286.87	-13185	-13185	0
90	0.003230	0.000000	0.000000	405.69	0.00	0.00	405.69	0.00	584	-18889	615

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KP4F-23 - Elevation 48 - From Leg B											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	16.97	0.00	0.00	0.00	-16.97	-845	-30	21
45	0.001520	0.000000	0.000000	16.97	0.00	0.00	12.00	-12.00	-606	-606	0
90	0.001520	0.000000	0.000000	16.97	0.00	0.00	16.97	0.00	-30	-845	-21

KP6F-19 - Elevation 48 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	38.19	0.00	0.00	0.00	-38.19	-1918	85	-36
45	0.001520	0.000000	0.000000	38.19	0.00	0.00	27.00	-27.00	-1381	-1211	-51
90	0.001520	0.000000	0.000000	38.19	0.00	0.00	38.19	0.00	-85	-1748	-36

HP4-107 - Elevation 46 - From Leg C											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	44.55	0.00	0.00	0.00	-44.55	-2003	-47	58
45	0.003230	0.000000	0.000000	44.55	0.00	0.00	31.50	-31.50	-1402	-1496	82
90	0.003230	0.000000	0.000000	44.55	0.00	0.00	44.55	0.00	47	-2096	58

KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	37.73	0.00	0.00	0.00	-37.73	-1618	117	-49
45	0.001520	0.000000	0.000000	37.73	0.00	0.00	26.68	-26.68	-1110	-1110	0
90	0.001520	0.000000	0.000000	37.73	0.00	0.00	37.73	0.00	117	-1618	49

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	42.96	0.00	0.00	0.00	-42.96	-1693	-47	56
45	0.003230	0.000000	0.000000	42.96	0.00	0.00	30.38	-30.38	-1183	-1277	79
90	0.003230	0.000000	0.000000	42.96	0.00	0.00	42.96	0.00	47	-1786	56

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	382.33	0.00	0.00	0.00	-382.33	-14408	503	-498
45	0.003230	0.000000	0.000000	382.33	0.00	0.00	270.35	-270.35	-10041	-10041	0
90	0.003230	0.000000	0.000000	382.33	0.00	0.00	382.33	0.00	503	-14408	498

HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	42.18	0.00	0.00	0.00	-42.18	-1556	-47	55
45	0.003230	0.000000	0.000000	42.18	0.00	0.00	29.83	-29.83	-1087	-1180	78
90	0.003230	0.000000	0.000000	42.18	0.00	0.00	42.18	0.00	47	-1650	55

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HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	37.43	0.00	0.00	0.00	-37.43	-987	52	-54
45	0.003230	0.000000	0.000000	37.43	0.00	0.00	26.46	-26.46	-713	-610	-76
90	0.003230	0.000000	0.000000	37.43	0.00	0.00	37.43	0.00	-52	-884	-54

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	32.65	0.00	0.00	0.00	-32.65	-417	89	-81
45	0.003230	0.000000	0.000000	32.65	0.00	0.00	23.09	-23.09	-269	-269	0
90	0.003230	0.000000	0.000000	32.65	0.00	0.00	32.65	0.00	89	-417	81

Dish Totals - Service

Wind Azimuth °	Vx	Vz	OTMx	OTMz	Torque
	kg	kg	kg-m	kg-m	kg-m
0	0.00	-1080.66	-44335	1259	-1142
45	764.14	-764.14	-30979	-30985	111
90	1080.66	0.00	1266	-44341	1300

User Load Vectors - No Ice

C x MANTENIMIENTO - Elevation 50								
Wind Azimuth °	Offsetx	Offsetz	F	Vx	Vz	OTMx	OTMz	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANT OMNI (E) - Elevation 48								
Wind Azimuth °	Offsetx	Offsetz	F	Vx	Vz	OTMx	OTMz	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0

2 SOP. ANT OMNI (E) - Elevation 42								
Wind Azimuth °	Offsetx	Offsetz	F	Vx	Vz	OTMx	OTMz	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0

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User Load Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	80.00	-80.00	-3600	-3600	0
45	80.00	-80.00	-3600	-3600	0
90	80.00	-80.00	-3600	-3600	0

User Load Vectors - Service

C x MANTENIMIENTO - Elevation 50								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANT OMNI (E) - Elevation 48								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
45	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
90	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0

2 SOP. ANT OMNI (E) - Elevation 42								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
45	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
90	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0

User Load Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	20.00	-20.00	-900	-900	0
45	20.00	-20.00	-900	-900	0
90	20.00	-20.00	-900	-900	0

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Force Totals

Load Case	Vertical Forces kg	Sum of Forces X kg	Sum of Forces Z kg	Sum of Overturning Moments, M_x kg-m	Sum of Overturning Moments, M_z kg-m	Sum of Torques kg-m
Leg Weight	0.00					
Bracing Weight	4644.92					
Total Member Self-Weight	4644.92			1088	1139	
Total Weight	7221.51			1088	1139	
Wind 0 deg - No Ice		34.09	-11712.45	-383661	-258	-4434
Wind 45 deg - No Ice		8907.26	-8972.18	-291995	-288828	407
Wind 90 deg - No Ice		11620.63	-34.09	-308	-379203	5011
Total Weight	7221.51			1088	1139	
Wind 0 deg - Service		8.52	-2928.11	-95099	790	-1109
Wind 45 deg - Service		2226.82	-2243.05	-72183	-71353	102
Wind 90 deg - Service		2905.16	-8.52	739	-93947	1253

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 45 deg - No Ice
4	Dead+Wind 90 deg - No Ice
5	Dead+Wind 0 deg - Service
6	Dead+Wind 45 deg - Service
7	Dead+Wind 90 deg - Service

Maximum Member Forces

Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T1	50 - 46	Leg	Max Tension	3	957.18	13	13
			Max. Compression	3	-1143.31	-13	-13
			Max. Mx	2	-133.54	-16	1
			Max. My	4	-133.33	1	-16
			Max. Vy	2	897.02	10	5
			Max. Vx	2	-897.55	-5	-10
		Diagonal	Max Tension	2	1362.30	0	0
			Max. Compression	2	-1478.65	0	0
			Max. Mx	2	471.43	1	0
			Max. My	2	-1466.74	1	1
			Max. Vy	2	340	1	0
			Max. Vx	2	-039	1	1
		Top Girt	Max Tension	2	3.89	0	0
			Max. Compression	2	-0.99	0	0
			Max. Mx	5	1.81	-2	0
			Max. My	4	0.21	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	0.00	0	0
		Mid Girt	Max Tension	2	77.05	0	0
			Max. Compression	2	-4.03	0	0
			Max. Mx	5	33.51	-2	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T2	46 - 40	Inner Bracing	Max. My	4	25.39	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	2.16	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	1.48	5	0
			Max. My	4	2.04	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	7557.28	0	8
		Leg	Max. Compression	3	-8559.42	-67	-54
			Max. Mx	4	-6075.40	-131	46
			Max. My	4	4741.58	-48	130
			Max. Vy	4	-176.02	-12	0
			Max. Vx	4	175.76	-1	12
			Max Tension	4	1818.86	0	0
			Max. Compression	4	-1984.72	0	0
			Max. Mx	3	1473.28	2	0
			Max. My	4	-1883.50	0	-1
			Max. Vy	3	4.32	2	0
		Top Girt	Max. Vx	4	0.51	0	-1
			Max Tension	2	231.54	0	0
			Max. Compression	2	-159.53	0	0
			Max. Mx	5	6.66	-2	0
			Max. My	4	10.11	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	815.14	0	0
			Max. Compression	2	-658.70	0	0
			Max. Mx	5	-87.82	-2	0
		Mid Girt	Max. My	4	34.17	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	37.40	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	36.75	5	0
			Max. My	4	36.76	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	19711.99	25	24
T3	40 - 34	Leg	Max. Compression	3	-21135.98	-3	-2
			Max. Mx	2	6824.61	-222	-46
			Max. My	2	-8640.45	44	222
			Max. Vy	4	-370.06	-130	46
			Max. Vx	4	369.70	-48	130
		Diagonal	Max Tension	3	3355.01	0	0
			Max. Compression	4	-3577.35	0	0
			Max. Mx	3	542.05	4	0
			Max. My	4	-3553.37	-1	-2
			Max. Vy	3	-5.81	4	0
			Max. Vx	4	1.22	-1	-2
			Max Tension	2	1159.64	0	0
			Max. Compression	2	-1038.69	0	0
			Max. Mx	5	-196.40	-2	0
			Max. My	4	32.36	0	0
		Top Girt	Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	2378.52	0	0
			Max. Compression	2	-2116.34	0	0
			Max. Mx	1	179.64	-3	0
			Max. My	4	72.86	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	2378.52	0	0
			Max. Compression	2	-2116.34	0	0
			Max. Mx	1	179.64	-3	0
			Max. My	4	72.86	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T4	34 - 28	Inner Bracing	Max. Vy	1	651	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	69.33	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	60.89	5	0
			Max. My	4	59.37	0	0
		Leg	Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	36571.86	-1253	0
			Max. Compression	3	-38327.71	148	-4
			Max. Mx	3	-38327.29	1262	-2
			Max. My	3	-1159.40	-3	560
		Diagonal	Max. Vy	3	-591.01	1262	-2
			Max. Vx	3	280.99	-3	560
			Max Tension	4	3593.29	0	0
			Max. Compression	4	-3732.86	0	0
			Max. Mx	3	683.01	4	0
			Max. My	4	-3715.54	-1	-1
		Top Girt	Max. Vy	3	-5.38	4	0
			Max. Vx	4	1.07	-1	-1
			Max Tension	2	1972.50	0	0
			Max. Compression	2	-1838.19	0	0
			Max. Mx	1	99.08	-3	0
			Max. My	4	27.16	0	0
		Mid Girt	Max. Vy	1	651	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	1729.92	0	0
			Max. Compression	2	-1587.29	0	0
			Max. Mx	1	89.67	-3	0
			Max. My	4	45.23	0	0
		Inner Bracing	Max. Vy	1	651	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	77.76	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	53.21	5	0
			Max. My	4	48.90	0	0
T5	28 - 26	Leg	Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	40067.08	3	6
			Max. Compression	3	-42100.95	-23	-2
			Max. Mx	3	-42092.42	1262	-2
			Max. My	3	-1343.70	-11	570
		Diagonal	Max. Vy	3	670.27	1262	-2
			Max. Vx	3	-283.69	-11	570
			Max Tension	4	1670.07	0	0
			Max. Compression	4	-1800.43	0	0
			Max. Mx	3	64.14	3	0
			Max. My	4	-1795.28	0	-2
		Top Girt	Max. Vy	3	451	3	0
			Max. Vx	4	1.48	0	0
			Max Tension	2	115.81	0	0
			Max. Compression	2	-137.96	0	0
			Max. Mx	4	-135.27	-3	0
			Max. My	4	-28.74	0	0
		Inner Bracing	Max. Vy	4	648	0	0
			Max. Vx	4	-0.61	0	0
			Max Tension	3	79.32	0	0
			Max. Compression	3	-111.33	0	0
			Max. Mx	1	-4.88	5	0
			Max. My	4	-15.48	0	0
			Max. Vy	1	-7.30	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m			
T6	26 - 24	Leg	Max. Vx	4	0.00	0	0			
			Max Tension	3	39858.75	-351	4			
			Max. Compression	3	-42206.46	365	2			
			Max. Mx	3	-42206.46	365	2			
			Max. My	3	-1346.93	-11	570			
			Max. Vy	3	-239.61	365	2			
		Diagonal	Max. Vx	3	254.76	-11	570			
			Max Tension	4	1226.81	0	0			
			Max. Compression	4	-1256.05	0	0			
			Max. Mx	3	-469.72	3	-1			
			Max. My	4	-1244.21	2	-1			
			Max. Vy	3	4.64	3	-1			
			Max. Vx	4	1.04	0	0			
			T7	24 - 22	Leg	Max Tension	3	39088.51	-285	-1
Max. Compression	3	-41580.80				303	-2			
Max. Mx	3	-41572.69				365	2			
Max. My	3	-1366.38				7	199			
Max. Vy	3	-63.79				-351	4			
Max. Vx	3	65.14				7	199			
Diagonal	Max Tension	4			877.04	0	0			
	Max. Compression	4			-889.34	0	0			
	Max. Mx	3			-467.33	3	-1			
	Max. My	4			-682.14	2	-1			
	Max. Vy	3			5.03	3	-1			
	Max. Vx	4			1.02	0	0			
	T8	22 - 18.3			Leg	Max Tension	3	38140.97	-66	2
						Max. Compression	3	-40709.68	44	-1
Max. Mx			3	-40692.83		303	-2			
Max. My			3	-1392.04		-8	326			
Max. Vy			3	133.78		303	-2			
Max. Vx			3	-117.34		-8	326			
Diagonal			Max Tension	4	824.67	0	0			
			Max. Compression	4	-866.48	0	0			
			Max. Mx	3	-164.80	7	-2			
			Max. My	4	-256.00	2	-3			
			Max. Vy	3	9.01	7	-2			
			Max. Vx	4	2.06	0	0			
			T9	18.3 - 13.8	Leg	Max Tension	3	37845.67	-66	2
						Max. Compression	3	-40515.94	414	0
Max. Mx	3	-40515.94				414	0			
Max. My	3	-1487.81				-9	326			
Max. Vy	3	-179.00				414	0			
Max. Vx	3	154.76				-9	326			
Diagonal	Max Tension	4			500.29	0	0			
	Max. Compression	4			-549.91	0	0			
	Max. Mx	3			-34.42	8	-3			
	Max. My	4			-518.18	6	-4			
	Max. Vy	3			10.27	8	-3			
	Max. Vx	4			2.21	0	0			
	T10	13.8 - 8.8			Leg	Max Tension	3	38307.86	258	2
						Max. Compression	3	-41117.43	-311	-3
Max. Mx			3	-41095.91		414	0			
Max. My			3	-1181.94		-18	-412			
Max. Vy			3	225.40		414	0			
Max. Vx			3	158.25		-18	-412			
Diagonal			Max Tension	4	658.84	0	0			
			Max. Compression	4	-627.92	0	0			
			Max. Mx	3	-36.83	11	-5			
			Max. My	4	-609.19	11	-6			
			Max. Vy	3	12.24	11	-5			
			Max. Vx	4	2.82	0	0			

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T11	8.8 - 6.5	Leg	Max Tension	3	37880.86	-524	1
			Max. Compression	3	-40759.77	551	1
			Max. Mx	3	-40759.77	551	1
			Max. My	3	-1351.34	-19	-412
			Max. Vy	3	-410.10	551	1
			Max. Vx	3	-163.43	-19	-412
		Diagonal	Max Tension	4	868.96	0	0
			Max. Compression	4	-879.67	0	0
			Max. Mx	3	-317.99	-8	0
			Max. My	3	345.46	0	1
			Max. Vy	3	939	0	0
			Max. Vx	3	-1.15	0	0
		T12	Max Tension	3	37805.15	0	0
			Max. Compression	3	-40740.84	0	0
			Max. Mx	3	-40706.50	551	1
			Max. My	3	-1373.78	12	158
			Max. Vy	3	213.53	551	1
			Max. Vx	3	149.78	17	125
		Diagonal	Max Tension	4	1213.61	0	0
			Max. Compression	4	-1441.66	0	0
			Max. Mx	4	1213.61	-36	0
			Max. My	4	-51.14	0	-7
			Max. Vy	4	19.47	0	0
			Max. Vx	4	3.80	0	0
		Horizontal	Max Tension	3	403.28	16	-1
			Max. Compression	3	-450.78	8	-1
			Max. Mx	2	253.38	17	-1
			Max. My	2	-313.70	12	-2
			Max. Vy	2	-21.89	17	-1
			Max. Vx	4	2.03	12	-2
		Inner Bracing	Max Tension	3	23.47	0	0
			Max. Compression	3	-48.06	0	0
			Max. Mx	1	-12.23	-20	0
			Max. My	3	22.94	0	0
			Max. Vy	1	18.95	0	0
			Max. Vx	3	0.01	0	0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg D	Max. Vert	1	1961.64	211.13	-211.49
	Max. H _x	1	1961.64	211.13	-211.49
	Max. H _z	3	-38966.42	-4078.72	4044.45
	Min. Vert	3	-38966.42	-4078.72	4044.45
	Min. H _x	3	-38966.42	-4078.72	4044.45
	Min. H _z	1	1961.64	211.13	-211.49
Leg C	Max. Vert	4	28351.99	-3279.06	-2648.92
	Max. H _x	2	-25057.04	2612.70	2567.81
	Max. H _z	2	-25057.04	2612.70	2567.81
	Min. Vert	2	-25057.04	2612.70	2567.81
	Min. H _x	4	28351.99	-3279.06	-2648.92
	Min. H _z	4	28351.99	-3279.06	-2648.92
Leg B	Max. Vert	3	42414.79	-4430.87	4453.67
	Max. H _x	1	1649.11	-196.08	195.72
	Max. H _z	3	42414.79	-4430.87	4453.67

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Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg A	Min. Vert	1	1649.11	-196.08	195.72
	Min. H _x	3	42414.79	-4430.87	4453.67
	Min. H _z	1	1649.11	-196.08	195.72
	Max. Vert	2	28667.34	2699.98	3282.37
	Max. H _x	2	28667.34	2699.98	3282.37
	Max. H _z	2	28667.34	2699.98	3282.37
	Min. Vert	4	-24741.69	-2524.34	-2601.65
	Min. H _x	4	-24741.69	-2524.34	-2601.65
	Min. H _z	4	-24741.69	-2524.34	-2601.65

Tower Mast Reaction Summary

Load Combination	Vertical kg	Shear _x kg	Shear _z kg	Overturing Moment, M _x kg-m	Overturing Moment, M _z kg-m	Torque kg-m
Dead Only	7221.51	0.02	-0.02	1092	1143	0
Dead+Wind 0 deg - No Ice	7221.50	34.09	-11712.30	-384369	-240	-4444
Dead+Wind 45 deg - No Ice	7221.50	8907.16	-8972.08	-292518	-289358	408
Dead+Wind 90 deg - No Ice	7221.50	11620.49	-34.09	-281	-379901	5021
Dead+Wind 0 deg - Service	7221.51	8.52	-2928.08	-95273	797	-1111
Dead+Wind 45 deg - Service	7221.51	2226.79	-2243.02	-72311	-71480	102
Dead+Wind 90 deg - Service	7221.51	2905.12	-8.52	747	-94118	1255

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX kg	PY kg	PZ kg	PX kg	PY kg	PZ kg	
1	0.00	-7221.51	-0.00	-0.02	7221.51	0.02	0.000%
2	34.09	-7221.51	-11712.45	-34.09	7221.50	11712.30	0.001%
3	8907.26	-7221.51	-8972.18	-8907.16	7221.50	8972.08	0.001%
4	11620.63	-7221.51	-34.09	-11620.49	7221.50	34.09	0.001%
5	8.52	-7221.51	-2928.11	-8.52	7221.51	2928.08	0.000%
6	2226.82	-7221.51	-2243.05	-2226.79	7221.51	2243.02	0.000%
7	2905.16	-7221.51	-8.52	-2905.12	7221.51	8.52	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	7	0.00000001	0.00011437
2	Yes	9	0.00000001	0.00005344
3	Yes	9	0.00000001	0.00005346
4	Yes	9	0.00000001	0.00005330
5	Yes	9	0.00000001	0.00005236
6	Yes	9	0.00000001	0.00005172
7	Yes	9	0.00000001	0.00005232

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Maximum Tower Deflections - Service Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	50 - 46	61.96	6	0.1515	0.0684
T2	46 - 40	51.28	6	0.1514	0.0656
T3	40 - 34	35.41	6	0.1402	0.0560
T4	34 - 28	21.58	6	0.1041	0.0393
T5	28 - 26	11.45	6	0.0697	0.0212
T6	26 - 24	9.30	6	0.0576	0.0156
T7	24 - 22	7.52	6	0.0478	0.0118
T8	22 - 18.3	6.04	6	0.0393	0.0092
T9	18.3 - 13.8	3.87	6	0.0288	0.0063
T10	13.8 - 8.8	1.98	6	0.0191	0.0040
T11	8.8 - 6.5	0.65	6	0.0097	0.0023
T12	6.5 - 0	0.23	6	0.0075	0.0017

Critical Deflections and Radius of Curvature - Service Wind

Elevation m	Appurtenance	Gov. Load Comb.	Deflection mm	Tilt °	Twist °	Radius of Curvature m
50.0000	C x MANTENIMIENTO	6	61.96	0.1515	0.0684	219736
48.0000	HP12-21B	6	56.63	0.1517	0.0672	167438
46.0000	HP4-107	6	51.28	0.1514	0.0656	126013
42.0000	ANT OMNI L=4.0m	6	40.58	0.1468	0.0601	24269
40.5000	HP4-107	6	36.69	0.1422	0.0571	16830
39.0000	HP12-21B	6	32.92	0.1354	0.0536	14207
38.0000	HP4-107	6	30.50	0.1298	0.0510	13407
25.0000	HP4-107	6	8.37	0.0524	0.0135	13061
15.5000	HP4-107	6	2.61	0.0227	0.0048	27236

Maximum Tower Deflections - Design Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	50 - 46	258.25	3	0.6459	0.2738
T2	46 - 40	212.78	3	0.6431	0.2625
T3	40 - 34	145.85	3	0.5896	0.2242
T4	34 - 28	88.19	3	0.4313	0.1571
T5	28 - 26	46.47	3	0.2871	0.0848
T6	26 - 24	37.67	3	0.2366	0.0623
T7	24 - 22	30.42	3	0.1958	0.0473
T8	22 - 18.3	24.38	3	0.1610	0.0367
T9	18.3 - 13.8	15.57	3	0.1177	0.0253
T10	13.8 - 8.8	7.91	3	0.0780	0.0160
T11	8.8 - 6.5	2.54	3	0.0395	0.0091
T12	6.5 - 0	0.84	3	0.0307	0.0069

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Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
m			mm	°	°	m
50.0000	C x MANTENIMIENTO	3	258.25	0.6459	0.2738	11182.6
48.0000	HP12-21 B	3	235.53	0.6456	0.2689	85212
46.0000	HP4-107	3	212.78	0.6431	0.2625	11573.5
42.0000	ANT OMNI L=4.0m	3	167.55	0.6197	0.2406	5359
40.5000	HP4-107	3	151.19	0.5987	0.2286	3806
39.0000	HP12-21 B	3	135.41	0.5682	0.2145	3233
38.0000	HP4-107	3	125.27	0.5433	0.2040	3052
25.0000	HP4-107	3	33.89	0.2151	0.0540	3161
15.5000	HP4-107	3	10.45	0.0927	0.0192	6654

Bolt Design Data

Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
T1	50	Leg	A394T0	16	6	52.30	5536.87	0.009 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	739.32	3705.44	0.200 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	1.95	3705.44	0.001 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	38.53	3699.61	0.010 ✓	1.333	Member Bearing
T2	46	Leg	A394T0	16	6	1054.95	5536.87	0.191 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	992.36	3705.44	0.268 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	115.77	3705.44	0.031 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	407.57	3699.61	0.110 ✓	1.333	Member Bearing
T3	40	Leg	A394T0	16	8	3003.05	5536.87	0.542 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	1788.68	3705.44	0.483 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	579.82	3705.44	0.156 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	1189.26	3699.61	0.321 ✓	1.333	Member Bearing
T4	34	Leg	A394T0	16	12	4625.19	9979.03	0.463 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1866.43	3705.44	0.504 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	986.25	3705.44	0.266 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	864.96	3699.61	0.234 ✓	1.333	Member Bearing
T5	28	Leg	A394T0	16	8	10525.25	9979.03	1.055 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	900.21	3705.44	0.243 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	68.98	3705.44	0.019 ✓	1.333	Member Bearing
T6	26	Diagonal	A394T0	16	2	628.03	3705.44	0.169 ✓	1.333	Member Bearing
T7	24	Leg	A394T0	16	16	5197.58	9979.03	0.521 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	444.67	3705.44	0.120 ✓	1.333	Member Bearing
T8	22	Diagonal	A394T0	16	2	433.24	3705.44	0.117 ✓	1.333	Member Bearing
T9	18.3	Leg	A394T0	16	24	3376.33	9979.03	0.338 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	274.96	3705.44	0.074 ✓	1.333	Member Bearing

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Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
T10	13.8	Leg	A394T0	16	24	3426.45	9979.03	0.343 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	329.42	3705.44	0.089 ✓	1.333	Member Bearing
T11	8.8	Diagonal	A394T0	16	2	439.84	3705.44	0.119 ✓	1.333	Member Bearing
T12	6.5	Leg	A394T0	16	32	2546.30	9979.03	0.255 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	720.83	4940.57	0.146 ✓	1.333	Member Bearing
		Horizontal	A394T0	16	1	403.28	3699.61	0.109 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T1	50 - 46	L102x102x6	4.0000	2.0000	49.5 K=0.50	145	1252	-1075.29	18504.49	0.058 ✓
T2	46 - 40	L102x102x6	6.0000	2.0000	49.5 K=0.50	145	1252	-8559.43	18504.49	0.463 ✓
T3	40 - 34	L102x102x6	6.0000	2.0000	49.5 K=0.50	145	1252	-21135.96	18504.49	1.142 ✓
T4	34 - 28	L102x6+L102x8	6.0000	2.0000	49.5 K=0.50	168	2800	-38327.70	48082.62	0.797 ✓
T5	28 - 26	L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-42100.96	58020.83	0.726 ✓
T6	26 - 24	L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-42206.46	58020.83	0.727 ✓
T7	24 - 22	L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-41580.78	58020.83	0.717 ✓
T8	22 - 18.3	L102x10+L102x13	3.7324	3.7324	46.6 K=0.25	171	4264	-40709.70	74553.82	0.546 ✓
T9	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	56.7 K=0.25	160	4264	-40515.92	69769.78	0.581 ✓
T10	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	63.0 K=0.25	153	4264	-41117.43	66550.64	0.618 ✓
T11	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	46.1 K=0.50	172	5393	-40759.78	94571.31	0.431 ✓
T12	6.5 - 0	L127x10+L127x13	6.5569	6.5569	52.2 K=0.20	166	5393	-40740.82	91045.09	0.447 ✓

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Diagonal Design Data (Compression)

Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_U</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T1	50 - 46	L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-1478.64	2845.73	0.520
T2	46 - 40	L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-1984.73	2845.73	0.697
T3	40 - 34	L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-3577.35	2845.73	1.257
T4	34 - 28	L51x51x5	2.7586	1.3053	130.4 K=1.00	61	461	-3732.86	2846.99	1.311
T5	28 - 26	L44x44x5	2.8970	1.5081	110.6 K=1.00	80	401	-1800.43	3266.19	0.551
T6	26 - 24	L44x44x5	3.1779	1.6443	120.6 K=1.00	70	401	-1256.05	2873.95	0.437
T7	24 - 22	L44x44x5	3.4766	1.7908	131.3 K=1.00	60	401	-889.34	2440.08	0.364
T8	22 - 18.3	L64x64x5	5.0180	2.6917	136.2 K=1.00	55	582	-866.48	3292.99	0.263
T9	18.3 - 13.8	L64x64x5	6.1299	3.3022	167.1 K=1.00	37	582	-549.91	2187.98	0.251
T10	13.8 - 8.8	L64x64x5	7.1088	3.8136	193.0 K=1.00	28	582	-627.92	1640.49	0.383
T11	8.8 - 6.5	L64x64x5	3.5915	3.5251	178.4 K=1.00	32	582	-879.67	1920.02	0.458
T12	6.5 - 0	L76x76x6	7.4433	7.3129	194.5 K=0.40	27	929	-1441.66	2577.44	0.559

Horizontal Design Data (Compression)

Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_U</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T12	6.5 - 0	L76x76x6	5.9310	2.9020	122.9 K=1.00	68	929	-450.78	6446.86	0.070

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Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L51x51x5	19000	17984	179.7 K=1.00	32	461	-0.99	1499.72	0.001
T2	46 - 40	L51x51x5	19000	17984	179.7 K=1.00	32	461	-159.53	1499.72	0.106
T3	40 - 34	L51x51x5	19000	17984	179.7 K=1.00	32	461	-1038.69	1499.72	0.693
T4	34 - 28	L64x64x5	19000	17984	143.0 K=1.00	50	582	-1838.19	2986.27	0.616
T5	28 - 26	L64x64x5	19000	17980	143.0 K=1.00	50	582	-137.96	2987.60	0.046

Mid Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L51x51x5	19000	17984	179.7 K=1.00	32	461	-4.03	1499.72	0.003
T2	46 - 40	L51x51x5	19000	17984	179.7 K=1.00	32	461	-658.70	1499.72	0.439
T3	40 - 34	L64x64x5	19000	17984	143.0 K=1.00	50	582	-2116.34	2986.27	0.709
T4	34 - 28	L64x64x5	19000	17980	143.0 K=1.00	50	582	-1587.29	2987.60	0.531

Inner Bracing Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T5	28 - 26	L51x51x5	26870	25850	164.9 K=1.00	38	461	-111.33	1780.07	0.063
T12	6.5 - 0	L64x64x6	41938	41938	214.7 K=1.00	22	768	-48.06	1748.47	0.027

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Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L102x102x6	4.0000	2.0000	63.0	224	1009	472.91	23063.59	0.021
T2	46 - 40	L102x102x6	6.0000	2.0000	63.0	224	1009	7531.54	23063.59	0.327
T3	40 - 34	L102x102x6	6.0000	2.0000	63.0	224	1009	19712.00	23063.59	0.855
T4	34 - 28	L102x6+L102x8	6.0000	2.0000	99.0	207	2800	36571.85	59057.74	0.619
T5	28 - 26	L102x8+L102x10	2.0175	2.0175	100.4	207	3394	40067.09	71576.90	0.560
T6	26 - 24	L102x8+L102x10	2.0175	2.0175	100.4	207	3394	39858.76	71576.90	0.557
T7	24 - 22	L102x8+L102x10	2.0175	2.0175	100.4	207	3394	39088.51	71576.90	0.546
T8	22 - 18.3	L102x10+L102x13	3.7324	3.7324	186.5	207	4264	38140.96	89936.51	0.424
T9	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	226.8	207	4264	37845.67	89936.51	0.421
T10	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	252.0	207	4264	38307.88	89936.51	0.426
T11	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	92.3	207	5393	37880.87	113749.66	0.333
T12	6.5 - 0	L127x10+L127x13	6.5569	6.5569	260.8	207	5393	37805.17	113749.66	0.332

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L51x51x5	2.7586	1.3056	125.0	200	278	1362.30	5664.74	0.240
T2	46 - 40	L51x51x5	2.7586	1.3056	125.0	200	278	1818.86	5664.74	0.321
T3	40 - 34	L51x51x5	2.7586	1.3056	125.0	200	278	3355.02	5664.74	0.592
T4	34 - 28	L51x51x5	2.7586	1.3053	124.9	200	278	3593.29	5664.74	0.634
T5	28 - 26	L44x44x5	2.8970	1.5081	156.3	200	232	1670.06	4738.32	0.352
T6	26 - 24	L44x44x5	3.1779	1.6443	172.0	200	232	1226.81	4738.32	0.259

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Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_u</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T7	24 - 22	L44x44x5	3.4766	1.7908	188.5	200	232	877.04	4738.32	0.185
T8	22 - 18.3	L64x64x5	5.0180	2.6917	191.3	200	368	824.67	7509.63	0.110
T9	18.3 - 13.8	L64x64x5	6.1299	3.3022	234.9	200	368	500.29	7509.63	0.067
T10	13.8 - 8.8	L64x64x5	7.1088	3.8136	272.7	200	368	658.84	7509.63	0.088
T11	8.8 - 6.5	L64x64x5	3.5915	3.5251	178.4	200	368	868.96	7509.63	0.116
T12	6.5 - 0	L76x76x6	7.4433	7.3129	309.6	200	606	1213.61	12354.27	0.098

Horizontal Design Data (Tension)

Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_u</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T12	6.5 - 0	L76x76x6	5.9310	2.9020	122.9	200	606	403.28	12354.27	0.033

Top Girt Design Data (Tension)

Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_u</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T1	50 - 46	L51x51x5	1.9000	1.7984	114.8	200	278	3.89	5664.74	0.001
T2	46 - 40	L51x51x5	1.9000	1.7984	114.8	200	278	231.54	5664.74	0.041
T3	40 - 34	L51x51x5	1.9000	1.7984	114.8	200	278	1159.65	5664.74	0.205
T4	34 - 28	L64x64x5	1.9000	1.7984	91.0	200	368	1972.50	7509.63	0.263
T5	28 - 26	L64x64x5	1.9000	1.7980	91.0	200	368	115.81	7509.63	0.015

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	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

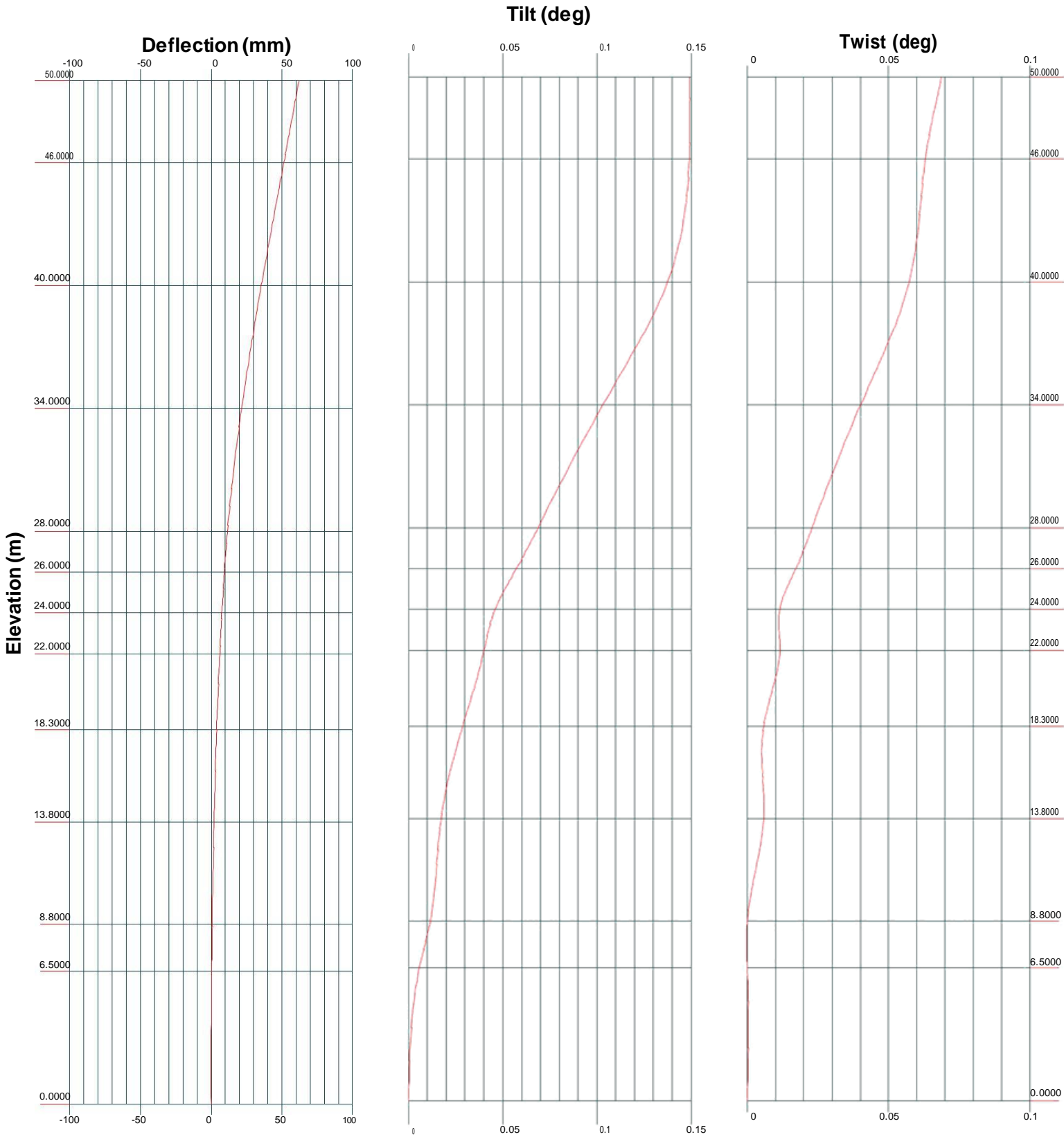
Mid Girt Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L51x51x5	19000	17984	114.8	200	278	77.05	5666.60	0.014
T2	46 - 40	L51x51x5	19000	17984	114.8	200	278	815.14	5666.60	0.144
T3	40 - 34	L64x64x5	19000	17984	91.0	200	368	2378.52	7511.45	0.317
T4	34 - 28	L64x64x5	19000	17980	91.0	200	368	1729.92	7511.45	0.230

Inner Bracing Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	50 - 46	L51x51x5	26870	25854	165.0	149	461	2.16	7005.28	0.000
T2	46 - 40	L51x51x5	26870	25854	165.0	149	461	36.79	7005.28	0.005*
T3	40 - 34	L51x51x5	26870	25854	165.0	149	461	60.90	7005.28	0.009*
T4	34 - 28	L51x51x5	26870	25854	165.0	149	461	77.76	7005.28	0.011
T5	28 - 26	L51x51x5	26870	25850	164.9	149	461	79.32	7005.28	0.011
T12	6.5 - 0	L64x64x6	41938	41938	214.7	149	768	23.47	11659.14	0.002

* DL controls



BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job: DIAGRAMA DE DEFLEXIONES-TC50.0m PATA 7.15m - V=120KPH		
	Project: EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.		
	Client: RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Drawn by: Ing. C. Londoño M.	App'd:
	Code: TIA/EIA-222-F	Date: 05/25/16	Scale: NTS
	Path:		

Feedline Distribution Chart

0.0000 - 50.0000

Round

Flat

App In Face

App Out Face

Truss Leg

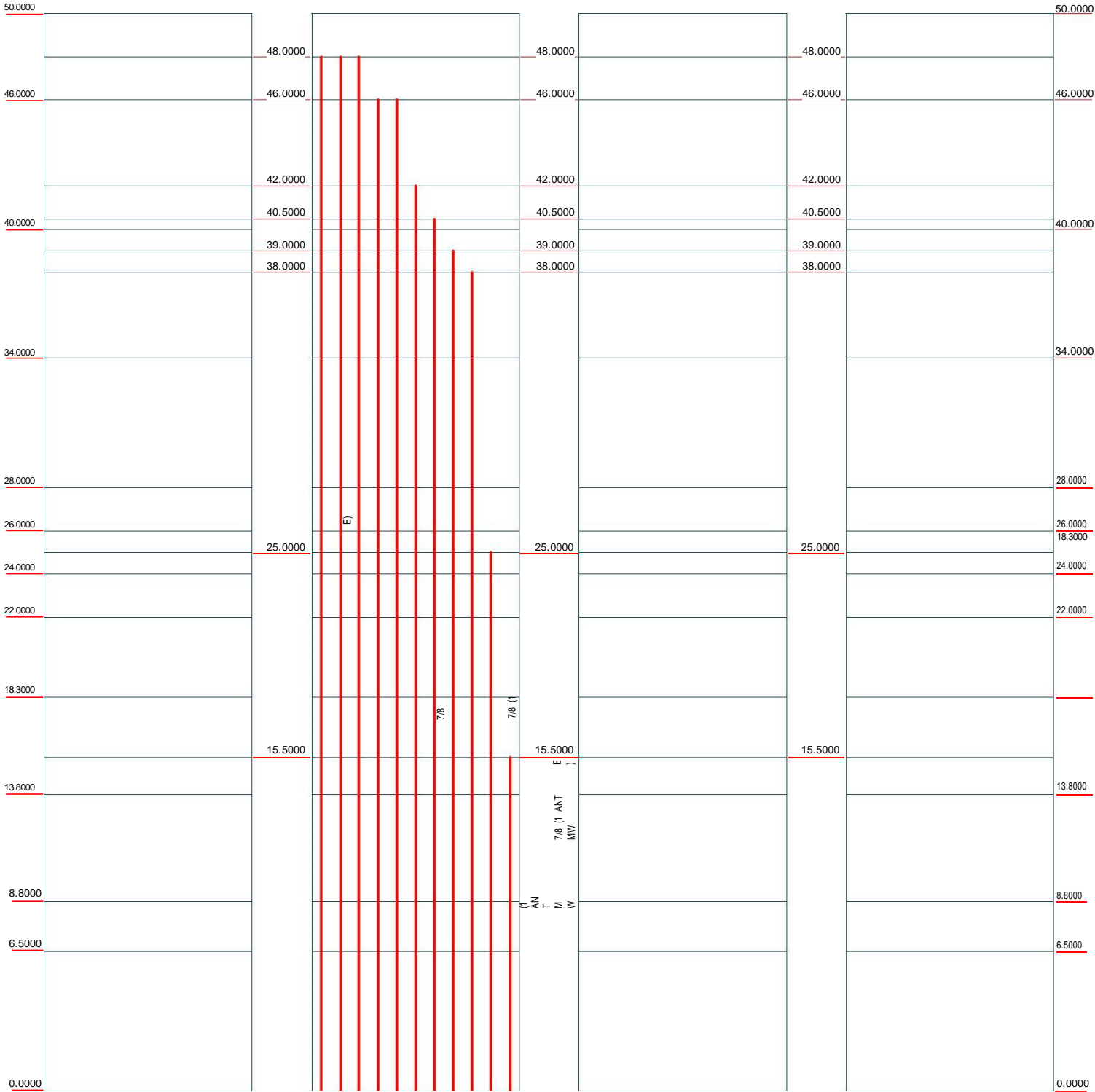
Face A

Face B

Face C

Face D

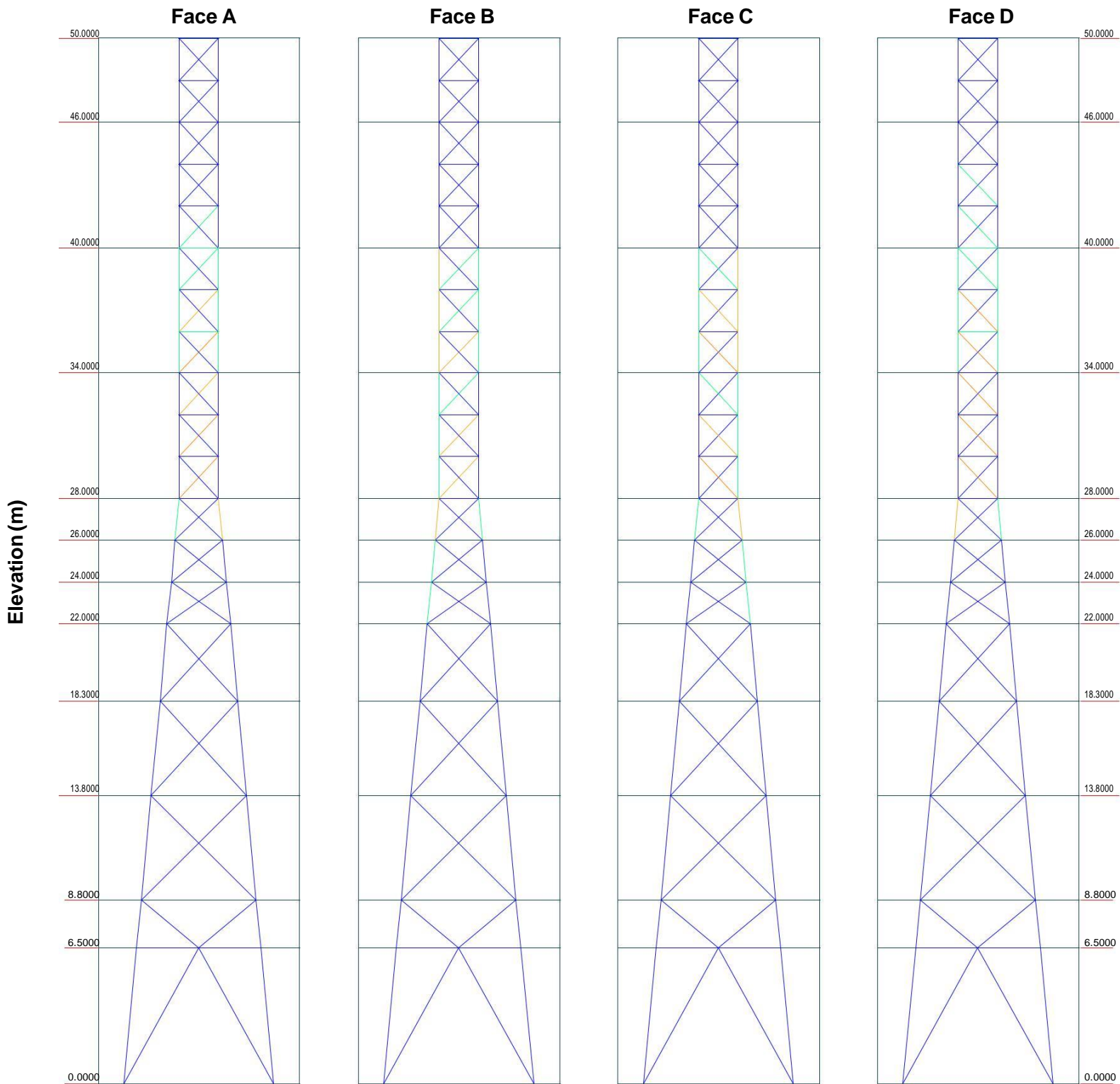
Elevation (m)



BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job:	DIAGRAMA CABLES GUIA DE ONDA-TC50.0m PATA 7.15m - V=120KPH		
	Project:	EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION ACTUAL.		
	Client:	RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Drawn by:	Ing. C. Londoño M.
	Code:	TIA/EIA-222-F	Date:	05/25/16
	Path:	Scale: NTS		
Dwg No. E-7				

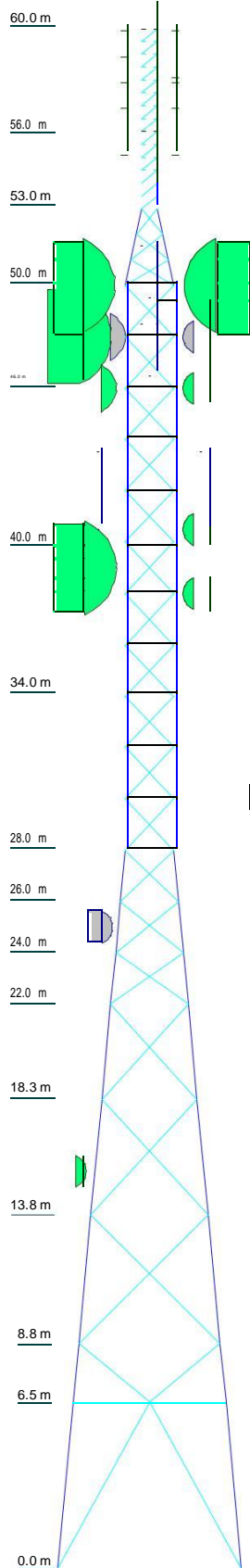
Stress Distribution Chart
0.0000 - 50.0000

> 100% 90%-100% 75%-90% 50%-75% < 50% Overstress

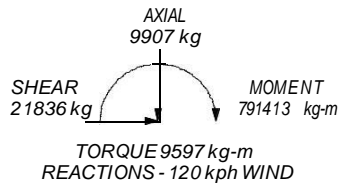


CONDICION NUEVA (FUTURA).
ESTACION: CERRÓ BAÑADEROS.

Section	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L127x10+L127x13	L102x10+L102x13	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10	L102x8+L102x10
Leg Grade	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Diagonals	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Diagonal Grade	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Top Girts	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Mid Girts	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Horizontal	L76x76x6	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Inner Bracing	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5	L64x64x5
Face Width (m)	5.931	4.56	3.719	3.025	2.65	2.275	2.65	2.275	2.65	2.275	2.65	2.275	2.65	2.275	2.65
# Panels @ (m)	1 @ 6.5	1 @ 2.3	1 @ 5	1 @ 3.7	1 @ 4.5	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7	1 @ 3.7
Weight (kg)	5247.4	1041.4	380.6	986.9	1041.4	380.6	986.9	1041.4	380.6	986.9	1041.4	380.6	986.9	1041.4	380.6



MAX. CORNER REACTIONS AT BASE:
DOWN: 80369 kg
UPLIFT: -76147 kg
SHEAR: 11248 kg



DESIGNED APPURTENANCE LOADING			
TYPE	ELEVATION	TYPE	ELEVATION
ANT PANEL 1.0x0.50x0.19m (1N)	60	HP12-21B (1 ANT MW Ø3.70m N)	50
C x MANTENIMIENTO	60	ANT OMNI L=4.0m (1E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	59	HP12-21B (1 ANT MW Ø3.70m E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	59	KP4F-23 (1 ANT GRID Ø1.20m E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	59	KP4F-19 (1 ANT GRID Ø1.80m E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	58	ANT OMNI L=4.0m (1E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	58	2 SOP. ANT OMNI (E)	48
ANT PANEL 1.0x0.50x0.19m (1N)	58	HP4-107 (1 ANT MW Ø1.20m E)	46
ANT PANEL 1.0x0.50x0.19m (1N)	57	KP4F-19 (1 ANT GRID Ø1.80m E)	46
ANT PANEL 1.0x0.50x0.19m (1N)	57	ANT OMNI L=4.0m (1E)	42
ANT PANEL 1.0x0.50x0.19m (1N)	56	2 SOP. ANT OMNI (E)	42
ANT PANEL 1.0x0.50x0.19m (1N)	56	HP4-107 (1 ANT MW Ø3.70m E)	39
ANT PANEL 1.0x0.50x0.19m (1N)	55	HP4-107 (1 ANT MW Ø1.20m E)	38
ANT OMNI L=4.0m (1N)	50	HP4-107 (1 ANT MW Ø1.20m E)	25
ANT OMNI L=4.0m (1N)	50	HP4-107 (1 ANT MW Ø1.20m E)	15.5
HP12-21B (1 ANT MW Ø3.70m N)	50		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	345 MPa	448 MPa	A36	248 MPa	400 MPa

TOWER DESIGN NOTES

1. Tower designed for a 120 kph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Deflections are based upon a 60 kph wind.
3. Weld together tower sections have flange connections.
4. Connections use galvanized A-394 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
5. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
6. Welds are fabricated with ER-70S-6 electrodes.
7. TOWER RATING: 256.6%

BTESA BROAD TELECOM.
Calle 129 No. 8 - 08 - Oficina 204.
BOGOTA D.C. - COLOMBIA.
Phone: 57 (1) 2740536.
FAX: 57 (1) 2740536

Job: **SILUETA DE CALCULO-TC50+10m Ext. PATA 7.15m - V=120KPH**
Project: **EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).**
Client: **RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.**
Code: **TIA/EIA-222-F**
Path:
Drawn by: **Ing. C. Londoño M.**
Date: **05/25/16**
App'd: **Scale: NTS**
Dwg No. **F-1**

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 1 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

SALIDA 2 - CONDICION NUEVA (FUTURA).

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 60.0000 m above the ground line.

The base of the tower is set at an elevation of 0.0000 m above the ground line.

The face width of the tower is 0.6000 m at the top and 7.1500 m at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 120 kph.

Deflections calculated using a wind speed of 60 kph.

Weld together tower sections have flange connections.

Connections use galvanized A-394 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.

Welds are fabricated with ER-70S-6 electrodes.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

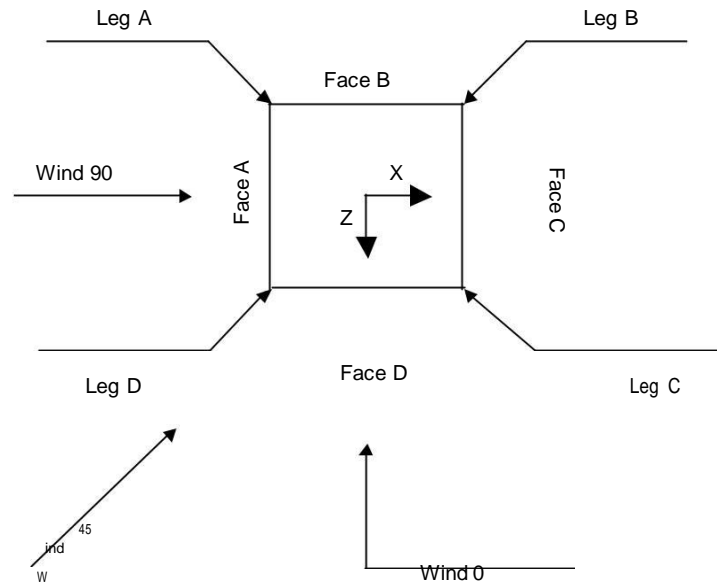
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	√ Distribute Leg Loads As Uniform	√ Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	√ Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTÁ D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 2 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.



Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	m			m		m
T1	60.0000-56.0000			0.6000	1	4.0000
T2	56.0000-53.0000			0.6000	1	3.0000
T3	53.0000-50.0000			0.6000	1	3.0000
T4	50.0000-46.0000			1.9000	1	4.0000
T5	46.0000-40.0000			1.9000	1	6.0000
T6	40.0000-34.0000			1.9000	1	6.0000
T7	34.0000-28.0000			1.9000	1	6.0000
T8	28.0000-26.0000			1.9000	1	2.0000
T9	26.0000-24.0000			2.2750	1	2.0000
T10	24.0000-22.0000			2.6500	1	2.0000
T11	22.0000-18.3000			3.0250	1	3.7000
T12	18.3000-13.8000			3.7190	1	4.5000
T13	13.8000-8.8000			4.5630	1	5.0000
T14	8.8000-6.5000			5.5000	1	2.3000
T15	6.5000-0.0000			5.9310	1	6.5000

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End	Has Horizontals	Top Girt Offset	Bottom Girt Offset
---------------	-----------------	------------------	--------------	-----------------	-----------------	-----------------	--------------------

	<i>m</i>	<i>m</i>		<i>Panels</i>		<i>mm</i>	<i>mm</i>
T1	60.0000-56.0000	0.5000	Diag Up	No	Yes	0	0
T2	56.0000-53.0000	0.5000	Diag Up	No	Yes	0	0
T3	53.0000-50.0000	1.0000	X Brace	No	No	0	0
T4	50.0000-46.0000	2.0000	X Brace	No	No	0	0

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 3 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	m	m				mm	mm
T5	46.0000-40.0000	2.0000	X Brace	No	No	0	0
T6	40.0000-34.0000	2.0000	X Brace	No	No	0	0
T7	34.0000-28.0000	2.0000	X Brace	No	No	0	0
T8	28.0000-26.0000	2.0000	X Brace	No	No	0	0
T9	26.0000-24.0000	2.0000	X Brace	No	No	0	0
T10	24.0000-22.0000	2.0000	X Brace	No	No	0	0
T11	22.0000-18.3000	3.7000	X Brace	No	No	0	0
T12	18.3000-13.8000	4.5000	X Brace	No	No	0	0
T13	13.8000-8.8000	5.0000	X Brace	No	No	0	0
T14	8.8000-6.5000	2.3000	K Brace Up	No	Yes	0	0
T15	6.5000-0.0000	6.5000	K Brace Down	No	Yes	0	0

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
m						
T1	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
60.0000-56.0000			(345 MPa)			(248 MPa)
T2	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
56.0000-53.0000			(345 MPa)			(248 MPa)
T3	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
53.0000-50.0000			(345 MPa)			(248 MPa)
T4	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
50.0000-46.0000			(345 MPa)			(248 MPa)
T5	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
46.0000-40.0000			(345 MPa)			(248 MPa)
T6	Equal Angle	L102x102x6	A572-50	Equal Angle	L51x51x5	A36
40.0000-34.0000			(345 MPa)			(248 MPa)
T7	Arbitrary Shape	L102x6+L102x8	A572-50	Equal Angle	L51x51x5	A36
34.0000-28.0000			(345 MPa)			(248 MPa)
T8	Arbitrary Shape	L102x8+L102x10	A572-50	Equal Angle	L44x44x5	A36
28.0000-26.0000			(345 MPa)			(248 MPa)
T9	Arbitrary Shape	L102x8+L102x10	A572-50	Equal Angle	L44x44x5	A36
26.0000-24.0000			(345 MPa)			(248 MPa)
T10	Arbitrary Shape	L102x8+L102x10	A572-50	Equal Angle	L44x44x5	A36
24.0000-22.0000			(345 MPa)			(248 MPa)
T11	Arbitrary Shape	L102x10+L102x13	A572-50	Equal Angle	L64x64x5	A36
22.0000-18.3000			(345 MPa)			(248 MPa)
T12	Arbitrary Shape	L102x10+L102x13	A572-50	Equal Angle	L64x64x5	A36
18.3000-13.8000			(345 MPa)			(248 MPa)
T13	Arbitrary Shape	L102x10+L102x13	A572-50	Equal Angle	L64x64x5	A36
13.8000-8.8000			(345 MPa)			(248 MPa)
T14	Arbitrary Shape	L127x10+L127x13	A572-50	Equal Angle	L64x64x5	A36
8.8000-6.5000			(345 MPa)			(248 MPa)
T15	Arbitrary Shape	L127x10+L127x13	A572-50	Equal Angle	L76x76x6	A36
6.5000-0.0000			(345 MPa)			(248 MPa)

<i>RISATower</i> BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 4 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Section Geometry (cont'd)

Tower Elevation m	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 60.0000-56.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T2 56.0000-53.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T3 53.0000-50.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T4 50.0000-46.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T5 46.0000-40.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T6 40.0000-34.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T7 34.0000-28.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T8 28.0000-26.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 60.0000-56.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T2 56.0000-53.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T4 50.0000-46.0000	1	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T5 46.0000-40.0000	2	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T6 40.0000-34.0000	2	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T7 34.0000-28.0000	2	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T14 8.8000-6.5000	None	Equal Angle		A36 (248 MPa)	Solid Round	8	A36 (248 MPa)
T15 6.5000-0.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 50.0000-46.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T5 46.0000-40.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T6	Solid Round		A572-50	Equal Angle	L51x51x5	A36

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Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
m						
40.0000-34.0000			(345 MPa)			(248 MPa)
T7	Solid Round		A572-50	Equal Angle	L51x51x5	A36
34.0000-28.0000			(345 MPa)			(248 MPa)
T8	Solid Round		A572-50	Equal Angle	L51x51x5	A36
28.0000-26.0000			(345 MPa)			(248 MPa)
T15	Solid Round		A572-50	Equal Angle	L64x64x6	A36
6.5000-0.0000			(345 MPa)			(248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
m	m ²	mm					mm	mm
T1	0.0000	0	A36	1	1	1.5	0	0
60.0000-56.0000			(248 MPa)					
T2	0.0000	0	A36	1	1	1.5	0	0
56.0000-53.0000			(248 MPa)					
T3	0.0000	0	A36	1	1	1.5	0	0
53.0000-50.0000			(248 MPa)					
T4	0.0000	0	A36	1.1	1	1.5	0	0
50.0000-46.0000			(248 MPa)					
T5	0.0000	0	A36	1.1	1	1.5	0	0
46.0000-40.0000			(248 MPa)					
T6	0.0000	0	A36	1.1	1	1.5	0	0
40.0000-34.0000			(248 MPa)					
T7	0.0000	0	A36	1.1	1	1.5	0	0
34.0000-28.0000			(248 MPa)					
T8	0.0000	0	A36	1.2	1	1.5	0	0
28.0000-26.0000			(248 MPa)					
T9	0.0000	0	A36	1.2	1	1.5	0	0
26.0000-24.0000			(248 MPa)					
T10	0.0000	0	A36	1.2	1	1.5	0	0
24.0000-22.0000			(248 MPa)					
T11	0.0000	0	A36	1.4	1	1.5	0	0
22.0000-18.3000			(248 MPa)					
T12	0.0000	0	A36	1.4	1	1.5	0	0
18.3000-13.8000			(248 MPa)					
T13	0.0000	0	A36	1.4	1	1.5	0	0
13.8000-8.8000			(248 MPa)					
T14	0.0000	0	A36	1.4	1	1.5	0	0
8.8000-6.5000			(248 MPa)					
T15	0.0000	0	A36	1.5	1	1.5	0	0

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
m	m ²	mm					mm	mm
6.5000-0.0000			(248 MPa)					

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹						
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1	No	No	1	1	1	1	1	1	1	1
60.0000-56.0000				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
56.0000-53.0000				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
53.0000-50.0000				1	1	1	1	1	1	1
T4	No	No	0.5	1	1	1	1	1	1	1
50.0000-46.0000				1	1	1	1	1	1	0.5
T5	No	No	0.5	1	1	1	1	1	1	1
46.0000-40.0000				1	1	1	1	1	1	0.5
T6	No	No	0.5	1	1	1	1	1	1	1
40.0000-34.0000				1	1	1	1	1	1	0.5
T7	No	No	0.5	1	1	1	1	1	1	1
34.0000-28.0000				1	1	1	1	1	1	0.5
T8	No	No	0.5	1	1	1	1	1	1	1
28.0000-26.0000				0.25	1	1	1	1	1	0.5
T9	No	No	0.5	1	1	1	1	1	1	1
26.0000-24.0000				0.25	1	1	1	1	1	1
T10	No	No	0.5	1	1	1	1	1	1	1
24.0000-22.0000				0.25	1	1	1	1	1	1
T11	No	No	0.25	1	1	1	1	1	1	1
22.0000-18.3000				0.25	1	1	1	1	1	1
T12	No	No	0.25	1	1	1	1	1	1	1
18.3000-13.8000				0.25	1	1	1	1	1	1
T13	No	No	0.25	1	1	1	1	1	1	1
13.8000-8.8000				0.25	1	1	1	1	1	1
T14	No	No	0.5	1	1	1	1	1	1	1
8.8000-6.5000				1	0.5	1	1	1	1	1
T15	No	No	0.2	1	0.4	1	1	1	1	1
6.5000-0.0000				1	0.4	1	1	0.5	1	0.5

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

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Tower Section Geometry (cont'd)

Tower Elevation m	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U
T1 60.0000-56.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T2 56.0000-53.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T3 53.0000-50.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T4 50.0000-46.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T5 46.0000-40.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T6 40.0000-34.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T7 34.0000-28.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T8 28.0000-26.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T9 26.0000-24.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T10 24.0000-22.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T11 22.0000-18.30 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T12 18.3000-13.80 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T13 13.8000-8.800 0	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T14 8.8000-6.5000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T15 6.5000-0.0000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75

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Tower Section Geometry (cont'd)

Tower Elevation m	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.
T1 60.0000-56.00 00	Sleeve SS	16 A394T0	2	16 A394T0	1	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T2 56.0000-53.00 00	Sleeve SS	16 A394T0	6	16 A394T0	1	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T3 53.0000-50.00 00	Sleeve SS	16 A394T0	6	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T4 50.0000-46.00 00	Sleeve SS	16 A394T0	6	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T5 46.0000-40.00 00	Sleeve SS	16 A394T0	6	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T6 40.0000-34.00 00	Sleeve SS	16 A394T0	12	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T7 34.0000-28.00 00	Sleeve SS	16 A394T0	8	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0
T8 28.0000-26.00 00	Sleeve SS	16 A394T0	8	16 A394T0	2	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T9 26.0000-24.00 00	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T10 24.0000-22.00 00	Sleeve SS	16 A394T0	16	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T11 22.0000-18.30 00	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T12 18.3000-13.80 00	Sleeve SS	16 A394T0	24	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T13 13.8000-8.800 0	Sleeve SS	16 A394T0	24	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T14 8.8000-6.5000	Sleeve SS	16 A394T0	0	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	0
T15 6.5000-0.0000	Sleeve SS	16 A394T0	32	16 A394T0	2	16 A394T0	0	16 A394T0	0	16 A394T0	0	16 A394T0	1	16 A394T0	0

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Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement m	Total Number	Number Per Row	Clear Spacing mm	Width or Diameter mm	Perimeter mm	Weight kg/m
1/2 (2 ANT OMNI E)	B	No	Ar (CfAe)	48.0000 - 0.0000	2	2	15	15		0.37
7/8 (2 ANT GRID E)	B	No	Ar (CfAe)	48.0000 - 0.0000	2	2	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	48.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT GRID E)	B	No	Ar (CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
1/2 (2 ANT OMNI E)	B	No	Ar (CfAe)	42.0000 - 0.0000	2	2	15	15		0.37
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	40.5000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	39.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	38.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	25.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	15.5000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar (CfAe)	50.0000 - 0.0000	2	2	28	28		0.80
1/2 (2 ANT MW N)	B	No	Ar (CfAe)	50.0000 - 0.0000	2	2	15	15		0.37
1 5/8 (2 ANT OMNI N)	B	No	Ar (CfAe)	58.0000 - 0.0000	3	3	50	50		1.55
1 5/8 (ANT TV N)	B	No	Ar (CfAe)	57.0000 - 0.0000	3	3	50	50		1.55
1 5/8 (ANT TV N)	B	No	Ar (CfAe)	56.0000 - 0.0000	3	3	50	50		1.55
1 5/8 (ANT TV N)	B	No	Ar (CfAe)	56.0000 - 0.0000	3	3	50	50		1.55

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation m	Face	A _R m ²	A _F m ²	C _{AAA} In Face m ²	C _{AAA} Out Face m ²	Weight kg
T1	60.0000-56.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.453	0.000	0.000	0.000	13.93
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T2	56.0000-53.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.358	0.000	0.000	0.000	41.79
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T3	53.0000-50.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.358	0.000	0.000	0.000	41.79
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T4	50.0000-46.0000	A	0.000	0.000	0.000	0.000	0.00
		B	2.382	0.000	0.000	0.000	71.43

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Tower Section	Tower Elevation m	Face	A _R m ²	A _F m ²	C _{AA} In Face m ²	C _{AA} Out Face m ²	Weight kg
T5	46.0000-40.0000	C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	4.327	0.000	0.000	0.000	128.15
		C	0.000	0.000	0.000	0.000	0.00
T6	40.0000-34.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	4.853	0.000	0.000	0.000	142.77
		C	0.000	0.000	0.000	0.000	0.00
T7	34.0000-28.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	4.938	0.000	0.000	0.000	145.19
		C	0.000	0.000	0.000	0.000	0.00
T8	28.0000-26.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.646	0.000	0.000	0.000	48.40
		C	0.000	0.000	0.000	0.000	0.00
T9	26.0000-24.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.674	0.000	0.000	0.000	49.20
		C	0.000	0.000	0.000	0.000	0.00
T10	24.0000-22.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	1.702	0.000	0.000	0.000	50.00
		C	0.000	0.000	0.000	0.000	0.00
T11	22.0000-18.3000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	3.149	0.000	0.000	0.000	92.50
		C	0.000	0.000	0.000	0.000	0.00
T12	18.3000-13.8000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	3.878	0.000	0.000	0.000	113.87
		C	0.000	0.000	0.000	0.000	0.00
T13	13.8000-8.8000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	4.397	0.000	0.000	0.000	129.02
		C	0.000	0.000	0.000	0.000	0.00
T14	8.8000-6.5000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	2.023	0.000	0.000	0.000	59.35
		C	0.000	0.000	0.000	0.000	0.00
T15	6.5000-0.0000	D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	5.716	0.000	0.000	0.000	167.73
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00

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User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle		Weight	F _x	F _z	Wind Force	C _A A _C
	m	m	°		kg	kg	kg	kg	m ²
C x MANTENIMIENTO	60.0000	0.0000	0.0000	No Ice	320.00	0.00	0.00	0.00	0.0000
				Service	320.00	0.00	0.00	0.00	0.0000
2 SOP. ANT OMNI (E)	48.0000	0.0000	0.0000	No Ice	240.00	40.00	-40.00	0.00	0.0000
				Service	240.00	10.00	-10.00	0.00	0.0000
2 SOP. ANT OMNI (E)	42.0000	0.0000	0.0000	No Ice	240.00	40.00	-40.00	0.00	0.0000
				Service	240.00	10.00	-10.00	0.00	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			m m m	°	m	m ²	m ²	kg
ANT OMNI L=4.0m (IE)	B	From Face	0.0000 0.0000 0.0000	0.0000	48.0000	No Ice	1.3000	60.00
ANT OMNI L=4.0m (IE)	C	From Leg	1.5000 0.0000 0.0000	0.0000	48.0000	No Ice	1.3000	60.00
ANT OMNI L=4.0m (IE)	A	From Leg	1.5000 0.0000 0.0000	0.0000	42.0000	No Ice	1.3000	60.00
ANT OMNI L=4.0m (IE)	B	From Leg	1.5000 0.0000 0.0000	0.0000	42.0000	No Ice	1.3000	60.00
ANT OMNI L=4.0m (IN)	B	From Face	0.0000 0.3000 0.0000	0.0000	50.0000	No Ice	1.3000	60.00
ANT OMNI L=4.0m (IN)	B	From Face	0.0000 -0.3000 0.0000	0.0000	50.0000	No Ice	1.3000	60.00
ANT PANEL 1.0x0.50x0.19m (IN)	D	From Face	0.0000 0.0000 0.0000	0.0000	60.0000	No Ice	0.5000	20.00
ANT PANEL 1.0x0.50x0.19m (IN)	D	From Leg	1.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	20.00
ANT PANEL 1.0x0.50x0.19m (IN)	D	From Face	0.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	20.00
ANT PANEL 1.0x0.50x0.19m (IN)	C	From Leg	1.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	20.00
ANT PANEL 1.0x0.50x0.19m (IN)	D	From Leg	1.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	20.00
ANT PANEL 1.0x0.50x0.19m (IN)	D	From Face	0.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	20.00

<i>RISA Tower</i> BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 12 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	Placement m		C _{AA} Front m ²	C _{AA} Side m ²	Weight kg
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	56.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	56.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	56.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	55.0000	No Ice	0.5000	0.2000	20.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	3 dB Beam Width °	Elevation m	Outside Diameter m		Aperture Area m ²	Weight kg
HP12-21B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.8000 0.0000 0.0000	Worst		48.0000	3.6576	No Ice	10.5064	385.55
KP4F-23 (1 ANT GRID Ø1.20m E)	B	Grid	From Leg	0.5000 0.0000 0.0000	Worst		48.0000	1.2192	No Ice	0.9337	23.13
KP6F-19 (1 ANT GRID Ø1.80m E)	A	Grid	From Leg	0.0000 0.0000 0.0000	Worst		48.0000	1.8288	No Ice	2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.2192	No Ice	1.1678	35.83
KP6F-19 (1 ANT GRID Ø1.80m E)	D	Grid	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.8288	No Ice	2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		40.5000	1.2192	No Ice	1.1678	35.83
HP12-21B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		39.0000	3.6576	No Ice	10.5064	385.55
HP4-107	C	Paraboloid	From	0.5000	Worst		38.0000	1.2192	No Ice	1.1678	35.83

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert m	Azimuth Adjustment °	3 dB Beam Width °	Elevation m	Outside Diameter m	Aperture Area m ²	Weight kg
(1 ANT MW Ø1.20m E) HP4-107	A	w/Shroud (HP) Paraboloid	Leg From	0.0000 0.0000 0.3000			25.0000	1.2192	No Ice 1.1678	35.83
(1 ANT MW Ø1.20m E) HP4-107	D	w/Shroud (HP) Paraboloid	Leg From	0.0000 0.0000 0.5000	Worst		15.5000	1.2192	No Ice 1.1678	35.83
(1 ANT MW Ø1.20m E) HP12-21 B	C	w/Shroud (HP) Paraboloid	Leg From	0.0000 0.0000 0.6000	Worst		50.0000	3.6576	No Ice 10.5064	385.55
(1 ANT MW Ø3.70m N) HP12-21 B	D	w/Shroud (HP) Paraboloid	Leg From	0.0000 0.0000 0.6000	Worst		50.0000	3.6576	No Ice 10.5064	385.55
(1 ANT MW Ø3.70m N)			Leg	0.0000						

Tower Pressures - No Ice

$$G_H = 1.115$$

Section Elevation m	z m	Kz	qz MPa	Ag m ²	F a c e	AF m ²	AR m ²	Aleg m ²	Leg %	CAA In Face m ²	CAA Out Face m ²
T1 60.0000-56.00 00	58.0000	1.65	0.00	2.624	A	1.279	0.000	0.813	63.55	0.000	0.000
					B	1.279	0.453		46.94	0.000	0.000
					C	1.279	0.000		63.55	0.000	0.000
					D	1.279	0.000		63.55	0.000	0.000
T2 56.0000-53.00 00	54.5000	1.621	0.00	1.968	A	0.959	0.000	0.610	63.55	0.000	0.000
					B	0.959	1.358		26.31	0.000	0.000
					C	0.959	0.000		63.55	0.000	0.000
					D	0.959	0.000		63.55	0.000	0.000
T3 53.0000-50.00 00	51.5000	1.595	0.00	3.922	A	1.119	0.000	0.638	56.97	0.000	0.000
					B	1.119	1.358		25.74	0.000	0.000
					C	1.119	0.000		56.97	0.000	0.000
					D	1.119	0.000		56.97	0.000	0.000
T4 50.0000-46.00 00	48.0000	1.563	0.00	7.824	A	1.679	0.000	0.813	48.42	0.000	0.000
					B	1.679	2.382		20.02	0.000	0.000
					C	1.679	0.000		48.42	0.000	0.000
					D	1.679	0.000		48.42	0.000	0.000
T5 46.0000-40.00 00	43.0000	1.514	0.00	11.737	A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	4.327		17.81	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000
					D	2.518	0.000		48.42	0.000	0.000
T6 40.0000-34.00 00	37.0000	1.451	0.00	11.737	A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	4.853		16.54	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000
					D	2.518	0.000		48.42	0.000	0.000
T7 34.0000-28.00 00	31.0000	1.379	0.00	12.012	A	1.202	0.000	0.000	0.00	0.000	0.000
					B	1.202	4.938		0.00	0.000	0.000
					C	1.202	0.000		0.00	0.000	0.000
					D	1.202	0.000		0.00	0.000	0.000
T8 28.0000-26.00 00	27.0000	1.326	0.00	4.380	A	0.431	0.000	0.000	0.00	0.000	0.000
					B	0.431	1.646		0.00	0.000	0.000
					C	0.431	0.000		0.00	0.000	0.000
					D	0.431	0.000		0.00	0.000	0.000

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Section Elevation m	z m	Kz	qz MPa	AG m ²	F a c e	AF m ²	AR m ²	A _{leg} m ²	Leg %	CAAA In Face m ²	CAAA Out Face m ²
T9 26.0000-24.0000	25.0000	1.297	0.00	5.130	A	0.325	0.000	0.000	0.00	0.000	0.000
					B	0.325	1.674		0.00	0.000	0.000
					C	0.325	0.000		0.00	0.000	0.000
					D	0.325	0.000		0.00	0.000	0.000
T10 24.0000-22.0000	23.0000	1.267	0.00	5.880	A	0.358	0.000	0.000	0.00	0.000	0.000
					B	0.358	1.702		0.00	0.000	0.000
					C	0.358	0.000		0.00	0.000	0.000
					D	0.358	0.000		0.00	0.000	0.000
T11 22.0000-18.3000	20.1500	1.22	0.00	12.855	A	0.865	0.000	0.000	0.00	0.000	0.000
					B	0.865	3.149		0.00	0.000	0.000
					C	0.865	0.000		0.00	0.000	0.000
					D	0.865	0.000		0.00	0.000	0.000
T12 18.3000-13.8000	16.0500	1.143	0.00	19.096	A	1.063	0.000	0.000	0.00	0.000	0.000
					B	1.063	3.878		0.00	0.000	0.000
					C	1.063	0.000		0.00	0.000	0.000
					D	1.063	0.000		0.00	0.000	0.000
T13 13.8000-8.8000	11.3000	1.034	0.00	25.670	A	1.238	0.000	0.000	0.00	0.000	0.000
					B	1.238	4.397		0.00	0.000	0.000
					C	1.238	0.000		0.00	0.000	0.000
					D	1.238	0.000		0.00	0.000	0.000
T14 8.8000-6.5000	7.6500	1	0.00	13.439	A	0.627	0.000	0.000	0.00	0.000	0.000
					B	0.627	2.023		0.00	0.000	0.000
					C	0.627	0.000		0.00	0.000	0.000
					D	0.627	0.000		0.00	0.000	0.000
T15 6.5000-0.0000	3.2500	1	0.00	43.342	A	2.335	0.000	0.000	0.00	0.000	0.000
					B	2.335	5.716		0.00	0.000	0.000
					C	2.335	0.000		0.00	0.000	0.000
					D	2.335	0.000		0.00	0.000	0.000

Tower Pressure - Service

$$G_H = 1.115$$

Section Elevation m	z m	Kz	qz MPa	AG m ²	F a c e	AF m ²	AR m ²	A _{leg} m ²	Leg %	CAAA In Face m ²	CAAA Out Face m ²
T1 60.0000-56.0000	58.0000	1.65	0.00	2.624	A	1.279	0.000	0.813	63.55	0.000	0.000
					B	1.279	0.453		46.94	0.000	0.000
					C	1.279	0.000		63.55	0.000	0.000
					D	1.279	0.000		63.55	0.000	0.000
T2 56.0000-53.0000	54.5000	1.621	0.00	1.968	A	0.959	0.000	0.610	63.55	0.000	0.000
					B	0.959	1.358		26.31	0.000	0.000
					C	0.959	0.000		63.55	0.000	0.000
					D	0.959	0.000		63.55	0.000	0.000
T3 53.0000-50.0000	51.5000	1.595	0.00	3.922	A	1.119	0.000	0.638	56.97	0.000	0.000
					B	1.119	1.358		25.74	0.000	0.000
					C	1.119	0.000		56.97	0.000	0.000
					D	1.119	0.000		56.97	0.000	0.000
T4 50.0000-46.0000	48.0000	1.563	0.00	7.824	A	1.679	0.000	0.813	48.42	0.000	0.000
					B	1.679	2.382		20.02	0.000	0.000
					C	1.679	0.000		48.42	0.000	0.000
					D	1.679	0.000		48.42	0.000	0.000
T5 46.0000-40.0000	43.0000	1.514	0.00	11.737	A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	4.327		17.81	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000

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Section Elevation m	z m	Kz	qz MPa	Ag m ²	F a c e	AF m ²	AR m ²	Areg m ²	Leg %	CAAA In Face m ²	CAAA Out Face m ²
T6 40.0000-34.00 00	37.0000	1.451	0.00	11.737	D	2.518	0.000		48.42	0.000	0.000
					A	2.518	0.000	1.219	48.42	0.000	0.000
					B	2.518	4.853		16.54	0.000	0.000
					C	2.518	0.000		48.42	0.000	0.000
					D	2.518	0.000		48.42	0.000	0.000
T7 34.0000-28.00 00	31.0000	1.379	0.00	12.012	A	1.202	0.000	0.000	0.00	0.000	0.000
					B	1.202	4.938		0.00	0.000	0.000
					C	1.202	0.000		0.00	0.000	0.000
					D	1.202	0.000		0.00	0.000	0.000
T8 28.0000-26.00 00	27.0000	1.326	0.00	4.380	A	0.431	0.000	0.000	0.00	0.000	0.000
					B	0.431	1.646		0.00	0.000	0.000
					C	0.431	0.000		0.00	0.000	0.000
					D	0.431	0.000		0.00	0.000	0.000
T9 26.0000-24.00 00	25.0000	1.297	0.00	5.130	A	0.325	0.000	0.000	0.00	0.000	0.000
					B	0.325	1.674		0.00	0.000	0.000
					C	0.325	0.000		0.00	0.000	0.000
					D	0.325	0.000		0.00	0.000	0.000
T10 24.0000-22.00 00	23.0000	1.267	0.00	5.880	A	0.358	0.000	0.000	0.00	0.000	0.000
					B	0.358	1.702		0.00	0.000	0.000
					C	0.358	0.000		0.00	0.000	0.000
					D	0.358	0.000		0.00	0.000	0.000
T11 22.0000-18.30 00	20.1500	1.22	0.00	12.855	A	0.865	0.000	0.000	0.00	0.000	0.000
					B	0.865	3.149		0.00	0.000	0.000
					C	0.865	0.000		0.00	0.000	0.000
					D	0.865	0.000		0.00	0.000	0.000
T12 18.3000-13.80 00	16.0500	1.143	0.00	19.096	A	1.063	0.000	0.000	0.00	0.000	0.000
					B	1.063	3.878		0.00	0.000	0.000
					C	1.063	0.000		0.00	0.000	0.000
					D	1.063	0.000		0.00	0.000	0.000
T13 13.8000-8.800 0	11.3000	1.034	0.00	25.670	A	1.238	0.000	0.000	0.00	0.000	0.000
					B	1.238	4.397		0.00	0.000	0.000
					C	1.238	0.000		0.00	0.000	0.000
					D	1.238	0.000		0.00	0.000	0.000
T14 8.8000-6.5000	7.6500	1	0.00	13.439	A	0.627	0.000	0.000	0.00	0.000	0.000
					B	0.627	2.023		0.00	0.000	0.000
					C	0.627	0.000		0.00	0.000	0.000
					D	0.627	0.000		0.00	0.000	0.000
T15 6.5000-0.0000	3.2500	1	0.00	43.342	A	2.335	0.000	0.000	0.00	0.000	0.000
					B	2.335	5.716		0.00	0.000	0.000
					C	2.335	0.000		0.00	0.000	0.000
					D	2.335	0.000		0.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation m	Add Weight kg	Self Weight kg	F a c e	e	C _F	R _R	D _F	D _R	A _E m ²	F kg	w kg/m	Ctrl. Face
T1 60.0000-56.00 00	13.93	240.01	A	0.487	2.075	0.691	1	1	1.279	386.88	96.72	B
			B	0.66	1.849	0.792	1	1	1.638			
			C	0.487	2.075	0.691	1	1	1.279			
			D	0.487	2.075	0.691	1	1	1.279			
T2 56.0000-53.00 00	41.79	180.01	A	0.487	2.075	0.691	1	1	0.959	494.29*	164.76	B
			B	1	2.1	1	1	1	2.317			
			C	0.487	2.075	0.691	1	1	0.959			
			D	0.487	2.075	0.691	1	1	0.959			
T3	41.79	225.69	A	0.285	2.642	0.612	1	1	1.119	500.97	166.99	B

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Section Elevation m	Add Weight kg	Self Weight kg	F a c e	e	C _F	R _R	D _F	D _R	A _E m ²	F kg	w kg/m	Ctrl. Face
53.0000-50.0000			B	0.632	1.869	0.773	1	1	2.169			
			C	0.285	2.642	0.612	1	1	1.119			
			D	0.285	2.642	0.612	1	1	1.119			
T4	71.43	351.45	A	0.215	2.918	0.593	1	1	1.679	820.84	205.21	B
50.0000-46.0000			B	0.519	2.015	0.707	1	1	3.364			
			C	0.215	2.918	0.593	1	1	1.679			
			D	0.215	2.918	0.593	1	1	1.679			
T5	128.15	512.59	A	0.215	2.918	0.593	1	1	2.518	1291.70	215.28	B
46.0000-40.0000			B	0.583	1.92	0.743	1	1	5.735			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T6	142.77	512.59	A	0.215	2.918	0.593	1	1	2.518	1317.61	219.60	B
40.0000-34.0000			B	0.628	1.872	0.771	1	1	6.261			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T7	145.19	523.38	A	0.1	3.45	0.575	1	1	1.202	1013.70	168.95	B
34.0000-28.0000			B	0.511	2.029	0.703	1	1	4.674			
			C	0.1	3.45	0.575	1	1	1.202			
			D	0.1	3.45	0.575	1	1	1.202			
T8	48.40	190.60	A	0.098	3.458	0.575	1	1	0.431	336.37	168.19	B
28.0000-26.0000			B	0.474	2.102	0.685	1	1	1.558			
			C	0.098	3.458	0.575	1	1	0.431			
			D	0.098	3.458	0.575	1	1	0.431			
T9	49.20	119.94	A	0.063	3.642	0.572	1	1	0.325	326.82	163.41	B
26.0000-24.0000			B	0.39	2.308	0.647	1	1	1.409			
			C	0.063	3.642	0.572	1	1	0.325			
			D	0.063	3.642	0.572	1	1	0.325			
T10	50.00	131.21	A	0.061	3.656	0.572	1	1	0.358	341.20	170.60	B
24.0000-22.0000			B	0.35	2.424	0.633	1	1	1.434			
			C	0.061	3.656	0.572	1	1	0.358			
			D	0.061	3.656	0.572	1	1	0.358			
T11	92.50	275.05	A	0.067	3.621	0.572	1	1	0.865	678.13	183.28	B
22.0000-18.3000			B	0.312	2.548	0.62	1	1	2.817			
			C	0.067	3.621	0.572	1	1	0.865			
			D	0.067	3.621	0.572	1	1	0.865			
T12	113.87	335.99	A	0.056	3.684	0.572	1	1	1.063	826.70	183.71	B
18.3000-13.8000			B	0.259	2.741	0.604	1	1	3.406			
			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T13	129.02	389.65	A	0.048	3.725	0.571	1	1	1.238	894.14	178.83	B
13.8000-8.8000			B	0.22	2.898	0.595	1	1	3.853			
			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T14	59.35	196.86	A	0.047	3.734	0.571	1	1	0.627	421.87	183.42	B
8.8000-6.5000			B	0.197	2.992	0.59	1	1	1.820			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T15	167.73	1062.44	A	0.054	3.694	0.571	1	1	2.335	1341.95	206.45	B
6.5000-0.0000			B	0.186	3.042	0.588	1	1	5.694			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	1295.12	5247.45			*2A _g limit			OTM	320023 kg-m	10993.19		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 17 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m²	kg	kg/m	
T1 60.0000-56.00 00	13.93	240.01	A	0.487	2.075	0.691	1.2	1.2	1.535	464.26	116.06	B
			B	0.66	1.849	0.792	1.2	1.2	1.965			
			C	0.487	2.075	0.691	1.2	1.2	1.535			
			D	0.487	2.075	0.691	1.2	1.2	1.535			
T2 56.0000-53.00 00	41.79	180.01	A	0.487	2.075	0.691	1.2	1.2	1.151	494.29*	164.76	B
			B	1	2.1	1	1.2	1.2	2.781			
			C	0.487	2.075	0.691	1.2	1.2	1.151			
			D	0.487	2.075	0.691	1.2	1.2	1.151			
T3 53.0000-50.00 00	41.79	225.69	A	0.285	2.642	0.612	1.2	1.2	1.343	601.16	200.39	B
			B	0.632	1.869	0.773	1.2	1.2	2.603			
			C	0.285	2.642	0.612	1.2	1.2	1.343			
			D	0.285	2.642	0.612	1.2	1.2	1.343			
T4 50.0000-46.00 00	71.43	351.45	A	0.215	2.918	0.593	1.161	1.161	1.949	985.01	246.25	B
			B	0.519	2.015	0.707	1.2	1.2	4.036			
			C	0.215	2.918	0.593	1.161	1.161	1.949			
			D	0.215	2.918	0.593	1.161	1.161	1.949			
T5 46.0000-40.00 00	128.15	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	1550.04	258.34	B
			B	0.583	1.92	0.743	1.2	1.2	6.882			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T6 40.0000-34.00 00	142.77	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	1581.13	263.52	B
			B	0.628	1.872	0.771	1.2	1.2	7.513			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T7 34.0000-28.00 00	145.19	523.38	A	0.1	3.45	0.575	1.075	1.075	1.292	1216.44	202.74	B
			B	0.511	2.029	0.703	1.2	1.2	5.609			
			C	0.1	3.45	0.575	1.075	1.075	1.292			
			D	0.1	3.45	0.575	1.075	1.075	1.292			
T8 28.0000-26.00 00	48.40	190.60	A	0.098	3.458	0.575	1.074	1.074	0.463	403.64	201.82	B
			B	0.474	2.102	0.685	1.2	1.2	1.870			
			C	0.098	3.458	0.575	1.074	1.074	0.463			
			D	0.098	3.458	0.575	1.074	1.074	0.463			
T9 26.0000-24.00 00	49.20	119.94	A	0.063	3.642	0.572	1.048	1.048	0.340	392.19	196.09	B
			B	0.39	2.308	0.647	1.2	1.2	1.691			
			C	0.063	3.642	0.572	1.048	1.048	0.340			
			D	0.063	3.642	0.572	1.048	1.048	0.340			
T10 24.0000-22.00 00	50.00	131.21	A	0.061	3.656	0.572	1.046	1.046	0.374	409.44	204.72	B
			B	0.35	2.424	0.633	1.2	1.2	1.721			
			C	0.061	3.656	0.572	1.046	1.046	0.374			
			D	0.061	3.656	0.572	1.046	1.046	0.374			
T11 22.0000-18.30 00	92.50	275.05	A	0.067	3.621	0.572	1.05	1.05	0.909	813.76	219.93	B
			B	0.312	2.548	0.62	1.2	1.2	3.381			
			C	0.067	3.621	0.572	1.05	1.05	0.909			
			D	0.067	3.621	0.572	1.05	1.05	0.909			
T12 18.3000-13.80 00	113.87	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	987.14	219.37	B
			B	0.259	2.741	0.604	1.194	1.194	4.067			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T13 13.8000-8.800 0	129.02	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	1041.36	208.27	B
			B	0.22	2.898	0.595	1.165	1.165	4.487			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T14 8.8000-6.5000	59.35	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	484.24	210.54	B
			B	0.197	2.992	0.59	1.148	1.148	2.089			
			C	0.047	3.734	0.571	1.035	1.035	0.649			

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 18 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T15 6.5000-0.0000	167.73	1062.44	D	0.047	3.734	0.571	1.035	1.035	0.649			
			A	0.054	3.694	0.571	1.04	1.04	2.429	1528.90	235.22	B
			B	0.186	3.042	0.588	1.139	1.139	6.487			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	1295.12	5247.45			*2A _g limit			OTM	377771 kg-m	12953.02		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1 60.0000-56.0000	13.93	240.01	A	0.487	2.075	0.691	1	1	1.279	96.72	24.18	B
			B	0.66	1.849	0.792	1	1	1.638			
			C	0.487	2.075	0.691	1	1	1.279			
			D	0.487	2.075	0.691	1	1	1.279			
T2 56.0000-53.0000	41.79	180.01	A	0.487	2.075	0.691	1	1	0.959	123.57*	41.19	B
			B	1	2.1	1	1	1	2.317			
			C	0.487	2.075	0.691	1	1	0.959			
			D	0.487	2.075	0.691	1	1	0.959			
T3 53.0000-50.0000	41.79	225.69	A	0.285	2.642	0.612	1	1	1.119	125.24	41.75	B
			B	0.632	1.869	0.773	1	1	2.169			
			C	0.285	2.642	0.612	1	1	1.119			
			D	0.285	2.642	0.612	1	1	1.119			
T4 50.0000-46.0000	71.43	351.45	A	0.215	2.918	0.593	1	1	1.679	205.21	51.30	B
			B	0.519	2.015	0.707	1	1	3.364			
			C	0.215	2.918	0.593	1	1	1.679			
			D	0.215	2.918	0.593	1	1	1.679			
T5 46.0000-40.0000	128.15	512.59	A	0.215	2.918	0.593	1	1	2.518	322.93	53.82	B
			B	0.583	1.92	0.743	1	1	5.735			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T6 40.0000-34.0000	142.77	512.59	A	0.215	2.918	0.593	1	1	2.518	329.40	54.90	B
			B	0.628	1.872	0.771	1	1	6.261			
			C	0.215	2.918	0.593	1	1	2.518			
			D	0.215	2.918	0.593	1	1	2.518			
T7 34.0000-28.0000	145.19	523.38	A	0.1	3.45	0.575	1	1	1.202	253.43	42.24	B
			B	0.511	2.029	0.703	1	1	4.674			
			C	0.1	3.45	0.575	1	1	1.202			
			D	0.1	3.45	0.575	1	1	1.202			
T8 28.0000-26.0000	48.40	190.60	A	0.098	3.458	0.575	1	1	0.431	84.09	42.05	B
			B	0.474	2.102	0.685	1	1	1.558			
			C	0.098	3.458	0.575	1	1	0.431			
			D	0.098	3.458	0.575	1	1	0.431			
T9 26.0000-24.0000	49.20	119.94	A	0.063	3.642	0.572	1	1	0.325	81.71	40.85	B
			B	0.39	2.308	0.647	1	1	1.409			
			C	0.063	3.642	0.572	1	1	0.325			
			D	0.063	3.642	0.572	1	1	0.325			
T10 24.0000-22.0000	50.00	131.21	A	0.061	3.656	0.572	1	1	0.358	85.30	42.65	B
			B	0.35	2.424	0.633	1	1	1.434			
			C	0.061	3.656	0.572	1	1	0.358			
			D	0.061	3.656	0.572	1	1	0.358			
T11 22.0000-18.30	92.50	275.05	A	0.067	3.621	0.572	1	1	0.865	169.53	45.82	B
			B	0.312	2.548	0.62	1	1	2.817			

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 19 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
00			C	0.067	3.621	0.572	1	1	0.865			
			D	0.067	3.621	0.572	1	1	0.865			
T12	113.87	335.99	A	0.056	3.684	0.572	1	1	1.063	206.68	45.93	B
18.3000-13.8000			B	0.259	2.741	0.604	1	1	3.406			
			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T13	129.02	389.65	A	0.048	3.725	0.571	1	1	1.238	223.54	44.71	B
13.8000-8.8000			B	0.22	2.898	0.595	1	1	3.853			
			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T14	59.35	196.86	A	0.047	3.734	0.571	1	1	0.627	105.47	45.86	B
8.8000-6.5000			B	0.197	2.992	0.59	1	1	1.820			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T15	167.73	1062.44	A	0.054	3.694	0.571	1	1	2.335	335.49	51.61	B
6.5000-0.0000			B	0.186	3.042	0.588	1	1	5.694			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	1295.12	5247.45			*2Ag limit			OTM	80006 kg-m	2748.30		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1	13.93	240.01	A	0.487	2.075	0.691	1.2	1.2	1.535	116.06	29.02	B
60.0000-56.0000			B	0.66	1.849	0.792	1.2	1.2	1.965			
			C	0.487	2.075	0.691	1.2	1.2	1.535			
			D	0.487	2.075	0.691	1.2	1.2	1.535			
T2	41.79	180.01	A	0.487	2.075	0.691	1.2	1.2	1.151	123.57*	41.19	B
56.0000-53.0000			B	1	2.1	1	1.2	1.2	2.781			
			C	0.487	2.075	0.691	1.2	1.2	1.151			
			D	0.487	2.075	0.691	1.2	1.2	1.151			
T3	41.79	225.69	A	0.285	2.642	0.612	1.2	1.2	1.343	150.29	50.10	B
53.0000-50.0000			B	0.632	1.869	0.773	1.2	1.2	2.603			
			C	0.285	2.642	0.612	1.2	1.2	1.343			
			D	0.285	2.642	0.612	1.2	1.2	1.343			
T4	71.43	351.45	A	0.215	2.918	0.593	1.161	1.161	1.949	246.25	61.56	B
50.0000-46.0000			B	0.519	2.015	0.707	1.2	1.2	4.036			
			C	0.215	2.918	0.593	1.161	1.161	1.949			
			D	0.215	2.918	0.593	1.161	1.161	1.949			
T5	128.15	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	387.51	64.59	B
46.0000-40.0000			B	0.583	1.92	0.743	1.2	1.2	6.882			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T6	142.77	512.59	A	0.215	2.918	0.593	1.161	1.161	2.923	395.28	65.88	B
40.0000-34.0000			B	0.628	1.872	0.771	1.2	1.2	7.513			
			C	0.215	2.918	0.593	1.161	1.161	2.923			
			D	0.215	2.918	0.593	1.161	1.161	2.923			
T7	145.19	523.38	A	0.1	3.45	0.575	1.075	1.075	1.292	304.11	50.69	B
34.0000-28.0000			B	0.511	2.029	0.703	1.2	1.2	5.609			
			C	0.1	3.45	0.575	1.075	1.075	1.292			
			D	0.1	3.45	0.575	1.075	1.075	1.292			
T8	48.40	190.60	A	0.098	3.458	0.575	1.074	1.074	0.463	100.91	50.46	B

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 20 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
28.0000-26.0000			B	0.474	2.102	0.685	1.2	1.2	1.870			
			C	0.098	3.458	0.575	1.074	1.074	0.463			
			D	0.098	3.458	0.575	1.074	1.074	0.463			
T9	49.20	119.94	A	0.063	3.642	0.572	1.048	1.048	0.340	98.05	49.02	B
26.0000-24.0000			B	0.39	2.308	0.647	1.2	1.2	1.691			
			C	0.063	3.642	0.572	1.048	1.048	0.340			
			D	0.063	3.642	0.572	1.048	1.048	0.340			
T10	50.00	131.21	A	0.061	3.656	0.572	1.046	1.046	0.374	102.36	51.18	B
24.0000-22.0000			B	0.35	2.424	0.633	1.2	1.2	1.721			
			C	0.061	3.656	0.572	1.046	1.046	0.374			
			D	0.061	3.656	0.572	1.046	1.046	0.374			
T11	92.50	275.05	A	0.067	3.621	0.572	1.05	1.05	0.909	203.44	54.98	B
22.0000-18.3000			B	0.312	2.548	0.62	1.2	1.2	3.381			
			C	0.067	3.621	0.572	1.05	1.05	0.909			
			D	0.067	3.621	0.572	1.05	1.05	0.909			
T12	113.87	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	246.79	54.84	B
18.3000-13.8000			B	0.259	2.741	0.604	1.194	1.194	4.067			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T13	129.02	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	260.34	52.07	B
13.8000-8.8000			B	0.22	2.898	0.595	1.165	1.165	4.487			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T14	59.35	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	121.06	52.64	B
8.8000-6.5000			B	0.197	2.992	0.59	1.148	1.148	2.089			
			C	0.047	3.734	0.571	1.035	1.035	0.649			
			D	0.047	3.734	0.571	1.035	1.035	0.649			
T15	167.73	1062.44	A	0.054	3.694	0.571	1.04	1.04	2.429	382.23	58.80	B
6.5000-0.0000			B	0.186	3.042	0.588	1.139	1.139	6.487			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	1295.12	5247.45			* 2Ag limit			OTM	94443 kg-m	3238.25		

Mast Vectors - No Ice

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	60.0000-56.0000	0	Wind Normal	386.88	0.00	-386.88	-22439	0	0
		45	Wind 90	464.26	328.28	-328.28	-19040	-19040	0
		90	Wind Normal	386.88	386.88	0.00	0	-22439	0
T2	56.0000-53.0000	0	Wind Normal	494.29	0.00	-494.29	-26939	0	0
		45	Wind 90	494.29	349.52	-349.52	-19049	-19049	0
		90	Wind Normal	494.29	494.29	0.00	0	-26939	0
T3	53.0000-50.0000	0	Wind Normal	500.97	0.00	-500.97	-25800	0	0
		45	Wind 90	601.16	425.08	-425.08	-21892	-21892	0
		90	Wind Normal	500.97	500.97	0.00	0	-25800	0
T4	50.0000-46.0000	0	Wind Normal	820.84	0.00	-820.84	-39400	0	0
		45	Wind 90	985.01	696.51	-696.51	-33432	-33432	0
		90	Wind Normal	820.84	820.84	0.00	0	-39400	0
T5	46.0000-40.0000	0	Wind Normal	1291.70	0.00	-1291.70	-55543	0	0
		45	Wind 90	1550.04	1096.05	-1096.05	-47130	-47130	0
		90	Wind Normal	1291.70	1291.70	0.00	0	-55543	0
T6	40.0000-34.0000	0	Wind Normal	1317.61	0.00	-1317.61	-48752	0	0
		45	Wind 90	1581.13	1118.03	-1118.03	-41367	-41367	0

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 21 of 55
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).	Date 15:40:59 05/24/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T7	34.0000-28.0000	90	Wind Normal	1317.61	1317.61	0.00	0	-48752	0
		0	Wind Normal	1013.70	0.00	-1013.70	-31425	0	0
		45	Wind 90	1216.44	860.16	-860.16	-26665	-26665	0
T8	28.0000-26.0000	90	Wind Normal	1013.70	1013.70	0.00	0	-31425	0
		0	Wind Normal	336.37	0.00	-336.37	-9082	0	0
		45	Wind 90	403.64	285.42	-285.42	-7706	-7706	0
T9	26.0000-24.0000	90	Wind Normal	336.37	336.37	0.00	0	-9082	0
		0	Wind Normal	326.82	0.00	-326.82	-8171	0	0
		45	Wind 90	392.19	277.32	-277.32	-6933	-6933	0
T10	24.0000-22.0000	90	Wind Normal	326.82	326.82	0.00	0	-8171	0
		0	Wind Normal	341.20	0.00	-341.20	-7848	0	0
		45	Wind 90	409.44	289.52	-289.52	-6659	-6659	0
T11	22.0000-18.3000	90	Wind Normal	341.20	341.20	0.00	0	-7848	0
		0	Wind Normal	678.13	0.00	-678.13	-13664	0	0
		45	Wind 90	813.76	575.41	-575.41	-11595	-11595	0
T12	18.3000-13.8000	90	Wind Normal	678.13	678.13	0.00	0	-13664	0
		0	Wind Normal	826.70	0.00	-826.70	-13269	0	0
		45	Wind 90	987.14	698.02	-698.02	-11203	-11203	0
T13	13.8000-8.8000	90	Wind Normal	826.70	826.70	0.00	0	-13269	0
		0	Wind Normal	894.14	0.00	-894.14	-10104	0	0
		45	Wind 90	1041.36	736.35	-736.35	-8321	-8321	0
T14	8.8000-6.5000	90	Wind Normal	894.14	894.14	0.00	0	-10104	0
		0	Wind Normal	421.87	0.00	-421.87	-3227	0	0
		45	Wind 90	484.24	342.41	-342.41	-2619	-2619	0
T15	6.5000-0.0000	90	Wind Normal	421.87	421.87	0.00	0	-3227	0
		0	Wind Normal	1341.95	0.00	-1341.95	-4361	0	0
		45	Wind 90	1528.90	1081.10	-1081.10	-3514	-3514	0
		90	Wind Normal	1341.95	1341.95	0.00	0	-4361	0

Mast Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-10993.19	-320023	0	0
45	9159.17	-9159.17	-267125	-267125	0
90	10993.19	0.00	0	-320023	0

Mast Vectors - Service

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	60.0000-56.0000	0	Wind Normal	96.72	0.00	-96.72	-5610	0	0
		45	Wind 90	116.06	82.07	-82.07	-4760	-4760	0
		90	Wind Normal	96.72	96.72	0.00	0	-5610	0
T2	56.0000-53.0000	0	Wind Normal	123.57	0.00	-123.57	-6735	0	0
		45	Wind 90	123.57	87.38	-87.38	-4762	-4762	0
		90	Wind Normal	123.57	123.57	0.00	0	-6735	0
T3	53.0000-50.0000	0	Wind Normal	125.24	0.00	-125.24	-6450	0	0
		45	Wind 90	150.29	106.27	-106.27	-5473	-5473	0
		90	Wind Normal	125.24	125.24	0.00	0	-6450	0

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 22 of 55
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	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T4	50.0000-46.0000	0	Wind Normal	205.21	0.00	-205.21	-9850	0	0
		45	Wind 90	246.25	174.13	-174.13	-8358	-8358	0
		90	Wind Normal	205.21	205.21	0.00	0	-9850	0
T5	46.0000-40.0000	0	Wind Normal	322.93	0.00	-322.93	-13886	0	0
		45	Wind 90	387.51	274.01	-274.01	-11782	-11782	0
		90	Wind Normal	322.93	322.93	0.00	0	-13886	0
T6	40.0000-34.0000	0	Wind Normal	329.40	0.00	-329.40	-12188	0	0
		45	Wind 90	395.28	279.51	-279.51	-10342	-10342	0
		90	Wind Normal	329.40	329.40	0.00	0	-12188	0
T7	34.0000-28.0000	0	Wind Normal	253.43	0.00	-253.43	-7856	0	0
		45	Wind 90	304.11	215.04	-215.04	-6666	-6666	0
		90	Wind Normal	253.43	253.43	0.00	0	-7856	0
T8	28.0000-26.0000	0	Wind Normal	84.09	0.00	-84.09	-2271	0	0
		45	Wind 90	100.91	71.35	-71.35	-1927	-1927	0
		90	Wind Normal	84.09	84.09	0.00	0	-2271	0
T9	26.0000-24.0000	0	Wind Normal	81.71	0.00	-81.71	-2043	0	0
		45	Wind 90	98.05	69.33	-69.33	-1733	-1733	0
		90	Wind Normal	81.71	81.71	0.00	0	-2043	0
T10	24.0000-22.0000	0	Wind Normal	85.30	0.00	-85.30	-1962	0	0
		45	Wind 90	102.36	72.38	-72.38	-1665	-1665	0
		90	Wind Normal	85.30	85.30	0.00	0	-1962	0
T11	22.0000-18.3000	0	Wind Normal	169.53	0.00	-169.53	-3416	0	0
		45	Wind 90	203.44	143.85	-143.85	-2899	-2899	0
		90	Wind Normal	169.53	169.53	0.00	0	-3416	0
T12	18.3000-13.8000	0	Wind Normal	206.68	0.00	-206.68	-3317	0	0
		45	Wind 90	246.79	174.50	-174.50	-2801	-2801	0
		90	Wind Normal	206.68	206.68	0.00	0	-3317	0
T13	13.8000-8.8000	0	Wind Normal	223.54	0.00	-223.54	-2526	0	0
		45	Wind 90	260.34	184.09	-184.09	-2080	-2080	0
		90	Wind Normal	223.54	223.54	0.00	0	-2526	0
T14	8.8000-6.5000	0	Wind Normal	105.47	0.00	-105.47	-807	0	0
		45	Wind 90	121.06	85.60	-85.60	-655	-655	0
		90	Wind Normal	105.47	105.47	0.00	0	-807	0
T15	6.5000-0.0000	0	Wind Normal	335.49	0.00	-335.49	-1090	0	0
		45	Wind 90	382.23	270.27	-270.27	-878	-878	0
		90	Wind Normal	335.49	335.49	0.00	0	-1090	0

Mast Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-2748.30	-80006	0	0
45	2289.79	-2289.79	-66781	-66781	0
90	2748.30	0.00	0	-80006	0

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	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Discrete Appurtenance Pressures - No Ice $G_H = 1.115$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _r MPa	C _{AAC} Front m ²	C _{AAC} Side m ²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	-0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	60.0000	1.666	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	55.0000	1.625	0.00	0.5000	0.2000
Sum Weights		640.00							

Discrete Appurtenance Vectors - No Ice

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	157.41	0.00	0.00	-157.41	-7613	0	0
45	111.31	47.09	47.09	-111.31	-5400	-2260	-45
90	0.00	66.60	66.60	0.00	-57	-3197	-63

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ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	111.31	47.09	-45.41	-112.00	-5256	2059	134
45	0.00	66.60	47.09	-47.09	-2140	-2381	189
90	111.31	47.09	112.00	45.41	2300	-5497	134

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	107.14	45.33	-43.71	-107.81	-4649	1956	-129
45	0.00	64.10	45.33	-45.33	-2024	-1783	-182
90	107.14	45.33	107.81	43.71	1715	-4407	-129

ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	107.14	45.33	43.71	-107.81	-4649	-1956	129
45	151.52	0.00	107.14	-107.14	-4620	-4620	0
90	107.14	45.33	107.81	-43.71	-1956	-4649	-129

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	159.26	0.00	0.00	-159.26	-8020	-18	48
45	112.61	47.64	47.64	-112.61	-5688	-2400	-11
90	0.00	67.38	67.38	0.00	-57	-3387	-64

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	159.26	0.00	0.00	-159.26	-8020	18	-48
45	112.61	47.64	47.64	-112.61	-5688	-2364	-79
90	0.00	67.38	67.38	0.00	-57	-3351	-64

ANT PANEL 1.0x0.50x0.19m - Elevation 60 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	64.53	0.00	0.00	-64.53	-3866	0	0
45	45.63	18.25	18.25	-45.63	-2732	-1095	5
90	0.00	25.81	25.81	0.00	6	-1549	8

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ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	45.41	18.16	19.27	-44.95	-2632	-1117	-26
45	64.22	0.00	45.41	-45.41	-2659	-2659	0
90	45.41	18.16	44.95	-19.27	-1117	-2632	26

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	64.22	0.00	0.00	-64.22	-3783	0	0
45	45.41	18.16	18.16	-45.41	-2673	-1072	5
90	0.00	25.69	25.69	0.00	6	-1516	8

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	45.41	18.16	-19.27	-44.95	-2632	1117	26
45	0.00	25.69	18.16	-18.16	-1052	-1092	37
90	45.41	18.16	44.95	19.27	1157	-2672	26

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	45.19	18.08	19.17	-44.73	-2574	-1092	-26
45	63.91	0.00	45.19	-45.19	-2601	-2601	0
90	45.19	18.08	44.73	-19.17	-1092	-2574	26

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	63.91	0.00	0.00	-63.91	-3701	0	0
45	45.19	18.08	18.08	-45.19	-2615	-1048	5
90	0.00	25.56	25.56	0.00	6	-1483	8

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	45.19	18.08	-19.17	-44.73	-2574	1092	26
45	0.00	25.56	18.08	-18.08	-1028	-1069	36
90	45.19	18.08	44.73	19.17	1132	-2615	26

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ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.96	17.99	19.08	-44.51	-2517	-1067	-26
45	63.59	0.00	44.96	-44.96	-2543	-2543	0
90	44.96	17.99	44.51	-19.08	-1067	-2517	26

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	63.59	0.00	0.00	-63.59	-3619	0	0
45	44.96	17.99	17.99	-44.96	-2557	-1025	5
90	0.00	25.44	25.44	0.00	6	-1450	8

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.96	17.99	-19.08	-44.51	-2517	1067	26
45	0.00	25.44	17.99	-17.99	-1005	-1045	36
90	44.96	17.99	44.51	19.08	1108	-2557	26

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.74	17.90	18.98	-44.29	-2460	-1043	-25
45	63.27	0.00	44.74	-44.74	-2485	-2485	0
90	44.74	17.90	44.29	-18.98	-1043	-2460	25

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	63.27	0.00	0.00	-63.27	-3537	0	0
45	44.74	17.90	17.90	-44.74	-2499	-1002	5
90	0.00	25.31	25.31	0.00	6	-1417	8

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.74	17.90	-18.98	-44.29	-2460	1043	25
45	0.00	25.31	17.90	-17.90	-982	-1022	36
90	44.74	17.90	44.29	18.98	1083	-2500	25

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ANT PANEL 1.0x0.50x0.19m - Elevation 55 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	62.94	0.00	0.00	-62.94	-3456	0	0
45	44.51	17.80	17.80	-44.51	-2442	-979	5
90	0.00	25.18	25.18	0.00	6	-1385	8

Discrete Appurtenance Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-45.41	-1542.98	-80533	2059	134
45	702.53	-1058.94	-55432	-36547	50
90	1038.93	45.41	2085	-53814	-64

Discrete Appurtenance Pressures - Service $G_H = 1.115$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q MPa	C _A A _c Front m ²	C _A A _c Side m ²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	-0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	60.0000	1.666	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000

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Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _z MPa	C _{AAC} Front m ²	C _{AAC} Side m ²
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	55.0000	1.625	0.00	0.5000	0.2000
	Sum Weight:	640.00							

Discrete Appurtenance Vectors - Service

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	39.35	0.00	0.00	-39.35	-1946	0	0
45	27.83	11.77	11.77	-27.83	-1393	-565	-11
90	0.00	16.65	16.65	0.00	-57	-799	-16

ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	27.83	11.77	-11.35	-28.00	-1223	424	33
45	0.00	16.65	11.77	-11.77	-444	-686	47
90	27.83	11.77	28.00	11.35	666	-1465	33

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	26.78	11.33	-10.93	-26.95	-1253	580	-32
45	0.00	16.03	11.33	-11.33	-597	-355	-46
90	26.78	11.33	26.95	10.93	338	-1011	-32

ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	26.78	11.33	10.93	-26.95	-1253	-580	32
45	37.88	0.00	26.78	-26.78	-1246	-1246	0
90	26.78	11.33	26.95	-10.93	-580	-1253	-32

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	39.81	0.00	0.00	-39.81	-2048	-18	12
45	28.15	11.91	11.91	-28.15	-1465	-614	-3
90	0.00	16.84	16.84	0.00	-57	-860	-16

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ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	39.81	0.00	0.00	-39.81	-2048	18	-12
45	28.15	11.91	11.91	-28.15	-1465	-578	-20
90	0.00	16.84	16.84	0.00	-57	-824	-16

ANT PANEL 1.0x0.50x0.19m - Elevation 60 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	16.13	0.00	0.00	-16.13	-962	0	0
45	11.41	4.56	4.56	-11.41	-678	-274	1
90	0.00	6.45	6.45	0.00	6	-387	2

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.35	4.54	4.82	-11.24	-643	-264	-6
45	16.05	0.00	11.35	-11.35	-650	-650	0
90	11.35	4.54	11.24	-4.82	-264	-643	6

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	16.05	0.00	0.00	-16.05	-941	0	0
45	11.35	4.54	4.54	-11.35	-664	-268	1
90	0.00	6.42	6.42	0.00	6	-379	2

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.35	4.54	-4.82	-11.24	-643	264	6
45	0.00	6.42	4.54	-4.54	-248	-288	9
90	11.35	4.54	11.24	4.82	304	-683	6

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.30	4.52	4.79	-11.18	-629	-258	-6
45	15.98	0.00	11.30	-11.30	-635	-635	0
90	11.30	4.52	11.18	-4.79	-258	-629	6

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ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	15.98	0.00	0.00	-15.98	-921	0	0
45	11.30	4.52	4.52	-11.30	-649	-262	1
90	0.00	6.39	6.39	0.00	6	-371	2

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.30	4.52	-4.79	-11.18	-629	258	6
45	0.00	6.39	4.52	-4.52	-242	-282	9
90	11.30	4.52	11.18	4.79	298	-669	6

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.24	4.50	4.77	-11.13	-614	-252	-6
45	15.90	0.00	11.24	-11.24	-621	-621	0
90	11.24	4.50	11.13	-4.77	-252	-614	6

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	15.90	0.00	0.00	-15.90	-900	0	0
45	11.24	4.50	4.50	-11.24	-635	-256	1
90	0.00	6.36	6.36	0.00	6	-362	2

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.24	4.50	-4.77	-11.13	-614	252	6
45	0.00	6.36	4.50	-4.50	-236	-276	9
90	11.24	4.50	11.13	4.77	292	-654	6

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.18	4.47	4.75	-11.07	-600	-246	-6
45	15.82	0.00	11.18	-11.18	-606	-606	0
90	11.18	4.47	11.07	-4.75	-246	-600	6

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ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	15.82	0.00	0.00	-15.82	-880	0	0
45	11.18	4.47	4.47	-11.18	-620	-251	1
90	0.00	6.33	6.33	0.00	6	-354	2

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	11.18	4.47	-4.75	-11.07	-600	246	6
45	0.00	6.33	4.47	-4.47	-230	-271	9
90	11.18	4.47	11.07	4.75	286	-640	6

ANT PANEL 1.0x0.50x0.19m - Elevation 55 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	15.74	0.00	0.00	-15.74	-859	0	0
45	11.13	4.45	4.45	-11.13	-606	-245	1
90	0.00	6.29	6.29	0.00	6	-346	2

Discrete Appurtenance Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-11.35	-385.74	-20204	424	33
45	175.63	-264.74	-13929	-9227	12
90	259.73	11.35	450	-13544	-16

Dish Pressures - No Ice

Elevation m	Dish Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	K _z	A _A m ²	q _z MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
50.0000	HP12-21B	135.0000	385.55	1.3743	1.3743	1.581	10.5064	0.00
50.0000	HP12-21B	225.0000	385.55	-1.3743	1.3743	1.581	10.5064	0.00
	Sum		1924.10					
	Weight:							

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Dish Vectors - No Ice

HP12-21B - Elevation 48 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	1605.11	0.00	0.00	0.00	-1605.11	-76461	584	-2433
45	0.003230	0.000000	0.000000	1605.11	0.00	0.00	1134.99	-1134.99	-53895	-53895	0
90	0.003230	0.000000	0.000000	1605.11	0.00	0.00	1605.11	0.00	584	-76461	2433

KP4F-23 - Elevation 48 - From Leg B											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.001520	0.000000	0.000000	67.13	0.00	0.00	0.00	-67.13	-3252	-30	88
45	0.001520	0.000000	0.000000	67.13	0.00	0.00	47.47	-47.47	-2309	-2309	0
90	0.001520	0.000000	0.000000	67.13	0.00	0.00	67.13	0.00	-30	-3252	-88

KP6F-19 - Elevation 48 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.001520	0.000000	0.000000	151.09	0.00	0.00	0.00	-151.09	-7337	85	-144
45	0.001520	0.000000	0.000000	151.09	0.00	0.00	106.83	-106.83	-5213	-5043	-203
90	0.001520	0.000000	0.000000	151.09	0.00	0.00	151.09	0.00	-85	-7167	-144

HP4-107 - Elevation 46 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	176.25	0.00	0.00	0.00	-176.25	-8061	-47	230
45	0.003230	0.000000	0.000000	176.25	0.00	0.00	124.63	-124.63	-5686	-5780	325
90	0.003230	0.000000	0.000000	176.25	0.00	0.00	176.25	0.00	47	-8154	230

KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.001520	0.000000	0.000000	149.26	0.00	0.00	0.00	-149.26	-6749	117	-195
45	0.001520	0.000000	0.000000	149.26	0.00	0.00	105.54	-105.54	-4738	-4738	0
90	0.001520	0.000000	0.000000	149.26	0.00	0.00	149.26	0.00	117	-6749	195

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	169.96	0.00	0.00	0.00	-169.96	-6837	-47	222
45	0.003230	0.000000	0.000000	169.96	0.00	0.00	120.18	-120.18	-4820	-4914	313
90	0.003230	0.000000	0.000000	169.96	0.00	0.00	169.96	0.00	47	-6930	222

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA kg	FS kg	FM kg	Vx kg	Vz kg	OTMx kg-m	OTMz kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	1512.66	0.00	0.00	0.00	-1512.66	-58491	503	-1972
45	0.003230	0.000000	0.000000	1512.66	0.00	0.00	1069.61	-1069.61	-41212	-41212	0
90	0.003230	0.000000	0.000000	1512.66	0.00	0.00	1512.66	0.00	503	-58491	1972

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HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	166.89	0.00	0.00	0.00	-166.89	-6295	-47	218
45	0.003230	0.000000	0.000000	166.89	0.00	0.00	118.01	-118.01	-4438	-4531	308
90	0.003230	0.000000	0.000000	166.89	0.00	0.00	166.89	0.00	47	-6389	218

HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	148.07	0.00	0.00	0.00	-148.07	-3754	52	-214
45	0.003230	0.000000	0.000000	148.07	0.00	0.00	104.70	-104.70	-2669	-2566	-302
90	0.003230	0.000000	0.000000	148.07	0.00	0.00	148.07	0.00	-52	-3650	-214

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	129.17	0.00	0.00	0.00	-129.17	-1913	89	-320
45	0.003230	0.000000	0.000000	129.17	0.00	0.00	91.34	-91.34	-1327	-1327	0
90	0.003230	0.000000	0.000000	129.17	0.00	0.00	129.17	0.00	89	-1913	320

HP12-21B - Elevation 50 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1623.95	0.00	0.00	0.00	-1623.95	-80667	-530	2232
45	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1148.30	-1148.30	-56885	-57945	3156
90	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1623.95	0.00	530	-81727	2232

HP12-21B - Elevation 50 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1623.95	0.00	0.00	0.00	-1623.95	-80667	530	-2232
45	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1148.30	-1148.30	-56885	-56885	0
90	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1623.95	0.00	530	-80667	2232

Dish Totals - No Ice

Wind Azimuth °	Vx	Vz	OTMx	OTMz	Torque
	kg	kg	kg-m	kg-m	kg-m
0	0.00	-7523.48	-340485	1259	-4520
45	5319.91	-5319.91	-240078	-241144	3597
90	7523.48	0.00	2325	-341551	9607

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Dish Pressures - Service

Elevation m	Dish Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	K _z	A _A m ²	q _z MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
50.0000	HP12-21B	135.0000	385.55	1.3743	1.3743	1.581	10.5064	0.00
50.0000	HP12-21B	225.0000	385.55	-1.3743	1.3743	1.581	10.5064	0.00
		Sum	1924.10					
		Weight:						

Dish Vectors - Service

HP12-21B - Elevation 48 - From Leg D

Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	401.28	0.00	0.00	0.00	-401.28	-18677	584	-608
45	0.003230	0.000000	0.000000	401.28	0.00	0.00	283.75	-283.75	-13035	-13035	0
90	0.003230	0.000000	0.000000	401.28	0.00	0.00	401.28	0.00	584	-18677	608

KP4F-23 - Elevation 48 - From Leg B

Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	16.78	0.00	0.00	0.00	-16.78	-836	-30	22
45	0.001520	0.000000	0.000000	16.78	0.00	0.00	11.87	-11.87	-600	-600	0
90	0.001520	0.000000	0.000000	16.78	0.00	0.00	16.78	0.00	-30	-836	-22

KP6F-19 - Elevation 48 - From Leg A

Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	37.77	0.00	0.00	0.00	-37.77	-1898	85	-36
45	0.001520	0.000000	0.000000	37.77	0.00	0.00	26.71	-26.71	-1367	-1197	-51
90	0.001520	0.000000	0.000000	37.77	0.00	0.00	37.77	0.00	-85	-1728	-36

HP4-107 - Elevation 46 - From Leg C

Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	44.06	0.00	0.00	0.00	-44.06	-1980	-47	57
45	0.003230	0.000000	0.000000	44.06	0.00	0.00	31.16	-31.16	-1387	-1480	81
90	0.003230	0.000000	0.000000	44.06	0.00	0.00	44.06	0.00	47	-2074	57

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KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	37.31	0.00	0.00	0.00	-37.31	-1599	117	-49
45	0.001520	0.000000	0.000000	37.31	0.00	0.00	26.39	-26.39	-1097	-1097	0
90	0.001520	0.000000	0.000000	37.31	0.00	0.00	37.31	0.00	117	-1599	49

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	42.49	0.00	0.00	0.00	-42.49	-1674	-47	55
45	0.003230	0.000000	0.000000	42.49	0.00	0.00	30.04	-30.04	-1170	-1264	78
90	0.003230	0.000000	0.000000	42.49	0.00	0.00	42.49	0.00	47	-1768	55

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	378.16	0.00	0.00	0.00	-378.16	-14246	503	-493
45	0.003230	0.000000	0.000000	378.16	0.00	0.00	267.40	-267.40	-9926	-9926	0
90	0.003230	0.000000	0.000000	378.16	0.00	0.00	378.16	0.00	503	-14246	493

HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	41.72	0.00	0.00	0.00	-41.72	-1539	-47	54
45	0.003230	0.000000	0.000000	41.72	0.00	0.00	29.50	-29.50	-1074	-1168	77
90	0.003230	0.000000	0.000000	41.72	0.00	0.00	41.72	0.00	47	-1632	54

HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	37.02	0.00	0.00	0.00	-37.02	-977	52	-53
45	0.003230	0.000000	0.000000	37.02	0.00	0.00	26.18	-26.18	-706	-603	-76
90	0.003230	0.000000	0.000000	37.02	0.00	0.00	37.02	0.00	-52	-874	-53

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	32.29	0.00	0.00	0.00	-32.29	-412	89	-80
45	0.003230	0.000000	0.000000	32.29	0.00	0.00	22.83	-22.83	-265	-265	0
90	0.003230	0.000000	0.000000	32.29	0.00	0.00	32.29	0.00	89	-412	80

HP12-21B - Elevation 50 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	405.99	0.00	0.00	0.00	-405.99	-19769	-530	558
45	0.003230	0.000000	0.000000	405.99	0.00	0.00	287.08	-287.08	-13824	-14884	789
90	0.003230	0.000000	0.000000	405.99	0.00	0.00	405.99	0.00	530	-20829	558

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HP12-21B - Elevation 50 - From Leg D											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	405.99	0.00	0.00	0.00	-405.99	-19769	530	-558
45	0.003230	0.000000	0.000000	405.99	0.00	0.00	287.08	-287.08	-13824	-13824	0
90	0.003230	0.000000	0.000000	405.99	0.00	0.00	405.99	0.00	530	-19769	558

Dish Totals - Service

Wind Azimuth °	V _x	V _z	OTM _x	OTM _z	Torque
	kg	kg	kg-m	kg-m	kg-m
0	0.00	-1880.87	-83377	1259	-1130
45	1329.98	-1329.98	-58276	-59341	899
90	1880.87	0.00	2325	-84443	2402

User Load Vectors - No Ice

C x MANTENIMIENTO - Elevation 60								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANT OMNI (E) - Elevation 48								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0

2 SOP. ANT OMNI (E) - Elevation 42								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0

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User Load Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	80.00	-80.00	-3600	-3600	0
45	80.00	-80.00	-3600	-3600	0
90	80.00	-80.00	-3600	-3600	0

User Load Vectors - Service

C x MANTENIMIENTO - Elevation 60								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANT OMNI (E) - Elevation 48								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
45	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
90	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0

2 SOP. ANT OMNI (E) - Elevation 42								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
45	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
90	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0

User Load Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	20.00	-20.00	-900	-900	0
45	20.00	-20.00	-900	-900	0
90	20.00	-20.00	-900	-900	0

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Force Totals

Load Case	Vertical Forces kg	Sum of Forces X kg	Sum of Forces Z kg	Sum of Overturning Moments, M_x kg-m	Sum of Overturning Moments, M_z kg-m	Sum of Torques kg-m
Leg Weight	0.00					
Bracing Weight	5247.45					
Total Member Self-Weight	5247.45			2231	1139	
Total Weight	9906.67			2231	1139	
Wind 0 deg - No Ice		34.59	-20139.65	-744642	-282	-4386
Wind 45 deg - No Ice		15261.60	-15618.02	-566235	-548416	3646
Wind 90 deg - No Ice		19635.61	-34.59	810	-718989	9543
Total Weight	9906.67			2231	1139	
Wind 0 deg - Service		8.65	-5034.91	-184487	784	-1097
Wind 45 deg - Service		3815.40	-3904.50	-139886	-136250	912
Wind 90 deg - Service		4908.90	-8.65	1876	-178893	2386

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 45 deg - No Ice
4	Dead+Wind 90 deg - No Ice
5	Dead+Wind 0 deg - Service
6	Dead+Wind 45 deg - Service
7	Dead+Wind 90 deg - Service

Maximum Member Forces

Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T1	60 - 56	Leg	Max Tension	3	1695.96	1	2
			Max. Compression	3	-2224.90	0	-3
			Max. M_x	3	-112.20	6	-5
			Max. M_y	4	-1209.29	5	-6
			Max. V_y	4	-54.53	3	-3
			Max. V_x	4	53.42	2	-3
		Diagonal	Max Tension	4	715.56	0	0
			Max. Compression	2	-597.51	0	0
			Max. M_x	2	220.15	0	0
			Max. M_y	4	9.80	0	0
			Max. V_y	2	1.67	0	0
			Max. V_x	4	-0.04	0	0
		Horizontal	Max Tension	2	438.62	0	0
			Max. Compression	4	-523.53	0	0
			Max. M_x	2	1.57	0	0
			Max. M_y	4	-207.86	0	0
			Max. V_y	2	-1.63	0	0
			Max. V_x	4	0.00	0	0
		Top Girt	Max Tension	2	24.33	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m		
T2	56 - 53	Leg	Max. Compression	2	-24.71	0	0		
			Max. Mx	2	1.16	0	0		
			Max. My	4	-18.16	0	0		
			Max. Vy	2	-1.63	0	0		
			Max. Vx	4	-0.00	0	0		
			Max Tension	3	6121.83	22	22		
		Diagonal	Max. Compression	3	-6751.98	1	-1		
			Max. Mx	3	-517.80	-28	21		
			Max. My	3	-6751.32	-23	-23		
			Max. Vy	2	-79.24	19	19		
			Max. Vx	2	-55.50	17	-14		
			Max Tension	4	1186.30	0	0		
			Horizontal	Max. Compression	2	-1055.80	0	0	
				Max. Mx	2	720.30	0	0	
				Max. My	4	263.13	0	0	
				Max. Vy	2	1.67	0	0	
				Max. Vx	4	-0.04	0	0	
				Max Tension	2	767.94	0	0	
		Top Girt	Max. Compression	4	-878.35	0	0		
			Max. Mx	2	5.51	0	0		
			Max. My	4	-691.98	0	0		
			Max. Vy	2	-1.63	0	0		
			Max. Vx	4	-0.00	0	0		
			Max Tension	2	504.18	0	0		
T3	53 - 50	Leg	Max. Compression	4	-606.32	0	0		
			Max. Mx	2	-1.39	0	0		
			Max. My	4	-606.32	0	0		
			Max. Vy	2	1.63	0	0		
			Max. Vx	4	0.00	0	0		
			Max Tension	3	5508.14	-4	-4		
		Diagonal	Max. Compression	3	-5851.92	4	6		
			Max. Mx	3	99.14	-32	30		
			Max. My	3	-37.86	-32	30		
			Max. Vy	3	-54.86	-32	30		
			Max. Vx	3	52.34	-32	30		
			Max Tension	3	1057.87	0	0		
			Top Girt	Max. Compression	3	-1025.61	0	1	
				Max. Mx	2	-164.86	-5	0	
				Max. My	4	474.35	-2	-2	
				Max. Vy	2	9.26	0	0	
				Max. Vx	4	4.03	0	0	
				Max Tension	3	512.91	0	0	
		T4	50 - 46	Leg	Max. Compression	3	-726.70	0	0
					Max. Mx	4	305.65	0	0
					Max. My	4	202.16	0	0
					Max. Vy	4	1.59	0	0
					Max. Vx	4	-0.35	0	0
					Max Tension	3	10330.59	18	18
Diagonal	Max. Compression			3	-11242.39	-18	-18		
	Max. Mx			2	-4572.39	-26	5		
	Max. My			2	3663.39	-4	26		
	Max. Vy			4	-1479.30	-4	-2		
	Max. Vx			4	1466.01	3	3		
	Max Tension			4	4095.01	0	0		
Top Girt	Max. Compression	4	-4388.05	0	0				
	Max. Mx	3	3292.80	3	0				
	Max. My	4	-4371.80	0	-3				
	Max. Vy	3	5.05	3	0				
	Max. Vx	4	1.84	0	-3				
	Max Tension	2	1027.25	0	0				
T4	50 - 46	Top Girt	Max. Compression	2	-891.90	0	0		

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T5	46 - 40	Mid Girt	Max. Mx	5	282.64	-2	0
			Max. My	4	22.28	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	950.02	0	0
			Max. Compression	2	-753.31	0	0
			Max. Mx	5	-65.91	-2	0
			Max. My	4	36.00	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
		Inner Bracing	Max Tension	4	75.14	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	6	68.06	5	0
			Max. My	4	66.67	0	0
			Max. Vy	6	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	29483.37	9	15
			Max. Compression	3	-31189.30	-76	-61
			Max. Mx	4	-21438.37	-150	52
			Max. My	4	18547.13	-57	150
		Diagonal	Max. Vy	4	-187.53	-24	4
			Max. Vx	4	187.20	-6	25
			Max Tension	3	5039.25	0	0
			Max. Compression	3	-5267.46	0	0
			Max. Mx	3	3756.86	7	0
			Max. My	4	-4916.49	-2	-3
			Max. Vy	3	7.46	7	0
			Max. Vx	4	2.11	-2	-3
		Top Girt	Max Tension	2	1612.44	0	0
			Max. Compression	2	-1461.57	0	0
			Max. Mx	5	-252.10	-2	0
			Max. My	4	-9.02	0	0
			Max. Vy	5	5.16	0	0
		Mid Girt	Max. Vx	4	-0.00	0	0
			Max Tension	2	3160.16	0	0
			Max. Compression	2	-2878.06	0	0
			Max. Mx	5	-552.50	-2	0
			Max. My	4	30.46	0	0
		Inner Bracing	Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	94.15	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	6	81.46	5	0
			Max. My	4	74.30	0	0
			Max. Vy	6	-7.30	0	0
			Max. Vx	4	0.00	0	0
		Leg	Max Tension	3	54633.94	45	42
			Max. Compression	3	-56842.35	-13	-10
			Max. Mx	2	25116.45	-205	-60
			Max. My	2	-27743.66	56	204
			Max. Vy	2	-382.62	150	-60
			Max. Vx	2	381.25	56	-150
		Diagonal	Max Tension	3	7975.70	0	0
			Max. Compression	3	-8124.64	0	0
			Max. Mx	3	583.48	11	4
			Max. My	2	-2896.22	6	112
			Max. Vy	3	-10.39	11	4
		Top Girt	Max. Vx	2	81.15	0	0
			Max Tension	2	3961.45	0	0
			Max. Compression	2	-3731.15	0	0
			Max. Mx	5	-804.73	-2	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T7	34 - 28	Mid Girt	Max. My	4	-15.00	0	0
			Max. Vy	5	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	5020.37	0	0
			Max. Compression	2	-5128.94	0	0
			Max. Mx	1	294.48	-2	0
			Max. My	4	27.56	0	0
			Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	206.64	0	0
			Max. Compression	3	-30.90	0	0
			Max. Mx	1	105.29	5	0
		Inner Bracing	Max. My	4	90.18	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	86659.97	-2965	-3
			Max. Compression	3	-89039.63	364	-24
			Max. Mx	3	86659.97	-2965	-3
			Max. My	3	-2926.56	15	1337
			Max. Vy	3	1356.24	-2965	-3
			Max. Vx	3	644.45	15	1337
			Max Tension	3	7424.79	0	0
			Max. Compression	3	-7530.02	0	0
		Diagonal	Max. Mx	3	1157.55	8	0
			Max. My	2	-4397.89	-1	74
			Max. Vy	3	-8.34	8	0
			Max. Vx	2	-53.42	5	74
			Max Tension	2	4118.64	0	0
			Max. Compression	2	-4094.26	0	0
			Max. Mx	1	168.51	-3	0
			Max. My	4	-9.58	0	0
			Max. Vy	1	651	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	4095.12	0	0
			Max. Compression	2	-3865.66	0	0
		Top Girt	Max. Mx	1	138.78	-2	0
			Max. My	4	1.86	0	0
			Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	267.13	0	0
			Max. Compression	3	-161.41	0	0
			Max. Mx	1	82.19	5	0
			Max. My	4	22.68	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	92028.72	57	21
			Max. Compression	3	-94924.98	-59	-27
T8	28 - 26	Leg	Max. Mx	3	92014.60	-2965	-3
			Max. My	3	190.89	0	-1271
			Max. Vy	3	-1547.94	-2965	-3
			Max. Vx	3	-605.00	-6	1267
			Max Tension	3	4175.85	0	0
			Max. Compression	4	-4172.98	4	0
		Diagonal	Max. Mx	3	-1227.21	5	1
			Max. My	2	-2821.75	-2	23
			Max. Vy	3	6.10	5	1
			Max. Vx	2	-17.33	0	0
			Max Tension	3	119.43	0	0
			Max. Compression	2	-309.97	0	0
			Max. Mx	4	-97.50	-3	0
			Max. My	4	-98.25	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m			
T9	26 - 24	Inner Bracing	Max. Vy	4	648	0	0			
			Max. Vx	4	-0.61	0	0			
			Max Tension	3	422.19	0	0			
			Max. Compression	3	-557.76	0	0			
			Max. Mx	1	-7.62	5	0			
			Max. My	4	-105.33	0	0			
		Leg	Max. Vy	1	-7.30	0	0			
			Max. Vx	4	0.00	0	0			
			Max Tension	3	89245.90	-766	12			
			Max. Compression	3	-93019.84	797	-3			
			Max. Mx	3	-93019.84	797	-3			
			Max. My	3	326.11	-2	-1271			
			Diagonal	Max. Vy	3	-490.57	797	-3		
				Max. Vx	3	501.46	-7	1267		
				Max Tension	4	3551.36	0	0		
				Max. Compression	4	-3679.55	0	0		
				Max. Mx	3	-2144.12	5	-1		
				Max. My	4	-3674.87	3	-2		
T10	24 - 22	Leg	Max. Vy	3	-5.84	5	-1			
			Max. Vx	4	1.91	0	0			
			Max Tension	3	85617.88	-572	-7			
			Max. Compression	3	-89790.94	623	-16			
			Max. Mx	3	-89778.09	797	-3			
			Max. My	3	-2959.11	19	436			
		Diagonal	Max. Vy	3	-146.71	-766	12			
			Max. Vx	3	146.71	19	436			
			Max Tension	4	2695.12	0	0			
			Max. Compression	4	-2763.96	0	0			
			Max. Mx	3	-2080.54	4	-1			
			Max. My	4	-1383.41	3	-2			
			T11	22 - 18.3	Leg	Max. Vy	3	5.74	4	-1
						Max. Vx	4	1.46	0	0
						Max Tension	3	81520.98	-112	12
						Max. Compression	3	-85777.01	67	-8
						Max. Mx	3	-85751.13	623	-16
						Max. My	3	-2935.03	-13	653
Diagonal	Max. Vy	3			250.00	623	-16			
	Max. Vx	3			-211.63	-13	653			
	Max Tension	4			2707.54	0	0			
	Max. Compression	4			-2824.03	0	0			
	Max. Mx	3			-1470.78	11	-1			
	Max. My	4			-1398.22	0	-3			
	T12	18.3 - 13.8			Leg	Max. Vy	3	10.26	11	-1
						Max. Vx	4	2.20	0	0
						Max Tension	3	78809.36	-722	-2
						Max. Compression	3	-82913.55	798	2
						Max. Mx	3	-82913.55	798	2
						Max. My	3	-3072.41	-14	653
Diagonal			Max. Vy	3	-304.38	798	2			
			Max. Vx	3	274.63	-14	653			
			Max Tension	4	1938.04	0	0			
			Max. Compression	4	-2077.05	0	0			
			Max. Mx	3	-1082.09	10	-4			
			Max. My	4	-2048.73	8	-6			
			T13	13.8 - 8.8	Leg	Max. Vy	3	10.88	10	-4
						Max. Vx	4	2.88	0	0
						Max Tension	3	77833.50	519	9
						Max. Compression	3	-81756.55	-634	-16
						Max. Mx	3	-81722.75	798	1
						Max. My	3	-706.29	-22	-797

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T14	8.8 - 6.5	Diagonal	Max. Vx	3	283.36	-22	-797
			Max Tension	4	1238.14	0	0
			Max. Compression	4	-1252.54	0	0
			Max. Mx	3	-888.23	13	-6
			Max. My	4	-1139.63	12	-9
			Max. Vy	3	12.77	13	-6
		Leg	Max. Vx	4	3.71	0	0
			Max Tension	3	75532.56	-986	7
			Max. Compression	3	-79217.74	1035	7
			Max. Mx	3	-79217.74	1035	7
			Max. My	3	-1198.94	-24	-797
			Max. Vy	3	-779.50	1035	7
		Diagonal	Max. Vx	3	-323.61	-24	-797
			Max Tension	4	1681.04	0	0
			Max. Compression	4	-1670.66	0	0
			Max. Mx	3	-1053.33	-8	0
			Max. My	3	1348.92	0	1
			Max. Vy	3	940	0	0
T15	6.5 - 0	Leg	Max. Vx	3	-1.16	0	0
			Max Tension	3	75392.49	0	0
			Max. Compression	3	-79164.94	0	0
			Max. Mx	3	-79114.68	1035	7
			Max. My	3	-1220.58	15	228
			Max. Vy	3	347.31	1035	7
		Diagonal	Max. Vx	3	221.97	44	200
			Max Tension	4	1577.37	0	0
			Max. Compression	4	-1835.16	0	0
			Max. Mx	4	10.68	-36	0
			Max. My	4	-0.04	0	-7
			Max. Vy	4	19.47	0	0
		Horizontal	Max. Vx	4	3.80	0	0
			Max Tension	3	662.40	20	-2
			Max. Compression	3	-873.86	5	-1
			Max. Mx	2	478.52	22	-1
			Max. My	2	-547.96	12	-2
			Max. Vy	2	-23.59	22	-1
		Inner Bracing	Max. Vx	4	2.19	12	-2
			Max Tension	3	133.21	0	0
			Max. Compression	3	-159.27	0	0
			Max. Mx	1	-12.24	-20	0
			Max. My	3	133.21	0	0
			Max. Vy	1	18.95	0	0
			Max. Vx	3	-0.02	0	0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg D	Max. Vert	1	2714.83	283.55	-275.82
	Max. H _x	1	2714.83	283.55	-275.82
	Max. H _z	3	-76146.54	-7675.56	7384.81
	Min. Vert	3	-76146.54	-7675.56	7384.81
	Min. H _x	3	-76146.54	-7675.56	7384.81
	Min. H _z	1	2714.83	283.55	-275.82
Leg C	Max. Vert	4	53030.67	-5516.43	-4915.56
	Max. H _x	2	-49798.73	5084.87	4605.59

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Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg B	Max. H _z	2	-49798.73	5084.87	4605.59
	Min. Vert	2	-49798.73	5084.87	4605.59
	Min. H _x	4	53030.67	-5516.43	-4915.56
	Min. H _z	4	53030.67	-5516.43	-4915.56
	Max. Vert	3	80369.11	-7842.88	8062.85
	Max. H _x	1	2238.48	-252.22	259.96
	Max. H _z	3	80369.11	-7842.88	8062.85
	Min. Vert	1	2238.48	-252.22	259.96
Leg A	Min. H _x	3	80369.11	-7842.88	8062.85
	Min. H _z	1	2238.48	-252.22	259.96
	Max. Vert	2	54750.17	5274.85	5456.71
	Max. H _x	2	54750.17	5274.85	5456.71
	Max. H _z	2	54750.17	5274.85	5456.71
	Min. Vert	4	-48085.21	-4305.44	-5085.58
	Min. H _x	4	-48085.21	-4305.44	-5085.58
	Min. H _z	4	-48085.21	-4305.44	-5085.58

Tower Mast Reaction Summary

Load Combination	Vertical kg	Shear _x kg	Shear _z kg	Overtuning Moment, M _x kg-m	Overtuning Moment, M _z kg-m	Torque kg-m
Dead Only	9906.67	0.02	-0.04	2256	1150	0
Dead+Wind 0 deg - No Ice	9906.74	34.55	-20143.42	-747844	-319	-4412
Dead+Wind 45 deg - No Ice	9906.64	15260.97	-15617.30	-568399	-550688	3664
Dead+Wind 90 deg - No Ice	9906.73	19638.70	-34.50	926	-722052	9597
Dead+Wind 0 deg - Service	9906.66	8.65	-5034.70	-185242	799	-1103
Dead+Wind 45 deg - Service	9906.66	3815.25	-3904.35	-140438	-136804	918
Dead+Wind 90 deg - Service	9906.66	4908.69	-8.66	1912	-179630	2400

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX kg	PY kg	PZ kg	PX kg	PY kg	PZ kg	
1	0.00	-9906.67	-0.00	-0.02	9906.67	0.04	0.000%
2	34.59	-9906.67	-20139.65	-34.55	9906.74	20143.42	0.017%
3	15261.60	-9906.67	-15618.02	-15260.97	9906.64	15617.30	0.004%
4	19635.61	-9906.67	-34.59	-19638.70	9906.73	34.50	0.014%
5	8.65	-9906.67	-5034.91	-8.65	9906.66	5034.70	0.002%
6	3815.40	-9906.67	-3904.50	-3815.25	9906.66	3904.35	0.002%
7	4908.90	-9906.67	-8.65	-4908.69	9906.66	8.66	0.002%

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Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	12	0.00000001	0.00010014
2	No	200	0.00474416	0.00000000
3	Yes	14	0.00007373	0.00008785
4	No	200	0.00429448	0.00000000
5	Yes	14	0.00000001	0.00008227
6	Yes	14	0.00000001	0.00008188
7	Yes	14	0.00000001	0.00008309

Maximum Tower Deflections - Service Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	60 - 56	225.03	6	0.4491	0.1803
T2	56 - 53	193.62	6	0.4462	0.1698
T3	53 - 50	170.38	6	0.4307	0.1521
T4	50 - 46	148.37	6	0.4165	0.1504
T5	46 - 40	119.09	6	0.4048	0.1363
T6	40 - 34	77.98	6	0.3505	0.1098
T7	34 - 28	45.09	6	0.2386	0.0762
T8	28 - 26	22.69	6	0.1534	0.0413
T9	26 - 24	18.16	6	0.1247	0.0304
T10	24 - 22	14.50	6	0.1019	0.0231
T11	22 - 18.3	11.49	6	0.0830	0.0178
T12	18.3 - 13.8	7.13	6	0.0599	0.0122
T13	13.8 - 8.8	3.44	6	0.0393	0.0077
T14	8.8 - 6.5	0.92	6	0.0198	0.0043
T15	6.5 - 0	0.13	6	0.0154	0.0033

Critical Deflections and Radius of Curvature - Service Wind

Elevation m	Appurtenance	Gov. Load Comb.	Deflection mm	Tilt °	Twist °	Radius of Curvature m
60.0000	ANT PANEL 1.0x0.50x0.19m	6	225.03	0.4491	0.1803	292478
59.0000	ANT PANEL 1.0x0.50x0.19m	6	217.18	0.4496	0.1791	292478
58.0000	ANT PANEL 1.0x0.50x0.19m	6	209.33	0.4496	0.1773	222866
57.0000	ANT PANEL 1.0x0.50x0.19m	6	201.48	0.4486	0.1744	168909
56.0000	ANT PANEL 1.0x0.50x0.19m	6	193.62	0.4462	0.1698	46051
55.0000	ANT PANEL 1.0x0.50x0.19m	6	185.78	0.4419	0.1635	13619
50.0000	HP12-21B	6	148.37	0.4165	0.1504	31363
48.0000	HP12-21B	6	133.71	0.4109	0.1452	83910
46.0000	HP4-107	6	119.09	0.4048	0.1363	12589
42.0000	ANT OMNI L=4.0m	6	90.97	0.3766	0.1190	5084
40.5000	HP4-107	6	81.14	0.3579	0.1122	4175
39.0000	HP12-21B	6	71.85	0.3338	0.1047	3877
38.0000	HP4-107	6	65.97	0.3153	0.0993	3851
25.0000	HP4-107	6	16.24	0.1126	0.0263	5752
15.5000	HP4-107	6	4.65	0.0469	0.0092	12846

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Maximum Tower Deflections - Design Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	60 - 56	930.89	3	1.8831	0.6984
T2	56 - 53	799.30	3	1.8676	0.6672
T3	53 - 50	702.22	3	1.7980	0.6105
T4	50 - 46	610.44	3	1.7373	0.6038
T5	46 - 40	488.59	3	1.6824	0.5473
T6	40 - 34	318.50	3	1.4478	0.4411
T7	34 - 28	183.26	3	0.9779	0.3055
T8	28 - 26	91.77	3	0.6265	0.1653
T9	26 - 24	73.36	3	0.5085	0.1216
T10	24 - 22	58.49	3	0.4151	0.0923
T11	22 - 18.3	46.29	3	0.3376	0.0713
T12	18.3 - 13.8	28.67	3	0.2433	0.0488
T13	13.8 - 8.8	13.74	3	0.1596	0.0306
T14	8.8 - 6.5	3.61	3	0.0805	0.0173
T15	6.5 - 0	0.44	3	0.0626	0.0132

Critical Deflections and Radius of Curvature - Design Wind

Elevation m	Appurtenance	Gov. Load Comb.	Deflection mm	Tilt °	Twist °	Radius of Curvature m
60.0000	ANT PANEL 1.0x0.50x0.19m	3	930.89	1.8831	0.6984	94782
59.0000	ANT PANEL 1.0x0.50x0.19m	3	897.97	1.8848	0.6952	94782
58.0000	ANT PANEL 1.0x0.50x0.19m	3	865.07	1.8843	0.6901	72224
57.0000	ANT PANEL 1.0x0.50x0.19m	3	832.17	1.8793	0.6814	41958
56.0000	ANT PANEL 1.0x0.50x0.19m	3	799.30	1.8676	0.6672	9700
55.0000	ANT PANEL 1.0x0.50x0.19m	3	766.51	1.8481	0.6470	2989
50.0000	HP12-21 B	3	610.44	1.7373	0.6038	8861
48.0000	HP12-21 B	3	549.41	1.7113	0.5825	18294
46.0000	HP4-107	3	488.59	1.6824	0.5473	2825
42.0000	ANT OMNI L=4.0m	3	372.15	1.5590	0.4782	1188
40.5000	HP4-107	3	331.54	1.4794	0.4508	986
39.0000	HP12-21 B	3	293.22	1.3773	0.4206	920
38.0000	HP4-107	3	269.03	1.2994	0.3989	915
25.0000	HP4-107	3	65.57	0.4588	0.1054	1406
15.5000	HP4-107	3	18.62	0.1903	0.0368	3159

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Bolt Design Data

Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
T1	60	Leg	A394T0	16	2	126.11	5536.87	0.023 ✓	1.333	Bearing
		Diagonal	A394T0	16	1	715.56	2774.71	0.258 ✓	1.333	Member Bearing
T2	56	Leg	A394T0	16	6	947.50	5536.87	0.171 ✓	1.333	Bearing
		Diagonal	A394T0	16	1	1186.30	2774.71	0.428 ✓	1.333	Member Bearing
T3	53	Leg	A394T0	16	6	1950.64	5536.87	0.352 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	528.93	3705.44	0.143 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	363.35	3705.44	0.098 ✓	1.333	Member Bearing
T4	50	Leg	A394T0	16	6	2141.46	5536.87	0.387 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	2194.03	3705.44	0.592 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	513.63	3705.44	0.139 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	475.01	3699.61	0.128 ✓	1.333	Member Bearing
T5	46	Leg	A394T0	16	6	5791.42	5536.87	1.046 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	2633.73	3705.44	0.711 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	806.22	3705.44	0.218 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	1580.08	3699.61	0.427 ✓	1.333	Member Bearing
T6	40	Leg	A394T0	16	12	6515.63	5536.87	1.177 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	4062.32	3705.44	1.096 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	1980.73	3705.44	0.535 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	2564.47	3699.61	0.693 ✓	1.333	Member Bearing
T7	34	Leg	A394T0	16	8	17495.61	9979.03	1.753 ✗	1.333	Bolt SS
		Diagonal	A394T0	16	2	3765.01	3705.44	1.016 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	2059.32	3705.44	0.556 ✓	1.333	Member Bearing
		Mid Girt	A394T0	16	2	2047.56	3699.61	0.553 ✓	1.333	Member Bearing
T8	28	Leg	A394T0	16	8	23731.23	9979.03	2.378 ✗	1.333	Bolt SS
		Diagonal	A394T0	16	2	2087.93	3705.44	0.563 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	154.99	3705.44	0.042 ✓	1.333	Member Bearing
T9	26	Diagonal	A394T0	16	2	1839.78	3705.44	0.497 ✓	1.333	Member Bearing
T10	24	Leg	A394T0	16	16	11223.87	9979.03	1.125 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1381.98	3705.44	0.373 ✓	1.333	Member Bearing
T11	22	Diagonal	A394T0	16	2	1412.02	3705.44	0.381 ✓	1.333	Member Bearing
T12	18.3	Leg	A394T0	16	24	6909.48	9979.03	0.692 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1038.53	3705.44	0.280 ✓	1.333	Member Bearing
T13	13.8	Leg	A394T0	16	24	6813.05	9979.03	0.683 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	626.27	3705.44	0.169 ✓	1.333	Member Bearing
T14	8.8	Diagonal	A394T0	16	2	840.52	3705.44	0.227 ✓	1.333	Member Bearing
T15	6.5	Leg	A394T0	16	32	4947.79	9979.03	0.496 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	917.58	4940.57	0.186 ✓	1.333	Member Bearing
		Horizontal	A394T0	16	1	662.40	3699.61	0.179 ✓	1.333	Member Bearing

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Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
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Compression Checks

Leg Design Data (Compression)

Section No.	Elevation m	Size	L m	L _u m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T1	60 - 56	L102x102x6	4.0000	0.5000	24.8 K=1.00	162	1252	-2224.90	20685.77	0.108 ✓
T2	56 - 53	L102x102x6	3.0000	0.5000	24.8 K=1.00	162	1252	-6752.00	20685.77	0.326 ✓
T3	53 - 50	L102x102x6	3.1377	1.0459	51.8 K=1.00	143	1252	-5851.93	18273.29	0.320 ✓
T4	50 - 46	L102x102x6	4.0000	2.0000	49.5 K=0.50	145	1252	-11164.77	18504.49	0.603 ✓
T5	46 - 40	L102x102x6	6.0000	2.0000	49.5 K=0.50	145	1252	-31189.29	18504.49	1.686 ✗
T6	40 - 34	HI-3 (1.69 CR) - 185 L102x102x6	6.0000	2.0000	49.5 K=0.50	145	1252	-56842.40	18504.49	3.072 ✗
T7	34 - 28	HI-3 (3.07 CR) - 227 L102x6+L102x8	6.0000	2.0000	49.5 K=0.50	168	2800	-89039.75	48082.62	1.852 ✗
T8	28 - 26	HI-3 (1.85 CR) - 269 L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-94925.12	58020.83	1.636 ✗
T9	26 - 24	bolt (2.38 CR) - 311 L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-93020.03	58020.83	1.603 ✗
T10	24 - 22	HI-3 (1.60 CR) - 329 L102x8+L102x10	2.0175	2.0175	50.2 K=0.50	168	3394	-89790.90	58020.83	1.548 ✗
T11	22 - 18.3	HI-3 (1.55 CR) - 341 L102x10+L102x13	3.7324	3.7324	46.6 K=0.25	171	4264	-85777.06	74553.82	1.151 ✓
T12	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	56.7 K=0.25	160	4264	-82913.53	69769.78	1.188 ✓
T13	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	63.0 K=0.25	153	4264	-81756.42	66550.64	1.228 ✓
T14	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	46.1 K=0.50	172	5393	-79217.66	94571.31	0.838 ✓
T15	6.5 - 0	L127x10+L127x13	6.5569	6.5569	52.2 K=0.20	166	5393	-79165.05	91045.09	0.870 ✓

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Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.7810	0.6488	64.8 K=1.00	117	461	-597.51	5499.45	0.109 ✓
T2	56 - 53	L51x51x5	0.7810	0.6488	64.8 K=1.00	117	461	-1055.80	5499.45	0.192 ✓
T3	53 - 50	L51x51x5	1.3092	0.7693	76.9 K=1.00	108	461	-1025.60	5091.80	0.201 ✓
T4	50 - 46	L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-4388.05	2845.73	1.542 ✗
T5	46 - 40	HI-3 (1.54 CR) - 168 L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-5267.48	2845.73	1.851 ✗
T6	40 - 34	HI-3 (1.85 CR) - 200 L51x51x5	2.7586	1.3056	130.5 K=1.00	60	461	-8124.66	2845.73	2.855 ✗
T7	34 - 28	HI-3 (2.86 CR) - 242 L51x51x5	2.7586	1.3053	130.4 K=1.00	61	461	-7530.00	2846.99	2.645 ✗
T8	28 - 26	HI-3 (2.64 CR) - 284 L44x44x5	2.8970	1.5081	110.6 K=1.00	80	401	-4172.98	3266.19	1.278 ✓
T9	26 - 24	L44x44x5	3.1779	1.6443	120.6 K=1.00	70	401	-3679.55	2873.95	1.280 ✓
T10	24 - 22	L44x44x5	3.4766	1.7908	131.3 K=1.00	60	401	-2763.96	2440.08	1.133 ✓
T11	22 - 18.3	L64x64x5	5.0180	2.6917	136.2 K=1.00	55	582	-2824.04	3292.99	0.858 ✓
T12	18.3 - 13.8	L64x64x5	6.1299	3.3022	167.1 K=1.00	37	582	-2077.05	2187.98	0.949 ✓
T13	13.8 - 8.8	L64x64x5	7.1088	3.8136	193.0 K=1.00	28	582	-1252.54	1640.49	0.764 ✓
T14	8.8 - 6.5	L64x64x5	3.5915	3.5251	178.4 K=1.00	32	582	-1670.65	1920.02	0.870 ✓
T15	6.5 - 0	L76x76x6	7.4433	7.3129	194.5 K=0.40	27	929	-1835.16	2577.44	0.712 ✓

Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-523.53	5957.12	0.088 ✓
T2	56 - 53	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-878.35	5957.12	0.147 ✓
T15	6.5 - 0	L76x76x6	5.9310	2.9020	122.9 K=1.00	68	929	-873.86	6446.86	0.136 ✓

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Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-24.71	5957.12	0.004 ✓
T2	56 - 53	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-606.32	5957.12	0.102 ✓
T3	53 - 50	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-726.70	5957.12	0.122 ✓
T4	50 - 46	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-891.90	1499.72	0.595 ✓
T5	46 - 40	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-1461.57	1499.72	0.975 ✓
T6	40 - 34	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-3731.15	1499.72	2.488 ✗
T7	34 - 28	HI-3 (2.49 CR) - 231 L64x64x5	1.9000	1.7984	143.0 K=1.00	50	582	-4094.27	2986.27	1.371 ✗
T8	28 - 26	HI-3 (1.37 CR) - 273 L64x64x5	1.9000	1.7980	143.0 K=1.00	50	582	-309.97	2987.60	0.104 ✓

Mid Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T4	50 - 46	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-753.31	1499.72	0.502 ✓
T5	46 - 40	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-2878.06	1499.72	1.919 ✗
T6	40 - 34	HI-3 (1.92 CR) - 193 L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-5128.95	1499.72	3.420 ✗
T7	34 - 28	HI-3 (3.42 CR) - 235 L51x51x5	1.9000	1.7980	179.7 K=1.00	32	461	-3865.66	1500.39	2.576 ✗
		HI-3 (2.58 CR) - 289								

Inner Bracing Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T6	40 - 34	L51x51x5	2.6870	2.5854	165.0 K=1.00	38	461	-30.90	1779.52	0.017 ✓
T7	34 - 28	L51x51x5	2.6870	2.5854	165.0 K=1.00	38	461	-161.41	1779.52	0.091 ✓

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Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_U</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T8	28 - 26	L51x51x5	2.6870	2.5850	164.9 K=1.00	38	461	-557.76	1780.07	0.313 ✓
T15	6.5 - 0	L64x64x6	4.1938	4.1938	214.7 K=1.00	22	768	-159.27	1748.47	0.091 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation <i>m</i>	Size	<i>L</i> <i>m</i>	<i>L_U</i> <i>m</i>	<i>KI/r</i>	<i>F_a</i> <i>MPa</i>	<i>A</i> <i>mm²</i>	Actual <i>P</i> <i>kg</i>	Allow. <i>P_a</i> <i>kg</i>	Ratio <i>P</i> <i>P_a</i>
T1	60 - 56	L102x102x6	4.0000	0.5000	15.7	224	1009	1695.96	23063.59	0.074 ✓
T2	56 - 53	L102x102x6	3.0000	0.5000	15.7	224	1009	6121.82	23063.59	0.265 ✓
T3	53 - 50	L102x102x6	3.1377	1.0459	32.9	224	1009	5508.16	23063.59	0.239 ✓
T4	50 - 46	L102x102x6	4.0000	2.0000	63.0	224	1009	9858.83	23063.59	0.427 ✓
T5	46 - 40	L102x102x6	6.0000	2.0000	63.0	224	1009	29458.70	23063.59	1.277 ✓
T6	40 - 34	L102x102x6	6.0000	2.0000	63.0	224	1009	54633.86	23063.59	2.369 ✗
T7	34 - 28	H2-1 (2.37 CR) - 225 L102x6+L102x8	6.0000	2.0000	99.0	207	2800	86659.75	59057.74	1.467 ✗
T8	28 - 26	bolt (1.69 CR) - 267 L102x8+L102x10	2.0175	2.0175	100.4	207	3394	92028.93	71576.90	1.286 ✓
T9	26 - 24	L102x8+L102x10	2.0175	2.0175	100.4	207	3394	89245.68	71576.90	1.247 ✓
T10	24 - 22	L102x8+L102x10	2.0175	2.0175	100.4	207	3394	85617.85	71576.90	1.196 ✓
T11	22 - 18.3	L102x10+L102x13	3.7324	3.7324	186.5	207	4264	81521.00	89936.51	0.906 ✓
T12	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	226.8	207	4264	78809.43	89936.51	0.876 ✓
T13	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	252.0	207	4264	77833.30	89936.51	0.865 ✓
T14	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	92.3	207	5393	75532.68	113749.66	0.664 ✓
T15	6.5 - 0	L127x10+L127x13	6.5569	6.5569	260.8	207	5393	75392.52	113749.66	0.663 ✓

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Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.7810	0.6488	41.4	200	278	715.56	5664.74	0.126
T2	56 - 53	L51x51x5	0.7810	0.6488	41.4	200	278	1186.30	5664.74	0.209
T3	53 - 50	L51x51x5	1.3092	0.7693	62.5	200	278	1057.87	5664.74	0.187
T4	50 - 46	L51x51x5	2.7586	1.3056	125.0	200	278	4095.01	5664.74	0.723
T5	46 - 40	L51x51x5	2.7586	1.3056	125.0	200	278	5039.23	5664.74	0.890
T6	40 - 34	L51x51x5	2.7586	1.3056	125.0	200	278	7975.70	5664.74	1.408
T7	34 - 28	bolt (1.08 CR) - 239 L51x51x5	2.7586	1.3053	124.9	200	278	7424.76	5664.74	1.311
T8	28 - 26	L44x44x5	2.8970	1.5081	156.3	200	232	4175.85	4738.32	0.881
T9	26 - 24	L44x44x5	3.1779	1.6443	172.0	200	232	3551.36	4738.32	0.749
T10	24 - 22	L44x44x5	3.4766	1.7908	188.5	200	232	2695.12	4738.32	0.569
T11	22 - 18.3	L64x64x5	5.0180	2.6917	191.3	200	368	2707.54	7509.63	0.361
T12	18.3 - 13.8	L64x64x5	6.1299	3.3022	234.9	200	368	1938.04	7509.63	0.258
T13	13.8 - 8.8	L64x64x5	7.1088	3.8136	272.7	200	368	1238.14	7509.63	0.165
T14	8.8 - 6.5	L64x64x5	3.5915	3.5251	178.4	200	368	1681.04	7509.63	0.224
T15	6.5 - 0	L76x76x6	7.4433	7.3129	309.6	200	606	1577.37	12354.27	0.128

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	31.8	149	461	438.62	7005.28	0.063
T2	56 - 53	L51x51x5	0.6000	0.4984	31.8	149	461	767.94	7005.28	0.110
T15	6.5 - 0	L76x76x6	5.9310	2.9020	122.9	200	606	662.40	12354.27	0.054

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Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	31.8	149	461	24.33	7005.28	0.003
T2	56 - 53	L51x51x5	0.6000	0.4984	31.8	149	461	504.18	7005.28	0.072
T3	53 - 50	L51x51x5	0.6000	0.4984	31.8	200	278	512.91	5664.74	0.091
T4	50 - 46	L51x51x5	1.9000	1.7984	114.8	200	278	1027.25	5664.74	0.181
T5	46 - 40	L51x51x5	1.9000	1.7984	114.8	200	278	1612.44	5664.74	0.285
T6	40 - 34	L51x51x5	1.9000	1.7984	114.8	200	278	3961.45	5664.74	0.699
T7	34 - 28	L64x64x5	1.9000	1.7984	91.0	200	368	4118.64	7509.63	0.548
T8	28 - 26	L64x64x5	1.9000	1.7980	91.0	200	368	119.43	7509.63	0.016

Mid Girt Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T4	50 - 46	L51x51x5	1.9000	1.7984	114.8	200	278	950.02	5666.60	0.168
T5	46 - 40	L51x51x5	1.9000	1.7984	114.8	200	278	3160.17	5666.60	0.558
T6	40 - 34	L51x51x5	1.9000	1.7984	114.8	200	278	5020.36	5666.60	0.886
T7	34 - 28	L51x51x5	1.9000	1.7980	114.7	200	278	4095.11	5666.60	0.723

Inner Bracing Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T4	50 - 46	L51x51x5	2.6870	2.5854	165.0	149	461	68.45	7005.28	0.010*
T5	46 - 40	L51x51x5	2.6870	2.5854	165.0	149	461	80.14	7005.28	0.011*
T6	40 - 34	L51x51x5	2.6870	2.5854	165.0	149	461	206.64	7005.28	0.029
T7	34 - 28	L51x51x5	2.6870	2.5854	165.0	149	461	267.13	7005.28	0.038
T8	28 - 26	L51x51x5	2.6870	2.5850	164.9	149	461	422.19	7005.28	0.060

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Section No.	Elevation m	Size	L m	L _u m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T15	6.5 - 0	L64x64x6	4.1938	4.1938	214.7	149	768	133.21	11659.14	0.011

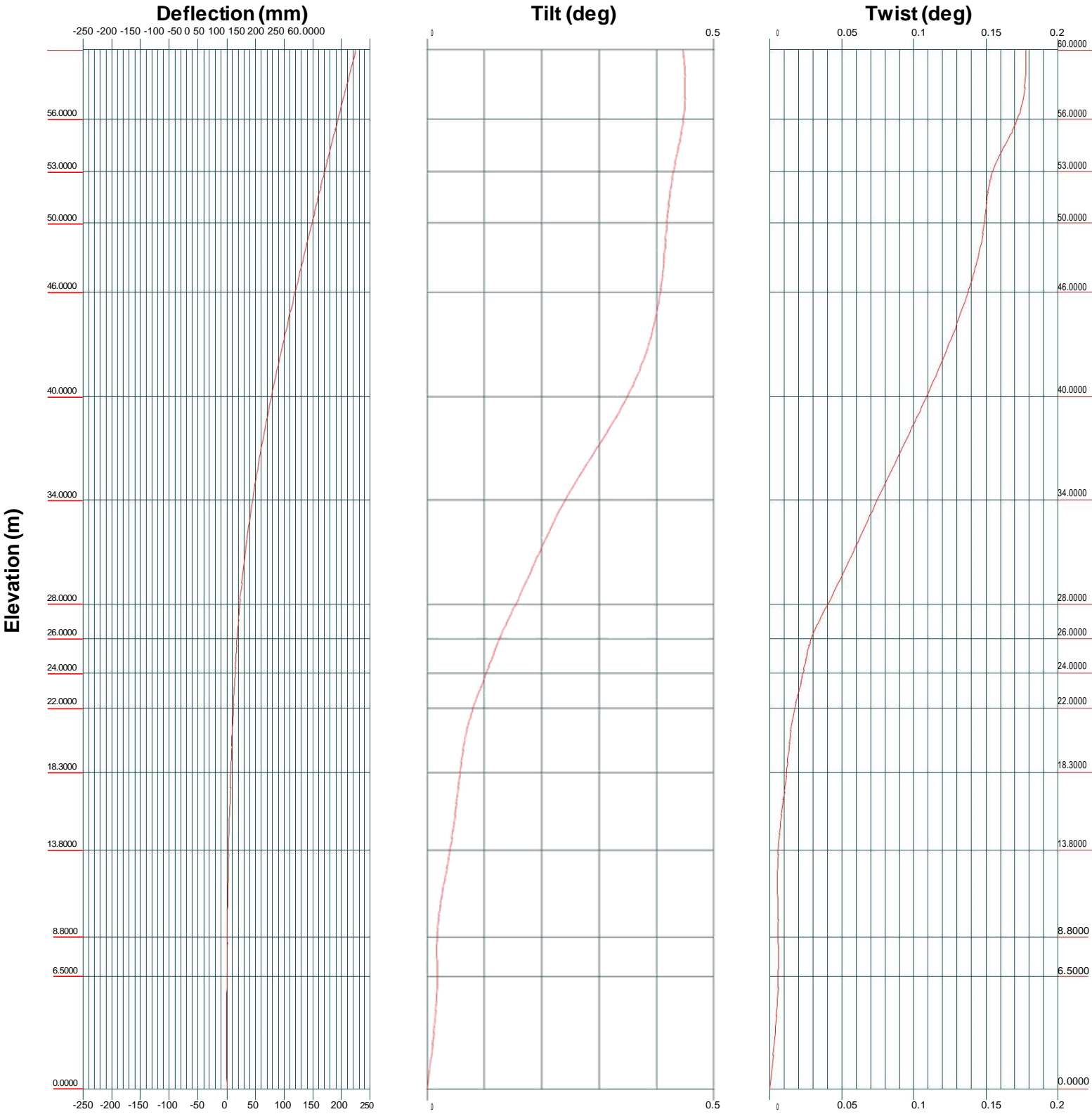
* DL controls

Section Capacity Table

Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass Fail
T1	60 - 56	Leg	L102x102x6	3	-2224.90	27574.13	8.1	Pass
		Diagonal	L51x51x5	9	715.56	7551.09	9.5	Pass
T2	56 - 53						19.3 (b)	
		Horizontal	L51x51x5	13	-523.53	7940.84	6.6	Pass
		Top Girt	L51x51x5	6	-24.71	7940.84	0.3	Pass
		Leg	L102x102x6	71	-6752.00	27574.13	24.5	Pass
		Diagonal	L51x51x5	77	1186.30	7551.09	15.7	Pass
							32.1 (b)	
T3	53 - 50	Horizontal	L51x51x5	81	-878.35	7940.84	11.1	Pass
		Top Girt	L51x51x5	73	-606.32	7940.84	7.6	Pass
		Leg	L102x102x6	123	-5851.93	24358.30	24.0	Pass
							26.4 (b)	
T4	50 - 46	Diagonal	L51x51x5	150	-1025.60	6787.37	15.1	Pass
		Top Girt	L51x51x5	126	-726.70	7940.84	9.2	Pass
		Leg	L102x102x6	155	-11164.77	24666.48	45.3	Pass
		Diagonal	L51x51x5	168	-4388.05	3793.35	115.7	Fail
		Top Girt	L51x51x5	159	-891.90	1999.13	44.6	Pass
		Mid Girt	L51x51x5	163	-753.31	1999.13	37.7	Pass
		Inner Bracing	L51x51x5	157	68.45	7005.28	1.0	Pass
		Leg	L102x102x6	185	-31189.29	24666.48	126.4	Fail
T5	46 - 40	Diagonal	L51x51x5	200	-5267.48	3793.35	138.9	Fail
		Top Girt	L51x51x5	189	-1461.57	1999.13	73.1	Pass
		Mid Girt	L51x51x5	193	-2878.06	1999.13	144.0	Fail
		Inner Bracing	L51x51x5	187	80.14	7005.28	1.1	Pass
		Leg	L102x102x6	227	-56842.40	24666.48	230.4	Fail
		Diagonal	L51x51x5	242	-8124.66	3793.35	214.2	Fail
		Top Girt	L51x51x5	231	-3731.15	1999.13	186.6	Fail
		Mid Girt	L51x51x5	235	-5128.95	1999.13	256.6	Fail
		Inner Bracing	L51x51x5	230	206.64	9338.04	2.2	Pass
		Leg	L102x6+L102x8	269	-89039.75	64094.13	138.9	Fail
T7	34 - 28	Diagonal	L51x51x5	284	-7530.00	3795.04	198.4	Fail
		Top Girt	L64x64x5	273	-4094.27	3980.69	102.9	Fail
		Mid Girt	L51x51x5	289	-3865.66	2000.02	193.3	Fail
		Inner Bracing	L51x51x5	271	-161.41	2372.10	6.8	Pass
		Leg	L102x8+L102x10	311	-94925.12	77341.76	122.7	Fail
							178.4 (b)	
T8	28 - 26	Diagonal	L44x44x5	324	-4172.98	4353.83	95.8	Pass
		Top Girt	L64x64x5	317	-309.97	3982.47	7.8	Pass
		Inner Bracing	L51x51x5	313	-557.76	2372.84	23.5	Pass
		Leg	L102x8+L102x10	329	-93020.03	77341.76	120.3	Fail
		Diagonal	L44x44x5	336	-3679.55	3830.97	96.0	Pass
T10	24 - 22	Leg	L102x8+L102x10	341	-89790.90	77341.76	116.1	Fail

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Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass Fail
T11	22 - 18.3	Diagonal	L44x44x5	348	-2763.96	3252.62	85.0	Pass
		Leg	L102x10+L102x13	353	-85777.06	99380.24	86.3	Pass
T12	18.3 - 13.8	Diagonal	L64x64x5	360	-2824.04	4389.55	64.3	Pass
		Leg	L102x10+L102x13	365	-82913.53	93003.12	89.2	Pass
T13	13.8 - 8.8	Diagonal	L64x64x5	372	-2077.05	2916.58	71.2	Pass
		Leg	L102x10+L102x13	377	-81756.42	88712.00	92.2	Pass
T14	8.8 - 6.5	Diagonal	L64x64x5	384	-1252.54	2186.77	57.3	Pass
		Leg	L127x10+L127x13	389	-79217.66	126063.56	62.8	Pass
T15	6.5 - 0	Diagonal	L64x64x5	395	-1670.65	2559.39	65.3	Pass
		Leg	L127x10+L127x13	405	-79165.05	121363.09	65.2	Pass
		Diagonal	L76x76x6	410	-1835.16	3435.72	53.4	Pass
		Horizontal	L76x76x6	391	-873.86	8593.67	10.2	Pass
		Inner Bracing	L64x64x6	417	-159.27	2330.71	13.4 (b) 6.8	Pass
							Summary	
							Leg (T6)	230.4 Fail X
							Diagonal (T6)	214.2 Fail X
							Horizontal (T15)	13.4 Pass
							Top Girt (T6)	186.6 Fail X
							Mid Girt (T6)	256.6 Fail X
							Inner Bracing (T8)	23.5 Pass
							Bolt Checks	178.4 Fail X
							RATING =	256.6 Fail X



Feedline Distribution Chart

0.0000 - 60.0000

Round

Flat

App In Face

App Out Face

Truss Leg

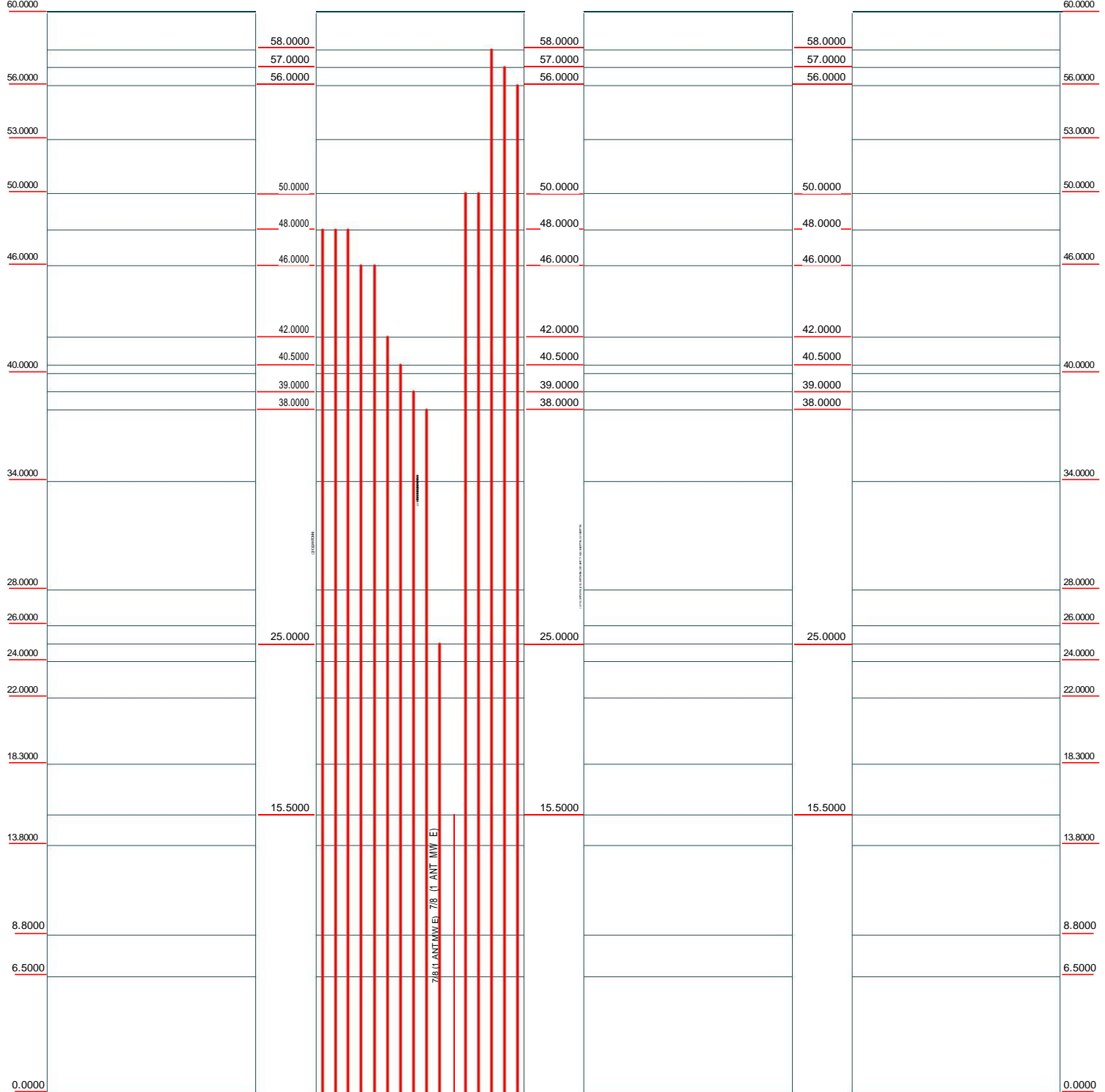
Face A

Face B

Face C

Face D

Elevation (m)



BTESA BROAD TELECOM.

Calle 129 No. 8 - 08 - Oficina 204.

BOGOTA D.C. - COLOMBIA.

Phone: 57 (1) 2740536.

Job: **DIAGRAMA CABLES GUIA DE ONDA-TC50+10m Ext. PATA 7.15m - V=120KPH**

Project: **EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA).**

Client: **RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.**

Code: **TIA/EIA-222-F**

Drawn by: **Ing. C. Londoño M.**

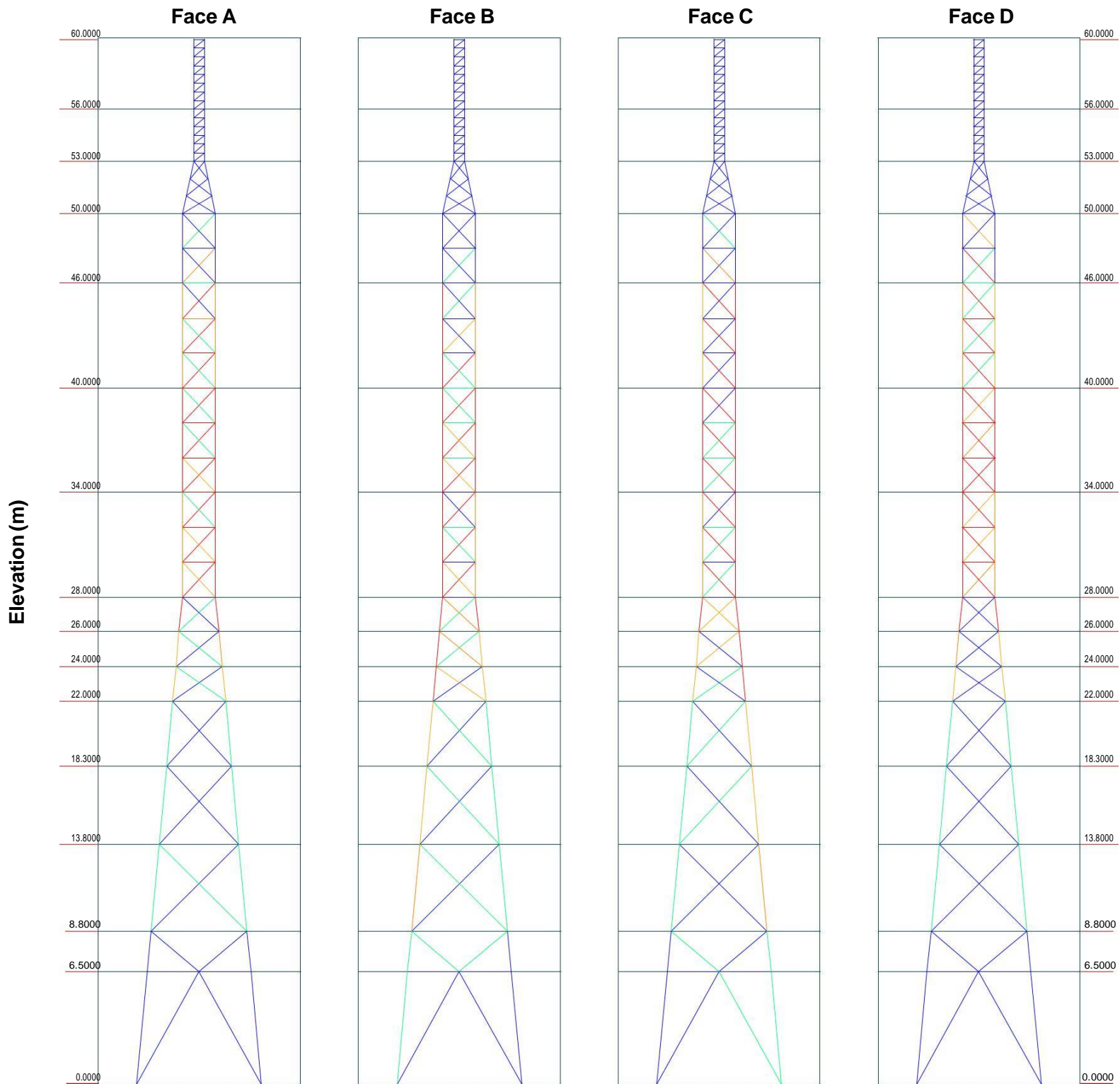
Date: **05/25/16**

App'd:

Scale: **NTS**

Stress Distribution Chart
0.0000 - 60.0000

> 100% 90%-100% 75%-90% 50%-75% < 50% Overstress



***CONDICION NUEVA (FUTURA)+REFUERZO.
ESTACION: CERRÓ BAÑADEROS.***

<i>RISATower</i> BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 1 of 53
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SALIDA 3 - CONDICION NUEVA (FUTURA) + REFUERZO.

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 60.0000 m above the ground line.

The base of the tower is set at an elevation of 0.0000 m above the ground line.

The face width of the tower is 0.6000 m at the top and 7.1500 m at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 120 kph.

Deflections calculated using a wind speed of 60 kph.

Weld together tower sections have flange connections.

Connections use galvanized A-394 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.

Welds are fabricated with ER-70S-6 electrodes.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

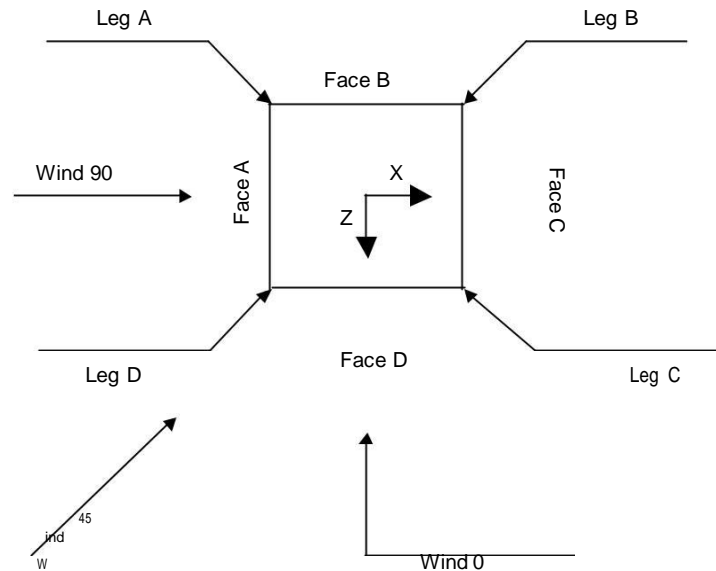
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	√ Distribute Leg Loads As Uniform	√ Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	√ Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

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Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	m			m		m
T1	60.0000-56.0000			0.6000	1	4.0000
T2	56.0000-53.0000			0.6000	1	3.0000
T3	53.0000-50.0000			0.6000	1	3.0000
T4	50.0000-46.0000			1.9000	1	4.0000
T5	46.0000-40.0000			1.9000	1	6.0000
T6	40.0000-34.0000			1.9000	1	6.0000
T7	34.0000-28.0000			1.9000	1	6.0000
T8	28.0000-26.0000			1.9000	1	2.0000
T9	26.0000-24.0000			2.2750	1	2.0000
T10	24.0000-22.0000			2.6500	1	2.0000
T11	22.0000-18.3000			3.0250	1	3.7000
T12	18.3000-13.8000			3.7190	1	4.5000
T13	13.8000-8.8000			4.5630	1	5.0000
T14	8.8000-6.5000			5.5000	1	2.3000
T15	6.5000-0.0000			5.9310	1	6.5000

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	m	m				mm	mm

T1	60.0000-56.0000	0.5000	Diag Up	No	Yes	0	0
T2	56.0000-53.0000	0.5000	Diag Up	No	Yes	0	0
T3	53.0000-50.0000	1.0000	X Brace	No	No	0	0
T4	50.0000-46.0000	2.0000	X Brace	No	No	0	0

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Tower Section	Tower Elevation m	Diagonal Spacing m	Bracing Type	Has K Brace End Panels	Has Horizontal	Top Girt Offset mm	Bottom Girt Offset mm
T5	46.0000-40.0000	2.0000	X Brace	No	No	0	0
T6	40.0000-34.0000	2.0000	X Brace	No	No	0	0
T7	34.0000-28.0000	2.0000	X Brace	No	No	0	0
T8	28.0000-26.0000	2.0000	X Brace	No	No	0	0
T9	26.0000-24.0000	2.0000	X Brace	No	No	0	0
T10	24.0000-22.0000	2.0000	X Brace	No	No	0	0
T11	22.0000-18.3000	3.7000	X Brace	No	No	0	0
T12	18.3000-13.8000	4.5000	X Brace	No	No	0	0
T13	13.8000-8.8000	5.0000	X Brace	No	No	0	0
T14	8.8000-6.5000	2.3000	K Brace Up	No	Yes	0	0
T15	6.5000-0.0000	6.5000	K Brace Down	No	Yes	0	0

Tower Section Geometry (cont'd)

Tower Elevation m	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A572-50 (345 MPa)
60.0000-56.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A572-50 (345 MPa)
T2	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A572-50 (345 MPa)
56.0000-53.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A572-50 (345 MPa)
T3	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L51x51x5	A572-50 (345 MPa)
53.0000-50.0000	Equal Angle	L102x102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
T4	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
50.0000-46.0000	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
T5	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
46.0000-40.0000	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
T6	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
40.0000-34.0000	Arbitrary Shape	L102x6+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
T7	Arbitrary Shape	L102x8+L102x8+L102x6	A572-50 (345 MPa)	Equal Angle	L64x64x5	A572-50 (345 MPa)
34.0000-28.0000	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T8	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
28.0000-26.0000	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T9	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
26.0000-24.0000	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
T10	Arbitrary Shape	L102x8+L102x10+L102x6	A572-50 (345 MPa)	Equal Angle	L44x44x5	A36 (248 MPa)
24.0000-22.0000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T11	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
22.0000-18.3000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T12	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
18.3000-13.8000	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T13	Arbitrary Shape	L102x10+L102x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
13.8000-8.8000	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
T14	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L64x64x5	A36 (248 MPa)
8.8000-6.5000	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)
T15	Arbitrary Shape	L127x10+L127x13	A572-50 (345 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)
6.5000-0.0000						

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Tower Section Geometry (cont'd)

Tower Elevation m	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 60.0000-56.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T2 56.0000-53.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T3 53.0000-50.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T4 50.0000-46.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T5 46.0000-40.0000	Equal Angle	L51x51x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T6 40.0000-34.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T7 34.0000-28.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)
T8 28.0000-26.0000	Equal Angle	L64x64x5	A36 (248 MPa)	Solid Round		A572-50 (345 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 60.0000-56.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T2 56.0000-53.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T4 50.0000-46.0000	1	Equal Angle	L51x51x5	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T5 46.0000-40.0000	2	Equal Angle	L64x64x6	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T6 40.0000-34.0000	2	Equal Angle	L64x64x6	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T7 34.0000-28.0000	2	Equal Angle	L64x64x6	A36 (248 MPa)	Equal Angle		A36 (248 MPa)
T14 8.8000-6.5000	None	Equal Angle		A36 (248 MPa)	Solid Round	8	A36 (248 MPa)
T15 6.5000-0.0000	None	Equal Angle		A36 (248 MPa)	Equal Angle	L76x76x6	A36 (248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation m	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 50.0000-46.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T5 46.0000-40.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T6 40.0000-34.0000	Solid Round		A572-50 (345 MPa)	Equal Angle	L51x51x5	A36 (248 MPa)
T7	Solid Round		A572-50	Equal Angle	L51x51x5	A36

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Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
<i>m</i>						
34.0000-28.0000 T8	Solid Round		(345 MPa) A572-50	Equal Angle	L51x51x5	(248 MPa) A36
28.0000-26.0000 T15	Solid Round		(345 MPa) A572-50	Equal Angle	L64x64x6	(248 MPa) A36
6.5000-0.0000			(345 MPa)			(248 MPa)

Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor <i>A_f</i>	Adjust. Factor <i>A_r</i>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
<i>m</i>	<i>m²</i>	<i>mm</i>					<i>mm</i>	<i>mm</i>
T1 60.0000-56.00 00	0.0000	0	A36 (248 MPa)	1	1	1.5	0	0
T2 56.0000-53.00 00	0.0000	0	A36 (248 MPa)	1	1	1.5	0	0
T3 53.0000-50.00 00	0.0000	0	A36 (248 MPa)	1	1	1.5	0	0
T4 50.0000-46.00 00	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T5 46.0000-40.00 00	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T6 40.0000-34.00 00	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T7 34.0000-28.00 00	0.0000	0	A36 (248 MPa)	1.1	1	1.5	0	0
T8 28.0000-26.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T9 26.0000-24.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T10 24.0000-22.00 00	0.0000	0	A36 (248 MPa)	1.2	1	1.5	0	0
T11 22.0000-18.30 00	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T12 18.3000-13.80 00	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T13 13.8000-8.800 0	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T14 8.8000-6.5000	0.0000	0	A36 (248 MPa)	1.4	1	1.5	0	0
T15	0.0000	0	A36	1.5	1	1.5	0	0

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight	Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
m	m ²	mm						mm	mm
6.5000-0.0000			(248 MPa)						

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
m										
T1	No	No	1	1	1	1	1	1	1	1
60.0000-56.0000				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
56.0000-53.0000				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
53.0000-50.0000				1	1	1	1	1	1	1
T4	No	No	0.5	1	1	1	1	1	1	1
50.0000-46.0000				1	1	1	1	1	1	0.5
T5	No	No	0.5	1	1	1	1	1	1	1
46.0000-40.0000				1	1	1	1	1	1	0.5
T6	No	No	0.5	1	1	1	1	1	1	1
40.0000-34.0000				1	1	1	1	1	1	0.5
T7	No	No	0.5	1	1	1	1	1	1	1
34.0000-28.0000				1	1	1	1	1	1	0.5
T8	No	No	0.5	1	1	1	1	1	1	1
28.0000-26.0000				0.25	1	1	1	1	1	0.5
T9	No	No	0.5	1	1	1	1	1	1	1
26.0000-24.0000				0.25	1	1	1	1	1	1
T10	No	No	0.5	1	1	1	1	1	1	1
24.0000-22.0000				0.25	1	1	1	1	1	1
T11	No	No	0.25	1	1	1	1	1	1	1
22.0000-18.3000				0.25	1	1	1	1	1	1
T12	No	No	0.25	1	1	1	1	1	1	1
18.3000-13.8000				0.25	1	1	1	1	1	1
T13	No	No	0.25	1	1	1	1	1	1	1
13.8000-8.8000				0.25	1	1	1	1	1	1
T14	No	No	0.5	1	1	1	1	1	1	1
8.8000-6.5000				1	0.5	1	1	1	1	1
T15	No	No	0.2	1	0.4	1	1	1	1	1
6.5000-0.0000				1	0.4	1	1	0.5	1	0.5

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

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Tower Section Geometry (cont'd)

Tower Elevation m	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U	Net Width Deduct mm	U
T1 60.0000-56.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T2 56.0000-53.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T3 53.0000-50.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T4 50.0000-46.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T5 46.0000-40.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T6 40.0000-34.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T7 34.0000-28.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T8 28.0000-26.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T9 26.0000-24.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T10 24.0000-22.00 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T11 22.0000-18.30 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T12 18.3000-13.80 00	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T13 13.8000-8.800 0	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T14 8.8000-6.5000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75
T15 6.5000-0.0000	0	1	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75	0	0.75

<i>RISATower</i> BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 8 of 53
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Tower Section Geometry (cont'd)

Tower Elevation m	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.	Bolt Size mm	No.
T1 60.0000-56.00 00	Sleeve SS	16 A394 T0	2	16 A394T0	1	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T2 56.0000-53.00 00	Sleeve SS	16 A394 T0	6	16 A394T0	1	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T3 53.0000-50.00 00	Sleeve SS	16 A394 T0	6	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T4 50.0000-46.00 00	Sleeve SS	16 A394 T0	6	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	2	16 A394 T0	0	16 A394T0	0
T5 46.0000-40.00 00	Sleeve SS	16 A394 T0	6	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	2	16 A394 T0	0	16 A394T0	0
T6 40.0000-34.00 00	Sleeve SS	16 A394 T0	12	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	2	16 A394 T0	0	16 A394T0	0
T7 34.0000-28.00 00	Sleeve SS	16 A394 T0	12	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	2	16 A394 T0	0	16 A394T0	0
T8 28.0000-26.00 00	Sleeve SS	16 A394 T0	16	16 A394T0	2	16 A394T0	2	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T9 26.0000-24.00 00	Sleeve SS	16 A394 T0	0	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T10 24.0000-22.00 00	Sleeve SS	16 A394 T0	16	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T11 22.0000-18.30 00	Sleeve SS	16 A394 T0	0	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T12 18.3000-13.80 00	Sleeve SS	16 A394 T0	24	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T13 13.8000-8.800 0	Sleeve SS	16 A394 T0	24	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T14 8.8000-6.5000	Sleeve SS	16 A394 T0	0	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	0	16 A394T0	0
T15 6.5000-0.0000	Sleeve SS	16 A394 T0	32	16 A394T0	2	16 A394T0	0	16 A394 T0	0	16 A394T0	0	16 A394 T0	1	16 A394T0	0

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Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement m	Total Number	Number Per Row	Clear Spacing mm	Width or Diameter mm	Perimeter mm	Weight kg/m
1/2 (2 ANT OMNI E)	B	No	Ar(CfAe)	48.0000 - 0.0000	2	2	15	15		0.37
7/8 (2 ANT GRID E)	B	No	Ar(CfAe)	48.0000 - 0.0000	2	2	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	48.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT GRID E)	B	No	Ar(CfAe)	46.0000 - 0.0000	1	1	28	28		0.80
1/2 (2 ANT OMNI E)	B	No	Ar(CfAe)	42.0000 - 0.0000	2	2	15	15		0.37
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	40.5000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	39.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	38.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	25.0000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW E)	B	No	Ar(CfAe)	15.5000 - 0.0000	1	1	28	28		0.80
7/8 (1 ANT MW N)	B	No	Ar(CfAe)	50.0000 - 0.0000	1	1	28	28		0.80
1/2 (2 ANT OMNI N)	B	No	Ar(CfAe)	50.0000 - 0.0000	2	2	15	15		0.37
1 5/8 (ANT TV N)	B	No	Ar(CfAe)	58.0000 - 0.0000	3	3	50	50		1.55
1 5/8 (ANT TV N)	B	No	Ar(CfAe)	57.0000 - 0.0000	3	3	50	50		1.55
1 5/8 (ANT TV N)	B	No	Ar(CfAe)	56.0000 - 0.0000	3	3	50	50		1.55

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation m	Face	A _R m ²	A _F m ²	C _{AA} In Face m ²	C _{AA} Out Face m ²	Weight kg
T1	60.0000-56.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.453	0.000	0.000	0.000	13.93
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T2	56.0000-53.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.358	0.000	0.000	0.000	41.79
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T3	53.0000-50.0000	A	0.000	0.000	0.000	0.000	0.00
		B	1.358	0.000	0.000	0.000	41.79
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T4	50.0000-46.0000	A	0.000	0.000	0.000	0.000	0.00
		B	2.269	0.000	0.000	0.000	68.22
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T5	46.0000-40.0000	A	0.000	0.000	0.000	0.000	0.00

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Tower Section	Tower Elevation m	Face	AR m ²	AF m ²	CAAA In Face m ²	CAAA Out Face m ²	Weight kg
T6	40.0000-34.0000	B	4.157	0.000	0.000	0.000	123.32
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T7	34.0000-28.0000	B	4.684	0.000	0.000	0.000	137.95
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T8	28.0000-26.0000	B	4.769	0.000	0.000	0.000	140.36
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T9	26.0000-24.0000	B	1.590	0.000	0.000	0.000	46.79
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T10	24.0000-22.0000	B	1.618	0.000	0.000	0.000	47.59
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T11	22.0000-18.3000	B	1.646	0.000	0.000	0.000	48.40
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T12	18.3000-13.8000	B	3.045	0.000	0.000	0.000	89.53
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T13	13.8000-8.8000	B	3.751	0.000	0.000	0.000	110.26
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T14	8.8000-6.5000	B	4.256	0.000	0.000	0.000	125.01
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
T15	6.5000-0.0000	B	1.958	0.000	0.000	0.000	57.50
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		B	5.533	0.000	0.000	0.000	162.51
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00

User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle	Weight	F _x	F _z	Wind Force	C _A C _c
	m	m	°	kg	kg	kg	kg	m ²
C x MANTENIMIENTO	60.0000	0.0000	0.0000	No Ice	320.00	0.00	0.00	0.0000
				Service	320.00	0.00	0.00	0.0000
2 SOP. ANT OMNI (E)	48.0000	0.0000	0.0000	No Ice	240.00	40.00	-40.00	0.0000
				Service	240.00	10.00	-10.00	0.0000
2 SOP. ANT OMNI (E)	42.0000	0.0000	0.0000	No Ice	240.00	40.00	-40.00	0.0000
				Service	240.00	10.00	-10.00	0.0000

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	Discrete Tower Loads	
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	Placement m		CAA Front m²	CAA Side m²	Weight kg
ANT OMNI L=4.0m (1E)	B	From Face	0.0000 0.0000 0.0000	0.0000	48.0000	No Ice	1.3000	0.5500	60.00
ANT OMNI L=4.0m (1E)	C	From Leg	1.5000 0.0000 0.0000	0.0000	48.0000	No Ice	1.3000	0.5500	60.00
ANT OMNI L=4.0m (1E)	A	From Leg	1.5000 0.0000 0.0000	0.0000	42.0000	No Ice	1.3000	0.5500	60.00
ANT OMNI L=4.0m (1E)	B	From Leg	1.5000 0.0000 0.0000	0.0000	42.0000	No Ice	1.3000	0.5500	60.00
ANT OMNI L=4.0m (1N)	B	From Face	0.0000 0.3000 0.0000	0.0000	50.0000	No Ice	1.3000	0.5500	60.00
ANT OMNI L=4.0m (1N)	B	From Face	0.0000 -0.3000 0.0000	0.0000	50.0000	No Ice	1.3000	0.5500	60.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	60.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	59.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	58.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000 0.0000	0.0000	57.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Leg	1.0000 0.0000 0.0000	0.0000	56.0000	No Ice	0.5000	0.2000	20.00
ANT PANEL	D	From Face	0.0000	0.0000	56.0000	No Ice	0.5000	0.2000	20.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert m m m	Azimuth Adjustment °	Placement m	CAAA Front m ²	CAAA Side m ²	Weight kg
1.0x0.50x0.19m (1N)			0.0000 0.0000					
ANT PANEL 1.0x0.50x0.19m (1N)	C	From Leg	1.0000 0.0000	0.0000	56.0000	No Ice 0.5000	0.2000	20.00
ANT PANEL 1.0x0.50x0.19m (1N)	D	From Face	0.0000 0.0000	0.0000	55.0000	No Ice 0.5000	0.2000	20.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert m	Azimuth Adjustment °	3 dB Beam Width °	Elevation m	Outside Diameter m	Aperture Area m ²	Weight kg
HP12-21B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.8000 0.0000 0.0000	Worst		48.0000	3.6576	No Ice 10.5064	385.55
KP4F-23 (1 ANT GRID Ø1.20m E)	B	Grid	From Leg	0.5000 0.0000 0.0000	Worst		48.0000	1.2192	No Ice 0.9337	23.13
KP6F-19 (1 ANT GRID Ø1.80m E)	A	Grid	From Leg	0.0000 0.0000 0.0000	Worst		48.0000	1.8288	No Ice 2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.2192	No Ice 1.1678	35.83
KP6F-19 (1 ANT GRID Ø1.80m E)	D	Grid	From Leg	0.5000 0.0000 0.0000	Worst		46.0000	1.8288	No Ice 2.1015	89.81
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		40.5000	1.2192	No Ice 1.1678	35.83
HP12-21B (1 ANT MW Ø3.70m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		39.0000	3.6576	No Ice 10.5064	385.55
HP4-107 (1 ANT MW Ø1.20m E)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		38.0000	1.2192	No Ice 1.1678	35.83
HP4-107 (1 ANT MW Ø1.20m E)	A	Paraboloid w/Shroud (HP)	From Leg	0.3000 0.0000 0.0000	Worst		25.0000	1.2192	No Ice 1.1678	35.83
HP4-107 (1 ANT MW Ø1.20m E)	D	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		15.5000	1.2192	No Ice 1.1678	35.83
HP12-21B (1 ANT MW Ø3.70m N)	C	Paraboloid w/Shroud (HP)	From Leg	0.5000 0.0000 0.0000	Worst		50.0000	3.6576	No Ice 10.5064	385.55

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Tower Pressures - No Ice

$$G_H = 1.115$$

Section Elevation m	z m	Kz	qz MPa	AG m ²	F a c e	AF m ²	AR m ²	A _{reg} m ²	Leg %	CAA In Face m ²	CAA Out Face m ²
T1 60.0000-56.0000	58.0000	1.65	0.00	2.624	A	1.279	0.000	0.813	63.55	0.000	0.000
					B	1.279	0.453		46.94	0.000	0.000
					C	1.279	0.000		63.55	0.000	0.000
					D	1.279	0.000		63.55	0.000	0.000
T2 56.0000-53.0000	54.5000	1.621	0.00	1.968	A	0.959	0.000	0.610	63.55	0.000	0.000
					B	0.959	1.358		26.31	0.000	0.000
					C	0.959	0.000		63.55	0.000	0.000
					D	0.959	0.000		63.55	0.000	0.000
T3 53.0000-50.0000	51.5000	1.595	0.00	3.922	A	1.119	0.000	0.638	56.97	0.000	0.000
					B	1.119	1.358		25.74	0.000	0.000
					C	1.119	0.000		56.97	0.000	0.000
					D	1.119	0.000		56.97	0.000	0.000
T4 50.0000-46.0000	48.0000	1.563	0.00	7.824	A	1.825	0.000	0.813	44.55	0.000	0.000
					B	1.825	2.269		19.85	0.000	0.000
					C	1.825	0.000		44.55	0.000	0.000
					D	1.825	0.000		44.55	0.000	0.000
T5 46.0000-40.0000	43.0000	1.514	0.00	12.012	A	1.446	0.000	0.000	0.00	0.000	0.000
					B	1.446	4.157		0.00	0.000	0.000
					C	1.446	0.000		0.00	0.000	0.000
					D	1.446	0.000		0.00	0.000	0.000
T6 40.0000-34.0000	37.0000	1.451	0.00	12.012	A	1.471	0.000	0.000	0.00	0.000	0.000
					B	1.471	4.684		0.00	0.000	0.000
					C	1.471	0.000		0.00	0.000	0.000
					D	1.471	0.000		0.00	0.000	0.000
T7 34.0000-28.0000	31.0000	1.379	0.00	12.012	A	1.407	0.000	0.000	0.00	0.000	0.000
					B	1.407	4.769		0.00	0.000	0.000
					C	1.407	0.000		0.00	0.000	0.000
					D	1.407	0.000		0.00	0.000	0.000
T8 28.0000-26.0000	27.0000	1.326	0.00	4.380	A	0.409	0.000	0.000	0.00	0.000	0.000
					B	0.409	1.590		0.00	0.000	0.000
					C	0.409	0.000		0.00	0.000	0.000
					D	0.409	0.000		0.00	0.000	0.000
T9 26.0000-24.0000	25.0000	1.297	0.00	5.130	A	0.312	0.000	0.000	0.00	0.000	0.000
					B	0.312	1.618		0.00	0.000	0.000
					C	0.312	0.000		0.00	0.000	0.000
					D	0.312	0.000		0.00	0.000	0.000
T10 24.0000-22.0000	23.0000	1.267	0.00	5.880	A	0.345	0.000	0.000	0.00	0.000	0.000
					B	0.345	1.646		0.00	0.000	0.000
					C	0.345	0.000		0.00	0.000	0.000
					D	0.345	0.000		0.00	0.000	0.000
T11 22.0000-18.3000	20.1500	1.22	0.00	12.855	A	0.852	0.000	0.000	0.00	0.000	0.000
					B	0.852	3.045		0.00	0.000	0.000
					C	0.852	0.000		0.00	0.000	0.000
					D	0.852	0.000		0.00	0.000	0.000
T12 18.3000-13.8000	16.0500	1.143	0.00	19.096	A	1.063	0.000	0.000	0.00	0.000	0.000
					B	1.063	3.751		0.00	0.000	0.000
					C	1.063	0.000		0.00	0.000	0.000
					D	1.063	0.000		0.00	0.000	0.000
T13 13.8000-8.8000	11.3000	1.034	0.00	25.670	A	1.238	0.000	0.000	0.00	0.000	0.000
					B	1.238	4.256		0.00	0.000	0.000
					C	1.238	0.000		0.00	0.000	0.000
					D	1.238	0.000		0.00	0.000	0.000
T14 8.8000-7.6500	7.6500	1	0.00	13.439	A	0.627	0.000	0.000	0.00	0.000	0.000

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 14 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	z	Kz	qz	AG	F a c e	AF	AR	Aleg	Leg %	CAAA In Face	CAAA Out Face
m	m		MPa	m ²		m ²	m ²	m ²		m ²	m ²
8.8000-6.5000					B	0.627	1.958		0.00	0.000	0.000
					C	0.627	0.000		0.00	0.000	0.000
					D	0.627	0.000		0.00	0.000	0.000
T15	3.2500	1	0.00	43.342	A	2.335	0.000	0.000	0.00	0.000	0.000
6.5000-0.0000					B	2.335	5.533		0.00	0.000	0.000
					C	2.335	0.000		0.00	0.000	0.000
					D	2.335	0.000		0.00	0.000	0.000

Tower Pressure - Service

$$G_H = 1.115$$

Section Elevation	z	Kz	qz	AG	F a c e	AF	AR	Aleg	Leg %	CAAA In Face	CAAA Out Face
m	m		MPa	m ²		m ²	m ²	m ²		m ²	m ²
T1	58.0000	1.65	0.00	2.624	A	1.279	0.000	0.813	63.55	0.000	0.000
60.0000-56.0000					B	1.279	0.453		46.94	0.000	0.000
					C	1.279	0.000		63.55	0.000	0.000
					D	1.279	0.000		63.55	0.000	0.000
T2	54.5000	1.621	0.00	1.968	A	0.959	0.000	0.610	63.55	0.000	0.000
56.0000-53.0000					B	0.959	1.358		26.31	0.000	0.000
					C	0.959	0.000		63.55	0.000	0.000
					D	0.959	0.000		63.55	0.000	0.000
T3	51.5000	1.595	0.00	3.922	A	1.119	0.000	0.638	56.97	0.000	0.000
53.0000-50.0000					B	1.119	1.358		25.74	0.000	0.000
					C	1.119	0.000		56.97	0.000	0.000
					D	1.119	0.000		56.97	0.000	0.000
T4	48.0000	1.563	0.00	7.824	A	1.825	0.000	0.813	44.55	0.000	0.000
50.0000-46.0000					B	1.825	2.269		19.85	0.000	0.000
					C	1.825	0.000		44.55	0.000	0.000
					D	1.825	0.000		44.55	0.000	0.000
T5	43.0000	1.514	0.00	12.012	A	1.446	0.000	0.000	0.00	0.000	0.000
46.0000-40.0000					B	1.446	4.157		0.00	0.000	0.000
					C	1.446	0.000		0.00	0.000	0.000
					D	1.446	0.000		0.00	0.000	0.000
T6	37.0000	1.451	0.00	12.012	A	1.471	0.000	0.000	0.00	0.000	0.000
40.0000-34.0000					B	1.471	4.684		0.00	0.000	0.000
					C	1.471	0.000		0.00	0.000	0.000
					D	1.471	0.000		0.00	0.000	0.000
T7	31.0000	1.379	0.00	12.012	A	1.407	0.000	0.000	0.00	0.000	0.000
34.0000-28.0000					B	1.407	4.769		0.00	0.000	0.000
					C	1.407	0.000		0.00	0.000	0.000
					D	1.407	0.000		0.00	0.000	0.000
T8	27.0000	1.326	0.00	4.380	A	0.409	0.000	0.000	0.00	0.000	0.000
28.0000-26.0000					B	0.409	1.590		0.00	0.000	0.000
					C	0.409	0.000		0.00	0.000	0.000
					D	0.409	0.000		0.00	0.000	0.000
T9	25.0000	1.297	0.00	5.130	A	0.312	0.000	0.000	0.00	0.000	0.000
26.0000-24.0000					B	0.312	1.618		0.00	0.000	0.000
					C	0.312	0.000		0.00	0.000	0.000
					D	0.312	0.000		0.00	0.000	0.000
T10	23.0000	1.267	0.00	5.880	A	0.345	0.000	0.000	0.00	0.000	0.000
24.0000-22.0000					B	0.345	1.646		0.00	0.000	0.000
					C	0.345	0.000		0.00	0.000	0.000
					D	0.345	0.000		0.00	0.000	0.000

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	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation m	z m	Kz	qz MPa	Ag m ²	F a c e m ²	AF m ²	AR m ²	Areg m ²	Leg %	CAAA In Face m ²	CAAA Out Face m ²
T11 22.0000-18.30 00	20.1500	1.22	0.00	12.855	A B C D	0.852 0.852 0.852 0.852	0.000 3.045 0.000 0.000	0.000	0.00 0.00 0.00 0.00	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
T12 18.3000-13.80 00	16.0500	1.143	0.00	19.096	A B C D	1.063 1.063 1.063 1.063	0.000 3.751 0.000 0.000	0.000	0.00 0.00 0.00 0.00	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
T13 13.8000-8.800 0	11.3000	1.034	0.00	25.670	A B C D	1.238 1.238 1.238 1.238	0.000 4.256 0.000 0.000	0.000	0.00 0.00 0.00 0.00	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
T14 8.8000-6.5000	7.6500	1	0.00	13.439	A B C D	0.627 0.627 0.627 0.627	0.000 1.958 0.000 0.000	0.000	0.00 0.00 0.00 0.00	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
T15 6.5000-0.0000	3.2500	1	0.00	43.342	A B C D	2.335 2.335 2.335 2.335	0.000 5.533 0.000 0.000	0.000	0.00 0.00 0.00 0.00	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation m	Add Weight kg	Self Weight kg	F a c e m ²	e	Cf	RR	Df	DR	AE m ²	F kg	w kg/m	Ctrl. Face
T1 60.0000-56.00 00	13.93	104.28	A B C D	0.487 0.66 0.487 0.487	2.075 1.849 2.075 2.075	0.691 0.792 0.691 0.691	1 1 1 1	1 1 1 1	1.279 1.638 1.279 1.279	386.88	96.72	B
T2 56.0000-53.00 00	41.79	78.21	A B C D	0.487 1 0.487 0.487	2.075 2.1 2.075 2.075	0.691 1 0.691 0.691	1 1 1 1	1 1 1 1	0.959 2.317 0.959 0.959	494.29 [*]	164.76	B
T3 53.0000-50.00 00	41.79	13.03	A B C D	0.285 0.632 0.285 0.285	2.642 1.869 2.642 2.642	0.612 0.773 0.612 0.612	1 1 1 1	1 1 1 1	1.119 2.169 1.119 1.119	500.97	166.99	B
T4 50.0000-46.00 00	68.22	111.74	A B C D	0.233 0.523 0.233 0.233	2.842 2.008 2.842 2.842	0.598 0.71 0.598 0.598	1 1 1 1	1 1 1 1	1.825 3.435 1.825 1.825	835.18	208.79	B
T5 46.0000-40.00 00	123.32	207.86	A B C D	0.12 0.466 0.12 0.12	3.348 2.118 3.348 3.348	0.577 0.681 0.577 0.577	1 1 1 1	1 1 1 1	1.446 4.277 1.446 1.446	1063.00	177.17	B
T6 40.0000-34.00 00	137.95	218.65	A B C D	0.122 0.512 0.122 0.122	3.338 2.027 3.338 3.338	0.578 0.704 0.578 0.578	1 1 1 1	1 1 1 1	1.471 4.768 1.471 1.471	1086.40	181.07	B
T7 34.0000-28.00 00	140.36	218.65	A B C D	0.117 0.514 0.117 0.117	3.364 2.024 3.364 3.364	0.577 0.705 0.577 0.577	1 1 1 1	1 1 1 1	1.407 4.768 1.407 1.407	1031.35	171.89	B
T8 28.0000-26.00	46.79	190.60	A B	0.093 0.456	3.484 2.141	0.574 0.676	1 1	1 1	0.409 1.484	326.33	163.16	B

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	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
00			C	0.093	3.484	0.574	1	1	0.409			
			D	0.093	3.484	0.574	1	1	0.409			
T9	47.59	119.94	A	0.061	3.656	0.572	1	1	0.312	318.48	159.24	B
26.0000-24.00			B	0.376	2.347	0.642	1	1	1.350			
00			C	0.061	3.656	0.572	1	1	0.312			
			D	0.061	3.656	0.572	1	1	0.312			
T10	48.40	131.21	A	0.059	3.668	0.572	1	1	0.345	333.07	166.53	B
24.0000-22.00			B	0.339	2.461	0.628	1	1	1.379			
00			C	0.059	3.668	0.572	1	1	0.345			
			D	0.059	3.668	0.572	1	1	0.345			
T11	89.53	275.05	A	0.066	3.626	0.572	1	1	0.852	665.46	179.85	B
22.0000-18.30			B	0.303	2.579	0.617	1	1	2.731			
00			C	0.066	3.626	0.572	1	1	0.852			
			D	0.066	3.626	0.572	1	1	0.852			
T12	110.26	335.99	A	0.056	3.684	0.572	1	1	1.063	814.06	180.90	B
18.3000-13.80			B	0.252	2.767	0.602	1	1	3.323			
00			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T13	125.01	389.65	A	0.048	3.725	0.571	1	1	1.238	880.39	176.08	B
13.8000-8.800			B	0.214	2.92	0.593	1	1	3.764			
0			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T14	57.50	196.86	A	0.047	3.734	0.571	1	1	0.627	415.46	180.63	B
8.8000-6.5000			B	0.192	3.013	0.589	1	1	1.780			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T15	162.51	1062.44	A	0.054	3.694	0.571	1	1	2.335	1323.64	203.64	B
6.5000-0.0000			B	0.182	3.061	0.587	1	1	5.582			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	1254.94	3654.14			*2A _g limit			OTM	301480 kg-m	10474.94		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T1	13.93	104.28	A	0.487	2.075	0.691	1.2	1.2	1.535	464.26	116.06	B
60.0000-56.00			B	0.66	1.849	0.792	1.2	1.2	1.965			
00			C	0.487	2.075	0.691	1.2	1.2	1.535			
			D	0.487	2.075	0.691	1.2	1.2	1.535			
T2	41.79	78.21	A	0.487	2.075	0.691	1.2	1.2	1.151	494.29*	164.76	B
56.0000-53.00			B	1	2.1	1	1.2	1.2	2.781			
00			C	0.487	2.075	0.691	1.2	1.2	1.151			
			D	0.487	2.075	0.691	1.2	1.2	1.151			
T3	41.79	13.03	A	0.285	2.642	0.612	1.2	1.2	1.343	601.16	200.39	B
53.0000-50.00			B	0.632	1.869	0.773	1.2	1.2	2.603			
00			C	0.285	2.642	0.612	1.2	1.2	1.343			
			D	0.285	2.642	0.612	1.2	1.2	1.343			
T4	68.22	111.74	A	0.233	2.842	0.598	1.175	1.175	2.144	1002.21	250.55	B
50.0000-46.00			B	0.523	2.008	0.71	1.2	1.2	4.122			
00			C	0.233	2.842	0.598	1.175	1.175	2.144			
			D	0.233	2.842	0.598	1.175	1.175	2.144			
T5	123.32	207.86	A	0.12	3.348	0.577	1.09	1.09	1.576	1275.60	212.60	B

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 17 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation m	Add Weight kg	Self Weight kg	F a c e	e	C _F	R _R	D _F	D _R	A _E m ²	F kg	w kg/m	Ctrl. Face
46.0000-40.0000			B	0.466	2.118	0.681	1.2	1.2	5.132			
			C	0.12	3.348	0.577	1.09	1.09	1.576			
			D	0.12	3.348	0.577	1.09	1.09	1.576			
T6	137.95	218.65	A	0.122	3.338	0.578	1.092	1.092	1.606	1303.68	217.28	B
40.0000-34.0000			B	0.512	2.027	0.704	1.2	1.2	5.721			
			C	0.122	3.338	0.578	1.092	1.092	1.606			
			D	0.122	3.338	0.578	1.092	1.092	1.606			
T7	140.36	218.65	A	0.117	3.364	0.577	1.088	1.088	1.531	1237.62	206.27	B
34.0000-28.0000			B	0.514	2.024	0.705	1.2	1.2	5.722			
			C	0.117	3.364	0.577	1.088	1.088	1.531			
			D	0.117	3.364	0.577	1.088	1.088	1.531			
T8	46.79	190.60	A	0.093	3.484	0.574	1.07	1.07	0.438	391.59	195.80	B
28.0000-26.0000			B	0.456	2.141	0.676	1.2	1.2	1.781			
			C	0.093	3.484	0.574	1.07	1.07	0.438			
			D	0.093	3.484	0.574	1.07	1.07	0.438			
T9	47.59	119.94	A	0.061	3.656	0.572	1.046	1.046	0.326	382.18	191.09	B
26.0000-24.0000			B	0.376	2.347	0.642	1.2	1.2	1.620			
			C	0.061	3.656	0.572	1.046	1.046	0.326			
			D	0.061	3.656	0.572	1.046	1.046	0.326			
T10	48.40	131.21	A	0.059	3.668	0.572	1.044	1.044	0.360	399.68	199.84	B
24.0000-22.0000			B	0.339	2.461	0.628	1.2	1.2	1.655			
			C	0.059	3.668	0.572	1.044	1.044	0.360			
			D	0.059	3.668	0.572	1.044	1.044	0.360			
T11	89.53	275.05	A	0.066	3.626	0.572	1.05	1.05	0.895	798.55	215.82	B
22.0000-18.3000			B	0.303	2.579	0.617	1.2	1.2	3.277			
			C	0.066	3.626	0.572	1.05	1.05	0.895			
			D	0.066	3.626	0.572	1.05	1.05	0.895			
T12	110.26	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	967.99	215.11	B
18.3000-13.8000			B	0.252	2.767	0.602	1.189	1.189	3.951			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T13	125.01	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	1021.71	204.34	B
13.8000-8.8000			B	0.214	2.92	0.593	1.161	1.161	4.368			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T14	57.50	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	475.38	206.69	B
8.8000-6.5000			B	0.192	3.013	0.589	1.144	1.144	2.036			
			C	0.047	3.734	0.571	1.035	1.035	0.649			
			D	0.047	3.734	0.571	1.035	1.035	0.649			
T15	162.51	1062.44	A	0.054	3.694	0.571	1.04	1.04	2.429	1503.84	231.36	B
6.5000-0.0000			B	0.182	3.061	0.587	1.136	1.136	6.342			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	1254.94	3654.14			*2Ag limit			OTM	355401 kg-m	12319.74		

Tower Forces - Service - Wind Normal To Face

Section Elevation m	Add Weight kg	Self Weight kg	F a c e	e	C _F	R _R	D _F	D _R	A _E m ²	F kg	w kg/m	Ctrl. Face
T1	13.93	104.28	A	0.487	2.075	0.691	1	1	1.279	96.72	24.18	B
60.0000-56.0000			B	0.66	1.849	0.792	1	1	1.638			
			C	0.487	2.075	0.691	1	1	1.279			
			D	0.487	2.075	0.691	1	1	1.279			

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 18 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation m	Add Weight kg	Self Weight kg	F a c e	e	C _F	R _R	D _F	D _R	A _E m ²	F kg	w kg/m	Ctrl. Face
T2 56.0000-53.00 00	41.79	78.21	A	0.487	2.075	0.691	1	1	0.959	123.57*	41.19	B
			B	1	2.1	1	1	1	2.317			
			C	0.487	2.075	0.691	1	1	0.959			
			D	0.487	2.075	0.691	1	1	0.959			
T3 53.0000-50.00 00	41.79	13.03	A	0.285	2.642	0.612	1	1	1.119	125.24	41.75	B
			B	0.632	1.869	0.773	1	1	2.169			
			C	0.285	2.642	0.612	1	1	1.119			
			D	0.285	2.642	0.612	1	1	1.119			
T4 50.0000-46.00 00	68.22	111.74	A	0.233	2.842	0.598	1	1	1.825	208.79	52.20	B
			B	0.523	2.008	0.71	1	1	3.435			
			C	0.233	2.842	0.598	1	1	1.825			
			D	0.233	2.842	0.598	1	1	1.825			
T5 46.0000-40.00 00	123.32	207.86	A	0.12	3.348	0.577	1	1	1.446	265.75	44.29	B
			B	0.466	2.118	0.681	1	1	4.277			
			C	0.12	3.348	0.577	1	1	1.446			
			D	0.12	3.348	0.577	1	1	1.446			
T6 40.0000-34.00 00	137.95	218.65	A	0.122	3.338	0.578	1	1	1.471	271.60	45.27	B
			B	0.512	2.027	0.704	1	1	4.768			
			C	0.122	3.338	0.578	1	1	1.471			
			D	0.122	3.338	0.578	1	1	1.471			
T7 34.0000-28.00 00	140.36	218.65	A	0.117	3.364	0.577	1	1	1.407	257.84	42.97	B
			B	0.514	2.024	0.705	1	1	4.768			
			C	0.117	3.364	0.577	1	1	1.407			
			D	0.117	3.364	0.577	1	1	1.407			
T8 28.0000-26.00 00	46.79	190.60	A	0.093	3.484	0.574	1	1	0.409	81.58	40.79	B
			B	0.456	2.141	0.676	1	1	1.484			
			C	0.093	3.484	0.574	1	1	0.409			
			D	0.093	3.484	0.574	1	1	0.409			
T9 26.0000-24.00 00	47.59	119.94	A	0.061	3.656	0.572	1	1	0.312	79.62	39.81	B
			B	0.376	2.347	0.642	1	1	1.350			
			C	0.061	3.656	0.572	1	1	0.312			
			D	0.061	3.656	0.572	1	1	0.312			
T10 24.0000-22.00 00	48.40	131.21	A	0.059	3.668	0.572	1	1	0.345	83.27	41.63	B
			B	0.339	2.461	0.628	1	1	1.379			
			C	0.059	3.668	0.572	1	1	0.345			
			D	0.059	3.668	0.572	1	1	0.345			
T11 22.0000-18.30 00	89.53	275.05	A	0.066	3.626	0.572	1	1	0.852	166.36	44.96	B
			B	0.303	2.579	0.617	1	1	2.731			
			C	0.066	3.626	0.572	1	1	0.852			
			D	0.066	3.626	0.572	1	1	0.852			
T12 18.3000-13.80 00	110.26	335.99	A	0.056	3.684	0.572	1	1	1.063	203.51	45.23	B
			B	0.252	2.767	0.602	1	1	3.323			
			C	0.056	3.684	0.572	1	1	1.063			
			D	0.056	3.684	0.572	1	1	1.063			
T13 13.8000-8.800 0	125.01	389.65	A	0.048	3.725	0.571	1	1	1.238	220.10	44.02	B
			B	0.214	2.92	0.593	1	1	3.764			
			C	0.048	3.725	0.571	1	1	1.238			
			D	0.048	3.725	0.571	1	1	1.238			
T14 8.8000-6.5000	57.50	196.86	A	0.047	3.734	0.571	1	1	0.627	103.86	45.16	B
			B	0.192	3.013	0.589	1	1	1.780			
			C	0.047	3.734	0.571	1	1	0.627			
			D	0.047	3.734	0.571	1	1	0.627			
T15 6.5000-0.0000	162.51	1062.44	A	0.054	3.694	0.571	1	1	2.335	330.91	50.91	B
			B	0.182	3.061	0.587	1	1	5.582			
			C	0.054	3.694	0.571	1	1	2.335			
			D	0.054	3.694	0.571	1	1	2.335			
Sum Weight:	1254.94	3654.14			*2A _g limit			OTM	75370 kg-m	2618.73		

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 19 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
m	kg	kg							m²	kg	kg/m	
T1 60.0000-56.00 00	13.93	104.28	A	0.487	2.075	0.691	1.2	1.2	1.535	116.06	29.02	B
			B	0.66	1.849	0.792	1.2	1.2	1.965			
			C	0.487	2.075	0.691	1.2	1.2	1.535			
			D	0.487	2.075	0.691	1.2	1.2	1.535			
T2 56.0000-53.00 00	41.79	78.21	A	0.487	2.075	0.691	1.2	1.2	1.151	123.57*	41.19	B
			B	1	2.1	1	1.2	1.2	2.781			
			C	0.487	2.075	0.691	1.2	1.2	1.151			
			D	0.487	2.075	0.691	1.2	1.2	1.151			
T3 53.0000-50.00 00	41.79	13.03	A	0.285	2.642	0.612	1.2	1.2	1.343	150.29	50.10	B
			B	0.632	1.869	0.773	1.2	1.2	2.603			
			C	0.285	2.642	0.612	1.2	1.2	1.343			
			D	0.285	2.642	0.612	1.2	1.2	1.343			
T4 50.0000-46.00 00	68.22	111.74	A	0.233	2.842	0.598	1.175	1.175	2.144	250.55	62.64	B
			B	0.523	2.008	0.71	1.2	1.2	4.122			
			C	0.233	2.842	0.598	1.175	1.175	2.144			
			D	0.233	2.842	0.598	1.175	1.175	2.144			
T5 46.0000-40.00 00	123.32	207.86	A	0.12	3.348	0.577	1.09	1.09	1.576	318.90	53.15	B
			B	0.466	2.118	0.681	1.2	1.2	5.132			
			C	0.12	3.348	0.577	1.09	1.09	1.576			
			D	0.12	3.348	0.577	1.09	1.09	1.576			
T6 40.0000-34.00 00	137.95	218.65	A	0.122	3.338	0.578	1.092	1.092	1.606	325.92	54.32	B
			B	0.512	2.027	0.704	1.2	1.2	5.721			
			C	0.122	3.338	0.578	1.092	1.092	1.606			
			D	0.122	3.338	0.578	1.092	1.092	1.606			
T7 34.0000-28.00 00	140.36	218.65	A	0.117	3.364	0.577	1.088	1.088	1.531	309.41	51.57	B
			B	0.514	2.024	0.705	1.2	1.2	5.722			
			C	0.117	3.364	0.577	1.088	1.088	1.531			
			D	0.117	3.364	0.577	1.088	1.088	1.531			
T8 28.0000-26.00 00	46.79	190.60	A	0.093	3.484	0.574	1.07	1.07	0.438	97.90	48.95	B
			B	0.456	2.141	0.676	1.2	1.2	1.781			
			C	0.093	3.484	0.574	1.07	1.07	0.438			
			D	0.093	3.484	0.574	1.07	1.07	0.438			
T9 26.0000-24.00 00	47.59	119.94	A	0.061	3.656	0.572	1.046	1.046	0.326	95.54	47.77	B
			B	0.376	2.347	0.642	1.2	1.2	1.620			
			C	0.061	3.656	0.572	1.046	1.046	0.326			
			D	0.061	3.656	0.572	1.046	1.046	0.326			
T10 24.0000-22.00 00	48.40	131.21	A	0.059	3.668	0.572	1.044	1.044	0.360	99.92	49.96	B
			B	0.339	2.461	0.628	1.2	1.2	1.655			
			C	0.059	3.668	0.572	1.044	1.044	0.360			
			D	0.059	3.668	0.572	1.044	1.044	0.360			
T11 22.0000-18.30 00	89.53	275.05	A	0.066	3.626	0.572	1.05	1.05	0.895	199.64	53.96	B
			B	0.303	2.579	0.617	1.2	1.2	3.277			
			C	0.066	3.626	0.572	1.05	1.05	0.895			
			D	0.066	3.626	0.572	1.05	1.05	0.895			
T12 18.3000-13.80 00	110.26	335.99	A	0.056	3.684	0.572	1.042	1.042	1.108	242.00	53.78	B
			B	0.252	2.767	0.602	1.189	1.189	3.951			
			C	0.056	3.684	0.572	1.042	1.042	1.108			
			D	0.056	3.684	0.572	1.042	1.042	1.108			
T13 13.8000-8.800 0	125.01	389.65	A	0.048	3.725	0.571	1.036	1.036	1.283	255.43	51.09	B
			B	0.214	2.92	0.593	1.161	1.161	4.368			
			C	0.048	3.725	0.571	1.036	1.036	1.283			
			D	0.048	3.725	0.571	1.036	1.036	1.283			
T14 8.8000-6.5000	57.50	196.86	A	0.047	3.734	0.571	1.035	1.035	0.649	118.84	51.67	B
			B	0.192	3.013	0.589	1.144	1.144	2.036			
			C	0.047	3.734	0.571	1.035	1.035	0.649			

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 20 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section Elevation	Add Weight	Self Weight	F a c e	e	CF	RR	DF	DR	AE	F	w	Ctrl. Face
m	kg	kg							m ²	kg	kg/m	
T15 6.5000-0.0000	162.51	1062.44	D	0.047	3.734	0.571	1.035	1.035	0.649			
			A	0.054	3.694	0.571	1.04	1.04	2.429	375.96	57.84	B
			B	0.182	3.061	0.587	1.136	1.136	6.342			
			C	0.054	3.694	0.571	1.04	1.04	2.429			
			D	0.054	3.694	0.571	1.04	1.04	2.429			
Sum Weight:	1254.94	3654.14			*2A _g limit			OTM	88850 kg-m	3079.94		

Mast Vectors - No Ice

Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	60.0000-56.0000	0	Wind Normal	386.88	0.00	-386.88	-22439	0	0
		45	Wind 90	464.26	328.28	-328.28	-19040	-19040	0
		90	Wind Normal	386.88	386.88	0.00	0	-22439	0
T2	56.0000-53.0000	0	Wind Normal	494.29	0.00	-494.29	-26939	0	0
		45	Wind 90	494.29	349.52	-349.52	-19049	-19049	0
		90	Wind Normal	494.29	494.29	0.00	0	-26939	0
T3	53.0000-50.0000	0	Wind Normal	500.97	0.00	-500.97	-25800	0	0
		45	Wind 90	601.16	425.08	-425.08	-21892	-21892	0
		90	Wind Normal	500.97	500.97	0.00	0	-25800	0
T4	50.0000-46.0000	0	Wind Normal	835.18	0.00	-835.18	-40088	0	0
		45	Wind 90	1002.21	708.67	-708.67	-34016	-34016	0
		90	Wind Normal	835.18	835.18	0.00	0	-40088	0
T5	46.0000-40.0000	0	Wind Normal	1063.00	0.00	-1063.00	-45709	0	0
		45	Wind 90	1275.60	901.98	-901.98	-38785	-38785	0
		90	Wind Normal	1063.00	1063.00	0.00	0	-45709	0
T6	40.0000-34.0000	0	Wind Normal	1086.40	0.00	-1086.40	-40197	0	0
		45	Wind 90	1303.68	921.84	-921.84	-34108	-34108	0
		90	Wind Normal	1086.40	1086.40	0.00	0	-40197	0
T7	34.0000-28.0000	0	Wind Normal	1031.35	0.00	-1031.35	-31972	0	0
		45	Wind 90	1237.62	875.13	-875.13	-27129	-27129	0
		90	Wind Normal	1031.35	1031.35	0.00	0	-31972	0
T8	28.0000-26.0000	0	Wind Normal	326.33	0.00	-326.33	-8811	0	0
		45	Wind 90	391.59	276.90	-276.90	-7476	-7476	0
		90	Wind Normal	326.33	326.33	0.00	0	-8811	0
T9	26.0000-24.0000	0	Wind Normal	318.48	0.00	-318.48	-7962	0	0
		45	Wind 90	382.18	270.24	-270.24	-6756	-6756	0
		90	Wind Normal	318.48	318.48	0.00	0	-7962	0
T10	24.0000-22.0000	0	Wind Normal	333.07	0.00	-333.07	-7661	0	0
		45	Wind 90	399.68	282.62	-282.62	-6500	-6500	0
		90	Wind Normal	333.07	333.07	0.00	0	-7661	0
T11	22.0000-18.3000	0	Wind Normal	665.46	0.00	-665.46	-13409	0	0
		45	Wind 90	798.55	564.66	-564.66	-11378	-11378	0
		90	Wind Normal	665.46	665.46	0.00	0	-13409	0
T12	18.3000-13.8000	0	Wind Normal	814.06	0.00	-814.06	-13066	0	0
		45	Wind 90	967.99	684.47	-684.47	-10986	-10986	0
		90	Wind Normal	814.06	814.06	0.00	0	-13066	0
T13	13.8000-8.8000	0	Wind Normal	880.39	0.00	-880.39	-9948	0	0
		45	Wind 90	1021.71	722.46	-722.46	-8164	-8164	0
		90	Wind Normal	880.39	880.39	0.00	0	-9948	0
T14	8.8000-6.5000	0	Wind Normal	415.46	0.00	-415.46	-3178	0	0
		45	Wind 90	475.38	336.14	-336.14	-2572	-2572	0
		90	Wind Normal	415.46	415.46	0.00	0	-3178	0
T15	6.5000-0.0000	0	Wind Normal	1323.64	0.00	-1323.64	-4302	0	0
		45	Wind 90	1503.84	1063.38	-1063.38	-3456	-3456	0
		90	Wind Normal	1323.64	1323.64	0.00	0	-4302	0

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 21 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Mast Totals - No Ice									
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Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-10474.94	-301480	0	0
45	8711.37	-8711.37	-251307	-251307	0
90	10474.94	0.00	0	-301480	0

Mast Vectors - Service									
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Section No.	Section Elevation m	Wind Azimuth °	Directionality	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
T1	60.0000-56.0000	0	Wind Normal	96.72	0.00	-96.72	-5610	0	0
		45	Wind 90	116.06	82.07	-82.07	-4760	-4760	0
		90	Wind Normal	96.72	96.72	0.00	0	-5610	0
T2	56.0000-53.0000	0	Wind Normal	123.57	0.00	-123.57	-6735	0	0
		45	Wind 90	123.57	87.38	-87.38	-4762	-4762	0
		90	Wind Normal	123.57	123.57	0.00	0	-6735	0
T3	53.0000-50.0000	0	Wind Normal	125.24	0.00	-125.24	-6450	0	0
		45	Wind 90	150.29	106.27	-106.27	-5473	-5473	0
		90	Wind Normal	125.24	125.24	0.00	0	-6450	0
T4	50.0000-46.0000	0	Wind Normal	208.79	0.00	-208.79	-10022	0	0
		45	Wind 90	250.55	177.17	-177.17	-8504	-8504	0
		90	Wind Normal	208.79	208.79	0.00	0	-10022	0
T5	46.0000-40.0000	0	Wind Normal	265.75	0.00	-265.75	-11427	0	0
		45	Wind 90	318.90	225.50	-225.50	-9696	-9696	0
		90	Wind Normal	265.75	265.75	0.00	0	-11427	0
T6	40.0000-34.0000	0	Wind Normal	271.60	0.00	-271.60	-10049	0	0
		45	Wind 90	325.92	230.46	-230.46	-8527	-8527	0
		90	Wind Normal	271.60	271.60	0.00	0	-10049	0
T7	34.0000-28.0000	0	Wind Normal	257.84	0.00	-257.84	-7993	0	0
		45	Wind 90	309.41	218.78	-218.78	-6782	-6782	0
		90	Wind Normal	257.84	257.84	0.00	0	-7993	0
T8	28.0000-26.0000	0	Wind Normal	81.58	0.00	-81.58	-2203	0	0
		45	Wind 90	97.90	69.22	-69.22	-1869	-1869	0
		90	Wind Normal	81.58	81.58	0.00	0	-2203	0
T9	26.0000-24.0000	0	Wind Normal	79.62	0.00	-79.62	-1991	0	0
		45	Wind 90	95.54	67.56	-67.56	-1689	-1689	0
		90	Wind Normal	79.62	79.62	0.00	0	-1991	0
T10	24.0000-22.0000	0	Wind Normal	83.27	0.00	-83.27	-1915	0	0
		45	Wind 90	99.92	70.65	-70.65	-1625	-1625	0
		90	Wind Normal	83.27	83.27	0.00	0	-1915	0
T11	22.0000-18.3000	0	Wind Normal	166.36	0.00	-166.36	-3352	0	0
		45	Wind 90	199.64	141.16	-141.16	-2844	-2844	0
		90	Wind Normal	166.36	166.36	0.00	0	-3352	0
T12	18.3000-13.8000	0	Wind Normal	203.51	0.00	-203.51	-3266	0	0
		45	Wind 90	242.00	171.12	-171.12	-2746	-2746	0
		90	Wind Normal	203.51	203.51	0.00	0	-3266	0
T13	13.8000-8.8000	0	Wind Normal	220.10	0.00	-220.10	-2487	0	0
		45	Wind 90	255.43	180.61	-180.61	-2041	-2041	0
		90	Wind Normal	220.10	220.10	0.00	0	-2487	0
T14	8.8000-6.5000	0	Wind Normal	103.86	0.00	-103.86	-795	0	0
		45	Wind 90	118.84	84.04	-84.04	-643	-643	0
		90	Wind Normal	103.86	103.86	0.00	0	-795	0
T15	6.5000-0.0000	0	Wind Normal	330.91	0.00	-330.91	-1075	0	0
		45	Wind 90	375.96	265.84	-265.84	-864	-864	0
		90	Wind Normal	330.91	330.91	0.00	0	-1075	0

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 22 of 53
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Mast Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-2618.73	-75370	0	0
45	2177.84	-2177.84	-62827	-62827	0
90	2618.73	0.00	0	-75370	0

Discrete Appurtenance Pressures - No Ice $G_H = 1.115$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _z MPa	C _A A _c Front m ²	C _A A _c Side m ²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	-0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	60.0000	1.666	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	55.0000	1.625	0.00	0.5000	0.2000
Sum Weight:		640.00							

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 23 of 53
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Discrete Appurtenance Vectors - No Ice

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	157.41	0.00	0.00	-157.41	-7613	0	0
45	111.31	47.09	47.09	-111.31	-5400	-2260	-45
90	0.00	66.60	66.60	0.00	-57	-3197	-63

ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	111.31	47.09	-45.41	-112.00	-5256	2059	134
45	0.00	66.60	47.09	-47.09	-2140	-2381	189
90	111.31	47.09	112.00	45.41	2300	-5497	134

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	107.14	45.33	-43.71	-107.81	-4649	1956	-129
45	0.00	64.10	45.33	-45.33	-2024	-1783	-182
90	107.14	45.33	107.81	43.71	1715	-4407	-129

ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	107.14	45.33	43.71	-107.81	-4649	-1956	129
45	151.52	0.00	107.14	-107.14	-4620	-4620	0
90	107.14	45.33	107.81	-43.71	-1956	-4649	-129

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	159.26	0.00	0.00	-159.26	-8020	-18	48
45	112.61	47.64	47.64	-112.61	-5688	-2400	-11
90	0.00	67.38	67.38	0.00	-57	-3387	-64

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	159.26	0.00	0.00	-159.26	-8020	18	-48
45	112.61	47.64	47.64	-112.61	-5688	-2364	-79
90	0.00	67.38	67.38	0.00	-57	-3351	-64

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ANT PANEL 1.0x0.50x0.19m - Elevation 60 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	64.53	0.00	0.00	-64.53	-3866	0	0
45	45.63	18.25	18.25	-45.63	-2732	-1095	5
90	0.00	25.81	25.81	0.00	6	-1549	8

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	45.41	18.16	19.27	-44.95	-2632	-1117	-26
45	64.22	0.00	45.41	-45.41	-2659	-2659	0
90	45.41	18.16	44.95	-19.27	-1117	-2632	26

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	64.22	0.00	0.00	-64.22	-3783	0	0
45	45.41	18.16	18.16	-45.41	-2673	-1072	5
90	0.00	25.69	25.69	0.00	6	-1516	8

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	45.41	18.16	-19.27	-44.95	-2632	1117	26
45	0.00	25.69	18.16	-18.16	-1052	-1092	37
90	45.41	18.16	44.95	19.27	1157	-2672	26

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	45.19	18.08	19.17	-44.73	-2574	-1092	-26
45	63.91	0.00	45.19	-45.19	-2601	-2601	0
90	45.19	18.08	44.73	-19.17	-1092	-2574	26

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	63.91	0.00	0.00	-63.91	-3701	0	0
45	45.19	18.08	18.08	-45.19	-2615	-1048	5
90	0.00	25.56	25.56	0.00	6	-1483	8

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ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	45.19	18.08	-19.17	-44.73	-2574	1092	26
45	0.00	25.56	18.08	-18.08	-1028	-1069	36
90	45.19	18.08	44.73	19.17	1132	-2615	26

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.96	17.99	19.08	-44.51	-2517	-1067	-26
45	63.59	0.00	44.96	-44.96	-2543	-2543	0
90	44.96	17.99	44.51	-19.08	-1067	-2517	26

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	63.59	0.00	0.00	-63.59	-3619	0	0
45	44.96	17.99	17.99	-44.96	-2557	-1025	5
90	0.00	25.44	25.44	0.00	6	-1450	8

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.96	17.99	-19.08	-44.51	-2517	1067	26
45	0.00	25.44	17.99	-17.99	-1005	-1045	36
90	44.96	17.99	44.51	19.08	1108	-2557	26

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.74	17.90	18.98	-44.29	-2460	-1043	-25
45	63.27	0.00	44.74	-44.74	-2485	-2485	0
90	44.74	17.90	44.29	-18.98	-1043	-2460	25

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	63.27	0.00	0.00	-63.27	-3537	0	0
45	44.74	17.90	17.90	-44.74	-2499	-1002	5
90	0.00	25.31	25.31	0.00	6	-1417	8

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ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	44.74	17.90	-18.98	-44.29	-2460	1043	25
45	0.00	25.31	17.90	-17.90	-982	-1022	36
90	44.74	17.90	44.29	18.98	1083	-2500	25

ANT PANEL 1.0x0.50x0.19m - Elevation 55 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	62.94	0.00	0.00	-62.94	-3456	0	0
45	44.51	17.80	17.80	-44.51	-2442	-979	5
90	0.00	25.18	25.18	0.00	6	-1385	8

Discrete Appurtenance Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-45.41	-1542.98	-80533	2059	134
45	702.53	-1058.94	-55432	-36547	50
90	1038.93	45.41	2085	-53814	-64

Discrete Appurtenance Pressures - Service $G_H = 1.115$

Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q MPa	C _{AAC} Front m²	C _{AAC} Side m²
ANT OMNI L=4.0m	0.0000	60.00	0.0000	-0.9500	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	135.0000	60.00	2.0107	2.0107	48.0000	1.563	0.00	1.3000	0.5500
ANT OMNI L=4.0m	315.0000	60.00	-2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	45.0000	60.00	2.0107	-2.0107	42.0000	1.504	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT OMNI L=4.0m	0.0000	60.00	-0.3000	-0.9500	50.0000	1.581	0.00	1.3000	0.5500
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	60.0000	1.666	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	59.0000	1.658	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	180.0000	20.00	0.0000	0.3000	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	135.0000	20.00	1.0071	1.0071	58.0000	1.650	0.00	0.5000	0.2000
ANT PANEL 1.0x0.50x0.19m	225.0000	20.00	-1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000

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Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	z m	K _z	q _z MPa	CAAC Front m ²	CAAC Side m ²
1.0x0.50x0.19m ANT PANEL	180.0000	20.00	0.0000	0.3000	57.0000	1.642	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	135.0000	20.00	1.0071	1.0071	57.0000	1.642	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	225.0000	20.00	-1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	180.0000	20.00	0.0000	0.3000	56.0000	1.633	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	135.0000	20.00	1.0071	1.0071	56.0000	1.633	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	180.0000	20.00	0.0000	0.3000	55.0000	1.625	0.00	0.5000	0.2000
1.0x0.50x0.19m ANT PANEL	Sum Weight:	640.00							

Discrete Appurtenance Vectors - Service

ANT OMNI L=4.0m - Elevation 48 - From Face B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	39.35	0.00	0.00	-39.35	-1946	0	0
45	27.83	11.77	11.77	-27.83	-1393	-565	-11
90	0.00	16.65	16.65	0.00	-57	-799	-16

ANT OMNI L=4.0m - Elevation 48 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	27.83	11.77	-11.35	-28.00	-1223	424	33
45	0.00	16.65	11.77	-11.77	-444	-686	47
90	27.83	11.77	28.00	11.35	666	-1465	33

ANT OMNI L=4.0m - Elevation 42 - From Leg A							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	26.78	11.33	-10.93	-26.95	-1253	580	-32
45	0.00	16.03	11.33	-11.33	-597	-355	-46
90	26.78	11.33	26.95	10.93	338	-1011	-32

ANT OMNI L=4.0m - Elevation 42 - From Leg B							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	26.78	11.33	10.93	-26.95	-1253	-580	32
45	37.88	0.00	26.78	-26.78	-1246	-1246	0
90	26.78	11.33	26.95	-10.93	-580	-1253	-32

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ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	39.81	0.00	0.00	-39.81	-2048	-18	12
45	28.15	11.91	11.91	-28.15	-1465	-614	-3
90	0.00	16.84	16.84	0.00	-57	-860	-16

ANT OMNI L=4.0m - Elevation 50 - From Face B							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	39.81	0.00	0.00	-39.81	-2048	18	-12
45	28.15	11.91	11.91	-28.15	-1465	-578	-20
90	0.00	16.84	16.84	0.00	-57	-824	-16

ANT PANEL 1.0x0.50x0.19m - Elevation 60 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	16.13	0.00	0.00	-16.13	-962	0	0
45	11.41	4.56	4.56	-11.41	-678	-274	1
90	0.00	6.45	6.45	0.00	6	-387	2

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.35	4.54	4.82	-11.24	-643	-264	-6
45	16.05	0.00	11.35	-11.35	-650	-650	0
90	11.35	4.54	11.24	-4.82	-264	-643	6

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	16.05	0.00	0.00	-16.05	-941	0	0
45	11.35	4.54	4.54	-11.35	-664	-268	1
90	0.00	6.42	6.42	0.00	6	-379	2

ANT PANEL 1.0x0.50x0.19m - Elevation 59 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.35	4.54	-4.82	-11.24	-643	264	6
45	0.00	6.42	4.54	-4.54	-248	-288	9
90	11.35	4.54	11.24	4.82	304	-683	6

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ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.30	4.52	4.79	-11.18	-629	-258	-6
45	15.98	0.00	11.30	-11.30	-635	-635	0
90	11.30	4.52	11.18	-4.79	-258	-629	6

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	15.98	0.00	0.00	-15.98	-921	0	0
45	11.30	4.52	4.52	-11.30	-649	-262	1
90	0.00	6.39	6.39	0.00	6	-371	2

ANT PANEL 1.0x0.50x0.19m - Elevation 58 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.30	4.52	-4.79	-11.18	-629	258	6
45	0.00	6.39	4.52	-4.52	-242	-282	9
90	11.30	4.52	11.18	4.79	298	-669	6

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.24	4.50	4.77	-11.13	-614	-252	-6
45	15.90	0.00	11.24	-11.24	-621	-621	0
90	11.24	4.50	11.13	-4.77	-252	-614	6

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Face D							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	15.90	0.00	0.00	-15.90	-900	0	0
45	11.24	4.50	4.50	-11.24	-635	-256	1
90	0.00	6.36	6.36	0.00	6	-362	2

ANT PANEL 1.0x0.50x0.19m - Elevation 57 - From Leg C							
Wind Azimuth °	F_a kg	F_s kg	V_x kg	V_z kg	OTM_x kg-m	OTM_z kg-m	Torque kg-m
0	11.24	4.50	-4.77	-11.13	-614	252	6
45	0.00	6.36	4.50	-4.50	-236	-276	9
90	11.24	4.50	11.13	4.77	292	-654	6

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ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	11.18	4.47	4.75	-11.07	-600	-246	-6
45	15.82	0.00	11.18	-11.18	-606	-606	0
90	11.18	4.47	11.07	-4.75	-246	-600	6

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	15.82	0.00	0.00	-15.82	-880	0	0
45	11.18	4.47	4.47	-11.18	-620	-251	1
90	0.00	6.33	6.33	0.00	6	-354	2

ANT PANEL 1.0x0.50x0.19m - Elevation 56 - From Leg C							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	11.18	4.47	-4.75	-11.07	-600	246	6
45	0.00	6.33	4.47	-4.47	-230	-271	9
90	11.18	4.47	11.07	4.75	286	-640	6

ANT PANEL 1.0x0.50x0.19m - Elevation 55 - From Face D							
Wind Azimuth °	F _a kg	F _s kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	15.74	0.00	0.00	-15.74	-859	0	0
45	11.13	4.45	4.45	-11.13	-606	-245	1
90	0.00	6.29	6.29	0.00	6	-346	2

Discrete Appurtenance Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	-11.35	-385.74	-20204	424	33
45	175.63	-264.74	-13929	-9227	12
90	259.73	11.35	450	-13544	-16

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Dish Pressures - No Ice

Elevation m	Dish Description	Aiming Azimuth °	Weight kg	Offsetx m	Offsetz m	Kz	A _A m ²	qz MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
50.0000	HP12-21B	135.0000	385.55	1.3036	1.3036	1.581	10.5064	0.00
	Sum		1538.55					
	Weight:							

Dish Vectors - No Ice

HP12-21B - Elevation 48 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1605.11	0.00	0.00	0.00	-1605.11	-76461	584	-2433
45	0.003230	0.000000	0.000000	1605.11	0.00	0.00	1134.99	-1134.99	-53895	-53895	0
90	0.003230	0.000000	0.000000	1605.11	0.00	0.00	1605.11	0.00	584	-76461	2433

KP4F-23 - Elevation 48 - From Leg B											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	67.13	0.00	0.00	0.00	-67.13	-3252	-30	88
45	0.001520	0.000000	0.000000	67.13	0.00	0.00	47.47	-47.47	-2309	-2309	0
90	0.001520	0.000000	0.000000	67.13	0.00	0.00	67.13	0.00	-30	-3252	-88

KP6F-19 - Elevation 48 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	151.09	0.00	0.00	0.00	-151.09	-7337	85	-144
45	0.001520	0.000000	0.000000	151.09	0.00	0.00	106.83	-106.83	-5213	-5043	-203
90	0.001520	0.000000	0.000000	151.09	0.00	0.00	151.09	0.00	-85	-7167	-144

HP4-107 - Elevation 46 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	176.25	0.00	0.00	0.00	-176.25	-8061	-47	230
45	0.003230	0.000000	0.000000	176.25	0.00	0.00	124.63	-124.63	-5686	-5780	325
90	0.003230	0.000000	0.000000	176.25	0.00	0.00	176.25	0.00	47	-8154	230

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KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	149.26	0.00	0.00	0.00	-149.26	-6749	117	-195
45	0.001520	0.000000	0.000000	149.26	0.00	0.00	105.54	-105.54	-4738	-4738	0
90	0.001520	0.000000	0.000000	149.26	0.00	0.00	149.26	0.00	117	-6749	195

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	169.96	0.00	0.00	0.00	-169.96	-6837	-47	222
45	0.003230	0.000000	0.000000	169.96	0.00	0.00	120.18	-120.18	-4820	-4914	313
90	0.003230	0.000000	0.000000	169.96	0.00	0.00	169.96	0.00	47	-6930	222

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1512.66	0.00	0.00	0.00	-1512.66	-58491	503	-1972
45	0.003230	0.000000	0.000000	1512.66	0.00	0.00	1069.61	-1069.61	-41212	-41212	0
90	0.003230	0.000000	0.000000	1512.66	0.00	0.00	1512.66	0.00	503	-58491	1972

HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	166.89	0.00	0.00	0.00	-166.89	-6295	-47	218
45	0.003230	0.000000	0.000000	166.89	0.00	0.00	118.01	-118.01	-4438	-4531	308
90	0.003230	0.000000	0.000000	166.89	0.00	0.00	166.89	0.00	47	-6389	218

HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	148.07	0.00	0.00	0.00	-148.07	-3754	52	-214
45	0.003230	0.000000	0.000000	148.07	0.00	0.00	104.70	-104.70	-2669	-2566	-302
90	0.003230	0.000000	0.000000	148.07	0.00	0.00	148.07	0.00	-52	-3650	-214

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	129.17	0.00	0.00	0.00	-129.17	-1913	89	-320
45	0.003230	0.000000	0.000000	129.17	0.00	0.00	91.34	-91.34	-1327	-1327	0
90	0.003230	0.000000	0.000000	129.17	0.00	0.00	129.17	0.00	89	-1913	320

HP12-21B - Elevation 50 - From Leg C											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	1623.95	0.00	0.00	0.00	-1623.95	-80695	-503	2117
45	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1148.30	-1148.30	-56913	-57918	2994

90	0.003230	0.000000	0.000000	1623.95	0.00	0.00	1623.95	0.00	503	-81700	2117
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Dish Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.00	-5899.54	-259845	757	-2403
45	4171.60	-4171.60	-183220	-184232	3434
90	5899.54	0.00	1768	-260857	7260

Dish Pressures - Service

Elevation m	Dish Description	Aiming Azimuth °	Weight kg	Offset _x m	Offset _z m	K _z	A _A m ²	q _z MPa
48.0000	HP12-21B	225.0000	385.55	-1.5157	1.5157	1.563	10.5064	0.00
48.0000	KP4F-23	45.0000	23.13	1.3036	-1.3036	1.563	0.9337	0.00
48.0000	KP6F-19	315.0000	89.81	-0.9500	-0.9500	1.563	2.1015	0.00
46.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.544	1.1678	0.00
46.0000	KP6F-19	225.0000	89.81	-1.3036	1.3036	1.544	2.1015	0.00
40.5000	HP4-107	135.0000	35.83	1.3036	1.3036	1.489	1.1678	0.00
39.0000	HP12-21B	225.0000	385.55	-1.3036	1.3036	1.473	10.5064	0.00
38.0000	HP4-107	135.0000	35.83	1.3036	1.3036	1.462	1.1678	0.00
25.0000	HP4-107	315.0000	35.83	-1.4434	-1.4434	1.297	1.1678	0.00
15.5000	HP4-107	225.0000	35.83	-2.4756	2.4756	1.132	1.1678	0.00
50.0000	HP12-21B	135.0000	385.55	1.3036	1.3036	1.581	10.5064	0.00
	Sum		1538.55					
	Weight:							

Dish Vectors - Service

HP12-21B - Elevation 48 - From Leg D											
Wind Azimuth °	C _A	C _S	C _M	F _A kg	F _S kg	F _M kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.003230	0.000000	0.000000	401.28	0.00	0.00	0.00	-401.28	-18677	584	-608
45	0.003230	0.000000	0.000000	401.28	0.00	0.00	283.75	-283.75	-13035	-13035	0
90	0.003230	0.000000	0.000000	401.28	0.00	0.00	401.28	0.00	584	-18677	608

KP4F-23 - Elevation 48 - From Leg B											
Wind Azimuth °	C _A	C _S	C _M	F _A kg	F _S kg	F _M kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.001520	0.000000	0.000000	16.78	0.00	0.00	0.00	-16.78	-836	-30	22
45	0.001520	0.000000	0.000000	16.78	0.00	0.00	11.87	-11.87	-600	-600	0
90	0.001520	0.000000	0.000000	16.78	0.00	0.00	16.78	0.00	-30	-836	-22

KP6F-19 - Elevation 48 - From Leg A											
Wind Azimuth °	C _A	C _S	C _M	F _A kg	F _S kg	F _M kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.001520	0.000000	0.000000	37.77	0.00	0.00	0.00	-37.77	-1898	85	-36
45	0.001520	0.000000	0.000000	37.77	0.00	0.00	26.71	-26.71	-1367	-1197	-51
90	0.001520	0.000000	0.000000	37.77	0.00	0.00	37.77	0.00	-85	-1728	-36

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HP4-107 - Elevation 46 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	44.06	0.00	0.00	0.00	-44.06	-1980	-47	57
45	0.003230	0.000000	0.000000	44.06	0.00	0.00	31.16	-31.16	-1387	-1480	81
90	0.003230	0.000000	0.000000	44.06	0.00	0.00	44.06	0.00	47	-2074	57

KP6F-19 - Elevation 46 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.001520	0.000000	0.000000	37.31	0.00	0.00	0.00	-37.31	-1599	117	-49
45	0.001520	0.000000	0.000000	37.31	0.00	0.00	26.39	-26.39	-1097	-1097	0
90	0.001520	0.000000	0.000000	37.31	0.00	0.00	37.31	0.00	117	-1599	49

HP4-107 - Elevation 40.5 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	42.49	0.00	0.00	0.00	-42.49	-1674	-47	55
45	0.003230	0.000000	0.000000	42.49	0.00	0.00	30.04	-30.04	-1170	-1264	78
90	0.003230	0.000000	0.000000	42.49	0.00	0.00	42.49	0.00	47	-1768	55

HP12-21B - Elevation 39 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	378.16	0.00	0.00	0.00	-378.16	-14246	503	-493
45	0.003230	0.000000	0.000000	378.16	0.00	0.00	267.40	-267.40	-9926	-9926	0
90	0.003230	0.000000	0.000000	378.16	0.00	0.00	378.16	0.00	503	-14246	493

HP4-107 - Elevation 38 - From Leg C											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	41.72	0.00	0.00	0.00	-41.72	-1539	-47	54
45	0.003230	0.000000	0.000000	41.72	0.00	0.00	29.50	-29.50	-1074	-1168	77
90	0.003230	0.000000	0.000000	41.72	0.00	0.00	41.72	0.00	47	-1632	54

HP4-107 - Elevation 25 - From Leg A											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	37.02	0.00	0.00	0.00	-37.02	-977	52	-53
45	0.003230	0.000000	0.000000	37.02	0.00	0.00	26.18	-26.18	-706	-603	-76
90	0.003230	0.000000	0.000000	37.02	0.00	0.00	37.02	0.00	-52	-874	-53

HP4-107 - Elevation 15.5 - From Leg D											
Wind Azimuth °	CA	CS	CM	FA	FS	FM	Vx	Vz	OTMx	OTMz	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	32.29	0.00	0.00	0.00	-32.29	-412	89	-80
45	0.003230	0.000000	0.000000	32.29	0.00	0.00	22.83	-22.83	-265	-265	0
90	0.003230	0.000000	0.000000	32.29	0.00	0.00	32.29	0.00	89	-412	80

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HP12-21B - Elevation 50 - From Leg C											
Wind Azimuth °	C _A	C _S	C _M	F _A	F _S	F _M	V _x	V _z	OTM _x	OTM _z	Torque
				kg	kg	kg	kg	kg	kg-m	kg-m	kg-m
0	0.003230	0.000000	0.000000	405.99	0.00	0.00	0.00	-405.99	-19797	-503	529
45	0.003230	0.000000	0.000000	405.99	0.00	0.00	287.08	-287.08	-13851	-14856	748
90	0.003230	0.000000	0.000000	405.99	0.00	0.00	405.99	0.00	503	-20802	529

Dish Totals - Service

Wind Azimuth °	V _x	V _z	OTM _x	OTM _z	Torque
	kg	kg	kg-m	kg-m	kg-m
0	0.00	-1474.88	-63635	757	-601
45	1042.90	-1042.90	-44479	-45490	859
90	1474.88	0.00	1768	-64646	1815

User Load Vectors - No Ice

C x MANTENIMIENTO - Elevation 60								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANTONINI (E) - Elevation 48								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1920	-1920	0

2 SOP. ANTONINI (E) - Elevation 42								
Wind Azimuth °	Offset _x	Offset _z	F	V _x	V _z	OTM _x	OTM _z	Torque
	m	m	kg	kg	kg	kg-m	kg-m	kg-m
0	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
45	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0
90	0.0000	0.0000	0.00	40.00	-40.00	-1680	-1680	0

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User Load Totals - No Ice

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	80.00	-80.00	-3600	-3600	0
45	80.00	-80.00	-3600	-3600	0
90	80.00	-80.00	-3600	-3600	0

User Load Vectors - Service

C x MANTENIMIENTO - Elevation 60								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	0.00	0.00	0	0	0
45	0.0000	0.0000	0.00	0.00	0.00	0	0	0
90	0.0000	0.0000	0.00	0.00	0.00	0	0	0

2 SOP. ANT OMNI (E) - Elevation 48								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
45	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0
90	0.0000	0.0000	0.00	10.00	-10.00	-480	-480	0

2 SOP. ANT OMNI (E) - Elevation 42								
Wind Azimuth °	Offset _x m	Offset _z m	F kg	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
45	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0
90	0.0000	0.0000	0.00	10.00	-10.00	-420	-420	0

User Load Totals - Service

Wind Azimuth °	V _x kg	V _z kg	OTM _x kg-m	OTM _z kg-m	Torque kg-m
0	20.00	-20.00	-900	-900	0
45	20.00	-20.00	-900	-900	0
90	20.00	-20.00	-900	-900	0

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Force Totals

Load Case	Vertical Forces kg	Sum of Forces X kg	Sum of Forces Z kg	Sum of Overturning Moments, Mx kg-m	Sum of Overturning Moments, Mz kg-m	Sum of Torques kg-m
Leg Weight	0.00					
Bracing Weight	3654.14					
Total Member Self-Weight	3654.14			1674	636	
Total Weight	7887.63			1674	636	
Wind 0 deg - No Ice		34.59	-17997.45	-645459	-784	-2269
Wind 45 deg - No Ice		13665.51	-14021.92	-493559	-475685	3484
Wind 90 deg - No Ice		17493.41	-34.59	253	-619751	7196
Total Weight	7887.63			1674	636	
Wind 0 deg - Service		8.65	-4499.36	-160109	281	-567
Wind 45 deg - Service		3416.38	-3505.48	-122134	-118444	871
Wind 90 deg - Service		4373.35	-8.65	1319	-154461	1799

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 45 deg - No Ice
4	Dead+Wind 90 deg - No Ice
5	Dead+Wind 0 deg - Service
6	Dead+Wind 45 deg - Service
7	Dead+Wind 90 deg - Service

Maximum Member Forces

Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T1	60 - 56	Leg	Max Tension	3	1684.10	1	2
			Max. Compression	3	-2166.09	0	-3
			Max. Mx	3	-79.61	5	-5
			Max. My	4	-1169.96	5	-6
			Max. Vy	4	-53.88	3	-3
			Max. Vx	4	52.95	2	-3
		Diagonal	Max Tension	4	703.12	0	0
			Max. Compression	2	-588.46	0	0
			Max Tension	2	433.02	0	0
		Horizontal	Max. Compression	4	-515.22	0	0
			Max. Mx	1	0.00	0	0
			Max. My	4	-124.43	0	0
			Max. Vy	1	-1.63	0	0
			Max. Vx	4	-0.00	0	0
		Top Girt	Max Tension	2	23.22	0	0
			Max. Compression	2	-23.44	0	0
			Max. Mx	5	-0.32	0	0
			Max. My	4	-16.93	0	0
			Max. Vy	5	-1.63	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T2	56 - 53	Leg	Max. Vx	4	-0.00	0	0
			Max Tension	3	6066.14	22	22
			Max. Compression	3	-6633.50	1	-1
			Max. Mx	3	-443.36	-27	21
			Max. My	3	-6633.10	-23	-23
			Max. Vy	2	78.03	-18	-18
		Diagonal	Max. Vx	4	54.90	-1	2
			Max Tension	4	1169.87	0	0
			Max. Compression	2	-1042.08	0	0
			Max Tension	2	758.82	0	0
			Max. Compression	4	-866.37	0	0
			Max. Mx	1	-391	0	0
		Top Girt	Max. My	4	-681.78	0	0
			Max. Vy	1	-1.63	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	498.39	0	0
			Max. Compression	4	-597.17	0	0
			Max. Mx	1	0.01	0	0
			Max. My	4	-597.17	0	0
			Max. Vy	1	1.63	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	5474.61	-3	-4
			Max. Compression	3	-5739.48	4	5
			Max. Mx	3	-566.99	31	-29
			Max. My	3	47.03	-31	30
			Max. Vy	3	54.93	31	-29
			Max. Vx	3	52.70	-31	30
T3	53 - 50	Leg	Max Tension	3	1037.71	0	0
			Max. Compression	3	-1012.25	1	1
			Max. Mx	2	-170.56	-4	0
			Max. My	4	-638.27	2	-2
			Max. Vy	2	-693	0	0
			Max. Vx	4	3.54	0	0
		Diagonal	Max Tension	3	515.46	0	0
			Max. Compression	3	-710.61	0	0
			Max. Mx	4	310.21	0	0
			Max. My	4	209.43	0	0
			Max. Vy	4	1.59	0	0
			Max. Vx	4	0.35	0	0
		Top Girt	Max Tension	3	8839.12	17	18
			Max. Compression	3	-9344.57	-18	-17
			Max. Mx	2	5691.62	30	-10
			Max. My	2	-6643.39	9	-30
			Max. Vy	2	896.47	20	1
			Max. Vx	2	-895.40	-1	-20
			Max Tension	4	3046.58	2	-1
			Max. Compression	4	-3292.48	0	0
			Max. Mx	3	2883.76	3	-1
			Max. My	4	-3287.48	-2	-2
			Max. Vy	3	2.47	3	-1
			Max. Vx	4	1.17	0	0
T4	50 - 46	Leg	Max Tension	2	1000.37	0	0
			Max. Compression	2	-910.06	0	0
			Max. Mx	1	69.23	-2	0
			Max. My	4	13.54	0	0
			Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
		Diagonal	Max Tension	2	967.31	0	0
			Max. Compression	2	-811.38	0	0
			Max. Mx	1	120.83	-2	0
			Max. My	4	34.42	0	0
			Max Tension	2	967.31	0	0
			Max. Compression	2	-811.38	0	0
		Top Girt	Max. Mx	1	69.23	-2	0
			Max. My	4	13.54	0	0
			Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	967.31	0	0
			Max. Compression	2	-811.38	0	0
		Mid Girt	Max. Mx	1	120.83	-2	0
			Max. My	4	34.42	0	0
			Max Tension	2	967.31	0	0
			Max. Compression	2	-811.38	0	0
			Max. Mx	1	120.83	-2	0
			Max. My	4	34.42	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T5	46 - 40	Inner Bracing	Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	52.25	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	6	45.41	5	0
			Max. My	4	42.88	0	0
		Leg	Max. Vy	6	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	24845.49	-282	0
			Max. Compression	3	-26177.79	366	-14
			Max. Mx	3	24813.51	-373	9
			Max. My	3	30.40	3	-428
		Diagonal	Max. Vy	3	-168.60	255	-5
			Max. Vx	3	210.49	3	-428
			Max Tension	3	3727.37	5	-1
			Max. Compression	3	-3896.10	0	0
			Max. Mx	3	2539.20	5	-1
			Max. My	4	-3821.63	-3	-2
		Top Girt	Max. Vy	3	3.54	5	-1
			Max. Vx	4	1.44	0	0
			Max Tension	2	1125.98	0	0
			Max. Compression	2	-1028.86	0	0
			Max. Mx	1	91.98	-2	0
			Max. My	4	0.22	0	0
		Mid Girt	Max. Vy	1	5.16	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	1804.40	0	0
			Max. Compression	2	-1660.30	0	0
			Max. Mx	1	106.56	-4	0
			Max. My	4	21.42	0	0
		Inner Bracing	Max. Vy	1	8.59	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	53.79	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	50.49	5	0
			Max. My	4	49.40	0	0
T6	40 - 34	Leg	Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	46572.82	-476	15
			Max. Compression	3	-48231.53	566	-16
			Max. Mx	3	-40061.58	566	-16
			Max. My	3	321.85	10	-576
		Diagonal	Max. Vy	3	-303.70	489	-3
			Max. Vx	2	-365.49	-332	354
			Max Tension	3	5698.48	8	-1
			Max. Compression	3	-5835.18	0	0
			Max. Mx	3	4274.82	8	-1
			Max. My	4	-5276.16	-5	-3
		Top Girt	Max. Vy	3	6.07	8	-1
			Max. Vx	4	2.28	0	0
			Max Tension	2	2138.65	0	0
			Max. Compression	2	-2025.23	0	0
			Max. Mx	1	87.37	-3	0
			Max. My	4	9.24	0	0
		Mid Girt	Max. Vy	1	6.51	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	3499.47	0	0
			Max. Compression	2	-3301.87	0	0
			Max. Mx	1	148.01	-4	0
			Max. My	4	27.86	0	0
			Max. Vy	1	8.59	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T7	34 - 28	Inner Bracing	Max. Vx	4	-0.00	0	0
			Max Tension	3	77.84	0	0
			Max. Compression	1	0.00	0	0
			Max. Mx	1	45.22	5	0
			Max. My	4	40.91	0	0
			Max. Vy	1	-7.30	0	0
		Leg	Max. Vx	4	0.00	0	0
			Max Tension	3	73537.36	-2021	0
			Max. Compression	3	-75212.85	138	-18
			Max. Mx	3	73537.36	-2021	0
			Max. My	3	-2838.04	3	819
			Max. Vy	3	993.28	-2021	0
		Diagonal	Max. Vx	3	407.89	3	819
			Max Tension	3	6261.45	7	0
			Max. Compression	3	-6343.73	0	0
			Max. Mx	3	-109.27	-8	-2
			Max. My	4	-2671.59	-6	-3
			Max. Vy	3	5.97	0	0
		Top Girt	Max. Vx	4	2.42	0	0
			Max Tension	2	2995.48	0	0
			Max. Compression	2	-2878.80	0	0
			Max. Mx	1	89.48	-3	0
			Max. My	4	-6.18	0	0
		Mid Girt	Max. Vy	1	651	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	2	3175.24	0	0
			Max. Compression	2	-3031.54	0	0
			Max. Mx	1	96.72	-4	0
		Inner Bracing	Max. My	4	9.96	0	0
			Max. Vy	1	8.59	0	0
			Max. Vx	4	-0.00	0	0
			Max Tension	3	120.23	0	0
			Max. Compression	3	-50.46	0	0
T8	28 - 26	Leg	Max. Mx	1	44.06	5	0
			Max. My	4	34.35	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	0.00	0	0
			Max Tension	3	78384.14	109	17
			Max. Compression	3	-80437.20	-115	-22
		Diagonal	Max. Mx	3	78370.64	-2021	0
			Max. My	3	718.35	-3	-838
			Max. Vy	3	-1104.71	-2021	0
			Max. Vx	3	-409.84	-10	834
			Max Tension	3	3326.00	0	0
			Max. Compression	4	-3294.51	0	0
		Top Girt	Max. Mx	3	-1315.23	4	0
			Max. My	4	-2664.78	-1	-3
			Max. Vy	3	5.10	4	0
			Max. Vx	4	2.56	0	0
			Max Tension	2	455.65	0	0
			Max. Compression	2	-515.07	0	0
		Inner Bracing	Max. Mx	4	432.82	-3	0
			Max. My	4	-78.23	0	0
			Max. Vy	4	6.48	0	0
			Max. Vx	4	-0.61	0	0
			Max Tension	3	228.67	0	0
			Max. Compression	3	-322.33	0	0
			Max. Mx	1	-13.62	5	0
			Max. My	4	-38.85	0	0
			Max. Vy	1	-7.30	0	0
			Max. Vx	4	-0.00	0	0

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T9	26 - 24	Leg	Max Tension	3	75767.66	-532	8
			Max. Compression	3	-78387.83	552	0
			Max. Mx	3	-78387.83	552	0
			Max. My	3	751.11	-4	-838
			Max. Vy	3	-395.70	552	0
		Diagonal	Max. Vx	3	401.13	-10	834
			Max Tension	4	2784.76	0	0
			Max. Compression	4	-2856.36	0	0
			Max. Mx	3	-1852.94	3	-1
			Max. My	4	-2847.29	2	-2
			Max. Vy	3	496	3	-1
			Max. Vx	4	150	0	0
			Max Tension	3	72934.51	-453	-7
			Max. Compression	3	-75850.11	488	-15
			Max. Mx	3	-75837.47	552	0
			Max. My	3	723.96	-1	-206
			Max. Vy	3	-88.72	-532	8
			Max. Vx	3	60.06	14	202
T10	24 - 22	Leg	Max Tension	4	2136.46	0	0
			Max. Compression	4	-2171.60	0	0
			Max. Mx	3	-1803.21	3	-1
			Max. My	4	-1106.17	3	-1
			Max. Vy	3	534	3	-1
		Diagonal	Max. Vx	4	127	0	0
			Max Tension	3	69519.27	-96	13
			Max. Compression	3	-72544.92	61	-9
			Max. Mx	3	-72519.39	488	-15
			Max. My	3	-2593.53	-11	588
			Max. Vy	3	213.37	488	-15
			Max. Vx	3	-208.71	-11	588
			Max Tension	4	2056.21	0	0
			Max. Compression	4	-2142.72	0	0
			Max. Mx	3	-1182.11	10	-1
			Max. My	4	475.55	1	-3
			Max. Vy	3	995	10	-1
			Max. Vx	4	216	0	0
T11	22 - 18.3	Leg	Max Tension	3	67555.60	-646	-2
			Max. Compression	3	-70573.20	703	2
			Max. Mx	3	-70573.20	703	2
			Max. My	3	-2664.75	-12	588
			Max. Vy	3	-282.21	703	2
		Diagonal	Max. Vx	3	258.09	-12	588
			Max Tension	4	1401.26	0	0
			Max. Compression	4	-1506.06	0	0
			Max. Mx	3	-876.92	10	-4
			Max. My	4	-1476.39	7	-5
			Max. Vy	3	10.71	10	-4
			Max. Vx	4	2.60	0	0
			Max Tension	3	66979.97	452	9
			Max. Compression	3	-69968.01	-536	-16
			Max. Mx	3	-69934.80	703	2
			Max. My	3	-153.70	-14	-701
			Max. Vy	3	372.37	703	2
			Max. Vx	3	262.09	-14	-701
T12	18.3 - 13.8	Leg	Max Tension	4	968.63	0	0
			Max. Compression	4	-921.58	0	0
			Max. Mx	3	-675.50	13	-6
			Max. My	4	-902.85	12	-7
			Max. Vy	3	12.63	13	-6
		Diagonal	Max. Vx	4	331	0	0
			Max Tension	3	65281.98	-873	7
			Max. Compression	3	-69968.01	-536	-16
			Max. Mx	3	-69934.80	703	2
			Max. My	3	-153.70	-14	-701
			Max. Vy	3	372.37	703	2
			Max. Vx	3	262.09	-14	-701
			Max Tension	4	968.63	0	0
			Max. Compression	4	-921.58	0	0
			Max. Mx	3	-675.50	13	-6
			Max. My	4	-902.85	12	-7
			Max. Vy	3	12.63	13	-6
			Max. Vx	4	331	0	0
T13	13.8 - 8.8	Leg	Max Tension	3	65281.98	-873	7
		Leg	Max Tension	3	65281.98	-873	7
T14	8.8 - 6.5	Leg	Max Tension	3	65281.98	-873	7
		Leg	Max Tension	3	65281.98	-873	7

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Section No.	Elevation m	Component Type	Condition	Gov. Load Comb.	Force kg	Major Axis Moment kg-m	Minor Axis Moment kg-m
T15	6.5 - 0	Diagonal	Max. Compression	3	-68207.31	910	6
			Max. Mx	3	-68207.31	910	6
			Max. My	3	-564.90	-15	-701
			Max. Vy	3	-682.42	910	6
			Max. Vx	3	-284.42	-15	-701
			Max Tension	4	1385.27	0	0
			Max. Compression	4	-1364.72	0	0
			Max. Mx	3	-752.37	-8	0
			Max. My	3	1084.77	0	1
			Max. Vy	3	939	0	0
			Max. Vx	3	-1.16	0	0
			Max Tension	3	65160.35	0	0
		Leg	Max. Compression	3	-68163.07	0	0
			Max. Mx	3	-68113.66	910	6
			Max. My	3	-587.88	6	226
			Max. Vy	3	325.15	910	6
			Max. Vx	3	217.46	35	192
			Max Tension	3	1370.54	0	0
			Max. Compression	4	-1492.88	0	0
			Max. Mx	4	1070.25	-36	0
			Max. My	4	67.35	0	-7
			Max. Vy	4	19.47	0	0
			Max. Vx	4	3.80	0	0
			Max Tension	3	615.93	19	-2
		Horizontal	Max. Compression	3	-772.54	6	-1
			Max. Mx	2	416.12	21	-1
			Max. My	2	-503.34	12	-2
			Max. Vy	2	-23.09	21	-1
			Max. Vx	2	2.15	12	-2
			Max Tension	3	89.78	0	0
			Max. Compression	3	-115.28	0	0
			Max. Mx	1	-12.23	-20	0
			Max. My	3	89.78	0	0
			Max. Vy	1	18.95	0	0
			Max. Vx	3	-0.02	0	0
		Inner Bracing	Max. Compression	3	-115.28	0	0
			Max. Mx	1	-12.23	-20	0
			Max. My	3	89.78	0	0
			Max. Vy	1	18.95	0	0
			Max. Vx	3	-0.02	0	0
			Max. Compression	3	-115.28	0	0
			Max. Mx	1	-12.23	-20	0
			Max. My	3	89.78	0	0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg D	Max. Vert	1	2133.98	229.53	-222.25
	Max. H _x	1	2133.98	229.53	-222.25
	Max. H _z	3	-66188.01	-6788.39	6508.81
	Min. Vert	3	-66188.01	-6788.39	6508.81
	Min. H _x	3	-66188.01	-6788.39	6508.81
	Min. H _z	1	2133.98	229.53	-222.25
Leg C	Max. Vert	4	45428.90	-4842.58	-4250.48
	Max. H _x	2	-43211.82	4352.70	4194.11
	Max. H _z	2	-43211.82	4352.70	4194.11
	Min. Vert	2	-43211.82	4352.70	4194.11
	Min. H _x	4	45428.90	-4842.58	-4250.48
	Min. H _z	4	45428.90	-4842.58	-4250.48
Leg B	Max. Vert	3	69671.31	-6902.98	7110.73
	Max. H _x	1	1809.84	-206.28	213.56
	Max. H _z	3	69671.31	-6902.98	7110.73
	Min. Vert	1	1809.84	-206.28	213.56

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Location	Condition	Gov. Load Comb.	Vertical kg	Horizontal, X kg	Horizontal, Z kg
Leg A	Min. H _x	3	69671.31	-6902.98	7110.73
	Min. H _z	1	1809.84	-206.28	213.56
	Max. Vert	2	47156.30	4601.18	4791.34
	Max. H _x	2	47156.30	4601.18	4791.34
	Max. H _z	2	47156.30	4601.18	4791.34
	Min. Vert	4	-41486.86	-3901.52	-4345.26
	Min. H _x	4	-41486.86	-3901.52	-4345.26
	Min. H _z	4	-41486.86	-3901.52	-4345.26

Tower Mast Reaction Summary

Load Combination	Vertical kg	Shear _x kg	Shear _z kg	Overtuning Moment, M _x kg-m	Overtuning Moment, M _z kg-m	Torque kg-m
Dead Only	7887.63	0.01	-0.05	1680	638	0
Dead+Wind 0 deg - No Ice	7887.62	34.60	-17996.81	-646902	-770	-2276
Dead+Wind 45 deg - No Ice	7887.62	13665.03	-14021.43	-494615	-476779	3493
Dead+Wind 90 deg - No Ice	7887.63	17492.79	-34.60	317	-621131	7220
Dead+Wind 0 deg - Service	7887.63	8.65	-4499.21	-160468	284	-569
Dead+Wind 45 deg - Service	7887.63	3416.26	-3505.36	-122399	-118710	874
Dead+Wind 90 deg - Service	7887.63	4373.20	-8.65	1332	-154808	1805

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX kg	PY kg	PZ kg	PX kg	PY kg	PZ kg	
1	0.00	-7887.63	-0.00	-0.01	7887.63	0.05	0.001%
2	34.59	-7887.63	-17997.45	-34.60	7887.62	17996.81	0.003%
3	13665.51	-7887.63	-14021.92	-13665.03	7887.62	14021.43	0.003%
4	17493.41	-7887.63	-34.59	-17492.79	7887.63	34.60	0.003%
5	8.65	-7887.63	-4499.36	-8.65	7887.63	4499.21	0.002%
6	3416.38	-7887.63	-3505.48	-3416.26	7887.63	3505.36	0.002%
7	4373.35	-7887.63	-8.65	-4373.20	7887.63	8.65	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	9	0.00000001	0.00014188
2	Yes	12	0.00000001	0.00008433
3	Yes	12	0.00000001	0.00008549
4	Yes	12	0.00000001	0.00008481
5	Yes	12	0.00000001	0.00008358
6	Yes	12	0.00000001	0.00008365
7	Yes	12	0.00000001	0.00008445

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Maximum Tower Deflections - Service Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	60 - 56	144.99	6	0.2802	0.1203
T2	56 - 53	125.37	6	0.2774	0.1103
T3	53 - 50	110.96	6	0.2621	0.0936
T4	50 - 46	97.77	6	0.2481	0.0919
T5	46 - 40	80.46	6	0.2369	0.0853
T6	40 - 34	55.98	6	0.2134	0.0712
T7	34 - 28	34.89	6	0.1657	0.0515
T8	28 - 26	18.86	6	0.1157	0.0308
T9	26 - 24	15.41	6	0.0974	0.0227
T10	24 - 22	12.50	6	0.0831	0.0172
T11	22 - 18.3	10.00	6	0.0709	0.0133
T12	18.3 - 13.8	6.26	6	0.0512	0.0091
T13	13.8 - 8.8	3.06	6	0.0337	0.0058
T14	8.8 - 6.5	0.87	6	0.0170	0.0033
T15	6.5 - 0	0.18	6	0.0132	0.0025

Critical Deflections and Radius of Curvature - Service Wind

Elevation m	Appurtenance	Gov. Load Comb.	Deflection mm	Tilt °	Twist °	Radius of Curvature m
60.0000	ANT PANEL 1.0x0.50x0.19m	6	144.99	0.2802	0.1203	352941
59.0000	ANT PANEL 1.0x0.50x0.19m	6	140.09	0.2808	0.1190	352941
58.0000	ANT PANEL 1.0x0.50x0.19m	6	135.18	0.2808	0.1173	268948
57.0000	ANT PANEL 1.0x0.50x0.19m	6	130.28	0.2798	0.1145	205315
56.0000	ANT PANEL 1.0x0.50x0.19m	6	125.37	0.2774	0.1103	46436
55.0000	ANT PANEL 1.0x0.50x0.19m	6	120.47	0.2732	0.1044	14226
50.0000	HP12-21B	6	97.77	0.2481	0.0919	137765
48.0000	HP12-21B	6	89.09	0.2420	0.0897	80817
46.0000	HP4-107	6	80.46	0.2369	0.0853	20812
42.0000	ANT OMNI L=4.0m	6	63.82	0.2238	0.0763	11893
40.5000	HP4-107	6	57.90	0.2163	0.0726	10390
39.0000	HP12-21B	6	52.20	0.2067	0.0682	9757
38.0000	HP4-107	6	48.53	0.1992	0.0651	9606
25.0000	HP4-107	6	13.91	0.0897	0.0197	9691
15.5000	HP4-107	6	4.11	0.0399	0.0069	14979

Maximum Tower Deflections - Design Wind

Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T1	60 - 56	593.79	3	1.1641	0.4604
T2	56 - 53	512.39	3	1.1489	0.4297
T3	53 - 50	452.91	3	1.0802	0.3745
T4	50 - 46	398.67	3	1.0203	0.3678
T5	46 - 40	327.55	3	0.9725	0.3415
T6	40 - 34	227.33	3	0.8734	0.2848

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Section No.	Elevation m	Horz. Deflection mm	Gov. Load Comb.	Tilt °	Twist °
T7	34 - 28	141.25	3	0.6752	0.2062
T8	28 - 26	76.09	3	0.4705	0.1234
T9	26 - 24	62.12	3	0.3955	0.0909
T10	24 - 22	50.36	3	0.3369	0.0690
T11	22 - 18.3	40.23	3	0.2876	0.0534
T12	18.3 - 13.8	25.13	3	0.2075	0.0366
T13	13.8 - 8.8	12.25	3	0.1364	0.0231
T14	8.8 - 6.5	3.44	3	0.0688	0.0130
T15	6.5 - 0	0.67	3	0.0534	0.0099

Critical Deflections and Radius of Curvature - Design Wind

Elevation m	Appurtenance	Gov. Load Comb.	Deflection mm	Tilt °	Twist °	Radius of Curvature m
60.0000	ANT PANEL 1.0x0.50x0.19m	3	593.79	1.1641	0.4604	81533
59.0000	ANT PANEL 1.0x0.50x0.19m	3	573.42	1.1658	0.4571	81533
58.0000	ANT PANEL 1.0x0.50x0.19m	3	553.05	1.1653	0.4520	62128
57.0000	ANT PANEL 1.0x0.50x0.19m	3	532.71	1.1604	0.4435	36987
56.0000	ANT PANEL 1.0x0.50x0.19m	3	512.39	1.1489	0.4297	9674
55.0000	ANT PANEL 1.0x0.50x0.19m	3	492.14	1.1296	0.4103	3093
50.0000	HP12-21B	3	398.67	1.0203	0.3678	45373
48.0000	HP12-21B	3	363.02	0.9940	0.3586	21098
46.0000	HP4-107	3	327.55	0.9725	0.3415	4793
42.0000	ANT OMNI L=4.0m	3	259.41	0.9172	0.3056	2829
40.5000	HP4-107	3	235.20	0.8858	0.2904	2495
39.0000	HP12-21B	3	211.89	0.8455	0.2730	2350
38.0000	HP4-107	3	196.89	0.8143	0.2602	2313
25.0000	HP4-107	3	56.03	0.3642	0.0787	2380
15.5000	HP4-107	3	16.47	0.1617	0.0277	3695

Bolt Design Data

Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
T1	60	Leg	A394T0	16	2	122.37	5536.87	0.022 ✓	1.333	Bearing
		Diagonal	A394T0	16	1	703.12	3109.59	0.226 ✓	1.333	Member Bearing
T2	56	Leg	A394T0	16	6	924.72	5536.87	0.167 ✓	1.333	Bearing
		Diagonal	A394T0	16	1	1169.87	3109.59	0.376 ✓	1.333	Member Bearing
T3	53	Leg	A394T0	16	6	1913.16	5536.87	0.346 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	518.86	4152.65	0.125 ✓	1.333	Member Bearing
T4	50	Top Girt	A394T0	16	2	355.31	3705.44	0.096 ✓	1.333	Member Bearing
		Leg	A394T0	16	6	1927.84	5536.87	0.348 ✓	1.333	Bearing
		Diagonal	A394T0	16	2	1646.24	4152.65	0.396 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	500.19	3705.44	0.135 ✓	1.333	Member Bearing

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Section No.	Elevation m	Component Type	Bolt Grade	Bolt Size mm	Number Of Bolts	Maximum Load per Bolt kg	Allowable Load kg	Ratio Load Allowable	Allowable Ratio	Criteria
T5	46	Mid Girt	A394T0	16	2	483.66	3699.61	0.131 ✓	1.333	Member Bearing
		Leg	A394T0	16	6	4956.68	9979.03	0.497 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1948.05	4152.65	0.469 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	562.99	3705.44	0.152 ✓	1.333	Member Bearing
T6	40	Mid Girt	A394T0	16	2	902.20	4932.82	0.183 ✓	1.333	Member Bearing
		Leg	A394T0	16	12	5460.30	9979.03	0.547 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	2917.59	4152.65	0.703 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	1069.33	3705.44	0.289 ✓	1.333	Member Bearing
T7	34	Mid Girt	A394T0	16	2	1749.73	4932.82	0.355 ✓	1.333	Member Bearing
		Leg	A394T0	16	12	9734.96	9979.03	0.976 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	3171.86	4152.65	0.764 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	1497.74	3705.44	0.404 ✓	1.333	Member Bearing
T8	28	Mid Girt	A394T0	16	2	1587.62	4932.82	0.322 ✓	1.333	Member Bearing
		Leg	A394T0	16	16	10054.65	9979.03	1.008 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1663.00	3705.44	0.449 ✓	1.333	Member Bearing
		Top Girt	A394T0	16	2	257.54	3705.44	0.070 ✓	1.333	Member Bearing
T9	26	Diagonal	A394T0	16	2	1428.18	3705.44	0.385 ✓	1.333	Member Bearing
T10	24	Leg	A394T0	16	16	9481.26	9979.03	0.950 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	1085.80	3705.44	0.293 ✓	1.333	Member Bearing
T11	22	Diagonal	A394T0	16	2	1071.36	3705.44	0.289 ✓	1.333	Member Bearing
T12	18.3	Leg	A394T0	16	24	5881.10	9979.03	0.589 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	753.03	3705.44	0.203 ✓	1.333	Member Bearing
T13	13.8	Leg	A394T0	16	24	5830.66	9979.03	0.584 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	484.31	3705.44	0.131 ✓	1.333	Member Bearing
T14	8.8	Diagonal	A394T0	16	2	692.63	3705.44	0.187 ✓	1.333	Member Bearing
T15	6.5	Leg	A394T0	16	32	4260.19	9979.03	0.427 ✓	1.333	Bolt SS
		Diagonal	A394T0	16	2	746.44	4940.57	0.151 ✓	1.333	Member Bearing
		Horizontal	A394T0	16	1	615.93	3699.61	0.166 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation m	Size	L m	L _u m	KI/r K=1.00	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T1	60 - 56	L102x102x6	4.0000	0.5000	24.8	162	1252	-2166.09	20685.77	0.105 ✓
T2	56 - 53	L102x102x6	3.0000	0.5000	24.8	162	1252	-6633.52	20685.77	0.321

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Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
					K=1.00					
T3	53 - 50	L102x102x6	3.1377	1.0459	51.8 K=1.00	143	1252	-5739.49	18273.29	0.314
T4	50 - 46	L102x102x6	4.0000	2.0000	49.5 K=0.50	145	1252	-9273.43	18504.49	0.501
T5	46 - 40	L102x6+L102x6	6.0000	2.0000	49.5 K=0.50	168	2503	-26177.78	42986.37	0.609
T6	40 - 34	L102x6+L102x6	6.0000	2.0000	49.5 K=0.50	168	2503	-48231.40	42986.37	1.122
T7	34 - 28	L102x6+L102x8+L102x6	6.0000	2.0000	49.5 K=0.50	168	4052	-75212.89	69575.65	1.081
T8	28 - 26	L102x8+L102x10+L102x6	2.0175	2.0175	50.2 K=0.50	168	4645	-80437.37	79419.96	1.013
T9	26 - 24	L102x8+L102x10+L102x6	2.0175	2.0175	50.2 K=0.50	168	4645	-78388.04	79419.96	0.987
T10	24 - 22	L102x8+L102x10+L102x6	2.0175	2.0175	50.2 K=0.50	168	4645	-75850.19	79419.96	0.955
T11	22 - 18.3	L102x10+L102x13	3.7324	3.7324	46.6 K=0.25	171	4264	-72544.86	74553.82	0.973
T12	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	56.7 K=0.25	160	4264	-70573.10	69769.78	1.012
T13	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	63.0 K=0.25	153	4264	-69968.00	66550.64	1.051
T14	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	46.1 K=0.50	172	5393	-68207.16	94571.31	0.721
T15	6.5 - 0	L127x10+L127x13	6.5569	6.5569	52.2 K=0.20	166	5393	-68163.16	91045.09	0.749

Diagonal Design Data (Compression)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T1	60 - 56	L51x51x5	0.7810	0.6488	64.8 K=1.00	151	461	-588.46	7094.91	0.083
T2	56 - 53	L51x51x5	0.7810	0.6488	64.8 K=1.00	151	461	-1042.07	7094.91	0.147
T3	53 - 50	L51x51x5	1.3092	0.7693	76.9 K=1.00	135	461	-1012.25	6366.67	0.159
T4	50 - 46	L64x64x5	2.7586	1.3056	103.8 K=1.00	95	582	-3292.48	5647.50	0.583
T5	46 - 40	L64x64x5	2.7586	1.3053	103.8 K=1.00	95	582	-3896.11	5649.77	0.690
T6	40 - 34	L64x64x5	2.7586	1.3053	103.8 K=1.00	95	582	-5835.20	5649.77	1.033
T7	34 - 28	L64x64x5	2.7586	1.2341	98.2 K=1.00	104	582	-6343.72	6188.36	1.025
T8	28 - 26	L44x44x5	2.8970	1.4404	105.6 K=1.00	84	401	-3294.51	3452.41	0.954
T9	26 - 24	L44x44x5	3.1779	1.5813	115.9	75	401	-2856.36	3058.59	0.934

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Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T10	24 - 22	L44x44x5	3.4766	1.7309	K=1.00 126.9	64	401	-2171.61	2611.90	0.831
T11	22 - 18.3	L64x64x5	5.0180	2.6917	K=1.00 136.2	55	582	-2142.72	3292.99	0.651
T12	18.3 - 13.8	L64x64x5	6.1299	3.3022	K=1.00 167.1	37	582	-1506.06	2187.98	0.688
T13	13.8 - 8.8	L64x64x5	7.1088	3.8136	K=1.00 193.0	28	582	-921.58	1640.49	0.562
T14	8.8 - 6.5	L64x64x5	3.5915	3.5251	K=1.00 178.4	32	582	-1364.72	1920.02	0.711
T15	6.5 - 0	L76x76x6	7.4433	7.3129	K=1.00 194.5	27	929	-1492.88	2577.44	0.579
					K=0.40					

Horizontal Design Data (Compression)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-515.22	5957.12	0.086
T2	56 - 53	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-866.37	5957.12	0.145
T15	6.5 - 0	L76x76x6	5.9310	2.9020	122.9 K=1.00	68	929	-772.54	6446.86	0.120

Top Girt Design Data (Compression)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T1	60 - 56	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-23.44	5957.12	0.004
T2	56 - 53	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-597.17	5957.12	0.100
T3	53 - 50	L51x51x5	0.6000	0.4984	49.8 K=1.00	127	461	-710.61	5957.12	0.119
T4	50 - 46	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-910.06	1499.72	0.607
T5	46 - 40	L51x51x5	1.9000	1.7984	179.7 K=1.00	32	461	-1028.86	1499.72	0.686
T6	40 - 34	L64x64x5	1.9000	1.7980	143.0 K=1.00	50	582	-2025.23	2987.60	0.678
T7	34 - 28	L64x64x5	1.9000	1.7980	143.0 K=1.00	50	582	-2878.81	2987.60	0.964
T8	28 - 26	L64x64x5	1.9000	1.7000	135.2 K=1.00	56	582	-515.07	3341.98	0.154

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Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a

Mid Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T4	50 - 46	L51x51x5	19000	17984	179.7 K=1.00	32	461	-811.38	1499.72	0.541 ✓
T5	46 - 40	L64x64x6	19000	17980	144.2 K=1.00	50	768	-1660.30	3878.07	0.428 ✓
T6	40 - 34	L64x64x6	19000	17980	144.2 K=1.00	50	768	-3301.87	3878.07	0.851 ✓
T7	34 - 28	L64x64x6	19000	17000	136.3 K=1.00	55	768	-3031.54	4338.07	0.699 ✓

Inner Bracing Design Data (Compression)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T7	34 - 28	L51x51x5	26870	25850	164.9 K=1.00	38	461	-50.46	1780.07	0.028 ✓
T8	28 - 26	L51x51x5	26870	24870	158.7 K=1.00	41	461	-322.33	1923.12	0.168 ✓
T15	6.5 - 0	L64x64x6	41938	41938	214.7 K=1.00	22	768	-115.29	1748.47	0.066 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P
	m		m	m		MPa	mm ²	kg	kg	P _a
T1	60 - 56	L102x102x6	40000	05000	15.7	224	1009	1684.10	23063.59	0.073 ✓
T2	56 - 53	L102x102x6	30000	05000	15.7	224	1009	6066.12	23063.59	0.263 ✓
T3	53 - 50	L102x102x6	31377	10459	32.9	224	1009	5474.59	23063.59	0.237 ✓
T4	50 - 46	L102x102x6	40000	20000	63.0	224	1009	8359.17	23063.59	0.362 ✓
T5	46 - 40	L102x6+L102x6	60000	20000	99.0	207	2503	24820.08	52798.17	0.470 ✓

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Section No.	Elevation m	Size	L m	L _u m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T6	40 - 34	L102x6+L102x6	6.0000	2.0000	99.0	207	2503	46572.61	52798.17	0.882
T7	34 - 28	L102x6+L102x8+L102x6	6.0000	2.0000	99.0	207	4052	73537.32	85456.83	0.861
T8	28 - 26	L102x8+L102x10+L102x6	2.0175	2.0175	100.4	207	4645	78383.96	97975.98	0.800
T9	26 - 24	L102x8+L102x10+L102x6	2.0175	2.0175	100.4	207	4645	75767.64	97975.98	0.773
T10	24 - 22	L102x8+L102x10+L102x6	2.0175	2.0175	100.4	207	4645	72934.50	97975.98	0.744
T11	22 - 18.3	L102x10+L102x13	3.7324	3.7324	186.5	207	4264	69519.40	89936.51	0.773
T12	18.3 - 13.8	L102x10+L102x13	4.5394	4.5394	226.8	207	4264	67555.80	89936.51	0.751
T13	13.8 - 8.8	L102x10+L102x13	5.0437	5.0437	252.0	207	4264	66980.19	89936.51	0.745
T14	8.8 - 6.5	L127x10+L127x13	2.3201	2.3201	92.3	207	5393	65281.94	113749.66	0.574
T15	6.5 - 0	L127x10+L127x13	6.5569	6.5569	260.8	207	5393	65160.38	113749.66	0.573

Diagonal Design Data (Tension)

Section No.	Elevation m	Size	L m	L _u m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T1	60 - 56	L51x51x5	0.7810	0.6488	41.4	224	278	703.12	6348.44	0.111
T2	56 - 53	L51x51x5	0.7810	0.6488	41.4	224	278	1169.87	6348.44	0.184
T3	53 - 50	L51x51x5	1.3092	0.7693	62.5	224	278	1037.71	6348.44	0.163
T4	50 - 46	L64x64x5	2.7586	1.3056	99.1	224	368	3046.58	8415.96	0.362
T5	46 - 40	L64x64x5	2.7586	1.3053	99.1	224	368	3727.37	8415.96	0.443
T6	40 - 34	L64x64x5	2.7586	1.3053	99.1	224	368	5698.48	8415.96	0.677
T7	34 - 28	L64x64x5	2.7586	1.2341	93.7	224	368	6261.44	8415.96	0.744
T8	28 - 26	L44x44x5	2.8970	1.4404	148.9	200	232	3326.00	4738.32	0.702
T9	26 - 24	L44x44x5	3.1779	1.5813	165.0	200	232	2784.76	4738.32	0.588
T10	24 - 22	L44x44x5	3.4766	1.7309	181.9	200	232	2136.46	4738.32	0.451
T11	22 - 18.3	L64x64x5	5.0180	2.6917	189.4	200	368	2056.21	7509.63	0.274
T12	18.3 - 13.8	L64x64x5	6.1299	3.3022	234.9	200	368	1401.27	7509.63	0.187

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Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T13	13.8 - 8.8	L64x64x5	7.1088	3.8136	272.7	200	368	968.63	7509.63	0.129 ✓
T14	8.8 - 6.5	L64x64x5	3.5915	3.5251	178.4	200	368	1385.27	7509.63	0.184 ✓
T15	6.5 - 0	L76x76x6	7.4433	7.3129	309.6	200	606	1370.54	12354.27	0.111 ✓

Horizontal Design Data (Tension)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T1	60 - 56	L51x51x5	0.6000	0.4984	31.8	149	461	433.02	7005.28	0.062 ✓
T2	56 - 53	L51x51x5	0.6000	0.4984	31.8	149	461	758.82	7005.28	0.108 ✓
T15	6.5 - 0	L76x76x6	5.9310	2.9020	122.9	200	606	615.93	12354.27	0.050 ✓

Top Girt Design Data (Tension)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio $\frac{P}{P_a}$
T1	60 - 56	L51x51x5	0.6000	0.4984	31.8	149	461	23.22	7005.28	0.003 ✓
T2	56 - 53	L51x51x5	0.6000	0.4984	31.8	149	461	498.39	7005.28	0.071 ✓
T3	53 - 50	L51x51x5	0.6000	0.4984	31.8	200	278	515.46	5664.74	0.091 ✓
T4	50 - 46	L51x51x5	1.9000	1.7984	114.8	200	278	1000.37	5664.74	0.177 ✓
T5	46 - 40	L51x51x5	1.9000	1.7984	114.8	200	278	1125.98	5664.74	0.199 ✓
T6	40 - 34	L64x64x5	1.9000	1.7980	91.0	200	368	2138.65	7509.63	0.285 ✓
T7	34 - 28	L64x64x5	1.9000	1.7980	91.0	200	368	2995.48	7509.63	0.399 ✓
T8	28 - 26	L64x64x5	1.9000	1.7000	86.0	200	368	455.65	7509.63	0.061 ✓

Mid Girt Design Data (Tension)

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 52 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T4	50 - 46	L51x51x5	19000	17984	114.8	200	278	967.31	5666.60	0.171
T5	46 - 40	L64x64x6	19000	17980	92.1	200	485	1804.40	9890.31	0.182
T6	40 - 34	L64x64x6	19000	17980	92.1	200	485	3499.47	9890.31	0.354
T7	34 - 28	L64x64x6	19000	17000	87.0	200	485	3175.24	9890.31	0.321

Inner Bracing Design Data (Tension)

Section No.	Elevation m	Size	L m	L _U m	KI/r	F _a MPa	A mm ²	Actual P kg	Allow. P _a kg	Ratio P P _a
T4	50 - 46	L51x51x5	26870	25854	165.0	149	461	45.65	7005.28	0.007*
T5	46 - 40	L51x51x5	26870	25854	165.0	149	461	50.53	7005.28	0.007*
T6	40 - 34	L51x51x5	26870	25850	164.9	149	461	77.84	7005.28	0.011
T7	34 - 28	L51x51x5	26870	25850	164.9	149	461	120.23	7005.28	0.017
T8	28 - 26	L51x51x5	26870	24870	158.7	149	461	228.68	7005.28	0.033
T15	6.5 - 0	L64x64x6	41938	41938	214.7	149	768	89.78	11659.14	0.008

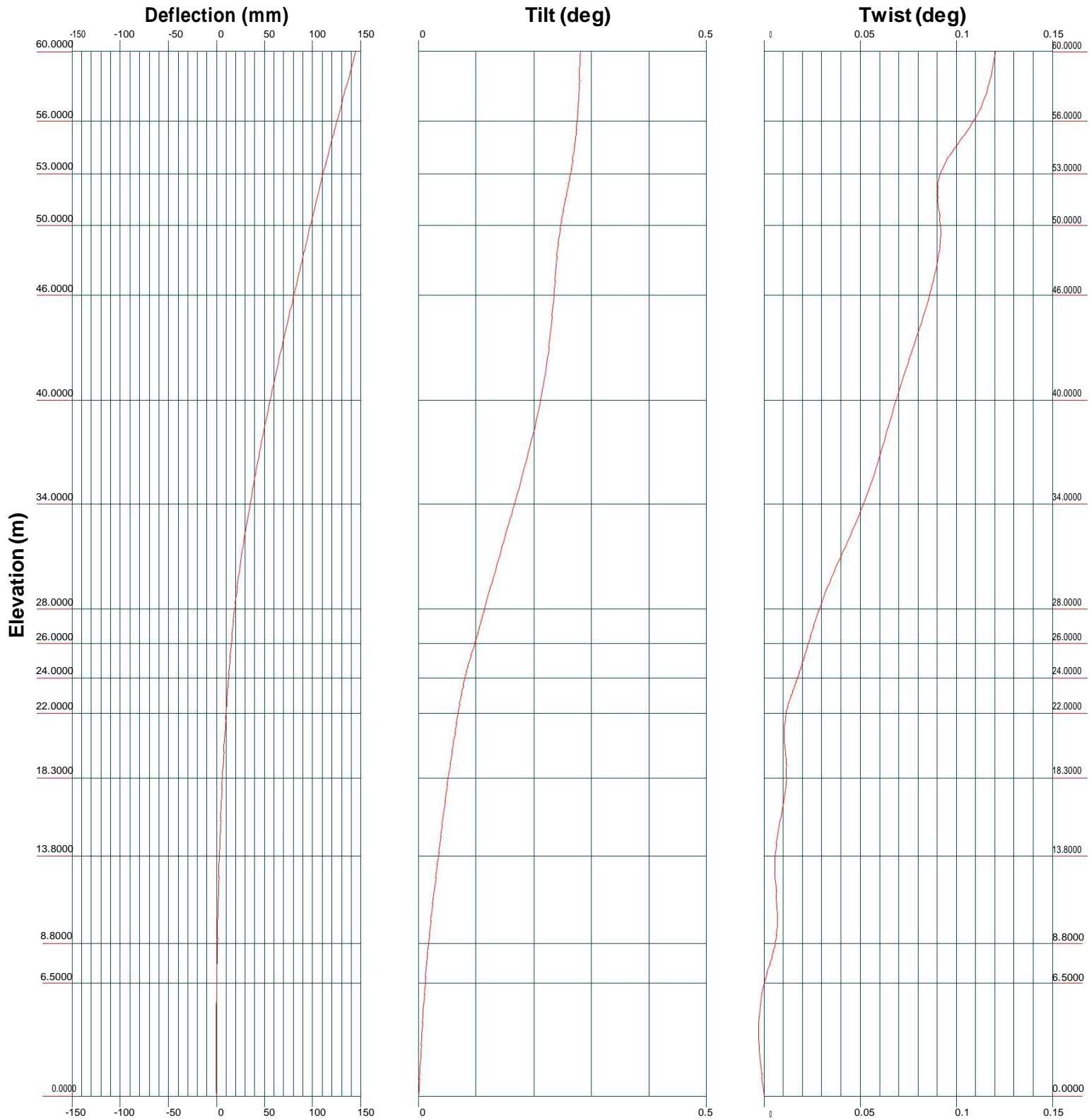
* DL controls

Section Capacity Table

Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass Fail	
T1	60 - 56	Leg	L102x102x6	3	-2166.09	27574.13	7.9	Pass	
		Diagonal	L51x51x5	9	703.12	8462.46	8.3	Pass	
T2	56 - 53	Horizontal Top Girt	L51x51x5	13	-515.22	7940.84	17.0 (b)	6.5	Pass
			L51x51x5	6	-23.44	7940.84	0.3	Pass	
		Leg	L102x102x6	71	-6633.52	27574.13	24.1	Pass	
			Diagonal	L51x51x5	77	1169.87	8462.46	13.8	Pass
		Horizontal Top Girt	L51x51x5	81	-866.37	7940.84	28.2 (b)	10.9	Pass
			L51x51x5	73	-597.17	7940.84	7.5	Pass	
T3	53 - 50	Leg	L102x102x6	123	-5739.49	24358.30	23.6	Pass	
		Diagonal Top Girt	L51x51x5	151	1037.71	8462.46	25.9 (b)	12.3	Pass
L51x51x5	126		-710.61	7940.84	8.9	Pass			
T4	50 - 46	Leg	L102x102x6	155	-9273.43	24666.48	37.6	Pass	
		Diagonal	L64x64x5	168	-3292.48	7528.12	43.7	Pass	

RISATower BTESA BROAD TELECOM. Calle 129 No. 8 - 08 - Oficina 204. BOGOTA D.C. - COLOMBIA. Phone: 57 (1) 2740536. FAX: 57 (1) 2740536.	Job TORRE CUADRADA H=50+10m Ext. PATA 7.15m - V=120KPH	Page 53 of 53
	Project EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.	Date 15:02:15 05/25/16
	Client RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.	Designed by Ing. C. Londoño M.

Section No.	Elevation m	Component Type	Size	Critical Element	P kg	SF*P _{allow} kg	% Capacity	Pass Fail
T5	46 - 40	Top Girt	L51x51x5	159	-910.06	1999.13	45.5	Pass
		Mid Girt	L51x51x5	163	-811.38	1999.13	40.6	Pass
		Inner Bracing	L51x51x5	158	45.65	7005.28	0.7	Pass
		Leg	L102x6+L102x6	185	-26177.78	57300.83	45.7	Pass
		Diagonal	L64x64x5	200	-3896.11	7531.14	51.7	Pass
T6	40 - 34	Top Girt	L51x51x5	189	-1028.86	1999.13	51.5	Pass
		Mid Girt	L64x64x6	193	-1660.30	5169.46	32.1	Pass
		Inner Bracing	L51x51x5	187	50.53	7005.28	0.7	Pass
		Leg	L102x6+L102x6	227	-48231.40	57300.83	84.2	Pass
		Diagonal	L64x64x5	242	-5835.20	7531.14	77.5	Pass
T7	34 - 28	Top Girt	L64x64x5	231	-2025.23	3982.47	50.9	Pass
		Mid Girt	L64x64x6	235	-3301.87	5169.46	63.9	Pass
		Inner Bracing	L51x51x5	230	77.84	9338.04	0.8	Pass
		Leg	L102x6+L102x8+L102x6	269	-75212.89	92744.33	81.1	Pass
		Diagonal	L64x64x5	284	-6343.72	8249.09	76.9	Pass
T8	28 - 26	Top Girt	L64x64x5	273	-2878.81	3982.47	72.3	Pass
		Mid Girt	L64x64x6	289	-3031.54	5782.65	52.4	Pass
		Inner Bracing	L51x51x5	271	-50.46	2372.84	2.1	Pass
		Leg	L102x8+L102x10+L102x6	311	-80437.37	105866.81	76.0	Pass
		Diagonal	L44x44x5	324	-3294.51	4602.07	71.6	Pass
T9	26 - 24	Top Girt	L64x64x5	317	-515.07	4454.86	11.6	Pass
		Inner Bracing	L51x51x5	313	-322.33	2563.52	12.6	Pass
		Leg	L102x8+L102x10+L102x6	329	-78388.04	105866.81	74.0	Pass
		Diagonal	L44x44x5	336	-2856.36	4077.10	70.1	Pass
		Leg	L102x8+L102x10+L102x6	341	-75850.19	105866.81	71.6	Pass
T10	24 - 22	Diagonal	L44x44x5	348	-2171.61	3481.66	62.4	Pass
		Leg	L102x10+L102x13	353	-72544.86	99380.24	73.0	Pass
		Diagonal	L64x64x5	360	-2142.72	4389.55	48.8	Pass
		Leg	L102x10+L102x13	365	-70573.10	93003.12	75.9	Pass
		Diagonal	L64x64x5	372	-1506.06	2916.58	51.6	Pass
T11	18.3 - 13.8	Leg	L102x10+L102x13	377	-69968.00	88712.00	78.9	Pass
		Diagonal	L64x64x5	386	-921.58	2186.77	42.1	Pass
		Leg	L127x10+L127x13	389	-68207.16	126063.56	54.1	Pass
		Diagonal	L64x64x5	395	-1364.72	2559.39	53.3	Pass
		Leg	L127x10+L127x13	405	-68163.16	121363.09	56.2	Pass
T12	13.8 - 8.8	Diagonal	L76x76x6	410	-1492.88	3435.72	43.5	Pass
		Horizontal	L76x76x6	391	-772.54	8593.67	9.0	Pass
		Inner Bracing	L64x64x6	417	-115.29	2330.71	12.5 (b)	Pass
							4.9	
							Summary	
T13	8.8 - 6.5	Leg (T6)					84.2	Pass
		Diagonal (T6)					77.5	Pass
		Horizontal (T15)					12.5	Pass
		Top Girt (T7)					72.3	Pass
		Mid Girt (T6)					63.9	Pass
T14	6.5 - 0	Inner					12.6	Pass
		Bracing (T8)						
		Bolt Checks					75.6	Pass
		RATING =					84.2	Pass



BTESA BROAD TELECOM.
Calle 129 No. 8 - 08 - Oficina 204.
BOGOTA D.C. - COLOMBIA.
Phone: 57 (1) 2740536.

FAX: 57 (1) 2740536.

Job: **DIAGRAMA DE DEFLEXIONES-TC50+10m Ext. PATA 7.15m - V=120KPH**
Project: **EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.**
Client: **RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.**
Code: **TIA/EIA-222-F**
Path: **05/25/16**
Drawn by: **Ing. C. Londoño M.**
App'd: **Scale: NTS**

Dwg No. E-5

Feedline Distribution Chart

0.0000 - 60.0000

Round

Flat

App In Face

App Out Face

Truss Leg

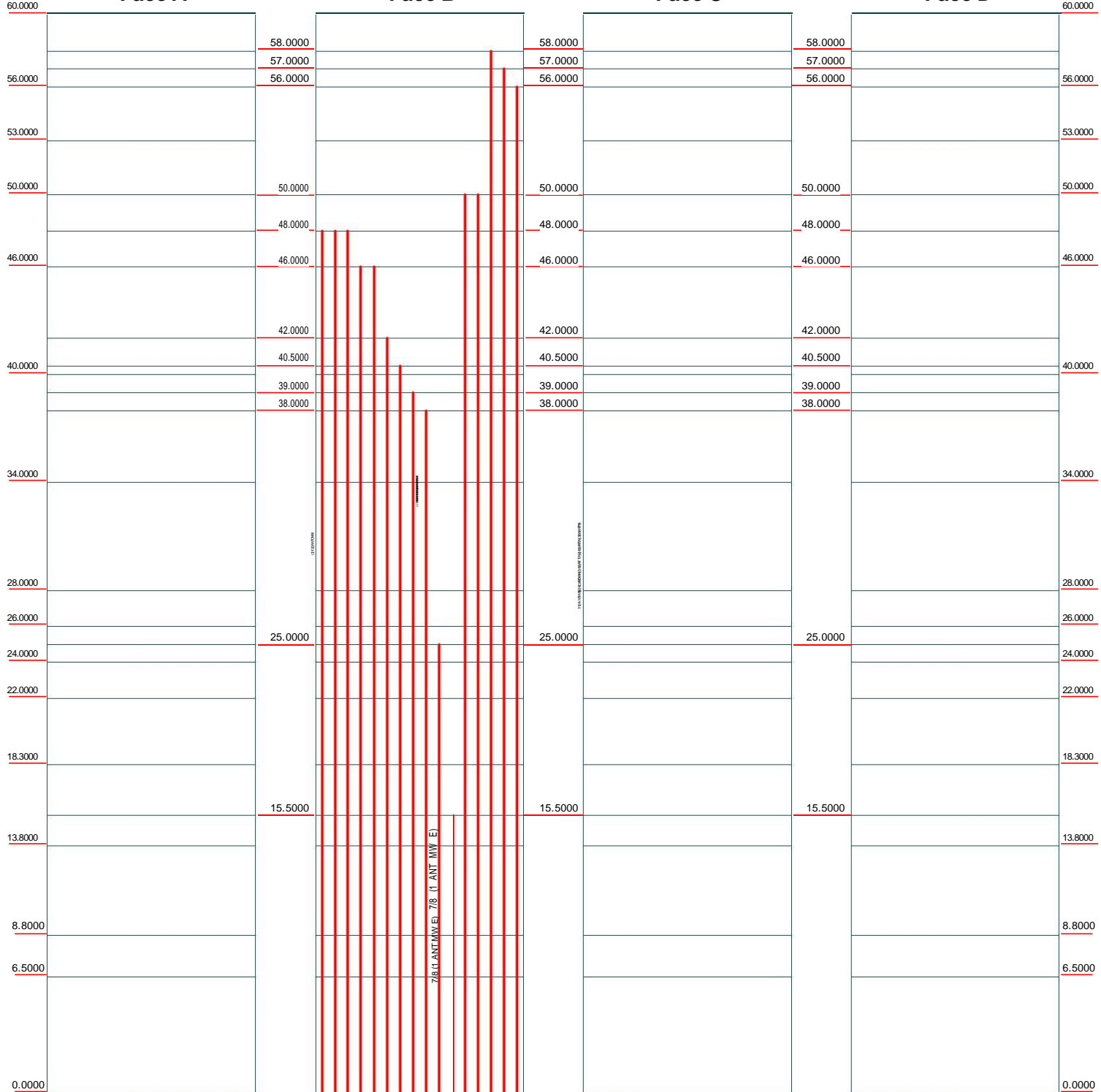
Face A

Face B

Face C

Face D

Elevation (m)



BTESA BROAD TELECOM.

Calle 129 No. 8 - 08 - Oficina 204.

BOGOTA D.C. - COLOMBIA.

Phone: 57 (1) 2740536.

Job:

DIAGRAMA CABLES GUIA DE ONDA-TC50+10m Ext. PATA 7.15m - V=120KPH

Project:

EVALUACION ESTRUCTURAL - ESTACION CERRO BAÑADEROS - CONDICION NUEVA (FUTURA) + REFUERZO.

Client:

RTVC - RADIO TELEVISION NACIONAL DE COLOMBIA.

Code:

TI/VEIA-222-F

Drawn by:

Ing. C. Londoño M.

App'd:

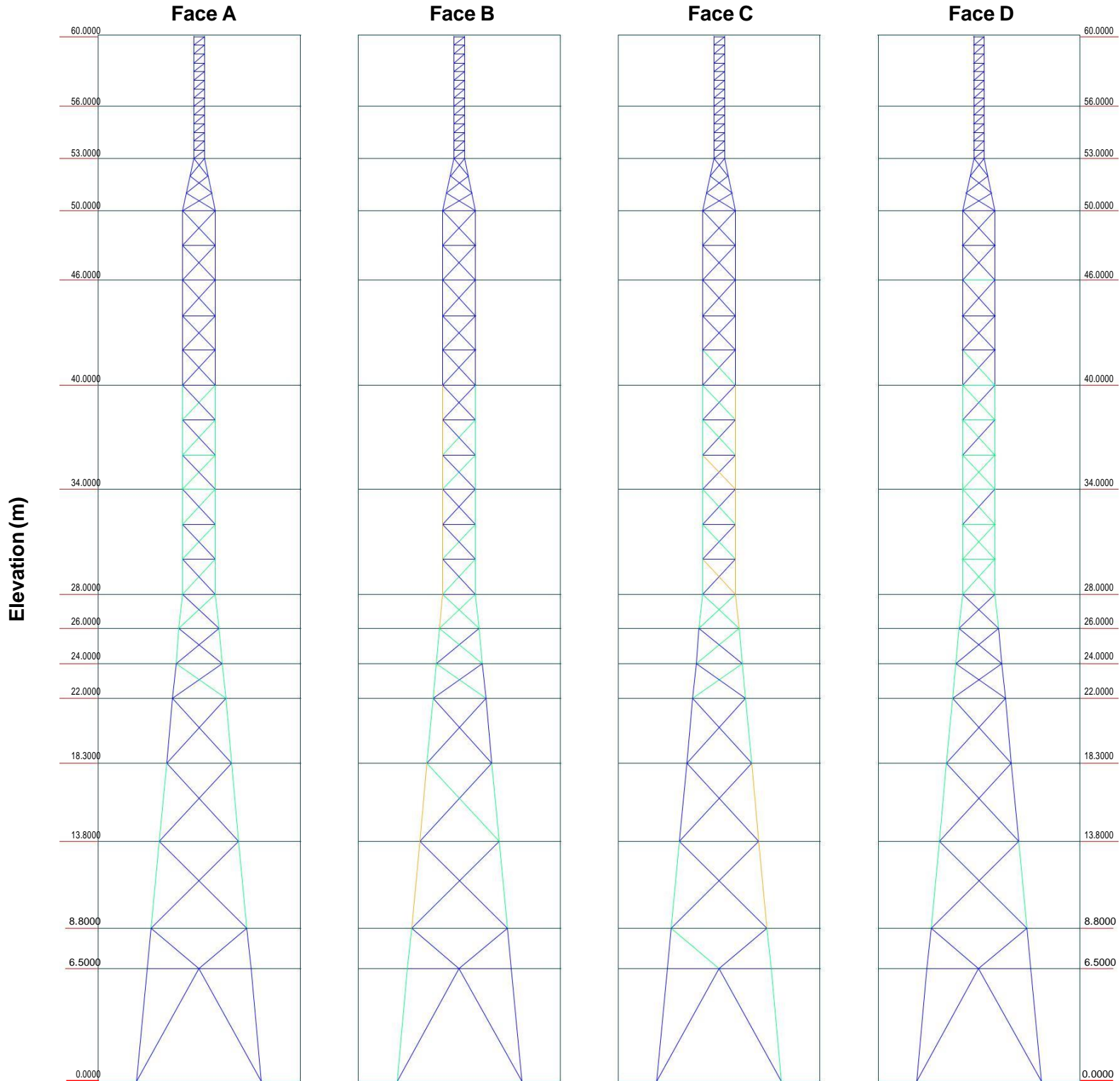
Date:

05/25/16

Scale: NTS

Stress Distribution Chart
0.0000 - 60.0000

> 100% 90%-100% 75%-90% 50%-75% < 50% Overstress



***CHEQUEO DE CIMENTACION.
ESTACION: CERRÓ BAÑADEROS.***

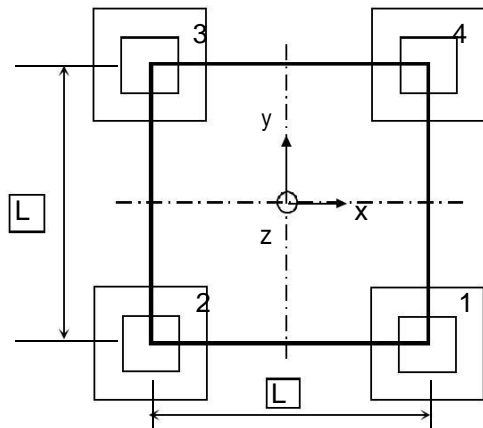
7. Rev. DISEÑO DE CIMENTACION TIPO ZAPATA PARA TORRES

OBRA: TORRE TELECOMUNICACIONES TC50+10m DE Ext. E. CERRO BAÑADEROS - GUAJIRA.

7.1. REACCIONES EN LA BASE DE LA TORRE (Obtenidas del análisis de la torre)Separación entre patas $L= 7,150$ m

Reacciones máximas en apoyos

Cargas de trabajo:



	Caso 1 (Ton)	Caso 2 (Ton)	Caso 3 (Ton)
Apoyo 1 $R_x=$	4,353	-0,351	-4,843
$R_y=$	4,194	0,082	-4,250
$R_z=$	43,212	-0,955	-45,429
Apoyo 2 $R_x=$	-4,211	-6,788	-4,408
$R_y=$	4,366	6,509	3,858
$R_z=$	43,320	66,188	41,441
Apoyo 3 $R_x=$	4,601	0,377	-3,902
$R_y=$	4,791	0,320	-4,345
$R_z=$	-47,156	-3,449	41,487
Apoyo 4 $R_x=$	-4,777	-6,903	-4,340
$R_y=$	4,645	7,111	4,772
$R_z=$	-47,263	-69,671	-45,386

Fuerza máxima de arrancamiento

 $R_z= 66,188$ Ton (tensión)RFZT= **66,188** Ton

Fuerza máxima de compresión

 $R_z= -69,671$ Ton (compresión)RFZC= **69,671** Ton

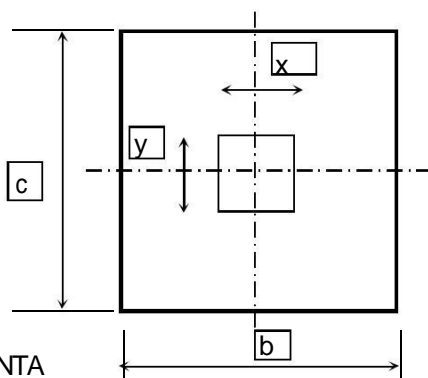
Fuerza máxima horizontal X

 $R_x= 6,903$ Ton (absoluto)RFX= **6,903** Ton

Fuerza máxima horizontal Y

 $R_y= 7,111$ Ton (absoluto)RFY= **7,111** Ton

Con estos valores máximos se diseña la zapata

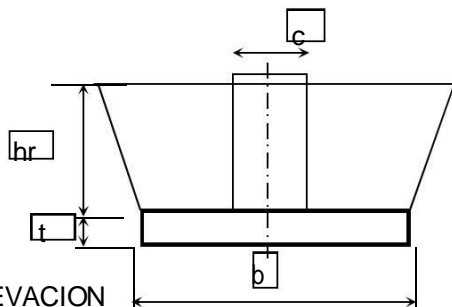
7.2. PREDIMENSIONAMIENTO GENERAL DE LA ZAPATA

PLANTA

$b= 4,50$ m $c= 4,50$ m
 $x= 1,00$ m $y= 1,00$ m
 espesor zapata $t= 0,60$ m

Relleno sobre zapata $h_r= 3,20$ mPeso específico relleno $\gamma_t= 1,70$ Ton/m³

Altura del pedestal $h_p= h_r+0.30= 3,50$ m
 (El pedestal sobresale 30 cm por encima del terreno)



ELEVACION

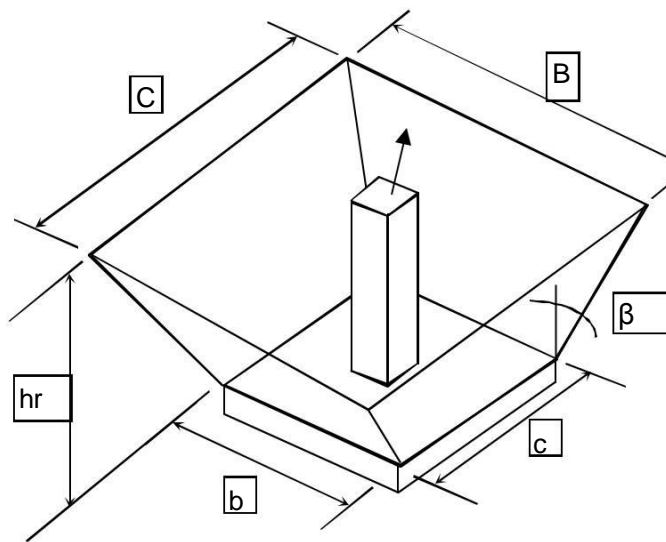
Cálculo del peso de zapata y pedestal

Zapata	$w_1= 29,16$	Ton
Pedestal	$w_2= 8,40$	Ton
TOTAL $W_z=$	37,56	Ton

Se evalúa el peso de la tierra sobre la zapata

7.3. SEGURIDAD AL ARRANCAMIENTO

Al aparecer una fuerza de tensión en la pata, la zapata trata de arrancar el suelo sobre ella, generando un tronco de pirámide cuyo peso se opone al arrancamiento, según el siguiente esquema:



Profundidad de Relleno $hr = 3,20$ m

Angulo $\beta = 25$ grados

$B = b + 2hr \cdot \tan \beta = 7,48$ m

$C = c + 2hr \cdot \tan \beta = 7,48$ m

$V_t = hr/3 [BC + bc + (BCbc)^{1/2}] = 117,28$ m³

Peso de tierra sobre area de la zapata

$W_1 = V_t \cdot \gamma_t = 199,37$ Ton

Descontando tierra pedestal

$W_p = 5,44$ Ton

$W_t = W_1 - W_p = 193,93$ Ton

Seguridad al arrancamiento

$K = (W_t + W_p) / RFZT \geq 1.50$

$K = 3,497$ BIEN

LAS DIMENSIONES Y PROFUNDIDAD DE CIMENTACION SON ADECUADAS POR ESTE EFECTO

7.4. ESFUERZOS SOBRE EL TERRENO

La máxima fuerza de compresión en la pata, en combinación con el efecto de vuelco generado por cargas horizontales, producen el mayor esfuerzo de compresión sobre el terreno. Este no debe exceder la capacidad portante del material de fundación, según el estudio de suelos.

Capacidad Portante Neta del Terreno: 20,00 Ton/m²

Alivio de excavación 6,46 Ton/m²

Capacidad total disponible 26,46 Ton/m²

$\gamma_s (\text{Ton/m}^3) = 1,70$

Presión media sobre el terreno

$\sigma_{\text{media}} = (RFZC + W_t) / A_{\text{zapata}} = 13,02$ Ton/m²

BIEN

Presión máxima sobre el terreno

Se evalua con la fórmula: $\sigma_{\text{max}} = (\sigma_c + \sigma_t + \sigma_l)$

σ_c = esfuerzo producido por compresión

σ_t = esfuerzo producido por flexión transversal

σ_l = esfuerzo producido por flexión longitudinal

Evaluación de las excentricidades por cargas horizontales

$M_x = RF_X \cdot hr = 22,0896$ Ton-m $e_x = M_x / RF_Z C = 0,32$ m

$M_y = RF_Y \cdot hr = 22,7552$ Ton-m $e_z = M_y / RF_Z C = 0,33$ m

$\sigma_c = P/A = 13,02$ Ton/m²

$\sigma_t = P/A(6e_x/L) = 5,50$ Ton/m²

$\sigma_l = P/A(6e_y/L) = 5,67$ Ton/m²

$\sigma_{\text{max}} = 24,19$ Ton/m²

LAS DIMENSIONES ADOPTADAS PARA LA CIMENTACION SON ADECUADAS POR ESTE EFECTO

LAS DIMENSIONES DE LAS ZAPATAS Y PEDESTALES CUMPLEN PARA LOS CHEQUEOS DE ARRANCAMIENTO Y CAPACIDAD.



Bogotá, D.C., 26 de Mayo de 2016.

MEMORIAL DE RESPONSABILIDAD.

Yo, CARLOS EDUARDO LONDOÑO MESA, Ingeniero Civil, debidamente Titulado e inscrito con matrícula profesional No. 25202-37439 CND, he realizado LA EVALUACION ESTRUCTURAL PARA UNA TORRE CUADRADA DE SECCION VARIABLE de 50.0 metros de altura, con ancho entre patas de 7.15 metros, Localizada en **LA ESTACION: CERRÓ BAÑADEROS** – Municipio de Hato Nuevo, Departamento de La Guajira, para una velocidad de viento de 120 Kph, que soporta antenas de MW y Omni.

La evaluación y recomendaciones han sido hechas siguiendo los parámetros establecidos en la NORMA TIA/EIA-222-F y las NORMAS COLOMBIANAS DE DISEÑO Y CONSTRUCCIÓN SISMO-RESISTENTE, NSR-10.

Por lo tanto, asumo la responsabilidad por los perjuicios que puedan ocasionar los diseños presentados y exonero a: Radio Televisión Nacional de Colombia (RTVC) de cualquier eventualidad referente a la evaluación de dicha estructura, bajo las condiciones anteriormente expuestas y descritas en la memoria de cálculo.

ATENTAMENTE.,

ING. Carlos Eduardo Londoño Mesa.
MAT.PROF. 25202 - 37439 CND.



REPÚBLICA DE COLOMBIA
CONSEJO PROFESIONAL NACIONAL DE
INGENIERÍA
COPNIA

EL DIRECTOR GENERAL

CERTIFICA:

1. Que LONDOÑO MESA CARLOS EDUARDO identificado (a) con Cédula de Ciudadanía Nº 91228746, se encuentra inscrito(a) en el Registro Profesional Nacional que lleva esta entidad, como INGENIERO CIVIL con Matrícula Profesional Nº 25202-37439 CND desde el (los) veintidos (22) día(s) del mes de noviembre del año mil novecientos noventa (1990).
2. Que la (el) Matrícula Profesional es la autorización que expide el Estado para que el titular ejerza su profesión en todo el territorio de la República de Colombia, de conformidad con lo dispuesto en la Ley 842 de 2003.
3. Que la (el) referida (o) Matrícula Profesional se encuentra vigente, por lo cual el profesional certificado actualmente NO está impedido para ejercer la profesión.
4. Que el profesional NO tiene antecedentes disciplinarios ético-profesionales.
5. Que la presente certificación tiene una validez de seis (6) meses y se expide en Bogotá, D.C., a los veintiuno (21) días del mes (diciembre) del año dos mil quince (2015).



RUBÉN DARÍO OCHOA ARBELÁEZ

Firma del titular (*)

(*) Con el fin de verificar que el titular autoriza su participación en procesos estatales de selección de contratistas, La falta de firma del titular no invalida el Certificado.

El presente es un documento público expedido electrónicamente con firma digital que garantiza su plena validez jurídica y probatoria según lo establecido en la Ley 527 de 1999.

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