EMPIRE telecom

January 28, 2015

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Street
New Britain, CT 06051

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	69 Wheeler Street, New Haven, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 98 foot Monopole ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 94 feet. The tower is controlled by Landmark Dividend. The Council approved the previous application on May 29th 2012, reference number EM-CING-093-120507. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-CING-093-120507.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor and the Executive Director of the City Plan Department for the City of New Haven. A copy of this letter is also being sent to Elmer F. Laydon, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 94 foot level of the 98 foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

EMPIRE telecom

standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the May 29th 2012 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Structural Components, LLC dated April 26, 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Toni Harp, Mayor, City of New Haven
Karyn Gilvarg, A.I.A., Executive Director, City of New Haven
Landmark Dividend, c/o Charles Dunn, Tower Owner

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

CT 2057

May 29, 2012

Douglas Talmadge
Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

RE: **EM-CING-093-120507** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 69 Wheeler Street, New Haven, Connecticut.

Dear Mr. Talmadge:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- The required modifications shown in Appendix C be completed in accordance with the recommendations made in the Structural Analysis Report prepared by Structural Components LLC dated April 26, 2012, and stamped by Carlo Centore; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated May 7, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

May 8, 2012

The Honorable John DeStefano, Jr
Mayor
City of New Haven
165 Church Street
New Haven, CT 06510

RE: **EM-CING-093-120507** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 69 Wheeler Street, New Haven, Connecticut.

Dear Mayor DeStefano:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by May 22, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts/MAB

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Thomas Talbot, Deputy Director-Plan Department, City of New Haven

at&t
Your world. Delivered
cingular

EM-CING-093-120507

ireless PCS, LLC
prise Dr, STE 3A
.y Hill, CT 06067
Phone: (203)-410-4531
Douglas Talmadge
Real Estate Consultant

May, 7 2012

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 69 Wheeler St, New Haven, CT 06512.

Dear Ms. Roberts:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

UMTS offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural modification plans dated 4/26/12 that are to be completed prior to the proposed antenna installation as well as a passing structural report dated

4/26/12 referencing the required tower modifications on the modification drawings dated 4/26/12 and the revised antenna configuration on the drawings dated 5/3/12.

The changes to the facility do not constitute modification as defined Connecticut General Statues ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound as all equipment will be located in the existing AT&T shelter.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more GSM channels for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons New Cingular Wireless PCS, LLC respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (203)-410-4531 or email DTalmadge@Transcendwireless.com with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas Talmadge
Real Estate Consultant

Structural Components
Bringing It All Together

Structural Components, LLC
2400 Central Ave.
Suite A-1 South
Boulder, CO 80301

Voice: 866-386-7622
Fax: 303-962-3577

April 26, 2012

Jason R. Mead
Centek Engineering, Inc.
63-2 North Branford Rd
Branford, CT 06405

Re: Structural Analysis Report
Structure: 98ft Monopole
Site Address: 69 Wheeler St, New Haven, CT 06512
Lat: 41 17 45.45N, 72 53 52.49W
Site Name: 69 Wheeler St
Site Number: 11118.CO10 – CT2037
SC Number: 120229
Status: **Passes with completed modifications (96% Capacity)**

Dear Mr. Mead:

Per your request, Structural Components, LLC has completed a structural analysis for the above referenced project to verify the tower's compliance to the following design criteria:

Standard:	TIA/EIA-222-F *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*
Building Code:	2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)
Design Basic Wind Speed without Ice:	90 mph fastest mile (Per Appendix K of the 2005 CT Building Code Supplement)
Design Basic Wind Speed with Ice:	78 mph fastest mile
Ice Thickness:	1/2" radial
Serviceability Basic Wind Speed:	50 mph fastest mile
Allowable Stress Increase:	1.33

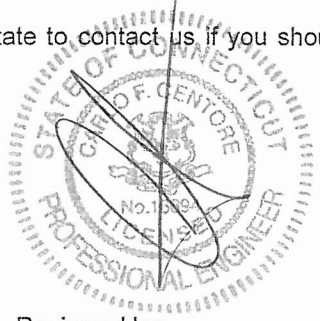
Please refer to the following structural analysis report, which gives complete details of the tower loading, results, information provided, modifications required and necessary assumptions.

We trust you find this report satisfactory. Please do not hesitate to contact us if you should have any questions or concerns.

Best Regards,
Structural Components LLC

Ryan Guerrero
5-2-2012

Ryan Guerrero
Structural Engineering Mgr.



Reviewed by:
Carlo F. Centore, P.E.
Centek Engineering, Inc.
License: CT PE #0016694
Expires: 01/31/2013

1 LOADING CONFIGURATION

The following antennas, mounts, transmission lines, and other appurtenances were considered for the structural analysis.

Elev. (ft) [1]	Appurtenance	Line	I/O [2]	Notes
98.0	(6) APX16DWV-16DWVS-E-A20 (6) ATMAA1412	(12) 1-5/8"	I	T-Mobile
97.0	(1) LP Platform			
94.0	**(6) RRUS-11** **(1) DC6 Surge Arrestor** **(1) Tri Bracket**	**(2) #8 copper** **(1) RG6 Fiber**	I	**AT&T Proposed**
91.5	**(2) AM-X-CD-16-65-00T-RET** **(1) AM-X-CD-14-65-00T-RET** **(3) Powerwave 7770** **(6) LGP21401** **(3) T-Arm**			
91.5	(3) 7750.00 (6) LGP219 Diplexer	(12) 7/8"	I	AT&T Existing
82.0	(2) ANT-18G-2-C	(1) 2" Conduit (1) ½"	I	Clearwire
80.0	(3) LLPX310R (3) RRUS-11			
80.0	(11) DB844G45ZAXY	(12) 1-5/8"	I	Nextel
78.0	(3) T-Arms			

1) Elevations reference centerline of panel, yagi, and dish antennas, and base of whip antennas, in relation to the base of the tower.
2) All lines are located within the monopole (I) and have been considered as fully shielded from the wind.
3) The loading listed in the above table reflects the final appurtenance configuration as provided by Centek Engineering and may not reflect the current tower loading.
4) The proposed monopole reinforcement has also been included in the wind loading of the tower from 0-70ft.

3 PROVIDED INFORMATION AND ASSUMPTIONS

Information about the tower was provided by Centek Engineering.. Structural Components, LLC visited the site on 3/26/2012.

Data	Document	Author	Date	File
Tower	Mapping Report tnxTower Analysis	Structural Components, LLC Centek Engineering, Inc.	03/27/2012 2/20/2012	120229 11118.CO10-CT2037
Existing and Proposed Loads	tnxTower Analysis	Centek Engineering, Inc.	02/20/2012	11118.CO10-CT2037
Foundation	Structural Analysis Report	All Points Technology	12/10/2008	CT198740
Soils	Not Provided	---	---	---

The following assumptions were made in order to complete the analysis. These assumptions must be checked. If they do not accurately represent the existing or proposed tower, foundation, soil, and loading conditions, we must be notified so that we can make the appropriate changes to our analysis, conclusions, and recommendations.

1. The tower and foundation are constructed as shown in the provided drawings, previous structural analysis reports, mapping reports, photos, and/or other documents.
2. The tower and foundation are in good condition with no corrosion, damage or fatiguing which could reduce the carrying capacity of the tower.
3. The tower has been properly maintained in accordance with industry standards.
4. The tower and foundation have not been modified except as indicated in the provided information or in this report.
5. The foundation was properly designed and constructed for the original design reactions.

4 REQUIRED STRUCTURAL MODIFICATIONS

Provided the assumptions outlined are accurate, we recommend the following modifications:

1. Install (4) Switchblade with 2-3/4" anchor rod base terminations from 0-20ft.
2. Install (3) sides of Switchblade monopole reinforcement from 20ft to 70ft.

Once the above upgrades are completed, the tower will be in structural compliance with the proposed antenna installation.

See Appendix C for Modification Drawings.

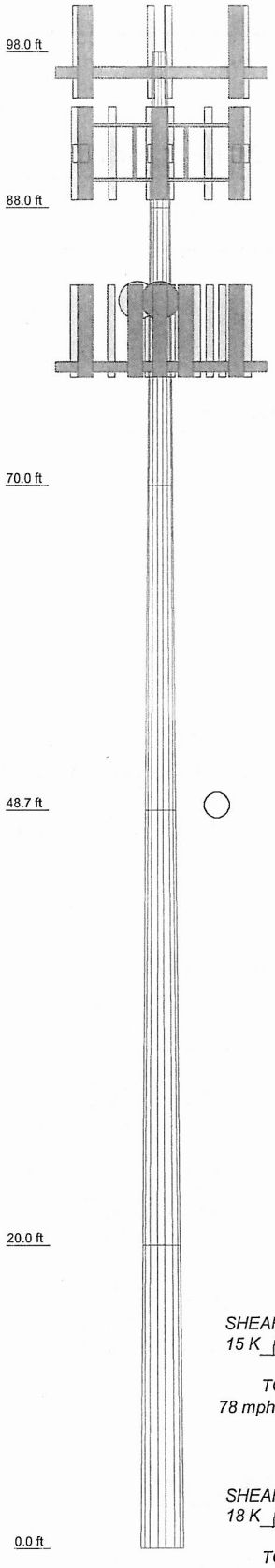
5 CONCLUSIONS

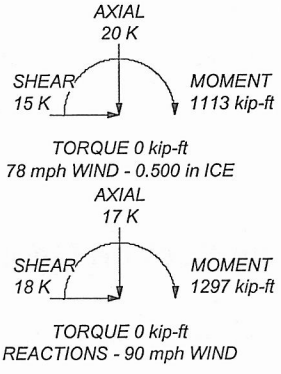
With the proposed loadings listed and the installed required structural modifications as outlined the tower and foundations satisfy the structural strength requirements of the standards and codes listed.

A passing letter of structural compliance with the standards and codes will be provided upon Structural Components review and approval of the completed structure.

Section	1	2	3	4	5
Length (ft)	10.000	18.000	21.320	28.680	20.000
Number of Sides	18	18	18	18	18
Thickness (in)	0.250	0.188	0.324	0.349	0.380
Top Dia (in)	12.750	16.500	20.070	24.313	30.020
Bot Dia (in)	16.500	20.070	24.313	30.020	34.000
Grade	A572-65				
Weight (K)	0.4	0.7	1.6	2.9	2.6

Total Weight: 8.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	98	7750.00 (ATI - Existing)	91.5
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	98	7750.00 (ATI - Existing)	91.5
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	98	7770 (ATI - Existing)	91.5
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98	7770 (ATI - Existing)	91.5
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98	7770 (ATI - Existing)	91.5
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98	(2) LGP21401 TMA (ATI - Existing)	91.5
EEI 14-ft Low Profile Platform (T-Mobile - Existing)	97	(2) LGP21401 TMA (ATI - Existing)	91.5
(2) RRUS-11 (ATI - Proposed)	94	(2) LGP21401 TMA (ATI - Existing)	91.5
(2) RRUS-11 (ATI - Proposed)	94	(2) LGP21901 Diplexer (ATI - Existing)	91.5
(2) RRUS-11 (ATI - Proposed)	94	(2) LGP21901 Diplexer (ATI - Existing)	91.5
DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	94	(2) LGP21901 Diplexer (ATI - Existing)	91.5
Valmont Uni-Tri Bracket (ATI - Proposed)	94	Valmont T-Arm (3) (ATI - Existing)	91.5
AM-X-CD-16-65-00T-RET (ATI - Proposed)	91.5	ANT-18G-2-C (Clearwire - Existing)	82
AM-X-CD-16-65-00T-RET (ATI - Proposed)	91.5	ANT-18G-2-C (Clearwire - Existing)	82
AM-X-CD-14-65-00T-RET (ATI - Proposed)	91.5	(4) DB844G45ZAXY (Nextel - Existing)	80
7750.00 (ATI - Existing)	91.5	LLPX310R (Clearwire - Existing)	80
		LLPX310R (Clearwire - Existing)	80
		LLPX310R (Clearwire - Existing)	80
		RRUS-11 (Clearwire - Existing)	80
		RRUS-11 (Clearwire - Existing)	80
		RRUS-11 (Clearwire - Existing)	80
		(3) DB844G45ZAXY (Nextel - Existing)	80
		(4) DB844G45ZAXY (Nextel - Existing)	80
		Valmont T-Arm (3) (Nextel - Existing)	78

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 93.2%

Stuctural Components, LLC
2400 Central Ave. Suite A-1 South
Boulder, CO 80301
Phone: (800) 584-8839
FAX: (303) 962-3577

Job: SC #120229		
Project: *98-ft EEI Monopole - 69 Wheeler St., New Haven, CT*		
Client: Centek	Drawn by: kjackson	App'd:
Code: TIA/EIA-222-F	Date: 04/26/12	Scale: NTS
Path:		Dwg No. E-1

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	48.680-20.000	28.680	0.000	18	24.313	30.020	0.349	1.396	A572-65 (65 ksi)
L5	20.000-0.000	20.000		18	30.020	34.000	0.380	1.520	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.947	9.919	195.801	4.438	6.477	30.230	391.859	4.960	1.804	7.216
	16.755	12.894	430.174	5.769	8.382	51.321	860.915	6.448	2.464	9.856
L2	16.755	9.708	326.368	5.791	8.382	38.937	653.165	4.855	2.574	13.728
	20.380	11.833	590.961	7.058	10.196	57.963	1182.699	5.917	3.202	17.079
L3	20.380	20.306	1000.292	7.010	10.196	98.111	2001.900	10.155	2.962	9.142
	24.688	24.669	1793.534	8.516	12.351	145.215	3589.427	12.337	3.709	11.447
L4	24.688	26.545	1925.890	8.507	12.351	155.932	3854.314	13.275	3.665	10.501
	30.483	32.867	3655.665	10.533	15.250	239.713	7316.140	16.437	4.669	13.379
L5	30.483	35.749	3967.917	10.522	15.250	260.189	7941.055	17.878	4.615	12.144
	34.525	40.550	5790.567	11.935	17.272	335.257	11588.754	20.279	5.315	13.987

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 98.000-88.000				1	1	1		
L2 88.000-70.000				1	1	1		
L3 70.000-48.680				1	1	1		
L4 48.680-20.000				1	1	1		
L5 20.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
RG6-Fiber (AT&T - Propsoed)	C	No	Inside Pole	88.000 - 3.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
#8 AWG Copper WIre (AT&T - Propsoed)	C	No	Inside Pole	88.000 - 3.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
1 5/8 (T-Mobile - Existing)	C	No	Inside Pole	98.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
7/8 (AT&T - Existing)	C	No	Inside Pole	88.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (Nextel - Existing)	C	No	Inside Pole	79.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1/2	C	No	Inside Pole	79.000 - 0.000	2	No Ice	0.000	0.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	A	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	7.065 7.516	2.150 2.490	0.041 0.074
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	B	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	7.065 7.516	2.150 2.490	0.041 0.074
(2) APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	C	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	7.065 7.516	2.150 2.490	0.041 0.074
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	A	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	0.013 0.021
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	B	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	0.013 0.021
(2) ATMAA1412D-1A20 TMA (T-Mobile - Existing)	C	From Face	3.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	0.013 0.021
EEI 14-ft Low Profile Platform (T-Mobile - Existing)	A	None		0.000	97.000	No Ice 1/2" Ice	16.500 20.000	16.500 20.000	1.550 1.800
***									
(2) RRUS-11 (AT&T - Proposed)	A	From Face	0.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.994 3.226	1.246 1.412	0.050 0.070
(2) RRUS-11 (AT&T - Proposed)	B	From Face	0.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.994 3.226	1.246 1.412	0.050 0.070
(2) RRUS-11 (AT&T - Proposed)	C	From Face	0.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.994 3.226	1.246 1.412	0.050 0.070
DC6-48-60-18-8F Surge Arrestor (AT&T - Proposed)	C	From Face	0.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.228 2.447	2.228 2.447	0.020 0.039
Valmont Uni-Tri Bracket (AT&T - Proposed)	C	None		0.000	94.000	No Ice 1/2" Ice	1.750 1.940	1.750 1.940	0.290 0.306
AM-X-CD-16-65-00T-RET (AT&T - Proposed)	A	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	6.652 7.088	4.132 4.537	0.033 0.075
AM-X-CD-16-65-00T-RET (AT&T - Proposed)	B	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	6.652 7.088	4.132 4.537	0.033 0.075
AM-X-CD-14-65-00T-RET (AT&T - Proposed)	C	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	5.507 5.899	2.828 3.137	0.036 0.068
7750.00 (AT&T - Existing)	A	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
7750.00 (AT&T - Existing)	B	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
7750.00 (AT&T - Existing)	C	From Face	3.000 0.000 0.000	0.000	91.500	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Valmont T-Arm (3) (Nextel - Existing)	C	None		0.000	78.000	No Ice 1/2" Ice	21.000 29.000	21.000 29.000	1.008 1.236

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
ANT-18G-2-C (Clearwire - Existing)	A	Paraboloid w/Radome	From Face	1.000 0.000 0.000	Worst		82.000	2.500	No Ice 1/2" Ice	4.910 5.240	0.040 0.070
ANT-18G-2-C (Clearwire - Existing)	C	Paraboloid w/Radome	From Face	1.000 0.000 0.000	Worst		82.000	2.500	No Ice 1/2" Ice	4.910 5.240	0.040 0.070

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 88	72.763	11	6.620	0.007
L2	88 - 70	59.040	11	6.488	0.007
L3	70 - 48.68	36.758	11	5.150	0.005
L4	48.68 - 20	17.282	11	3.528	0.002
L5	20 - 0	2.744	11	1.327	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.000	(2) APX16DWV-16DWVS-E-A20	11	72.763	6.620	0.007	2899
97.000	EEI 14-ft Low Profile Platform	11	71.377	6.619	0.007	2899
94.000	(2) RRUS-11	11	67.227	6.607	0.008	2899
91.500	AM-X-CD-16-65-00T-RET	11	63.790	6.578	0.008	2232
82.000	ANT-18G-2-C	11	51.145	6.157	0.007	1027
80.000	(3) DB844G45ZAXY	11	48.602	6.008	0.007	936
78.000	Valmont T-Arm (3)	11	46.111	5.847	0.006	860

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	98 - 97	TP16.5x12.75x0.25	10.000	0.000	0.0	39.000	10.216	-0.187	398.436	0.000
	97 - 96					39.000	10.514	-1.678	410.041	0.004
	96 - 95					39.000	10.811	-1.722	421.646	0.004
	95 - 94					39.000	11.109	-1.768	433.251	0.004
	94 - 93					39.000	11.407	-2.330	444.856	0.005
	93 - 92					39.000	11.704	-2.378	456.461	0.005
	92 - 91					39.000	12.002	-3.520	468.066	0.008
	91 - 90					39.000	12.299	-3.572	479.671	0.007
	90 - 89					39.000	12.597	-3.624	491.276	0.007
	89 - 88					39.000	12.894	-3.678	502.881	0.007
L2	88 - 87	TP20.07x16.5x0.188	18.000	0.000	0.0	39.000	9.826	-3.739	383.214	0.010
	87 - 86					39.000	9.944	-3.801	387.818	0.010
	86 - 85					39.000	10.062	-3.864	392.421	0.010
	85 - 84					39.000	10.180	-3.928	397.024	0.010
	84 - 83					39.000	10.298	-3.992	401.628	0.010
	83 - 82					39.000	10.416	-4.058	406.231	0.010
	82 - 81					39.000	10.534	-4.161	410.834	0.010
	81 - 80					39.000	10.652	-4.229	415.437	0.010
	80 - 79					39.000	10.770	-4.392	420.041	0.010
	79 - 78					39.000	10.888	-4.466	424.644	0.011
	78 - 77					39.000	11.006	-5.449	429.247	0.013
	77 - 76					39.000	11.124	-5.528	433.851	0.013
	76 - 75					39.000	11.242	-5.608	438.454	0.013
	75 - 74					39.000	11.360	-5.690	443.057	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	4 - 3					39.000	39.830	-16.227	1553.360	0.010
	3 - 2					39.000	40.070	-16.418	1562.720	0.011
	2 - 1					39.000	40.310	-16.610	1572.080	0.011
	1 - 0					39.000	40.550	-16.802	1581.440	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	98 - 97	TP16.5x12.75x0.25	1.602	0.599	39.000	0.015	0.000	0.000	39.000	0.000
	97 - 96		4.204	1.484	39.000	0.038	0.000	0.000	39.000	0.000
	96 - 95		6.845	2.283	39.000	0.059	0.000	0.000	39.000	0.000
	95 - 94		9.527	3.008	39.000	0.077	0.000	0.000	39.000	0.000
	94 - 93		13.114	3.926	39.000	0.101	0.000	0.000	39.000	0.000
	93 - 92		16.734	4.756	39.000	0.122	0.000	0.000	39.000	0.000
	92 - 91		22.061	5.961	39.000	0.153	0.000	0.000	39.000	0.000
	91 - 90		29.079	7.479	39.000	0.192	0.000	0.000	39.000	0.000
	90 - 89		36.141	8.858	39.000	0.227	0.000	0.000	39.000	0.000
	89 - 88		43.248	10.112	39.000	0.259	0.000	0.000	39.000	0.000
L2	88 - 87	TP20.07x16.5x0.188	50.401	15.160	39.000	0.389	0.000	0.000	39.000	0.000
	87 - 86		57.598	16.914	39.000	0.434	0.000	0.000	39.000	0.000
	86 - 85		64.840	18.594	39.000	0.477	0.000	0.000	39.000	0.000
	85 - 84		72.126	20.204	39.000	0.518	0.000	0.000	39.000	0.000
	84 - 83		79.458	21.748	39.000	0.558	0.000	0.000	39.000	0.000
	83 - 82		86.834	23.228	39.000	0.596	0.000	0.000	39.000	0.000
	82 - 81		94.696	24.764	39.000	0.635	0.000	0.000	39.000	0.000
	81 - 80		102.553	26.225	39.000	0.672	0.000	0.000	39.000	0.000
	80 - 79		114.028	28.520	39.000	0.731	0.000	0.000	39.000	0.000
	79 - 78		125.547	30.720	39.000	0.788	0.000	0.000	39.000	0.000
	78 - 77		138.150	33.080	39.000	0.848	0.000	0.000	39.000	0.000
	77 - 76		150.798	35.342	39.000	0.906	0.000	0.000	39.000	0.000
	76 - 75		163.489	37.512	39.000	0.962	0.000	0.000	39.000	0.000
	75 - 74		176.224	39.595	39.000	1.015	0.000	0.000	39.000	0.000
	74 - 73		189.003	41.593	39.000	1.066	0.000	0.000	39.000	0.000
	73 - 72		201.826	43.511	39.000	1.116	0.000	0.000	39.000	0.000
	72 - 71		214.691	45.352	39.000	1.163	0.000	0.000	39.000	0.000
	71 - 70		227.600	47.120	39.000	1.208	0.000	0.000	39.000	0.000
L3	70 - 68.934	TP24.313x20.07x0.324	241.423	28.899	39.000	0.741	0.000	0.000	39.000	0.000
	68.934 - 67.868		255.324	29.919	39.000	0.767	0.000	0.000	39.000	0.000
	67.868 - 66.802		269.303	30.898	39.000	0.792	0.000	0.000	39.000	0.000
	66.802 - 65.736		283.362	31.840	39.000	0.816	0.000	0.000	39.000	0.000
	65.736 - 64.67		297.498	32.745	39.000	0.840	0.000	0.000	39.000	0.000
	64.67 - 63.604		311.715	33.616	39.000	0.862	0.000	0.000	39.000	0.000
	63.604 - 62.538		326.012	34.453	39.000	0.883	0.000	0.000	39.000	0.000
	62.538 - 61.472		340.388	35.259	39.000	0.904	0.000	0.000	39.000	0.000
	61.472 - 60.406		354.845	36.035	39.000	0.924	0.000	0.000	39.000	0.000
	60.406 - 59.34		369.383	36.781	39.000	0.943	0.000	0.000	39.000	0.000
	59.34 - 58.274		384.003	37.501	39.000	0.962	0.000	0.000	39.000	0.000
	58.274 -		398.703	38.194	39.000	0.979	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	12 - 11		1108.300	45.423	39.000	1.165	0.000	0.000	39.000	0.000
	11 - 10		1125.167	45.533	39.000	1.168	0.000	0.000	39.000	0.000
	10 - 9		1142.100	45.638	39.000	1.170	0.000	0.000	39.000	0.000
	9 - 8		1159.100	45.740	39.000	1.173	0.000	0.000	39.000	0.000
	8 - 7		1176.167	45.839	39.000	1.175	0.000	0.000	39.000	0.000
	7 - 6		1193.300	45.935	39.000	1.178	0.000	0.000	39.000	0.000
	6 - 5		1210.492	46.026	39.000	1.180	0.000	0.000	39.000	0.000
	5 - 4		1227.758	46.115	39.000	1.182	0.000	0.000	39.000	0.000
	4 - 3		1245.083	46.201	39.000	1.185	0.000	0.000	39.000	0.000
	3 - 2		1262.475	46.284	39.000	1.187	0.000	0.000	39.000	0.000
	2 - 1		1279.942	46.364	39.000	1.189	0.000	0.000	39.000	0.000
	1 - 0		1297.467	46.441	39.000	1.191	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	98 - 97	TP16.5x12.75x0.25	1.622	0.159	26.000	0.012	0.000	0.000	26.000	0.000
	97 - 96		2.621	0.249	26.000	0.019	0.000	0.000	26.000	0.000
	96 - 95		2.661	0.246	26.000	0.019	0.000	0.000	26.000	0.000
	95 - 94		2.702	0.243	26.000	0.019	0.000	0.000	26.000	0.000
	94 - 93		3.598	0.315	26.000	0.024	0.032	0.005	26.000	0.000
	93 - 92		3.641	0.311	26.000	0.024	0.032	0.004	26.000	0.000
	92 - 91		6.994	0.583	26.000	0.045	0.079	0.010	26.000	0.000
	91 - 90		7.040	0.572	26.000	0.044	0.000	0.000	26.000	0.000
	90 - 89		7.085	0.562	26.000	0.043	0.000	0.000	26.000	0.000
	89 - 88		7.131	0.553	26.000	0.043	0.000	0.000	26.000	0.000
L2	88 - 87	TP20.07x16.5x0.188	7.176	0.730	26.000	0.056	0.000	0.000	26.000	0.000
	87 - 86		7.221	0.726	26.000	0.056	0.000	0.000	26.000	0.000
	86 - 85		7.266	0.722	26.000	0.056	0.000	0.000	26.000	0.000
	85 - 84		7.311	0.718	26.000	0.055	0.000	0.000	26.000	0.000
	84 - 83		7.356	0.714	26.000	0.055	0.000	0.000	26.000	0.000
	83 - 82		7.401	0.711	26.000	0.055	0.000	0.000	26.000	0.000
	82 - 81		7.838	0.744	26.000	0.057	0.249	0.032	26.000	0.001
	81 - 80		7.883	0.740	26.000	0.057	0.249	0.031	26.000	0.001
	80 - 79		11.499	1.068	26.000	0.082	0.427	0.052	26.000	0.002
	79 - 78		11.545	1.060	26.000	0.082	0.427	0.051	26.000	0.002
	78 - 77		12.630	1.147	26.000	0.088	0.427	0.050	26.000	0.002
	77 - 76		12.674	1.139	26.000	0.088	0.427	0.049	26.000	0.002
	76 - 75		12.718	1.131	26.000	0.087	0.427	0.048	26.000	0.002
	75 - 74		12.762	1.123	26.000	0.086	0.427	0.047	26.000	0.002
	74 - 73		12.806	1.116	26.000	0.086	0.427	0.046	26.000	0.002
	73 - 72		12.849	1.108	26.000	0.085	0.427	0.045	26.000	0.002

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	24.302									
	24.302 - 22.868		16.084	0.499	26.000	0.038	0.424	0.011	26.000	0.000
	22.868 - 21.434		16.178	0.497	26.000	0.038	0.424	0.011	26.000	0.000
	21.434 - 20		16.272	0.495	26.000	0.038	0.424	0.010	26.000	0.000
L5	20 - 19	TP34x30.02x0.38	16.331	0.454	26.000	0.035	0.424	0.009	26.000	0.000
	19 - 18		16.395	0.453	26.000	0.035	0.424	0.009	26.000	0.000
	18 - 17		16.459	0.451	26.000	0.035	0.424	0.009	26.000	0.000
	17 - 16		16.523	0.450	26.000	0.035	0.424	0.009	26.000	0.000
	16 - 15		16.587	0.449	26.000	0.035	0.424	0.009	26.000	0.000
	15 - 14		16.651	0.448	26.000	0.034	0.424	0.009	26.000	0.000
	14 - 13		16.716	0.447	26.000	0.034	0.424	0.009	26.000	0.000
	13 - 12		16.780	0.445	26.000	0.034	0.424	0.009	26.000	0.000
	12 - 11		16.845	0.444	26.000	0.034	0.424	0.008	26.000	0.000
	11 - 10		16.910	0.443	26.000	0.034	0.424	0.008	26.000	0.000
	10 - 9		16.976	0.442	26.000	0.034	0.424	0.008	26.000	0.000
	9 - 8		17.041	0.441	26.000	0.034	0.423	0.008	26.000	0.000
	8 - 7		17.106	0.440	26.000	0.034	0.423	0.008	26.000	0.000
	7 - 6		17.172	0.439	26.000	0.034	0.423	0.008	26.000	0.000
	6 - 5		17.238	0.438	26.000	0.034	0.423	0.008	26.000	0.000
	5 - 4		17.304	0.437	26.000	0.034	0.423	0.008	26.000	0.000
	4 - 3		17.370	0.436	26.000	0.034	0.423	0.008	26.000	0.000
	3 - 2		17.437	0.435	26.000	0.033	0.423	0.008	26.000	0.000
	2 - 1		17.503	0.434	26.000	0.033	0.423	0.007	26.000	0.000
	1 - 0		17.570	0.433	26.000	0.033	0.423	0.007	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	98 - 97	0.000	0.015	0.000	0.012	0.000	0.016 ✓	1.333	H1-3+VT ✓
	97 - 96	0.004	0.038	0.000	0.019	0.000	0.042 ✓	1.333	H1-3+VT ✓
	96 - 95	0.004	0.059	0.000	0.019	0.000	0.063 ✓	1.333	H1-3+VT ✓
	95 - 94	0.004	0.077	0.000	0.019	0.000	0.081 ✓	1.333	H1-3+VT ✓
	94 - 93	0.005	0.101	0.000	0.024	0.000	0.106 ✓	1.333	H1-3+VT ✓
	93 - 92	0.005	0.122	0.000	0.024	0.000	0.127 ✓	1.333	H1-3+VT ✓
	92 - 91	0.008	0.153	0.000	0.045	0.000	0.161 ✓	1.333	H1-3+VT ✓
	91 - 90	0.007	0.192	0.000	0.044	0.000	0.200 ✓	1.333	H1-3+VT ✓
	90 - 89	0.007	0.227	0.000	0.043	0.000	0.235 ✓	1.333	H1-3+VT ✓
	89 - 88	0.007	0.259	0.000	0.043	0.000	0.267 ✓	1.333	H1-3+VT ✓

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	61.472 - 60.406	0.008	0.924	0.000	0.047	0.001	0.933 ✓	1.333	H1-3+VT ✓
	60.406 - 59.34	0.008	0.943	0.000	0.047	0.001	0.952 ✓	1.333	H1-3+VT ✓
	59.34 - 58.274	0.008	0.962	0.000	0.047	0.001	0.971 ✓	1.333	H1-3+VT ✓
	58.274 - 57.208	0.008	0.979	0.000	0.046	0.001	0.988 ✓	1.333	H1-3+VT ✓
	57.208 - 56.142	0.009	0.996	0.000	0.046	0.001	1.006 ✓	1.333	H1-3+VT ✓
	56.142 - 55.076	0.009	1.013	0.000	0.046	0.001	1.022 ✓	1.333	H1-3+VT ✓
	55.076 - 54.01	0.009	1.029	0.000	0.046	0.001	1.038 ✓	1.333	H1-3+VT ✓
	54.01 - 52.944	0.009	1.044	0.000	0.046	0.001	1.053 ✓	1.333	H1-3+VT ✓
	52.944 - 51.878	0.009	1.059	0.000	0.046	0.001	1.068 ✓	1.333	H1-3+VT ✓
	51.878 - 50.812	0.009	1.073	0.000	0.045	0.001	1.083 ✓	1.333	H1-3+VT ✓
	50.812 - 49.746	0.009	1.087	0.000	0.045	0.001	1.097 ✓	1.333	H1-3+VT ✓
	49.746 - 48.68	0.009	1.100	0.000	0.045	0.001	1.110 ✓	1.333	H1-3+VT ✓
L4	48.68 - 47.246	0.008	1.041	0.000	0.042	0.001	1.050 ✓	1.333	H1-3+VT ✓
	47.246 - 45.812	0.009	1.056	0.000	0.041	0.001	1.065 ✓	1.333	H1-3+VT ✓
	45.812 - 44.378	0.009	1.070	0.000	0.041	0.001	1.079 ✓	1.333	H1-3+VT ✓
	44.378 - 42.944	0.009	1.084	0.000	0.041	0.001	1.093 ✓	1.333	H1-3+VT ✓
	42.944 - 41.51	0.009	1.097	0.000	0.041	0.001	1.106 ✓	1.333	H1-3+VT ✓
	41.51 - 40.076	0.009	1.109	0.000	0.041	0.001	1.119 ✓	1.333	H1-3+VT ✓
	40.076 - 38.642	0.009	1.121	0.000	0.040	0.001	1.130 ✓	1.333	H1-3+VT ✓
	38.642 - 37.208	0.009	1.132	0.000	0.040	0.001	1.142 ✓	1.333	H1-3+VT ✓
	37.208 - 35.774	0.009	1.143	0.000	0.040	0.000	1.152 ✓	1.333	H1-3+VT ✓
	35.774 - 34.34	0.009	1.153	0.000	0.040	0.000	1.163 ✓	1.333	H1-3+VT ✓
	34.34 - 32.906	0.009	1.163	0.000	0.040	0.000	1.172 ✓	1.333	H1-3+VT ✓
	32.906 - 31.472	0.010	1.172	0.000	0.039	0.000	1.182 ✓	1.333	H1-3+VT ✓
	31.472 - 30.038	0.010	1.181	0.000	0.039	0.000	1.191 ✓	1.333	H1-3+VT ✓
	30.038 - 28.604	0.010	1.189	0.000	0.039	0.000	1.199 ✓	1.333	H1-3+VT ✓

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	98 - 88	Pole	TP16.5x12.75x0.25	1	-3.678	670.340	20.0	Pass
L2	88 - 70	Pole	TP20.07x16.5x0.188	2	-6.031	615.139	91.8	Pass
L3	70 - 48.68	Pole	TP24.313x20.07x0.324	3	-8.691	1282.489	83.3	Pass
L4	48.68 - 20	Pole	TP30.02x24.313x0.349	4	-13.114	1708.679	93.2	Pass
L5	20 - 0	Pole	TP34x30.02x0.38	5	-16.802	2108.059	90.2	Pass
							Summary	
						Pole (L4)	93.2	Pass
						RATING =	**93.2**	**Pass**

Structural Components, LLC

By:	Rguerrero	Job #:	120229	Sheet:	
Date:	4/26/2012	Project:	11118.CO10	Subject:	
Principal:	CC	Client:	Centek		

Monopole Splice Calculator

Assumptions / Criteria

ASCE/SEI 48-05
AISC
TIA

Notes:

Anchor bolt stress for TIA-222-G assumes detail type d connection per figure 4-4. Free length between concrete and leveling nut does not exceed 1* bolt diameter.
Splice at 88ft.

Height feet	bolt dia. in	bolt circle dia in	fy ksi	fu ksi	Per Piece A reinf only in^2	Per Piece Ix reinf only in^4	quantity n	dist centoid to centroid in	dist centroid to outer reinf. Fiber in	Properties Ax total in^2	Ix total in^4	Sx total in^3	LRFD Mmax k-ft	ASD Mmax k-ft	4/3rds Mmax k-ft
bolt	1	25.75	85	120	0.606	0.049	12	12.875	0.5	7.27	603.06	45.09	287.44	191.63	255.50
reinf	2.75	51.125	95	115	4.928	2.807	0	15.125	1.375	0.00	0.00	0.00	0.00	0.00	0.00
total			95	115			12	15.125	1.375	7.27	603.06	36.55	287.44	191.63	255.50

Max usable reinf stress	75.00 ksi	O.K.	"only applies when reinforcement anchor rods are installed"

Moment required	43.3 k-ft
Axial required	3.7 k
Shear required	7.2 k

ASD		LRFD	
Ω	2.00	Φ	0.90
Allowable Stress	1.33	Φ_v	0.80
Axial Max Bolt	41.2 k	Axial Max Bolt	72.7 k
Axial Max reinf	374.6 k	Axial Max reinf	566.8 k
Shear Max Bolt	24.2 k	Shear Max Bolt	29.1 k
Stress at Bolt	19.2 ksi	Stress at Bolt	12.8 ksi
Stress at reinf	0.0 ksi	Stress at reinf	0.0 ksi
Axial to Bolt	7.0 k	Axial to Bolt	7.0 k
Axial to reinf	0.0 k	Axial to reinf	0.0 k
Shear to Bolt	0.6 k	Shear to Bolt	0.6 k

Splice Plate Analysis

Odd/Even Active Bolt #	Odd TRUE	Even TRUE
Round or Square	1 (round=1,square=0)	1 (round=1,square=0)
Plate Thickness	1.5 in	1.5 in
Pole Base Diameter	16.5 in	16.5 in
Plate Yield	60 ksi	60 ksi
Bendline	19.77 in	19.77 in

ASD		
Bending Stress	6.8 ksi	2.2 ksi
Allowable Stress	60.0 ksi	40.0 ksi
Ratio	0.113	0.055

ASD Ratings

Plate	12%
Bolt	20%
Reinforcement	N/A

APPENDIX B

Data Provided for Analysis

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	98 - 88 (1)	TP16.5x12.75x0.188	10.000	0.000	0.0	39.000	9.708	-3.504	378.611	0.009
L2	88 - 45.67 (2)	TP25.16x16.5x0.188 H1-3+VT (1.86 CR) - 2	42.330	0.000	0.0	39.000	14.415	-7.969	562.182	0.014
L3	45.67 - 0 (3)	TP34x24.034x0.25 H1-3+VT (1.76 CR) - 3	49.340	0.000	0.0	39.000	26.781	-15.013	1044.440	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	98 - 88 (1)	TP16.5x12.75x0.188	44.541	13.727	39.000	0.352	0.000	0.000	39.000	0.000
L2	88 - 45.67 (2)	TP25.16x16.5x0.188	517.423	72.058	39.000	1.848	0.000	0.000	39.000	0.000
L3	45.67 - 0 (3)	TP34x24.034x0.25	1267.192	68.149	39.000	1.747	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	98 - 88 (1)	TP16.5x12.75x0.188	7.361	0.758	26.000	0.058	0.032	0.005	26.000	0.000
L2	88 - 45.67 (2)	TP25.16x16.5x0.188	14.179	0.984	26.000	0.076	0.529	0.036	26.000	0.001
L3	45.67 - 0 (3)	TP34x24.034x0.25	16.202	0.605	26.000	0.047	0.524	0.014	26.000	0.001

Pole Interaction Design Data

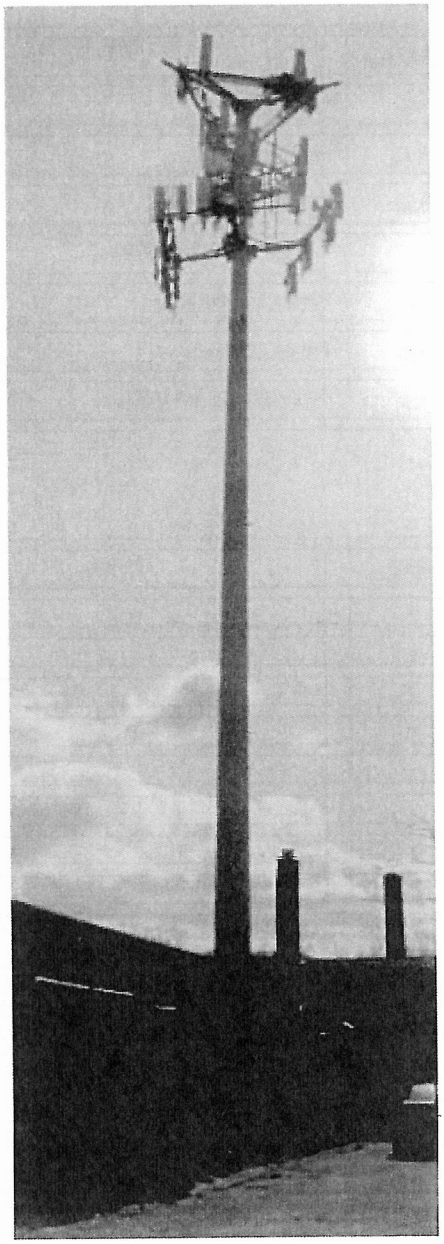
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	98 - 88 (1)	0.009	0.352	0.000	0.058	0.000	0.362 ✓	1.333	H1-3+VT ✓
L2	88 - 45.67 (2)	0.014	1.848	0.000	0.076	0.001	1.863 ✗	1.333	H1-3+VT ✗
L3	45.67 - 0 (3)	0.014	1.747	0.000	0.047	0.001	1.762 ✗	1.333	H1-3+VT ✗

Section Capacity Table

Structural Components
Bringing It All Together.

Structural Components, LLC Voice: 720-304-8839
2400 Central Ave, Suite A-1 South Fax: 720-489-3764
Boulder, CO 80301

MONOPOLE
PRE-CONSTRUCTION AND TIA INSPECTION REPORT



69 Wheeler Street
Site # 11118 CO10

PREPARED FOR:

CENTEK engineering

PREPARED BY:

Jeff Ham
Field Engineer
Structural Components, LLC
SC Job # 120229

DATE:

March 27, 2012

FCC TOWER REGISTRATION NUMBER
1210659

Structural Components
Bringing It All Together.

2400 Central Ave, Suite A-1 South Boulder, CO 80301 PH: 720-489-3764

PRE-CONSTRUCTION SUMMARY

CLIENT:	Centek Engineering	DATE AT SITE:	3/26/2012
SITE (ID):	69 Wheeler Street - 11118 CO10	TOWER TYPE:	18 Sided Monopole
ADDRESS:	69 Wheeler Street	TOWER HEIGHT:	98.0'
	New Haven, CT 06512	WEATHER:	Sun, 50°F, 20-30 mph NW wind
LEAD:	Jeff Ham	SUPPORT:	Ryan Hubert

1. TOWER MAST

* Section 3 is 0.259" thk, not 0.188" as listed in structural analysis.
* See "Monopole Details" page for complete tower mast information.

2. ANTENNA INFORMATION

* Antenna and mount elevations vary slightly from what is listed in structural analysis.
* T-Mobile has (18) 1-1/4" TX lines, not (12) as listed in structural analysis.
* Nextel has (4) 1/2" TX lines, not (2) as listed in structural analysis.
* Clearwire has (2) 2-3/8" OD conduit lines, not (1) as listed in structural analysis.
* T-Mobile has (9) TMSs at 98', not (6) as listed in structural analysis.
* Lightning rod and Omni at 88' are not listed in structural analysis.
* AT&T antennas are mounted on a low profile platform and not t-arms as listed in structural analysis.
* See "Antenna and Coax" sheets for complete line and antenna information.

3. FOUNDATION INFORMATION

* Not requested to complete full foundation mapping.
* Size of foundation above grade verified at site visit.

4. SOILS INFORMATION

* Not requested to complete geotechnical investigation.
* No soil information provided by client

5. SITE CONSTRAINTS

* Site is easily accessible.
* Compound has little extra space, work around base of tower may be difficult.

6. PROPOSED REINFORCEMENT

* (3) Faces of Switchblade Reinforcement with base terminations from 0' to 70'.

7. REINFORCEMENT CONSTRAINTS

* Portholes on faces 3, 4, 5, 8, 9, 12, 13, 14, 17, and 18 make these faces unusable.
* Faces 1, 2, 6, 7, 10, 11, 15, and 16 are open for Switchblade Reinforcement with limited obstructions.
* See "Monopole Obstructions" sheet for complete details.

8. TIA/MAINTENANCE ISSUES

* Full TIA Inspection completed at site visit.
* See "TIA/Maintenance Issues" sheet for complete details.

Structural Components
Bringing It All Together.

TIA/MAINTENANCE ISSUES

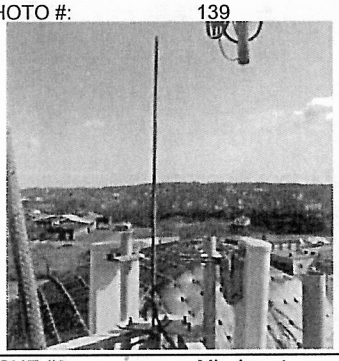
2400 Central Ave, Suite A-1 South Boulder, CO 80301 PH: 720-489-3764

CLIENT:	Centek Engineering	DATE AT SITE:	3/26/2012
SITE (ID):	69 Wheeler Street - 11118 CO10	TOWER TYPE:	18 Sided Monopole
ADDRESS:	69 Wheeler Street	TOWER HEIGHT:	98.0'
	New Haven, CT 06512	WEATHER:	Sun, 50°F, 20-30 mph NW wind
LEAD:	Jeff Ham	SUPPORT:	Ryan Hubert

ISSUE #7: Lightning rod is not tallest appurtenance on tower.

RECOMMENDATION: Move existing 6' x 1/2" lightning rod to top of tower.

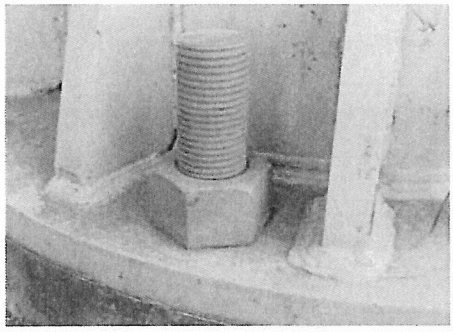
PHOTO #: 139



ISSUE #8: No locking devise on anchor rods.

RECOMMENDATION: Install second nut on top of existing anchor rod nut.

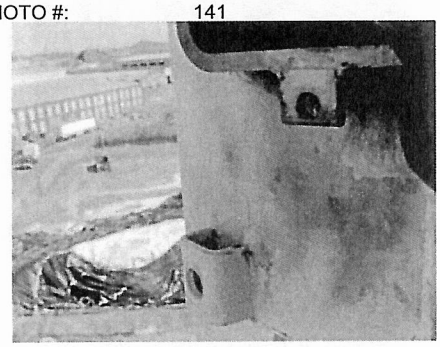
PHOTO #: 130



ISSUE #9: Missing step peg at 70'.

RECOMMENDATION: Install new step peg to bracket at 70'.

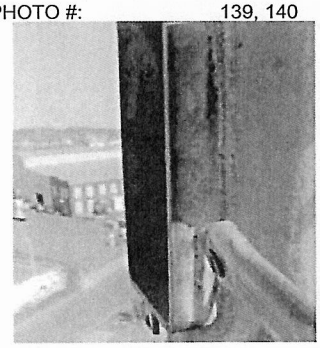
PHOTO #: 141

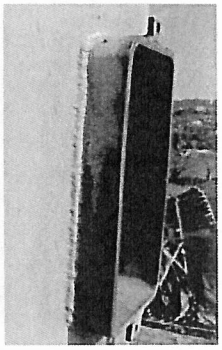


ISSUE #10: Level II rust on ports at 70' 6".

RECOMMENDATION: Remove rust with wire brush or similar. Cold-galvanize affected areas with minimum (2) coats of 95% ZRC paint.

PHOTO #: 139, 140





ISSUE #

RECOMMENDATION:

PHOTO #:

ISSUE #

RECOMMENDATION:

PHOTO #:

Structural Components
Bringing It All Together.

MONOPOLE DETAILS

2400 Central Ave, Suite A-1 South Boulder, CO 80301 PH: 720-489-3764

CLIENT:	Centek Engineering	DATE AT SITE:	3/26/2012
SITE (ID):	69 Wheeler Street - 11118 CO10	TOWER TYPE:	18 Sided Monopole
ADDRESS:	69 Wheeler Street	TOWER HEIGHT:	98.0'
	New Haven, CT 06512	WEATHER:	Sun, 50°F, 20-30 mph NW wind
LEAD:	Jeff Ham	SUPPORT:	Ryan Hubert

SPLICE ELEVATIONS TAKEN WITH:	LASER	**TAPE MEASURE**
SHAFT THICKNESSES TAKEN WITH:	**THICKNESS GAUGE**	CALIPERS

SECTION DETAILS

Shaft Section (Top to bottom)	Bottom Elevation (ft)	Top Elevation (ft)	Section Length (ft)	Overlap At Top* (in)	Thickness (in)	Diameter (F/F)	
						Bottom (in)	Top (in)*
1	88.00	98.00	10.00	N/A	0.259	16.00	13.00
2	45.50	88.00	42.50	N/A	0.194	25.43	16.50
3	0.00	48.68	48.68	38.15	0.259	34.00	24.77

* This information was not verified in the field. The overlap is assumed to be 1.5 times the diameter at the splice elevation.

BASEPLATE DETAILS

Plate Shape	Outer Width	Corner Length	Thickness	ID Plate	Grout Yes/No	Void or Grout Space
Round	48"	N/A	1-1/2"	24"	Yes	4-1/4"

ANCHOR ROD DETAILS

Quantity	Diameter	Type	Bolt Circle	c/c Spacing	Symmetric or Corners
6	2-1/4"	Unk.	42"	21-1/2"	Symmetric

TOP FLANGE PLATE DETAILS

Eleveation	Plate Shape	OD Plate	ID Plate	Thickness	# Holes	Hole Diameter	Hole Circle
88'	Circular	28-1/2"	Unk.	1-1/2"	12	1-1/8"	25-3/4"
98'	Circular	29"	Unk.	1"	24	1-1/8"	27-1/2"

PHOTO OF BASEPLATE

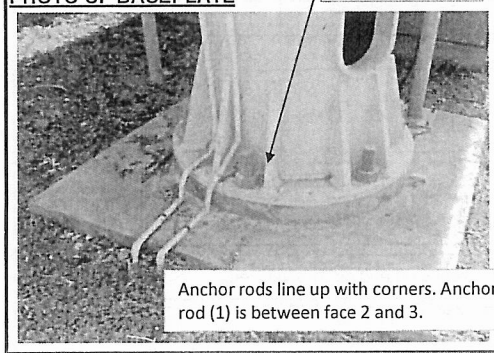
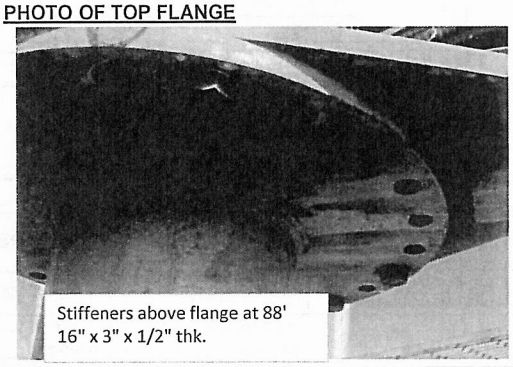


PHOTO OF TOP FLANGE



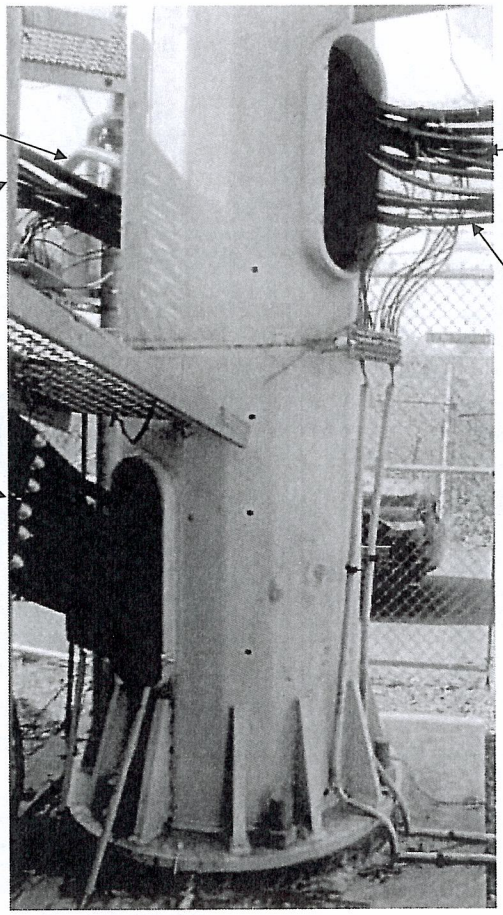
Structural Components
Bringing It All Together.

COAX MAP

2400 Central Ave, Suite A-1 South Boulder, CO 80301 PH: 720-489-3764

CLIENT:	Centek Engineering	DATE AT SITE:	3/26/2012
SITE (ID):	69 Wheeler Street - 11118 CO10	TOWER TYPE:	18 Sided Monopole
ADDRESS:	69 Wheeler Street	TOWER HEIGHT:	98.0'
	New Haven, CT 06512	WEATHER:	Sun, 50°F, 20-30 mph NW wind
LEAD:	Jeff Ham	SUPPORT:	Ryan Hubert

COAX LAYOUT ON TOWER MAST



PORT HOLE DETAILS

Elevation	Number	Face(s)	Dimensions	Weld Size	Occupied?	Photo #
3'	2	8/9, 17/18	32" x 12" x 4" x 1" thk	1/2"	Yes, No	28, 90
7-1/2'	2	3/4/5, 12/13/14	32" x 12" x 4" x 1" thk	1/2"	Yes	75, 92
70-1/2'	3	4/5/6, 10/11/12, 16/17/18	12" x 6" x 3" x 3/8" thk	1/4"	No	322
79-1/2'	3	4/5/6, 10/11/12, 16/17/18	9" x 6" x 3" x 1/2" thk	1/4"	Yes	283
89'	3	5/6, 11/12, 17/18/1	12" x 6" x 3" x 1/2" thk	1/4"	Yes	301
96'	3	5/6, 11/12, 17/18/2	12" x 6" x 3" x 1/2" thk	1/4"	Yes	180

Structural Components
Bringing It All Together.

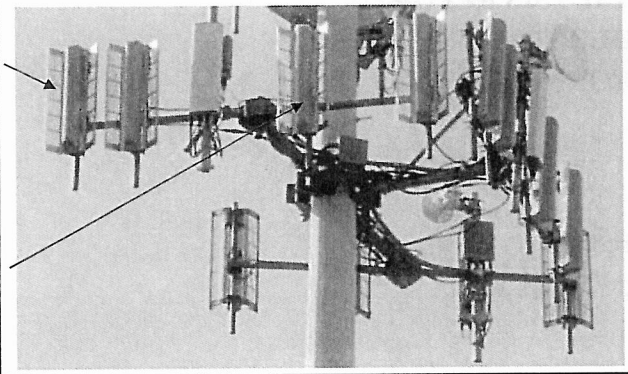
ANTENNA & COAX DETAILS

2400 Central Ave, Suite A-1 South Boulder, CO 80301 PH: 720-489-3764

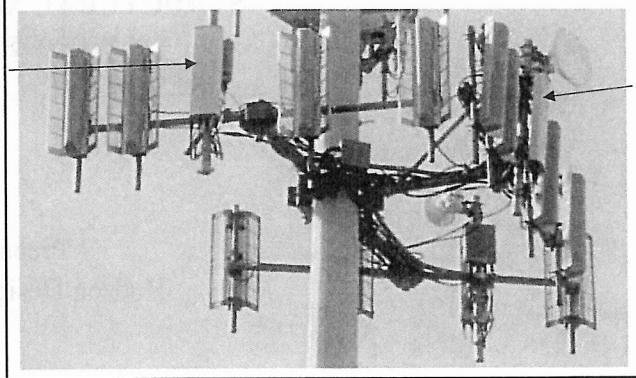
CLIENT:	Centek Engineering	DATE AT SITE:	3/26/2012
SITE (ID):	69 Wheeler Street - 11118 CO10	TOWER TYPE:	18 Sided Monopole
ADDRESS:	69 Wheeler Street	TOWER HEIGHT:	98.0'
	New Haven, CT 06512	WEATHER:	Sun, 50°F, 20-30 mph NW wind
LEAD:	Jeff Ham	SUPPORT:	Ryan Hubert

ANTENNA HEIGHTS TAKEN WITH: TAPE

ANTENNA #: 7 PHOTO #: 69



ANTENNA #: 8 PHOTO #: 69



ANTENNA #: 3 PHOTO #: ##

ANTENNA #: PHOTO #:

ANTENNA #: PHOTO #:

ANTENNA #: PHOTO #:

Antenna #	Elevation (ft.)	Quantity	Appurtenance	Coax	Owner	Azimuth (°)
7	79.0	11	DB844H65E-XY Panels on (3) 12' t-arms	(12) 7/8" TX	Nextel	80/ 250/ 350
8	79.0	3	Argus LLPX310R-V1 Panels with (1) Samsung RHH TMA each on (3) 12' t-arms	(2) 2-3/8" Conduit	Clearwire	80/ 250/ 350

Elevations of panels and dishes are to center line of antenna, all others are to base of antenna.

STRUCTURAL ANALYSIS REPORT
98' MONOPOLE TOWER
NEW HAVEN, CONNECTICUT
prepared for
Hudson Design Group, LLC

EXECUTIVE SUMMARY:

All-Points Technology Corporation, P.C. (APT) performed a structural analysis of this 98-foot monopole tower located in New Haven, Connecticut. The analysis was performed for AT&T Mobility's proposed replacement of nine existing panel antennas currently installed on a 12' mounting platform at 88' with six antennas and associated equipment as detailed below. Waveguide cables are to be three additional 1-5/8" cables installed inside the pole. The analysis assumed that all antennas, mounts and feed lines currently installed at 70' will be removed.

Our analysis indicates the tower meets the requirements of the Connecticut State Building Code with the proposed antenna changes. The tower foundation was evaluated and found to be adequately sized.

INTRODUCTION:

A structural analysis of this communications tower was performed by APT for Hudson Design Group, LLC. The tower is located at 69 Wheeler Street in New Haven, Connecticut.

APT previously visited the tower site on November 21, 2006 to verify satisfactory completion of base plate reinforcement. This analysis also relied on information previously provided by T-Mobile, which included a structural analysis conducted by Tectonic Engineering Consultants dated May 3, 2002, and Engineered Endeavors Incorporated (EEI) design drawings.

The structure is a 98-foot galvanized steel, three section monopole manufactured by EEI. The analysis was conducted for the following antenna inventory (proposed changes in **bold** text):

Antenna	Elev.	Mount	Coax.
(6) DR65-19-00DPQ panels [1]	98'	14' low-profile platform	(12) 1-5/8"
(6) 7750 panels, (6) TMAs, (6) diplexers, (6) RETs [2]	91'	12' platform w/rails	**(12)** 1-5/8"
8' x 2" omnidirectional whip	92'	On above platform	7/8"
(12) DB844G45 panels	80'	(3) 12' T-arms	(12) 1-1/4"

[1] Currently three panel antennas installed.
[2] Currently nine CSS DUO1417-8670 panels installed fed by nine 1-5/8" lines.

Base reactions imposed with the proposed antenna changes were calculated to be as follows:

Compression:	11.5 kips
Total Shear:	11.8 kips
Overturning Moment:	860 ft-kips

CONCLUSIONS AND SUGGESTIONS:

As detailed above, our analysis indicates that the existing 98' monopole tower located at 69 Wheeler Street in New Haven, Connecticut meets the requirements of the Connecticut State Building Code with AT&T Mobility's proposed antenna and associated equipment changes.

LIMITATIONS:

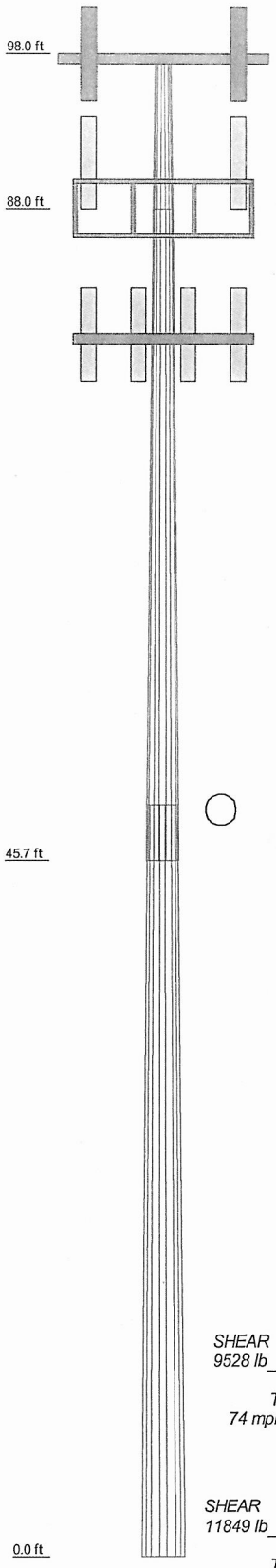
This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in new condition.
3. All bolts are in place and are properly tightened.
4. Tower is in plumb condition.
5. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
6. Record drawings accurately reflect tower dimensions and height.

All-Points Technology Corporation, P.C. (APT) is not responsible for any modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Adding or relocating antennas.
2. Installing antenna mounts or waveguide cables.
3. Reinforcing tower in any manner.
4. Extending tower.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.



Section	1	2	3
Length (ft)	10.00	42.33	49.34
Number of Sides	18	18	18
Thickness (in)	0.1875	0.1875	0.2500
Lap Splice (ft)		3.67	
Top Dia (in)	12.7500	16.5000	24.0349
Bot Dia (in)	16.5000	25.1600	34.0000
Grade	A572-65		
Weight (lb)	292.4	1769.5	3832.2

5894.1

AXIAL 16252 lb
SHEAR 9528 lb
MOMENT 713325 lb-ft
TORQUE 465 lb-ft
74 mph WIND - 0.5000 in ICE

AXIAL 11466 lb
SHEAR 11849 lb
MOMENT 859610 lb-ft
TORQUE 416 lb-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DR65-19-00DPQ	98	(2) LGP21903 Diplexer	88
(2) DR65-19-00DPQ	98	(2) LGP21903 Diplexer	88
(2) DR65-19-00DPQ	98	(2) LGP21903 Diplexer	88
14' low-profile platform	98	(2) 7020.00 RET-RCU	88
8' x 2" omni whip	90	(2) 7020.00 RET-RCU	88
(2) 7750.00	88	(2) 7020.00 RET-RCU	88
(2) 7750.00	88	12' platform w/rails	88
(2) 7750.00	88	(4) DB844G45ZAXY	80
(2) LGP2140X TMA	88	(4) DB844G45ZAXY	80
(2) LGP2140X TMA	88	(4) DB844G45ZAXY	80
(2) LGP2140X TMA	88	12' T-arm	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

All-Points Technology Corporation
P.O. Box 1491
North Conway, NH 03860
Phone: (603) 496-5853
FAX: (603) 356-5214

Job:	***88' EEI Monopole with 10' Extension***		
Project:	***CT198740 New Haven***		
Client: HDG; AT&T Site #2037		Drawn by: Rob Adair	App'd:
Code: TIA/EIA-222-F		Date: 12/10/08	Scale: NTS
Path: C:\Documents and Settings\Rob Adair\My Documents\Job\CT198740 New Haven & Landon\CT198740 New Haven.eri			Dwg No. E-1

HUDSON DESIGN GROUP, LLC
98' MONOPOLE TOWER
NEW HAVEN, CONNECTICUT
AT&T SITE #2037

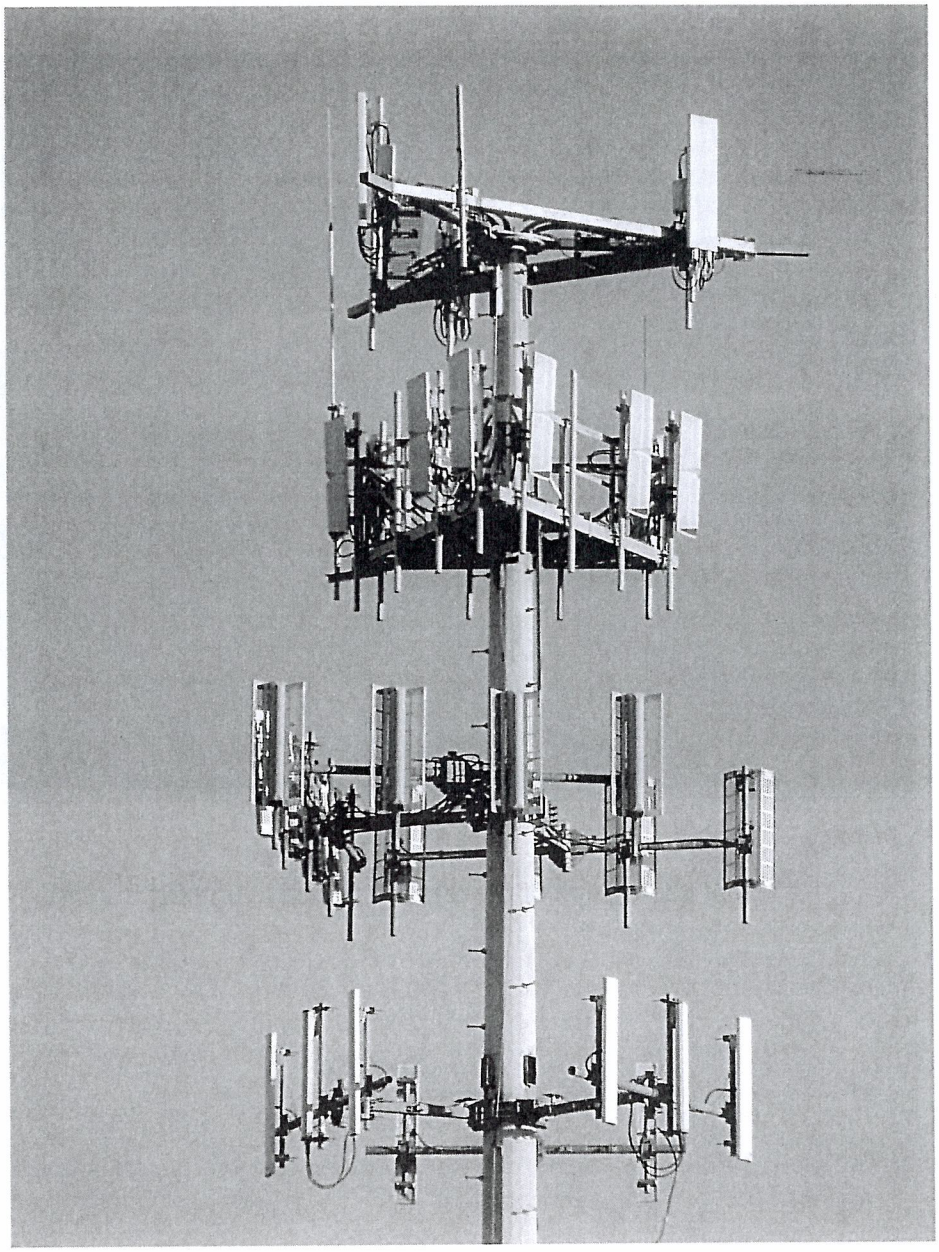


Photo of existing antennas on 98' monopole tower.

Photo taken by All-Points Technology Corporation, P.C. on November 21, 2006

Appendix C

Calculations

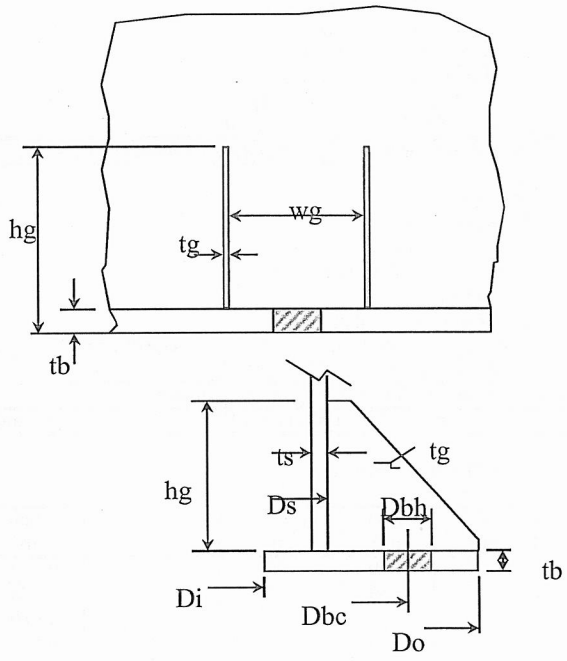
Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) DR65-19-00DPQ	C	From Face	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
14' low-profile platform	C	None		0.0000	98.00	No Ice 1/2" Ice	9.80 10.93	8.49 9.47	1200.00 2063.51
8' x 2" omni whip	A	From Leg	5.00 0.00 2.00	0.0000	90.00	No Ice 1/2" Ice	1.60 2.42	1.60 2.42	50.00 62.45
(2) 7750.00	A	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	6.10 6.54	3.06 3.42	40.00 73.74
(2) 7750.00	B	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	6.10 6.54	3.06 3.42	40.00 73.74
(2) 7750.00	C	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	6.10 6.54	3.06 3.42	40.00 73.74
(2) LGP2140X TMA	A	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	1.26 1.42	0.38 0.49	20.00 27.13
(2) LGP2140X TMA	C	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	1.26 1.42	0.38 0.49	20.00 27.13
(2) LGP2140X TMA	C	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	1.26 1.42	0.38 0.49	20.00 27.13
(2) LGP21903 Diplexer	A	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	6.00 8.41
(2) LGP21903 Diplexer	B	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	6.00 8.41
(2) LGP21903 Diplexer	C	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	6.00 8.41
(2) 7020.00 RET-RCU	A	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	5.00 7.94
(2) 7020.00 RET-RCU	B	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	5.00 7.94
(2) 7020.00 RET-RCU	C	From Leg	5.00 0.00 3.00	0.0000	88.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	5.00 7.94
12' platform w/rails	C	None		0.0000	88.00	No Ice 1/2" Ice	12.60 13.60	10.91 11.78	1300.00 1969.34
(4) DB844G45ZAXY	A	From Leg	4.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	7.00 7.41	3.97 4.34	21.00 64.04
(4) DB844G45ZAXY	B	From Leg	4.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	7.00 7.41	3.97 4.34	21.00 64.04
(4) DB844G45ZAXY	C	From Leg	4.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	7.00 7.41	3.97 4.34	21.00 64.04
12' T-arm	C	None		0.0000	80.00	No Ice 1/2" Ice	3.20 4.03	3.20 4.03	250.00 814.57

All-Points Technology Corp., P.C.
P.O. Box 1491
North Conway, NH 03860
(603) 496-5853

Client: **HDG for AT&T**
Job: **New Haven, CT**
Calculated By: **R. Adair**

Site No.: **2037**
APT Job No.: **CT198740**
Date: **10-Dec-08**

General Parameters			
Ds	Diameter of Skirt	34.0	in
Do	Outer Diameter of Base Ring	48.0	in
Di	Inner Diameter of Base Ring	24.0	in
Dbc	Bolt Circle Diameter	42.0	in
Dbolt	Nominal Bolt Diameter	2.25	in
Nbolt	Number of Bolts	6	
Dbh	Diameter of Bolt Hole	2.3750	in
Loadings			
OTM	Overturning Moment	859,610	ft-lbs
V	Vertical Load (+ is Compressive)	11,849	lbs
Material Properties			
Es	Modulus of Elasticity of Steel	29,000,000	psi
Ec	Modulus of Easticity of Concrete	3,000,000	psi
u	Poissons Ratio for Steel	0.30	
Fc(ult)	Ultimate Compressive Strength	4,000	psi
Fc(allow)	Allowable Compressive Strength	4,000	psi
Fbolt	Allowable Bolt Stress	75,000	psi
Fy	Yield Stress of Top & Bottom Plates	60,000	psi
Increase	Increase for Wind or Seismic?	1.33	
Fb	Allow Bending Stress (Fy*0.6)	47,880	psi
Gusset Dimensions			
Ngus	# of Gussets per bolt (0, 1, or 2)	2	
wg	Gusset Spacing	11	in
hg	Height of Gusset	18	in
Program Output			
tb	Minimum Base Plate Thickness	1.462	in
tg	Minimum Gusset Thickness	1.133	in
Bolting	Actual Load/ Allowable Load	0.535	OK
Concrete	Actual Load / Allowable Load	0.427	OK



Calculated Parameters			
n	Es / Ec	9.66666667	
Aroot	Root area of Bolt	3.02	in^2
tt1	Nbolt*Aroot/(3.14159*Dbc)	0.137	in
tt3	(Do-Di)/2	12.0	in
tt2	tt3-tt1	11.863	in

Iteratively Solve for Compressive and Tensile Loads on Compression Plate*									
Iteration #	k	Cc	Ct	z	j	fc psi	fs psi	Ft lbs	Fc lbs
1	0.340	1.614	2.354	0.429	0.783	4,000	75,000	307,329	319,178
2	0.132	0.979	2.813	0.473	0.769	714	45,263	312,001	323,850
3	0.231	1.312	2.593	0.452	0.778	1,194	38,463	308,857	320,706
4	0.171	1.121	2.725	0.465	0.773	883	41,300	310,554	322,403
5	0.203	1.226	2.655	0.458	0.776	1,039	39,519	309,437	321,286
6	0.185	1.166	2.695	0.462	0.774	946	40,409	310,059	321,908
7	0.195	1.200	2.673	0.460	0.775	997	39,890	309,690	321,539
8	0.189	1.180	2.686	0.461	0.775	968	40,173	309,901	321,750
9	0.192	1.191	2.679	0.461	0.775	984	40,011	309,782	321,631
10	0.190	1.185	2.683	0.461	0.775	975	40,103	309,849	321,698

All-Points Technology Corp., P.C.
P.O. Box 1491
North Conway, NH 03860
(603) 496-5853

Client:	**Hudson Design Group, LLC**	Site No.:	**2037**
Job:	**New Haven**	Job No.:	**CT198740**
Calculated By:	**R. Adair**	Date:	**10-Dec-08**

Program assumes:

Mat is square in plan view.
Water table is below bottom of mat.

Unit weight of concrete =	150 pcf
Unit weight of soil =	100 pcf

Information to be provided:

Pier is round or square in plan dimension ("R" or "S")	Shape =	s
OTM = Overturning Moment to be resisted	OTM =	860 ft-kips
P = Download reaction	P =	28.6 kips
V = Shear reaction	V =	11.8 kips
H = Height from ground surface to top of mat (if buried)	H =	1.0 ft.
P_M = Projection of pier above mat	P_M =	2.0 ft.
y = Thickness of mat	y =	3.25 ft.
x = Width of mat	x =	21.63 ft.
d = Diameter of round pier	d =	0.0 ft.
s = Size of square pier	s =	6.0 ft.
Mass of tower and appurtenances (below)		

Results:

Component	Mass	Moment Arm	Moment Resist.
Pier	10.8 kips	10.81665 ft.	116.8 ft-kips
Overburden	45.8 kips	10.81665 ft.	495.0 ft-kips
Mat	228.2 kips	10.81665 ft.	2467.8 ft-kips
Tower Dead Load	kips	10.81665 ft.	0.0 ft-kips
Antenna Dead Load	kips	10.81665 ft.	0.0 ft-kips

Overturning Moment Resistance :	3079.64 ft-kips	
Factor of Safety =	3.34	SATISFACTORY
Concrete Quantity =	60.3 c.y.	

WIRELESS COMMUNICATIONS FACILITY

CT2037

NEW HAVEN - WHEELER STREET

69 WHEELER ST

NEW HAVEN, CT 06512

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT **TO:** 69 WHEELER ST, NEW HAVEN, CT 06512

1. Take ramp left for I-91 South	29.0 mi
1. Take ramp left for I-95 North toward New London	1.3 mi
2. At exit 50, take ramp right for Woodward Ave toward Lighthouse Pt.	0.3 mi
3. Turn right onto ramp	0.2 mi
4. Turn right onto ramp	0.1 mi
5. Keep straight onto Alba St	0.2 mi
6. Turn right onto Stiles St	0.3 mi
7. Road name changes to Wheeler St	
8. Arrive at 69 WHEELER ST,NEW HAVEN, CT 06512	

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2005 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO "EXTRA" WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

VICINITY MAP

SCALE: 1" = 1000'

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY CONSISTS OF THE REPLACEMENT OF THE EXISTING ANTENNA PLATFORM. THE REPLACEMENT OF (3) OF THE (6) EXISTING PANEL ANTENNAS AND THE INSTALLATION OF ONE (1) LTE ANTENNA PER SECTOR FOR A TOTAL OF (3) LTE ANTENNAS TO THE EXISTING AT&T ANTENNA ARRAY. AN LTE BASEBAND EQUIPMENT UNIT (RBS) WILL BE INSTALLED WITHIN THE EXISTING AT&T EQUIPMENT SHELTER.
2. ADDITIONALLY, (2) REMOTE RADIO UNITS (RRUs) PER SECTOR WILL BE INSTALLED. SURGE ARRESTORS WILL BE INSTALLED AT BOTH AT&T RRU AND EQUIPMENT LOCATIONS.
3. STRUCTURAL MODIFICATIONS TO THE EXISTING MONOPOLE TOWER WILL BE REQUIRED PRIOR TO INSTALLATION OF ANY ADDITIONAL TOWER LOADING.
4. REFER TO THE ACCOMPANYING DRAWINGS FOR FURTHER INFORMATION.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2037
AT&T SITE NAME:	NEW HAVEN – WHEELER STREET
SITE ADDRESS:	69 WHEELER ST. NEW HAVEN, CT 06512
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-17'-45.5"N LONGITUDE: 72°-53'-52.5"W GROUND ELEVATION: ±09' AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	DESIGN BASIS, SPECIFICATIONS AND DETAIL	1
C-1	PLANS AND ELEVATION	1
C-2	LTE EQUIPMENT DETAILS	1
E-1	ELECTRICAL DETAILS AND NOTES	1
E-2	ELECTRICAL DETAILS	1

DESIGNED BY:	DEU
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY
1	5/3/12	FLO	CFC

CONSTRUCTION – CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
69 WHEELER ST.
NEW HAVEN, CT 06512

DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

TITLE SHEET

T-1

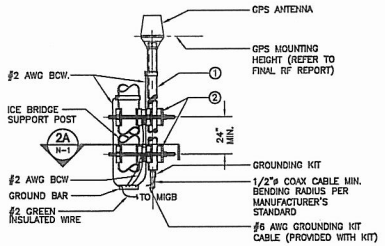
Sheet No. 1 of 11

BILL OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY
①	2-1/2"ø SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
②	UNIVERSAL CLAMP SET.	2

2A / N-1 PLAN VIEW
NOT TO SCALE

NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND COORDINATED WITH AT&T CONSTRUCTION MANAGER.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. ATTACH TO ICE BRIDGE POST NEAREST ANTENNA CABLE PORT AT EQUIPMENT.
4. PRIOR TO INSTALLATION CONTRACTOR SHALL TEST GPS LOCATION WITH HAND HELD AND MOVE GPS ANTENNA TO OTHER ICE BRIDGE POSTS AS REQUIRED TO ACHIEVE ADEQUATE SIGNAL. FAILURE TO ACHIEVE ADEQUATE SIGNAL WITH A HAND HELD GPS SHALL BE REPORTED TO CONSTRUCTION MANAGER AND ENGINEER TO DETERMINE ALTERNATE INSTALLATION LOCATION FOR GPS ANTENNA.



GPS ANTENNA MOUNTING BRACKET

1 / N-1 GPS GROUNDING/MOUNTING BRACKET DETAILS
NOT TO SCALE

STRUCTURAL SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:
   - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 90 MPH (FASTEST MILE), EQUIVALENT TO 110 MPH (3 SECOND GUST).
   - BASIC WIND SPEED (OTHER STRUCTURE): 110 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
   - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   - E. PIPE---ASTM A53 (FY = 35 KSI)
   - F. CONNECTION BOLTS---ASTM A325-N
   - G. U-BOLTS---ASTM A36
   - H. ANCHOR RODS---ASTM F 1554
   - I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
11. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
13. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
14. CONNECTIONS SHALL CONFORM TO ALL REQUIREMENTS OF THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR SHELTERS", LATEST EDITION, AND THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", LATEST EDITION.
15. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
16. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
17. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
18. FABRICATE BEAMS WITH MILL CAMBER UP.
19. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
20. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
21. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
22. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

DESIGNED BY:	DEB
DRAWN BY:	DEB
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	5/5/12	DEB	CFC	CONSTRUCTION
0	2/17/12	FLO	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

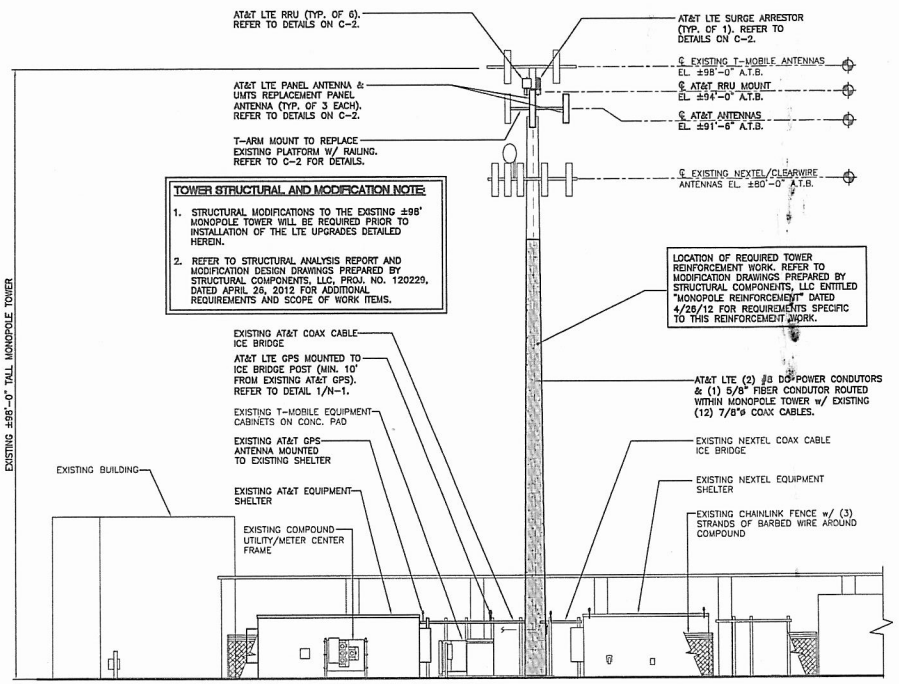
CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
60 WHEELER ST.
NEW HAVEN, CT 06512

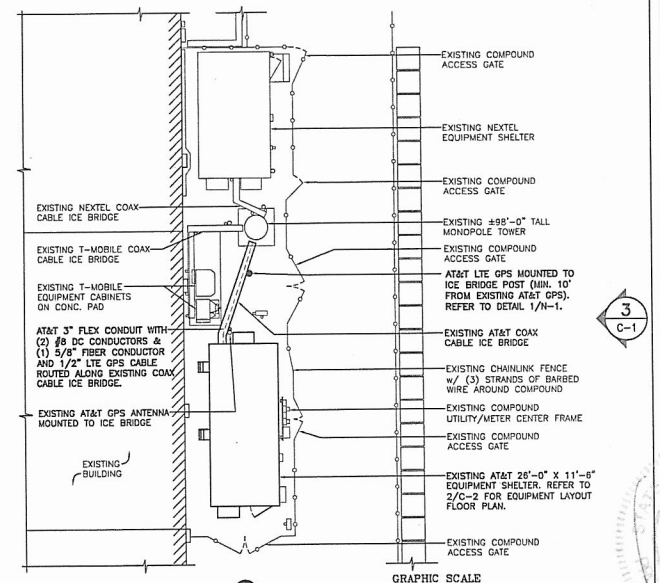
DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

DESIGN BASIS, SPECIFICATIONS AND DETAIL

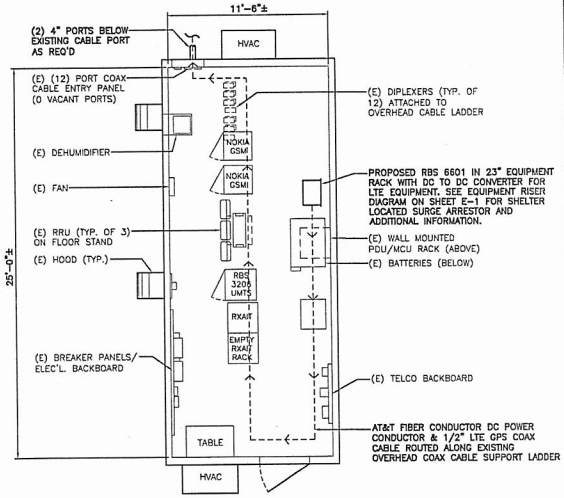
N-1



3 C-1 **SOUTH-WEST ELEVATION**
SCALE: 1" = 10'



1 C-1 **COMPOUND PLAN**
SCALE: 1" = 10'
APPROX. NORTH



2 C-1 **EQUIPMENT SHELTER FLOOR PLAN**
SCALE: 1/4" = 1'-0"
APPROX. NORTH

DESIGNED BY:	DEB
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	5/5/12	DEB	CFC	CONSTRUCTION
0	3/19/12	FLO	DEB	CONSTRUCTION – CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

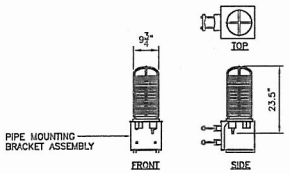
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
69 WHEELER ST.
NEW HAVEN, CT 06512

DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

PLANS AND ELEVATION

C-1

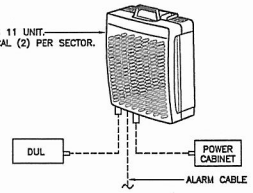
Sheet No. 3 of 6



SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

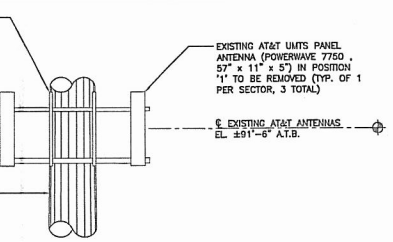
9 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



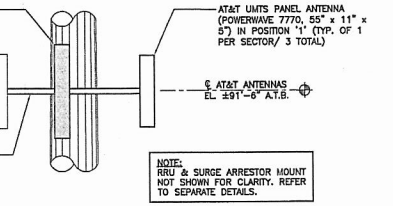
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERRICSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

8 / C-2 RRU DETAIL
NOT TO SCALE

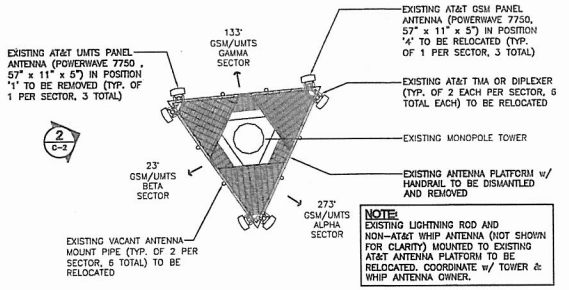


2 / C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



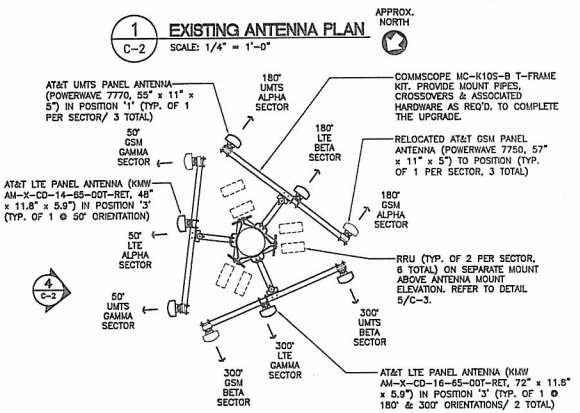
4 / C-2 PROPOSED ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"

NOTES:
1. COORDINATE TMA & DIPLEXER REQUIREMENTS FOR GSM & UMTS ANTENNAS WITH FINAL AT&T RFDS REPORT.
2. PROVIDE MOUNTING PIPES, CROSSOVERS & ASSOCIATED HARDWARE TO COMPLETE THE PROPOSED UPGRADE.
3. REFER TO STRUCTURAL ANALYSIS AND FINAL AT&T RFDS PRIOR TO INSTALLATION OF ANTENNAS AND CABLES.

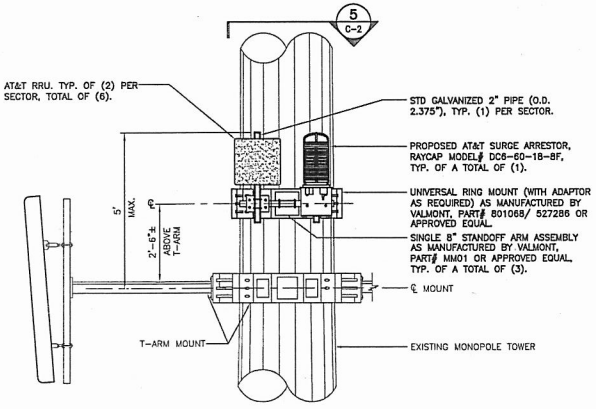


NOTE:
EXISTING LIGHTNING ROD AND NON-AT&T WHIP ANTENNA (NOT SHOWN FOR CLARITY) MOUNTED TO EXISTING AT&T ANTENNA PLATFORM TO BE RELOCATED. COORDINATE w/ TOWER & WHIP ANTENNA OWNER.

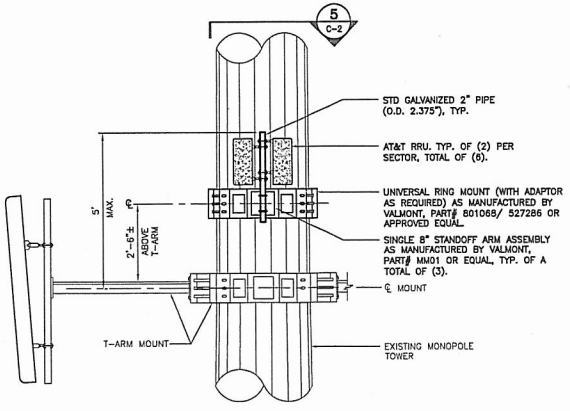
1 / C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"



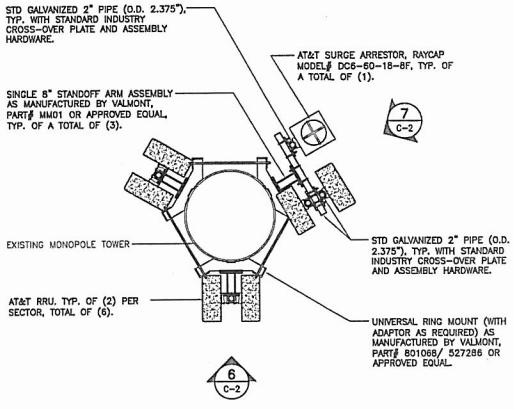
3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"



7 / C-2 RRU AND SURGE ARRESTOR MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"



6 / C-2 RRU MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"



5 / C-2 RRU AND SURGE ARRESTOR MOUNTING PLAN
SCALE: 1/2" = 1'- 0"

DESIGNED BY:	DEB
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE:	DRAWN BY	CHK'D BY	
1	5/5/13	DEB	CFC	CONSTRUCTION
0	2/17/12	FLO	DEB	CONSTRUCTION – CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

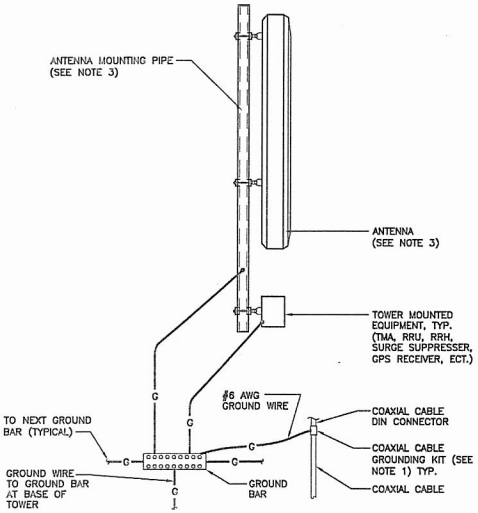
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY, LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
69 WHEELER ST.
NEW HAVEN, CT 06512

DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

EQUIPMENT LTE DETAILS

C-2

Sheet No. 4 of 6

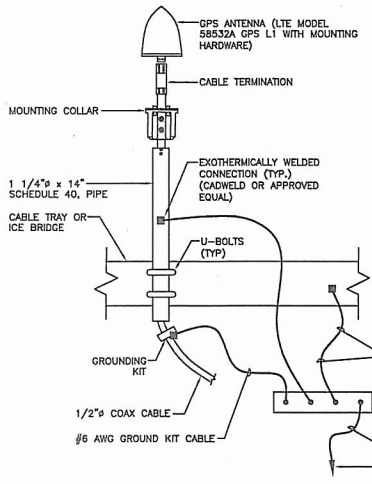


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

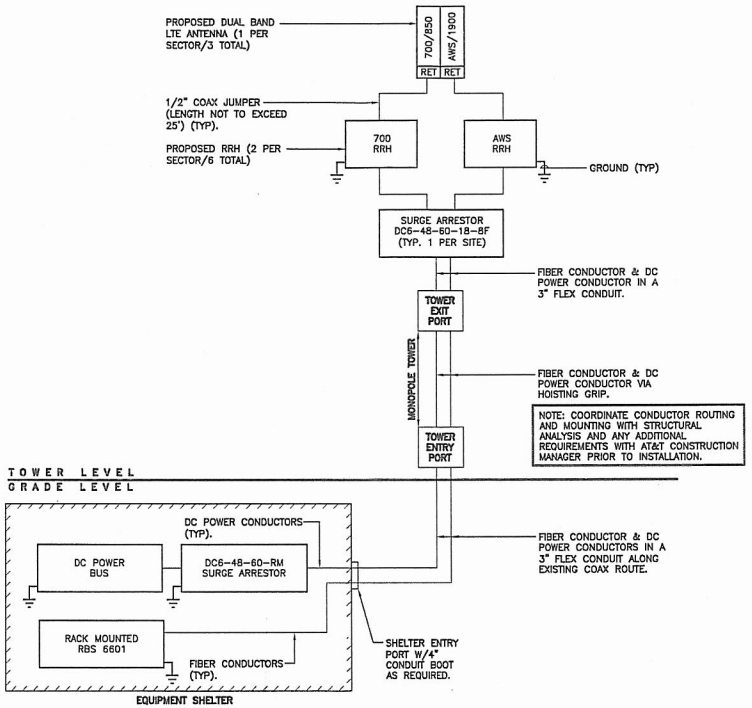


NOTE:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. ANTENNA MUST BE INSTALLED WITH UNOBSTRUCTED EXPOSURE TO SOUTHWESTERN SKY. VERIFY SATELLITE VISIBILITY WITH HANDHELD GPS AND RF ENGINEER PRIOR TO INSTALLATION.

3 E-1 GPS MOUNTED TO CABLE TRAY / ICE BRIDGE

NOT TO SCALE



NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURERS RECOMMENDATIONS.

2 E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

DESIGNED BY:	CKO
DRAWN BY:	TJB
CHK'D BY:	CKO

REV.	DATE	DRAWN BY	CHK'D BY	
0	2/17/12	TJO	DEB	CONSTRUCTION
1	5/3/12	DEB	CFC	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

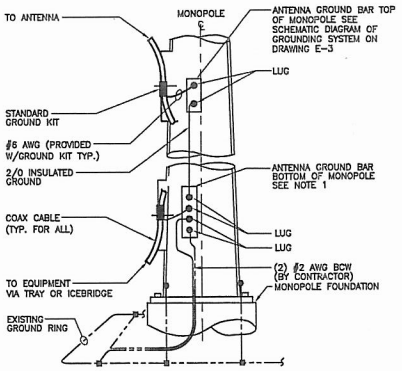
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
60 WHEELER ST.
NEW HAVEN, CT 06512

DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

ELECTRICAL DETAILS AND NOTES

E-1

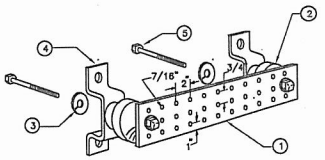
Sheet No. 5 of 8



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

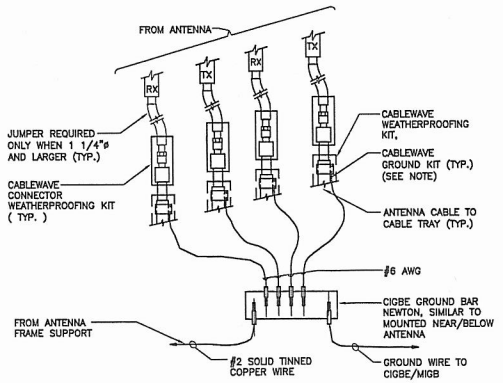
1 / E-2 **ANTENNA CABLE GROUNDING - MONOPOLE**
NOT TO SCALE



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-B.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

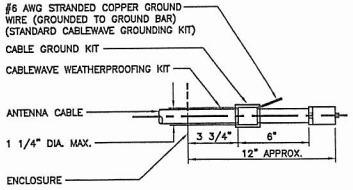
2 / E-2 **GROUND BAR DETAIL**
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

3 / E-2 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 / E-2 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE

DESIGNED BY:	CKD
DRAWN BY:	TJB
CHK'D BY:	CKD

REV.	DATE	DRAWN BY	CHK'D BY
1	5/3/12	EJD	CKD
0	2/13/12	EJD	CKD

CONSTRUCTION
CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2037
NEW HAVEN - WHEELER ST.
69 WHEELER ST.
NEW HAVEN, CT 06512

DATE:	02/13/12
SCALE:	AS NOTED
JOB NO.	11118.C010

ELECTRICAL DETAILS

E-2

Sheet No. 8 of 8

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

at&t

CT2037

(New Haven Wheeler Street)

69 Wheeler Street, New Haven, CT 06512

May 4, 2012

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antennas mounted on the monopole tower located at 69 Wheeler Street in East Haven, CT. The coordinates of the tower are 41-17-45.47 N, 72-53-52.55 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Nextel	80	851	24	100	0.1348	0.5673	23.77%
Clearwire	68	2496	2	153	0.0238	1.0000	2.38%
Clearwire	68	11000	1	211	0.0164	1.0000	1.64%
T-Mobile UMTS	98	2100	2	770	0.0577	1.0000	5.77%
T-Mobile GSM	98	1945	8	164	0.0491	1.0000	4.91%
AT&T UMTS	91.5	880	2	565	0.0049	0.5867	0.83%
AT&T UMTS	91.5	1900	2	875	0.0075	1.0000	0.75%
AT&T LTE	91.5	750	1	1117	0.0048	0.5000	0.96%
AT&T GSM	91.5	880	1	296	0.0013	0.5867	0.22%
AT&T GSM	91.5	1900	4	525	0.0090	1.0000	0.90%
						Total	**42.12%**

Table 1: Carrier Information[1] [2] [3]

[1] The existing CSC filing for AT&T should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the Structural Components structural analysis report dated 4/26/2012.

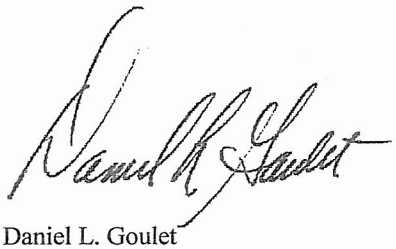
5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **42.12% of the FCC limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



May 4, 2012

Daniel L. Goulet
C Squared Systems, LLC

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

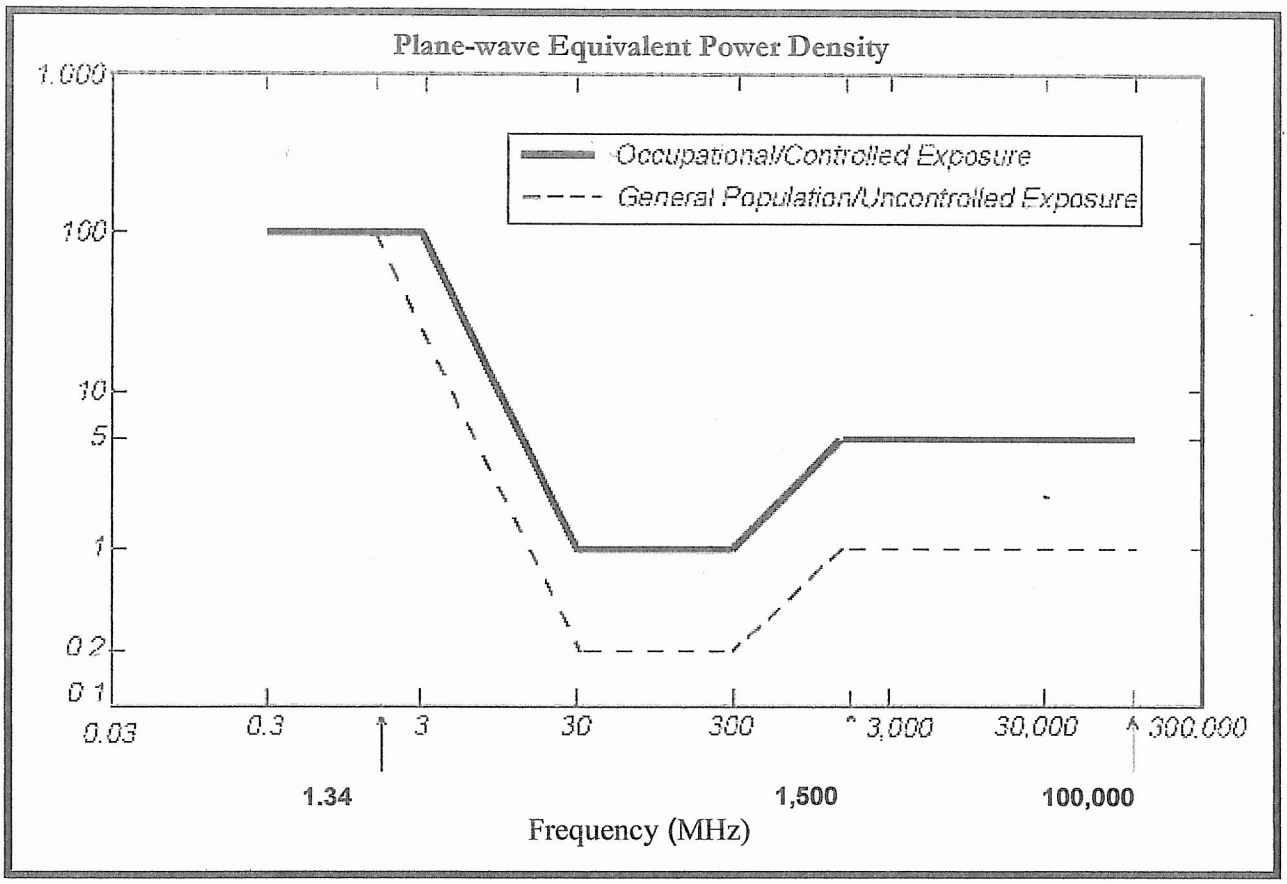
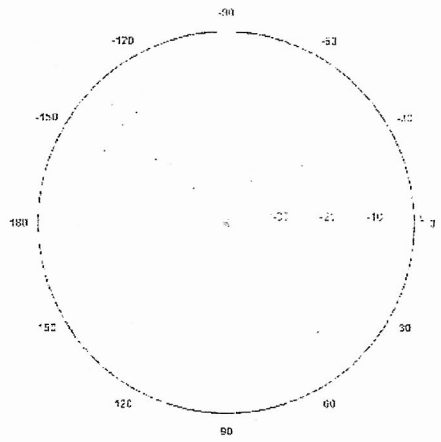


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T's Antenna Model Data Sheets and Electrical Patterns

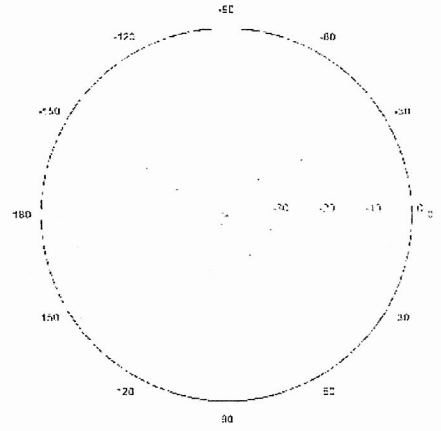
700 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	698-894 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Slant ±45°
Size L x W x D:	72.0" x 11.8" x 5.9"



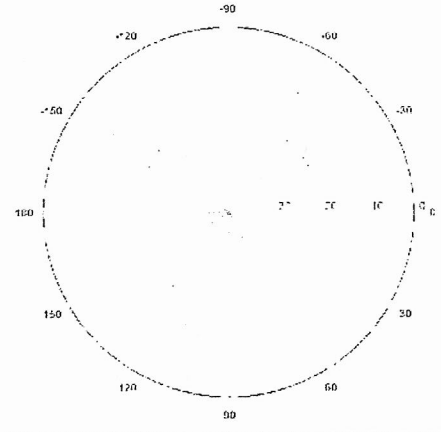
850 MHz

Manufacturer:	Powerwave
Model #:	7750.00
Frequency Band:	824-896 MHz
Gain:	12.5 dBd
Vertical Beamwidth:	14.9°
Horizontal Beamwidth:	69°
Polarization:	Dual Linear ±45°
Size L x W x D:	63.0" x 11.0" x 4.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7750.00
Frequency Band:	1850-1990 MHz
Gain:	15.6 dBd
Vertical Beamwidth:	6.6°
Horizontal Beamwidth:	65°
Polarization:	Dual Linear ±45°
Size L x W x D:	63.0" x 11.0" x 4.0"



EMPIRE
telecom

February 27, 2015

Mr. John Igoe
American Tower
10 Presidential Way
Woburn, MA 01801

Dear Mr. Igoe:

This letter is to inform you that an application for modification to the cell tower located at 159 Weingart Road, Harwinton CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Mr. Michael Criss
First Selectman, Town of Harwinton

EMPIRE
telecom

March 3, 2015

Mr. Edward F. Jaconette, Jr.
Ms. Kristen L. Jaconette
405 Brushy Plain Road
Branford, CT 06405

Dear Mr. and Ms. Jaconette:

This letter is to inform you that an application for modification to the cell tower located at 405 Brushy Plain Road, Branford CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Mayor, James B. Cosgrove, Town of Branford
Mr. Jose Giner, Director, Planning and Zoning Town of Branford
Mr. John Igoe, American Tower

EMPIRE
telecom

February 27, 2015

Candid Associates, LLC
110 Washington Avenue
North Haven, CT 06473

To Whom It May Concern:

This letter is to inform you that an application for modification to the cell site located at 125 Washington Avenue, North Haven, CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Michael Freda
First Selectman, Town of North Haven

EMPIRE telecom

February 27, 2015

Mr. Stephen B. Tripp
23 Wayne Road
Wallingford, CT 06492

Dear Mr. Tripp:

This letter is to inform you that an application for modification to the cell site located at 23 Wayne Road, Wallingford CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: William W. Dickinson, Mayor, Town of Walllingford
Kacie Costello, Town Planner

EMPIRE
telecom

March 3, 2015

Mr. Charles Dunn
69 Wheeler Street
New Haven, CT 06512

Dear Mr Dunn:

This letter is to inform you that an application for modification to the cell tower located at 69 Wheeler Street, New Haven, CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Toni Harp, Mayor, City of New Haven
Ms. Karyn Gilvarg, A.I.A. Executive Director, City of New Haven