T070913 - Structural analysis.
Manorah Gardens.

WALTER HOLCOMB, P.E.
CONSULTING ENGINEER
1108 W. BROAD ST.
ANGOLA, IN 46703
(219) 665-3271
FAX# (219) 665-9572

CGB-0509

SUMMARY REPORT

STRUCTURAL ANALYSIS

250 FT. SELF-SUPPORTING TOWER

VILLAGE OF BROADVIEW, IL

ATMOSPHERIC LOADING PER EIA 222-E:

Vo = 75 mph / NO ICE

ANTENNAS AND FEED LINES CONSIDERED FOR THE ANALYSIS :

EXISTING:

40 FT.	: 1.2 METER DISH	7/8" LINE
75 FT.	: DECIBEL	7/8" LINE
90 FT.	: DECIBEL	7/8" LINE
195 FT.	: OMNI ON SIDE ARM	7/8" LINE
205 FT.	: 1.2 METER DIAH	7/8" LINE
215 FT.	: OMNI ON SIDE ARM	7/8" LINE
250 FT.	: 10 FT. TALL OMNI	7/8" LINE
250 FT.	: 20 FT. TALL OMNI	7/8" LINE

PROPOSED PCS SYSTEM :

120 FT.	: (6) DB980H ANTENNAS	(6) 1-5/8" LINES
120 FT.	: (3) SIDE ARM MOUNTING FRAMES	

RESULTS OF ANALYSIS :

TOWER MEETS STRUCTURAL REQUIREMENTS OF ANSI/EIA 222-E CODE.

HOWEVER, THE TOWER LEGS FROM 110 FT. TO 150 FT. LEVELS ARE CARRYING NEARLY THE MAXIMUM ALLOWABLE COMPRESSION FORCES. THEREFORE, THE TOWER SHOULD NOW BE CONSIDERED TO BE FULLY LOADED.

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WALTER HOLCOMB, P.E.
1108 W. Broad Street
ANGOLA, INDIANA 46703
(219) 665-3271
FAX (219) 665-9572

JOB 250' TOWER, BROADVIEW, IL
SHEET NO. B2 OF B3
CALCULATED BY COH DATE
CHECKED BY DATE
SCALE

ANTENNA LOADS: NO ICE: EXISTING:

40': 1.2M. DISH: 15.83 x 1.55 x 12.56 = 308 lb = 0.31k

75': DECIBEL: 21.08 x 2.5 = 52 lb = 0.05k

90': DECIBEL: 21.08 x 2.5 = 53 lb = 0.05k

195': 20'OMNI/SIDE ARM: 26.86 x 9 = 242 lb = 0.24k

205': 1.2M DISH: 26.86 x 1.55 x 12.56 = 523 lb = 0.52k

215' TDF ANT./6' SIDE ARM: 26.86 x 9 = 242 lb = 0.24k

230': 10' DECIBEL: SIDE MOUNT: 26.86 x 6 = 161 lb = 0.16k

250': 10'OMNI + 20'OMNI: 28.07 x 9 = 253 lb = 0.25k

PROPOSED: (6) DB980H + (3) 6' ARMS: 120' LEV.

$C_A A_A \approx 65\ ft^2$

W.L. = 21.08 x 65 = 1,370 lb

FEED LINES:

7/8": O.D. = 1.0" $C_A A_A$ = 1.2 x 1/12 = 0.10 ft^2/ft

1 5/8": O.D. = 2.0" $C_A A_A$ = 1.2 x 2/12 = 0.20 ft^2/ft

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JOB 23 TOWER; BRADVIEW, IL
SHEET NO. B1 OF B3
CALCULATED BY WH DATE
CHECKED BY DATE
SCALE

WIND PRESSURE PER EIA 222-E

TOWER HT. = 250.0 FT.

GUST FACTOR = 1.099

BASE WIND VEL. = 75.0 MPH

PRESSURE = .00256 X VO**2 X GH X KZ

P1 = PRESSURE / NO ICE, psf

P2 = PRESSURE / WITH ICE, psf

SPAN	BOT. LV.	TOP LV.	CTR. HT.	VEL.	KZ	P1	P2
1	.00	60.00	30.00	75.00	1.000	15.83	11.87
2	60.00	120.00	90.00	86.56	1.332	21.08	15.81
3	120.00	180.00	150.00	93.11	1.541	24.40	18.30
4	180.00	240.00	210.00	97.70	1.697	26.86	20.14
5	240.00	250.00	245.00	99.87	1.773	28.07	21.05

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JOB 250' TOWER; BROADVIEW, IL
SHEET NO. B3 OF B3
CALCULATED BY CDH DATE
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SCALE

SAMPLE CALCULATION:

WIND LOAD: SECTION 16N: 0'-20' LEVELS

$C_F A_E = 85.47$ ft² (TOWER SECTION)

LINES: (9) 7/8"ϕ: $C_A A_A = 9 \times .10 = 0.90$ ft²/ft

(6) 1 5/8"ϕ: $C_A A_A = 6 \times .20 = 1.20$

$\Sigma C_A A_A = 2.10$ ft²/ft.

$P = 15.83$ lb/ft

DIST. WIND LOAD $= 15.83\left(\frac{85.47}{20} + 2.10\right) = \underline{100.5}$ lb/L-ft