Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

June 3, 2016

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

RE: **Tower Share Application for EyeTower Crown Site BU: 806372**
EyeTower Site ID: BDL200
266R Center Street, Manchester, CT 06040
Latitude: 41° 46' 19.0"/ Longitude: -72° 31' 48.8"

Dear Ms. Bachman:

EyeTower is applying for tower share to add five (5) antennas and five (5) lines of coax to the existing 115-foot monopole tower at 266R Center Street in Manchester, CT. The antennas will be installed at the 91-foot, 89-foot, and 84-foot level of the 115-foot tower. The tower and property is owned by Crown Castle. Eyetower also intends to perform ground work in the form of adding a 9'x 9' pad with a 6' x 6' building for equipment.

This facility was approved by the by the Connecticut Siting Council on August 24, 1990 in Docket No. 129. There were no conditions listed in this approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 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.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mr. Scott Shanley, General Manager, Town of Manchester, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mr. Scott Shanley, General Manager
Town of Manchester
41 Center Street PO Box 191
Manchester, CT 06045-0191

BH
B1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

August 24, 1990

Mr. David S. Malko
Manager, Engineering and Regulatory Services
Metro Mobile
50 Rockland Road
South Norwalk, CT 06854

RE: DOCKET NO. 129 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone tower and associated equipment in the Town of Manchester, Connecticut.

Dear Mr. Malko:

On August 22, 1990, the Siting Council considered and approved all remaining sections of the Development and Management Plan (D&M) for this cellular telephone tower and associated equipment in the Town of Manchester, Connecticut. This decision confirms use of barbed wire on the security fence surrounding the cellular site that was approved by the Council by its Decision and Order on March 12, 1990.

This approval applies only to the D&M plan submitted for the Manchester site. Modifications to this D&M Plan require advance Council notification and approval. Please notify the Council when construction is completed.

Enclosed for your use is a copy of the Staff Report regarding the D&M Plan.

Very truly yours,

Gloria Dibble Pond

Gloria Dibble Pond
Chairperson

SMH/smh

enclosure

4706-2

METRO MOBILE

July 20, 1990

Connecticut Siting Council
136 Main Street
Suite 401
New Britain, CT 06051

Attention: Joel M. Rinebold, Executive Director

Re: Docket No. 129 - Metro Mobile CTS of Hartford, Inc.
Manchester Cell Site

Dear Mr. Rinebold:

Metro Mobile CTS of Hartford, Inc. ("Metro Mobile") has submitted a proposed D&M Plan in the above-referenced proceeding and has received comments on it from the Town of Manchester and the Council.

Metro Mobile intends to construct an eight foot security fence around the facility with three strands of barbed wire on top. One of the comments received addresses the potential restriction on the use of barbed wire in constructing a fence at the proposed facility under Section 47-47 of the Connecticut General Statutes. This communication sets forth Metro Mobile's position that Metro Mobile is unaffected by said provision, as well as the Company's arguments in support of its position that the fencing plans already submitted are within State laws.

The provision of interest is Section 47-47 of the Connecticut General Statutes, which reads, in relevant part, as follows:

> Barbed wire between adjoining premises or enclosing grounds of public buildings. No person shall use barbed wire in the construction of fences or have barbed wire upon existing fences between his own premises and those of an adjoining proprietor, within twenty-five rods of any house or barn belonging to such proprietor, unless either premises are used in connection with raising livestock, without first obtaining his written consent . . . .

50 Rockland Road • South Norwalk, CT 06854 • (203) 852-9292

A. THE SITING COUNCIL'S JURISDICTION SUPERSEDES THE RESTRICTIONS IMPOSED BY C.G.S. SECTION 16-50x.

The Connecticut Siting Council was created with the express purpose of considering applications for the construction, operation, and maintenance of certain types of facilities within the state,including the proposed Manchester facility. The Council's jurisdiction overrides select state and local laws which would otherwise place restrictions on such activities. Section 16-50x of the C.G.S. contains the override language, as follows:

> (a) Notwithstanding any other provision of the general statutes to the contrary, except as provided in Section 16-243, the council shall have exclusive jurisdiction over the location and type of facilities and over the location and type of modifications of facilities subject to the provisions of subsection (d) of this section. (emphasis added)

It should be noted that neither Section 16-243 nor subsection (d) of Section 16-50x modifies the applicability of the section quoted above with respect to the proposed Metro Mobile facility.

Whether the proposed facility uses barbed wire is an issue as to the type of facility to be constructed. Thus, it falls within the exclusive jurisdiction of the Council and cannot be affected by other statutes or local regulations.

B. EVEN IF THE COUNCIL'S JURISDICTION DOES NOT SUPERSEDE SECTION 47-47, METRO MOBILE'S PROPOSED FACILITY WILL NOT COME WITHIN THE AMBIT OF THAT PROVISION.

As set forth above, Metro Mobile's position is that the Council's jurisdiction supersedes the provisions of Section 47-47, and that the statute is therefore inapplicable to Metro Mobile at the Manchester facility certificated by the Council. If, however, the Council concludes that its jurisdiction does not supersede the statute, Metro Mobile contends that the provisions of the statute are inapplicable to Metro Mobile for the following reasons.

1. Proposed Fence Not Between Proprietors

The statute prohibits the use of barbed wire ". . . between his own premises and those of an adjoining proprietor . . . ." In Manchester, Metro Mobile's proposed facility will not border two separate land parcels except on the east and southwest sides (see page 5 of Tab 1 in the Metro Mobile Application for the Manchester Site, Siting Council Docket No. 129).

On the north side of Metro Mobile's facility, the proposed barbed wire will not be between two adjoining proprietors, since Metro Mobile facility is located on a portion of a parcel owned by S. Mark Stephens.

2. No Houses or Barns Located on Adjacent Property

The statute prohibits the use of barbed wire ". . . within twenty-five rods of any house or barn belonging to such proprietor . . . ." On the east side of the Metro Mobile facility, there is a strip of land owned by Kenneth C. Burkamp over which the Consolidated Rail Corporation at one time had an easement to operate a railway. There are no houses or barns located on this parcel, and therefore the prohibition cannot apply to Metro Mobile with respect to this parcel.

Similarly, the southwest side of the Metro Mobile facility is bordered by a parcel owned by Kenneth C. Burkamp. There are no houses or barns located on this parcel. The prohibition stated in the barbed wire statute therefore cannot apply to Metro Mobile with respect to this parcel.

Thus, even if the Council finds that its jurisdiction does not supersede the provisions of Section 47-47 of the C.G.S., those provisions do not apply to Metro Mobile in this case.

Respectfully yours,

David S. Malko DSS

David S. Malko, P.E.
Manager, Engineering and Regulatory Services

DSM:mb

cc: Service List Docket 129

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

June 22, 1990

Metro Mobile CTS of Hartford, Inc.
100 Corporate Drive
Windsor, CT. 06095
Attn: Gary N. Shulman
Vice Pres. & Gen. Mgr.

DOCKET NO. 129 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone tower and associated equipment in the Town of Manchester, Connecticut.

Dear Mr. Shulman:

At a meeting of the Connecticut Siting Council (Council) on June 18, 1990, the Council considered and approved the Development and Management (D&M) Plan for the Manchester facility except for the subject of fencing to be reserved for final approval by the Council at a later date. Pursuant to Connecticut General Statutes Section 47-47, it states that no barbed wire is permitted on an existing or newly constructed fence. Enclosed for your reference is a copy of the staff report for this D&M Plan.

This approval applies only to the Manchester facility. Modifications to this D&M Plan require advance Council notification and approval. The Council awaits your submission of fencing plans, within State laws, that would meet Metro Mobile's needs and the Town of Manchester's requirements.

Very truly yours,

Gloria Dibble Pond /s

Gloria Dibble Pond
GDP:SJM:fc

Enclosures (3)

cc: Parties of Record
Council Members

4442E-5

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

DOCKET NO. 129
METRO MOBILE CTS OF HARTFORD, INC.
D&M PLAN MANCHESTER CELL SITE - MAY 21, 1990

On May 15, 1990, Metro Mobile CTS of Hartford, Inc. submitted to the Connecticut Siting Council a D&M Plan for its Manchester cell site. The plan includes construction of a 128 foot tower including antennas, at a total height of 324 feet above mean sea level, and a 14-foot by 40-foot equipment building surrounded by an eight foot security fence. In addition, Metro Mobile would remove an existing one story wood building from the site. In accordance with Regulations of State Agencies Section 16-50j-77, Metro Mobile has notified the Council of its intention to begin access work and clearing, to be followed immediately by the construction of the tower and associated equipment upon approval of the D&M Plan by the Council.

The existing site is flat, paved, and surrounded by buildings and railroad tracks. All areas disturbed by construction will be repaved. The right-of-way from Pine Street over the existing parking lot will be maintained, and all new pavement will meet the minimum specifications required by the Town.

Metro Mobile proposes to construct the tower foundation and the building foundation as per manufacturer specifications, soil test boring logs, and detailed engineering. Underground grounding will be installed as per Metro Mobile's specifications. The tower has been moved within the site as far east as possible to separate the fall zone of the tower from a residence located southwest of the tower site.

In preparation of the D&M Plan, Metro Mobile consulted with the Town of Manchester pursuant to the Council's Decision and Order. The Manchester Zoning Enforcement Officer recommended installation of erosion controls prior to the disturbance of the site. Metro Mobile will abide by this recommendation through the installation and maintenance of approximately 85 linear feet of hay bales located along the west perimeter of the site. The Town of Manchester has also provided comments requesting provisions for landscaping, delineation of areas to be paved, details regarding modifications to the drainage

pattern, removal of barbed wire from the security fence, maintenance of the right-of-way, and installation of a driveway apron on Pine Street. Metro Mobile has responded indicating that it does not believe landscaping is appropriate or necessary, that all disturbed areas will be repaved, that drainage patterns will not be affected, that barbed wire on the security fence is necessary to provide security for its equipment, that the right-of-way will be maintained, and that the apron onto Pine Street will not be modified, but if it is, it will be restored as per Town requirements.

Staff recommends the approval of Town recommendations regarding erosion control, paving, and right-of-way maintenance. In addition, if dewatering is to be performed during site construction, the certificate holder must be prepared for proper disposal of water from dewatering operations.

No staff recommendations regarding site landscaping and the use of barbed wire in the security fence are made.

All other orders and provisions regarding the D&M Plan have been complied with.

JMR:bw

4442E

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

DOCKET NO. 129
METRO MOBILE CTS OF HARTFORD, INC.
D&M PLAN MANCHESTER CELL SITE
June 18, 1990
Addendum

On Thursday, June 14, 1990, Brian Emerick of the Connecticut Siting Council (Council) and Fred Cunliffe of the Council staff met with David Malko of Metro Mobile and Stuart Popper of the Town of Manchester at the site of a telecommunications tower and building on Pine Street in Manchester, Connecticut.

The Town of Manchester recommends landscaping along the north and east sides of the leased parcel. White Pine or hemlock were perferred by the town. The town requests that the plantings be a minimum of four feet in height and four feet on center as required by town regulations. Metro Mobile would be willing to move the building and north-side of the fence several feet to the south and move the gate closer to the building to accommodate these plantings.

The town has requested that barbed wire not be used on the fence and have stated that the use of barbed wire on the fence is potentially inconsistent with Connecticut General Statutes section 47-47. No recommendations were made by the town or applicant for alternate fencing but Metro Mobile contends that security must be maintained.

Fred Cunliffe
Siting Analyst
4442E-4

Sec. 47-46a. Payment for fence between agricultural property and property in control of environmental protection department. Where there is no fence between property used for agricultural purposes and adjoining property of the state under control of the department of environmental protection sufficient for the purposes of section 47-43, or when any fence so located is in need of replacement, and the boundary has been mutually agreed upon, the adjoining proprietor may, with the written agreement of the commissioner of environmental protection, executed within sixty days of a written request by such proprietor, cause such a fence to be constructed or replaced within six months of the date of the agreement; and the commissioner shall, within sixty days after the construction or replacement is completed, reimburse the proprietor for one-half the cost thereof, the state's share not to exceed four dollars a rod, payments to be made in the order of receipt of applications and completion of projects. Total payments under this section shall not exceed five thousand dollars in any fiscal year.

(1961, P.A. 558; 1967, P.A. 72; 1971, P.A. 872, S. 205, P.A. 79-530, S. 1, 3.)

History: 1967 act increased state's maximum share in reimbursement from one to two dollars per rod; 1971 act replaced state park and forest commission and its director with department and commissioner of environmental protection and revised reference to maximum for total payments to reflect change from biennial to annual budget; P.A. 79-530 raised state's maximum share for reimbursement to four dollars per rod and raised maximum amount for total payments from twenty-five hundred to five thousand dollars per fiscal year.

Sec. 47-47. Barbed wire between adjoining premises or enclosing grounds of public buildings. No person shall use barbed wire in the construction of fences, or have barbed wire upon existing fences, between his own premises and those of an adjoining proprietor, within twenty-five rods of any house or barn belonging to such proprietor, unless either premises are used in connection with raising livestock, without first obtaining his written consent. No barbed wire shall be used in the construction of fences, or retained upon existing fences, connected with or enclosing the grounds of any public school or public building, except a department of transportation storage facility or a vessel operations area of a state-owned waterfront facility or aircraft operations area of a state-owned airport. Any person who violates any provision of this section shall be fined not more than one hundred dollars.

(1949 Rev., S. 7157; P.A. 80-105; P.A. 84-322.)

History: P.A. 80-105 added exception re premises used in raising livestock to provision requiring written consent for barbed wire fence within twenty-five rods of house or barn; P.A. 84-322 allowed use of barbed wire at department of transportation storage facilities, vessel operations areas of state-owned waterfront facilities and aircraft operations areas of state-owned airports.

See note to Sec. 47-48.

Sec. 47-48. Barbed wire along sidewalks. No barbed wire shall be installed along any sidewalk unless it is at least six and one-half feet above the ground. Any barbed wire in use in conformity with section 7156 of the general statutes, revision of 1949, on October 1, 1957, may be continued in use.

(1949 Rev., S. 7156; 1957, P.A. 157, S. 1.)

When violation of a statute concerning barbed wire is not set up in complaint in action for damages for personal injuries, it is error to read statute to the jury to show that legislature thought barbed wire a dangerous thing. 101 C. 549.

Sec. 47-49. Purchase of division fence. If one proprietor or his predecessor in title makes the whole fence and the adjoining proprietor afterwards encloses his land, such adjoining proprietor shall purchase and maintain half of the divisional fence. If the parties do not agree in dividing and appraising it, either may call on the selectmen of the town in which such fence is situated, who may set out, to each, his proportion of such fence and determine how much shall be paid to the party erecting or owning the same by the other; a certificate of which determination, under the hands of the selectmen, shall be sufficient evidence for the recovery of the amount so determined. No action therefor shall be maintained unless the proprietor, who, or whose predecessor in title, first occupied his land and made the whole of

Date: December 13, 1989

Docket No. 129

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party [X] Intervenor [ ]	Metro Mobile CTS of Hartford, Inc. 100 Corporate Drive Windsor, CT 06095 Attn: Gary N. Schulman Vice President and Gen. Mgr.	Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 Attn: Earl W. Phillips, Jr. (203) 275-8200
Party [ ] Intervenor [X]	SNET Cellular, Inc. 227 Church Street New Haven, CT 06506	Peter J. Tyrrell Senior Attorney SNET Cellular, Inc. 227 Church Street Room 1021 New Haven, CT 06506
Party [X] Intervenor [ ]	Town of Manchester Planning & Zoning Comm. Town Hall 41 Center Street Manchester, CT 06040	Mark Pellegrini Director of Planning and Economic Development Town Hall 41 Center Street Manchester, CT 06040

Date: December 13, 1989

Docket No. 129

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party [X] Intervenor [ ]	Cheney Brothers National Historic Landmark District and Cheney National Historic Commission	Bruce J. Comollo Garrity, Diana, Conti & Houck 1091 Main Street Manchester, CT 06040 (203) 643-2181
Party [ ] Intervenor [ ]		
Party [ ] Intervenor [ ]		

DOCKET NO. 129 - AN APPLICATION OF METRO MOBILE CTS OF HARTFORD, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF A CELLULAR TELEPHONE TOWER AND ASSOCIATED EQUIPMENT IN THE TOWN OF MANCHESTER, CONNECTICUT. : Connecticut Siting : Council : March 12, 1990

FINDINGS OF FACT

1. Metro Mobile CTS of Hartford, Inc., in accordance with provisions of sections 16-50g to 16-50z of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on September 29, 1989, for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, maintenance, and operation of a telecommunications tower, associated equipment, and building to provide Domestic Public Cellular Radio Telecommunications Service (cellular service) in the Town of Manchester, part of the Hartford, Connecticut, New England County Metropolitan Area ("Hartford NECMA"). (Record)

2. The application was accompanied by proof of service as required by section 16-50l of the CGS. (Record)

3. Affidavit of newspaper notice as required by section 16-50l of the CGS was supplied by the applicant. Newspaper notice of this application was published twice by the applicant in The Hartford Courant. (Metro Mobile 1, pp.4-5, Exhibit 5)

4. The Council and its staff inspected the proposed and alternate sites in the Town of Manchester, Connecticut, on December 28, 1989. (Record)

5. Pursuant to section 16-50m of the CGS, the Council, after giving due notice thereof, held a public hearing on this application on December 28, 1989, at 3:30 P.M., and 7:00 P.M., at the Lincoln Center Hearing Room, 494 Main Street, Manchester, Connecticut. (Record)

6. The parties to the proceeding are the applicant and those persons and organizations whose names are listed in the Decision and Order which accompanies these Findings. (Record)

7. The Department of Environmental Protection (DEP) filed written comments with the Council pursuant to section 16-50j of the CGS. (Record)

8. In 1981, the Federal Communications Commission (FCC) recognized a national need for technical improvement, wide-area coverage, high quality service, and competitive pricing in mobile telephone service. (Metro Mobile 1, p.5; Docket 107, Finding of Fact 10)

9. The FCC has pre-empted State regulation in determining that a public need currently exists for cellular service, setting technical standards for that service, and establishing a competitive market. (Metro Mobile 1, p.6; Docket 107, Finding of Fact 12)

10. The FCC has determined that the public interest requires two licenses for cellular service be made available in each market area or NECMA to provide competition. One license is awarded to a wireline company, the other to a non-wireline company. (Metro Mobile 1, pp.6, 10; Docket 107, Finding of Fact 11)

11. Conventional mobile telephone service has been limited by insufficient frequency availability, inefficient frequency use, and poor quality of service. These limitations have resulted in congestion, blocking of transmission, interference, lack of coverage, and high costs. (Metro Mobile 1, p.5; Docket 107 Finding of Fact 9)

12. Cellular service consists of small, overlapping broadcast regions. These regions or cells are limited in coverage by the FCC's technical standards governing transmitting power. The system design provides frequency reuse and hand-off and would be capable of an orderly and compatible expansion. (Metro Mobile 1, pp.13-14, Exhibit 11, p.6)

13. Cell site locations are limited by a basic need for a 10 percent to 20 percent overlap of coverage between cell sites. Location of cell sites is essential to provide for uninterrupted hand-off of calls in progress. (Metro Mobile 1, Exhibit 11, pp.6-7)

14. Presently, the proposed cellular system represents state-of-the-art technology and Metro Mobile is aware of no viable alternatives. A mobile satellite service has been under consideration by the FCC and may become available in the distant future. (Metro Mobile 1, p.18)

15. Metro Mobile expects digital cellular technology to be commercially available in the late 1990's. The technology would increase the capability of handling calls over present cellular technology without having to add additional sites. (Tr. 12/28/89, pp.33-34)

16. In selecting a site for the cell, Metro Mobile found no available structures of adequate height or structural strength in or near a 0.6 mile theoretical search area within Manchester. (Metro Mobile 1, Exhibit 11, pp.8-9 and Attachment "A"; Metro Mobile 7)

17. Before selecting the proposed and alternate sites Metro Mobile considered and rejected four sites within the search area. One site in an industrial zone to the west of the alternate cell site location was rejected because of inadequate space for a cell site. A second area in a B1 and B2 business zone located along Hartford Road to the west of Prospect Street was rejected by Metro Mobile because land uses were mostly small businesses on shallow lots adjacent to high density residential development. A third area in a B2 business zone located along Center Street east and west of Pine Street was rejected because of adjacent high-density residential development. A fourth site in a B3 business zone located near the intersection of High Street and Pine Street was rejected because it was a small site surrounded by high-density multi-family dwellings. (Metro Mobile 1, Exhibit 11, pp.8-9 and Attachment "A"; Metro Mobile 3, Q.5, Attachment 2)

18. At the hearing, attention was brought to a site at the Town-owned Lincoln Center as a possible location for Metro Mobile's tower and equipment building. The site is one-tenth of a mile outside the search area at a ground elevation of 260 feet AMSL, and is in a residential zone. The site had no acceptable space to construct a tower or building. (Metro Mobile 7; Tr. 12/28/89)

19. The applicant had no communication with the Town of Manchester to share antennas or tower space on Metro Mobile's proposed tower at the time of the hearing. The Town had not shown interest in sharing tower space from the time of the hearing to the close of the record on February 15, 1990. (Tr. 12/28/89, pp.40, 111, 112; Record)

20. The proposed monopole could be designed to handle the Town of Manchester's police and fire antennas if the Town were interested. (Tr. 12/28/89, pp.105, 109)

21. The Town of Manchester's Planning and Zoning Commission, a party to the proceeding, stated that Metro Mobile's tower at the proposed site would be very obtrusive and potentially incompatible with surrounding zoning districts and land uses, while the tower at the alternate site would be very obtrusive and totally incompatible with the surrounding Historic and residential neighborhood. The Town was also disappointed that Metro Mobile focused on two locations in the center of the urbanized portion of Manchester. (Town of Manchester 1; Tr. 12/28/89, p.91)

22. Both the proposed and alternate sites would primarily provide additional cellular traffic handling capacity, as opposed to providing coverage to an area otherwise unserved. (Metro Mobile 1, p.10)

23. The proposed tower would primarily provide "off-loading" of calls from existing sites in Hartford, Vernon, and Glastonbury. (Metro Mobile 1, pp.10, 15-16, Exhibit 8, Exhibit 11, p.10; Metro Mobile 3, Q.12; Tr. 12/28/89, p.31)

24. The existing Hartford, Glastonbury, and Vernon sites have been in service for a little over two years. (Tr. 12/28/89, p.25)

25. The interrelationship of the traffic load between all of the sites in the area, not just one site, is causing the need for the proposed Manchester site. (Tr. 12/28/89, p.28)

26. The proposed site would also increase the quality of coverage in the Manchester area. (Tr. 12/28/89, pp.22, 23)

27. At the time of installation of the proposed Manchester facility, all existing sites in the area, including the Manchester site, would be fully sectorized. Such sectorization provides for increased call handling capacity within a cell by dividing the geographic service area into six directional sectors which allows for additional frequency reuse. Even with sectorization, the projected cellular traffic demands and frequency reuse requirements necessitate location of a site within the Manchester area. Operation of the proposed facility would off load the existing sites and improve coverage to the Manchester area. (Metro Mobile 3, Q.7, Q.11, Q.12, Q.13; Tr. 12/28/89, p.26)

28. The proposed site would increase the total cellular capacity in the Manchester area by up to 3,600 calls per hour. (Metro Mobile 4, Q.26)

29. With the addition of the proposed Manchester site, potential frequency interference problems from the Vernon, Glastonbury, and Hartford sites would be limited by a reassignment of frequencies recognizing their coverage areas and overlap. (Metro Mobile 3, Q.8)

30. The Vernon and Glastonbury sites are currently omnidirectional sites which normally could accommodate approximately 45 channels and handle approximately 1,200 calls during the peak hour, however, because of a potential frequency separation problem due to the addition of new sites and the sectorization of surrounding sites, the Vernon and Glastonbury sites could only accommodate approximately 30 channels or 800 calls during the peak hour. Hartford is a sectorized site that can accommodate 12 to 15 channels in each of its six sectors which can handle approximately 3,600 calls or 600 calls per sector during the peak hour. (Metro Mobile 3, Q.10; Tr. 12/28/89, pp.20, 27-29)

31. The Vernon site currently handles approximately 250 calls during the peak hours and approximately 175 calls per hour averaged over a 12-hour business day from 7:00 a.m. to 7:00 p.m. The peak hour occurs during the afternoon on weekdays. (Metro Mobile 3, Q.14; Tr. 12/28/89, pp.26-27)

32. The Glastonbury site currently handles approximately 300 calls during the peak hours and approximately 250 calls per hour averaged over a 12-hour business day from 7:00 a.m. to 7:00 p.m. The peak hour occurs during the afternoon on weekdays. (Metro Mobile 3, Q.14; Tr. 12/28/89, pp.26-27)

33. The Hartford site currently handles approximately 2,225 calls from all six sectors during the peak hours and approximately 1,610 calls per hour averaged over a 12-hour business day from 7:00 a.m. to 7:00 p.m. The peak hour occurs during the afternoon on weekdays. (Metro Mobile 3, Q.14)

34. Sector three of the existing Hartford cell site is currently exceeding its 600 call per hour maximum call handling capacity during its peak hour. This sector covers parts of Hartford, East Hartford, and Glastonbury. The proposed Manchester site would provide relief to this sector. Sector five, the next busiest sector of the Hartford cell site, covers West Hartford and is also approaching its 600 call per hour capacity. A sector is the area within a 60 degree arc with sector one being between a vector starting at zero degrees and ending at 60 degrees, sector two between 60 degrees and 120 degrees, sector three between 120 degrees and 180 degrees, sector four between 180 degrees and 240 degrees, sector five between 240 degrees and 300 degrees, and sector six between 300 degrees and 360 degrees. (Metro Mobile 3, Q.15; Metro Mobile 4, Q.24; Tr. 12/28/89, p.21)

35. Without the proposed Manchester site, additional Hartford site sectors and the existing Vernon and Glastonbury cell sites would begin to exceed their maximum call handling capacity during 1990. No call projection data was provided, but Metro Mobile contends that the Vernon and Glastonbury sites could handle approximately twice the current demand. (Metro Mobile 3, Q.15; Metro Mobile 4, Q.24, Q.25, Q.27; Tr. 12/28/89, pp.30-31, 32; Record)

36. The proposed cellular site would be a triangular 7,600 square foot parcel of land located in the rear of a larger, 1.35 acre lot at 266 Center Street, Manchester, Connecticut. The remainder of the lot is used for storage and manufacturing. The proposed tower would be located approximately 12 feet west of an abutting property owned by Kenneth C. Burkamp, which has a metal storage shed on-site, and approximately 25 feet south of a manufacturing building owned by S. Mark Stephens, lessor of the site. The proposed tower would be located approximately 260 feet south of Center Street and approximately 140 feet east of the nearest residential building. (Metro Mobile 1, Exhibit 1, p.1; Metro Mobile 3, Q.6, Attachment 3; Tr. 12/28/89, pp.15-16, 17, 18)

37. Access to the proposed site would be over an existing driveway on land of an adjacent property owner (Kenneth C. Burkamp) and land of the lessor (S. Mark Stephens). Vehicular access over the adjacent property is permitted by a non-exclusive right of passage granted to the lessor. (Metro Mobile 1, p.9, Exhibit 1, p.1; Metro Mobile 3, Q.3)

38. Metro Mobile proposes to construct a 115-foot self-supporting monopole tower to which two platforms would be attached. Two 15-foot omnidirectional call-processing, whip transmit antennas would be mounted at 113 feet on the corners of the platform with six 11 1/2-foot transmit/receive antennas side mounted with center of radiation at 106 feet. The total height of the tower with antennas would be 128 feet above ground level. (Metro Mobile 1, Exhibit 1, p.8; Tr. 12/28/89, pp.18, 19, 77, 78)

39. The horizontal off-set of the antennas placed on the corners of the platform would be a maximum of 6 1/2 feet from the tower structure. (Tr. 12/28/89, p.78)

40. Ground elevation at the proposed site is 196 feet AMSL. Residential properties in the immediate area on Pine Street, Park Street, and New Street from where the tower would be visible are at an elevation ranging from 198 feet to 220 feet. (Tr. 12/28/89, pp.15-16, 17; Town of Manchester 1, pp.2-3)

41. Metro Mobile would raze an abandoned wood-frame building and construct a 20-foot by 40-foot single-story, prefabricated concrete building on the proposed site. The building would house receiving, transmitting, switching, processing, performance monitoring, and climate control equipment. The abandoned building could not be utilized for equipment because it is in poor condition, and the owner wanted it razed as part of the lease arrangement. (Metro Mobile 1, p.9; Metro Mobile 3, Q.2)

42. The alternate site would be on a 50-foot by 85-foot parcel of land located in the northern portion of a larger 1.1 acre lot at 218 Hartford Road, Manchester, Connecticut. The remainder of the lot is used for manufacturing. The proposed tower would be approximately 141 feet west of Prospect Street, approximately 44 feet west of an on-site two story brick manufacturing building, 46 feet south of Hartford Road, 120 feet east of abutting property also owned by S. Mark Stephens, and 120 feet north of land owned by Millbridge Hollow Condominiums. (Metro Mobile 1, Exhibit 2, p.1; Metro Mobile 3, Q.6, Attachment 3; Tr. 12/28/89, p.18; Town of Manchester 1, pp.3-4)

43. The southern boundary of the alternate site lot is 60 feet from the northern edge of Hop Brook. (Town of Manchester 1, p.4)

44. Access to the alternate site would be over an existing driveway and parking lot on land of the lessor (S. Mark Stephens). (Metro Mobile 1, Exhibit 1, p.9, Exhibit 2, pp.1, 7; Metro Mobile 3, Q.6, Attachment 3)

45. The alternate site tower would consist of a 140-foot self-supporting tower to which two platforms would be attached. Two 15-foot omnidirectional call-processing, whip transmit antennas would be mounted at 138-feet on the corners of the platform with six 11 1/2-foot transmit/receive antennas side mounted with center of radiation at 131 feet. The total height of the alternate site tower with antennas would be 153 feet above ground level. (Metro Mobile 1, p.8; Exhibit 2, p.8; Tr. 12/28/89, p. 78)

46. Ground elevation at the alternate site would be at 170 feet AMSL. (Tr. 12/28/89, p.18)

47. A 20-foot by 40-foot single story building would be constructed on the alternate site. The building would house the same equipment as the proposed site. (Metro Mobile 1, p.9)

48. Minimal site leveling or backfilling would be required at the proposed site. Removal of an on-site dirt pile would be required at the alternate site. (Metro Mobile 1, Exhibit 1, p.7, Exhibit 2, p.7; Tr. 12/28/89, p.18)

49. Utility lines for the proposed site would be routed from Center Street to the proposed cell site over land of the lessor. Utility lines for the alternate site would be routed from existing utility poles along Hartford Road to the alternate site. (Metro Mobile 1, p.9, Exhibit 1, p.1, Exhibit 2, p.1, Exhibit 9, pp. 1, 11; Tr. 12/28/89, p.88)

50. The metal storage shed east of the site on adjacent property owned by Kenneth C. Burkamp, a one-story brick manufacturing building on the lessor's property, and property west of the site owned by Kenneth C. Burkamp would be within the fall zone of the proposed site tower. Hartford Road, land owned by the Millbridge Hollow Condominiums, and a two-story brick manufacturing building on property of the lessor would be within the fall zone of the alternate site tower. The fall zones would not be totally within the lessor's properties. (Town of Manchester 1, p.2; Metro Mobile 3, Q.6, Attachment 3)

51. The zoning of the proposed cellular site is I, Industrial. This zone is approximately three acres in size and is surrounded to the north by a Business zone, to the east and west by Residential zones, and to the south by the Cheney Brothers National Historic Landmark District. The proposed tower would be a use requiring a special exception under Manchester zoning regulations. The zoning of the alternate cellular site is H, Historical, and is within the Cheney Brothers National Historic Landmark District. The alternate tower would be a use requiring a special exception under Manchester zoning regulations. (Town of Manchester 1, p.2; Metro Mobile 1, Exhibit 11, Attachment "A"; Metro Mobile 3, Q.5, Attachment 2)

52. The Cheney Brothers National Historic Landmark District was established in 1978 through a designation by the United States Department of the Interior, and is listed in the National Register of Historic Places. (Town of Manchester 1, pp.3-4; Tr. 12/28/89, p.59)

53. Metro Mobile does not have any existing towers within a national landmark district. (Tr. 12/28/89, p.59)

54. Within the Cheney Brothers District north of the alternate site are rehabilitated mill buildings used for multi-family dwellings and some neighborhood commercial purposes. Within the Cheney Brothers District east of the alternate site are buildings used for commercial purposes. To the west of the alternate site lot is property in an industrial zone used for commercial purposes. (Town of Manchester 1, pp.3-4)

55. The proposed site would be less than 200 feet north of the Cheney Brothers Historic District. (Town of Manchester 1, p.5; Metro Mobile 3, Q.5, Attachment 2)

56. There are approximately 159 residences within a 1,000-foot radius of the proposed tower. The nearest residence is 140 feet southwest of the proposed property. There are approximately 24 residences, six condominium buildings, and two apartment buildings within a 1,000-foot radius of the alternate cell site. The nearest residence is 180 feet from the alternate tower. (Metro Mobile 1, Exhibit 1, p.7, Exhibit 2, p.7, Exhibit 9, p.12; Tr. 12/28/89, pp.17-18, 103)

57. The electromagnetic radio frequency power density at the proposed and alternate sites, assuming all channels operating simultaneously at maximum allowable power and broadcasting from the lowest set of antennas would be 0.1124 milliwatts per square centimeter (mW/cm^2) at the proposed site and 0.0737 mW/cm^2 at the alternate site, and would be well below the American National Standards Institute standard of 2.92mW/cm^2, as adopted by the State in CGS 22a-162. (Metro Mobile 1, p.12, Exhibit 9, pp.2, 12; DEP comments of 12/14/89; Tr. 12/28/89, p.19)

58. Both the proposed and alternate towers would be designed to withstand pressure equivalent to a 90 mph wind with a 1/2-inch solid ice accumulation in accordance with Electronic Industries Association standard RS-222-D. The overturn moment for the foundation would be 1.5. The antenna mounting arrangement, the support brackets, and the antenna structure would be designed to withstand 125 mph winds. (Metro Mobile 1, Exhibit 1, p.9, Exhibit 2, p.9; Tr. 12/28/89, pp.82-83, 87)

59. According to the Connecticut Historical Commission, "the prime site,..., does not appear to meet the eligibility criteria for the National Register of Historic Places, while the alternate site,...does appear to be of local historic and architectural significance. Therefore, we recommend that the proposed telecommunications tower and associated equipment shelter be constructed at the 266 Center Street [prime] site." (Metro Mobile 3, Q.1, Attachment 1)

60. There are no known extant populations of Connecticut "Species of Special Concern" or Federal Endangered and Threatened Species that occur at the site in question. (Metro Mobile 3, Q.1, Attachment 1; DEP Comments of 12/14/89)

61. The total estimated cost of construction for the proposed site is as follows:

Radio equipment	$676,500
Tower and antennas	38,800
Power system	18,000
Building	76,600
Miscellaneous (Site preparation and installation	140,200
TOTAL	$950,100.

(Metro Mobile 1, pp.16-17, Exhibit 1, p.9)

62. The total estimated cost of construction for the alternate site is as follows:

Radio equipment	$676,500
Tower and antennas	41,760
Power system	18,000
Building	76,600
Miscellaneous	135,200
(Site preparation and installation	
TOTAL	$948,060.

(Metro Mobile 1, p.17, Exhibit 2, p.9)

JAW

4024E

DOCKET NO. 129 - AN APPLICATION OF METRO MOBILE CTS OF HARTFORD, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF A CELLULAR TELEPHONE TOWER AND ASSOCIATED EQUIPMENT IN THE TOWN OF MANCHESTER, CONNECTICUT.	:	Connecticut Siting Council
	:	March 12, 1990

O P I N I O N

On September 29, 1989, Metro Mobile CTS of Hartford, Inc., (Metro Mobile) applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) to construct, maintain, and operate a cellular telecommunications tower, associated equipment, and building in the Town of Manchester, Connecticut.

A determination of public need for cellular telephone service has been pre-empted by the Federal Communications Commission (FCC). Under Connecticut State law, the Council must balance the need to develop the proposed site as a cellular telephone facility with the need to protect the environment, including public health and safety.

In finding a proposed tower site, an applicant must locate a site or existing tower to share, offering the necessary coverage that would not have a substantial effect on the environment and be adequately distant from wetlands, public recreation areas, and adjacent homes. Because Metro Mobile does not have the authority to take land through eminent domain, acquisition of a site requires consent of the property owners to lease or sell the property. These requirements restrict the number of potential tower sites within defined search areas.

The proposed or alternate site would function as a secondary cellular facility, located near the intersection of three existing, primary cellular facilities in Hartford, Glastonbury, and Vernon, Connecticut. Cellular service demand is exceeding the call-handling capacity of Sector three in Hartford and is soon expected to exceed the call-handling capacity of the facilities in Glastonbury and Vernon. The proposed Manchester site would provide additional overlapping coverage between these three cells for the continuous transfer of calls in the Hartford-Glastonbury-Vernon region, in which there are presently weak signals and interference. The proposed and alternate sites would provide similar coverage and call-handling capability throughout the area.

The proposed site would be leased and developed in the rear of a privately owned 1.35 acre lot located at 266 Center Street. The proposed 128-foot, self-supporting monopole tower and antenna structure would be located approximately 12 feet west of Kenneth C. Burkamp's property and 140 feet east of the nearest residential building. The fall zone of the tower could encompass a metal storage shed on Kenneth C. Burkamp's property east of the site; a one-story brick manufacturing building on the lessor's property; and a portion of the adjacent property that the nearest residential building is located on, west of the site. Metro Mobile would raze an abandoned wood-frame building and construct a single story equipment building, measuring 20 feet by 40 feet, on the site. Vehicle access to the proposed site would be over an existing driveway on land of Kenneth C. Burkamp and land of the lessor permitted by a non-exclusive right of passage granted by Kenneth C. Burkamp to the lessor. Utilities from Center Street would be available to the facility. Minimal site leveling or backfilling would be required at the site.

The alternate site would be leased and located on the northern boundary of a 1.1 acre lot at 218 Hartford Road. The 153-foot, self-supporting monopole tower and antenna structure would be located 46 feet south of Hartford Road and 120 feet north of land owned by Millbridge Hollow Condominiums. The fall zone of the alternate tower could encompass Hartford Road, land owned by the Millbridge Hollow Condominiums, and a two-story brick manufacturing building on the lessor's lot. A single story equipment building, measuring 20 feet by 40 feet, would be constructed on the site. Vehicle access to the cell site would be over an existing driveway and parking lot on land of the lessor. Utilities from existing utility poles along Hartford Road would be routed to the facility. Removal of an on-site dirt pile would be required.

Electromagnetic radio frequency power density is a health and safety concern of the Council. However, the power density level measured at the base of the proposed tower would be 0.1124 milliwatts per square centimeter (mW/cm^2), and at the base of the alternate tower it would be 0.0737 mW/cm^2. These power densities are well below the American National Standards Institute (ANSI) safety standard of 2.92 mW/cm^2, as adopted by the State in Connecticut General Statutes Section 22a-162. The power density would rapidly decrease as distance from the tower increases.

No wetlands or watercourses exist at either site. No water flow and/or quality changes would be expected to result from the construction and operation of either the proposed or the alternate facilities.

There are no existing records of federally endangered or threatened species or Connecticut species of special concern occurring in the area of the proposed or alternate sites, according to the latest available information from the Connecticut Department of Environmental Protection Natural Resources Center.

The proposed facility is located near a historical zone. However, this historical zone is also a highly urbanized area that consists of industrial and commercial uses. There is no reason to believe that the proposed tower would have any significant effect on the zone. Furthermore, the State Historical Commission has stated that there would be no significant effect on the State's historic and architectural resources at the proposed site.

Moreover the Council believes that the industrial and urban nature of the proposed site lends itself to a commercial use such as the proposed cellular telecommunications tower. Visually, the tower will be acceptable with the site and surrounding land uses. Furthermore, the height of the tower is not so great that it will be visually obtrusive in the immediate area to adjacent residential units, or for any significant distance to the community in general.

The intrusion of the fall zone on adjacent structures and property should be avoided whenever possible to maintain a reasonable setback from other land uses. Nonetheless, the close proximity of tall urban structures on small urban sites make this goal impractical if not impossible. Although the Council will require the tower to be shifted the greatest distance possible from adjacent properties and structures to enhance the site, there is insufficient reason to deny the proposed site due to the location of the tower in relation to the adjacent land uses, properties, and structures.

In comparison, the alternate site tower would be 25 feet taller and located within the historic zone. Consequently it is the opinion of the Council that the proposed site is superior, and the alternate site should be denied.

Based on its record in this proceeding, the Council is of the opinion that the effects associated with the construction, operation, and maintenance of a cellular tower and associated equipment building at the proposed site, including the effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not significant either alone or cumulatively with other effects, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application for the proposed site.

The Council will require Metro Mobile to submit a Development and Management (D&M) plan for approval prior to the commencement of any construction at the proposed site. This D&M plan shall include detailed plans of the site preparation with the final tower height in relation to the site elevation, and placement of the tower as great a distance as possible from abutting properties.

JAW

4158E

DOCKET NO. 129 - AN APPLICATION OF METRO MOBILE CTS OF HARTFORD, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF A CELLULAR TELEPHONE TOWER AND ASSOCIATED EQUIPMENT IN THE TOWN OF MANCHESTER, CONNECTICUT.	:	Connecticut Siting Council
	:	March 12, 1990

D E C I S I O N A N D O R D E R

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council finds that the effects associated with the construction, operation, and maintenance of a cellular telephone facility at the proposed Manchester site, including effects on the natural environment; ecological integrity and balance; forests and parks; air and water purity; and fish and wildlife are not significant either alone or cumulatively with other effects, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Hartford, Inc., for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed site in Manchester, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The monopole tower including antennas and associated equipment shall not exceed a height of 128 feet above ground level, 324 feet AMSL.

2. The facility shall be constructed in accordance with the State of Connecticut Basic Building Code.

3. The Certificate Holder shall prepare a Development and Management (D&M) plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the site preparation with a soil boring report; plans, design details, and specifications for the tower foundation; and a site plan with placement of the tower as far removed from abutting properties and structures as possible.

4. The Certificate Holder shall prepare the D&M plan in consultation with the Town of Manchester which may provide its comments to the Council within 20 days of submission to the Town.

5. The Certificate Holder shall comply with any future radio frequency (RF) standard promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted in this Decision and Order shall be brought into compliance with such standards.

6. The Certificate Holder shall provide the Council a recalculated report of power density if and when additional channels over the proposed 90 channels, higher wattage over the proposed 100 watts per channel, or if other circumstances in operation cause a change in power density above the levels originally calculated in the application.

7. The Certificate Holder shall permit public or private entities to share space on the tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

8. If this facility does not initially provide, or permanently ceases to provide cellular service following the completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication of any new use shall be made to the Council before any such new use is made.

9. Unless otherwise approved by the Council, this Decision and Order shall be void if construction authorized herein is not completed within three years of the effective date of this Decision and Order.

Pursuant to Section 16-50p of the CGS, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below. A notice of issuance shall be published in the Hartford Courant and Journal Inquirer.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of State Agencies.

CERTIFICATE

OF

ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED
DOCKET NO. 129

Pursuant to section 16-50k of the General Statutes of Connecticut, as amended, the Connecticut Siting Council hereby issues a Certificate of Environmental Compatibility and Public Need to Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone tower and associated equipment at the proposed primary site in the Town of Manchester, Connecticut. This Certificate is issued in accordance with and subject to the terms and conditions set forth in the Decision and Order of the Council on March 12, 1990.

By order of the Council,

Gloria Dibble Pond

Gloria Dibble Pond, Chairperson

March 12, 1990

4203E-5

Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle, does hereby authorize **EyeTower** and its authorized contractors/agents to act as "Applicant" in the processing of all applications, permits, research and other related activities associated with the processing, planning, design review, permitting, entitlement and construction of additional equipment, antennas and site improvements for the Crown Castle existing wireless communications facility described as follows:

Customer Site Name:	**BDL200**	**Crown Castle Site ID Number:**	**806372**
Site Address:	**266R Center St. Manchester, CT 06040**	**Crown Castle Site Name:**	**HRT 093 943228**

This authorization is fully contingent upon **EyeTower** authorized contractors/agents' compliance with the following conditions:

1. Crown Castle must review the application prior to submittal. Crown Castle must be provided all applications, narratives, drawings and attachments at least 72 hours in advance of their submittal to the locality. Use of email and electronic attachments is encouraged. A Crown Castle Zoning Subject Matter Expert (SME) will review and provide written comment to the customer within 48 hours of receipt of a complete set of application materials. If Crown Castle indicates that changes are required, submissions shall be altered in accordance with Crown Castle comments prior to submission to the locality. Verification of corrections should also be accomplished via emails and attachments.
2. In no event may **EyeTower** encourage, suggest, participate in, or permit the imposition of any restrictions or additional obligations whatsoever on the tower site or Crown Castle's current or future use or ability to license space at the tower site as part of or in exchange for obtaining any approval, permit, exception or variance.
3. A copy of the final permit and/or a written summary of the zoning/entitlement decision rendered by the locality and any/all conditions placed on that decision shall be communicated in detail to Crown Castle well within the appeal period provided by the locality (typically 10-15 days).
4. All conditions of approval pertinent to the construction of the proposed project must be included in the construction drawings for the project. The conditions of approval pertinent to the construction of the project shall be copied verbatim from the zoning permit approval language, and shall be present in the drawings prior to submission for building permits and contractor bidding. Crown Castle shall verify the inclusion of appropriate conditions of approval in the construction drawing redline process.
5. Crown Castle will provide a Notice To Proceed (NTP) to construction to the customer upon receipt of the final approved zoning permit and the approved Building Permit.

By Crown Castle:

Signature: _____

Printed Name: Zachary Plummer

Title: Real Estate Specialist

Date: June 2, 2016

Town of Manchester, CT

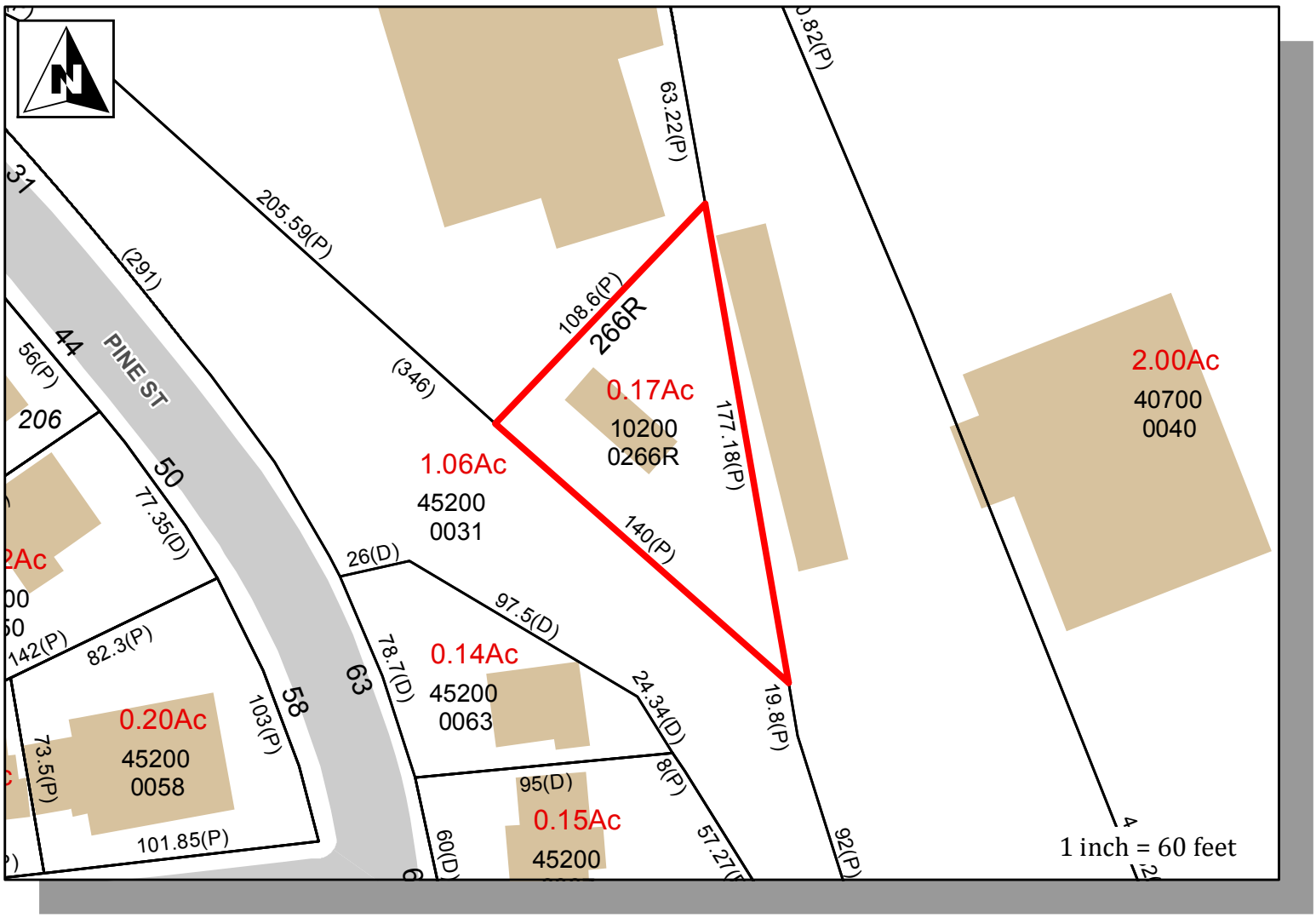
Address: 266R CENTER STREET

RPKEY: 102000266R

Property Information:

Mailing Address:	266R CENTER ST MANCHESTER, CT
Owner Name:	CROWN ATLANTIC CO LLC
Owner Address:	4017 WASHINGTON RD MCMURRAY, PA 15317
Land Class:	Ind Vac
Land Use Code:	302
Zoning:	Industrial

Acreage:	0.17
Year Built:	0
Appraisal:	167300
Assessment:	117100
Sale Price:	$
Sale Date:	04/19/1999
Book/Page:	2071 /309



Report Created: 4/14/2016

CROWN BU#: **806372**

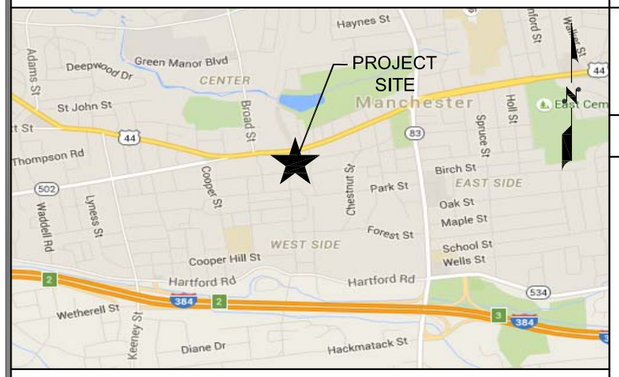
eyeTower, LLC SITE NAME: **BDL200**

PROJECT TYPE: **ADDITION OF EQUIPMENT IN PROPOSED SHELTER AND ANTENNAS TO EXISTING TELECOMUNICATIONS SITE**

PROJECT LOCATION: **266R CENTER ST**
MANCHESTER, CT 06040

PROJECT COUNTY: **HARTFORD COUNTY**

VICINITY MAP



DRIVING DIRECTIONS

FROM BRADLEY INTERNATIONAL AIRPORT:

CONTINUE TO SCHOEPHOESTER RD. HEAD NORTH TOWARDS BRADLEY INTERNATIONAL AIRPORT. SLIGHT LEFT ONTO BRADLEY INTERNATIONAL AIRPORT. KEEP RIGHT TO CONTINUE TOWARDS SCHOEPHOESTER RD. TAKE CT-20 E, I-91 S, I-291 E AND I-384 TO CT-83 N IN MANCHESTER. TAKE EXIT 3 FROM I-384. MERGE ONTO SCHOEPHOESTER RD. CONTINUE ONTO BRADLEY INTERNATIONAL AIRPORT CON. CONTINUE ONTO CT-20 E/BRADLEY INTERNATIONAL AIRPORT CON. USE THE RIGHT 2 LANES TO MERGE ONTO I-91 S TOWARDS HARTFORD. TAKE EXIT 35A FOR I-291 TOWARDS MANCHESTER. CONTINUE ONTO I-291 E. TAKE THE I-384 E EXIT. KEEP LEFT, FOLLOW SIGNS FOR INTERSTATE 384 E. CONTINUE ONTO I-384. TAKE EXIT 3 TO MERGE ONTO CT-83 N. TAKE HARTFORD RD TO PINE ST. MERGE ONTO CT-83 N. TURN LEFT ONTO HARTFORD RD. TURN RIGHT ONTO PINE ST. DESTINATION WILL BE ON THE RIGHT.

GENERAL NOTES

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE A/E FIRM IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

811 Know what's below. Call before you dig.

SCOPE OF WORK

INSTALLATION OF NEW eyeTower, LLC EQUIPMENT SHELTER AND ANTENNAS IN EXISTING TELECOMMUNICATIONS COMPOUND.

SITE INFORMATION

APPLICANT :	eyeTower, LLC C/O CORPORATION SERVICE COMPANY 2711 CENTERVILLE RD, STE 400, PMB 160 WILMINGTON, DE 19808
TOWER OWNER :	CROWN CASTLE 100 REGENCY FOREST DRIVE, SUITE 150 CARY, NC 27518
PROPERTY OWNER :	CROWN ATLANTIC CO LLC 4017 WASHINGTON RD McMURRAY, PA 15317
JURISDICTION :	TOWN OF MANCHESTER
MAP/PARCEL# :	102000266R
ZONING CLASSIFICATION :	INDUSTRIAL
LATITUDE :	41.772114° (41° 46' 19.0" N)
LONGITUDE :	-72.530211° (72° 31' 48.8" W)
POWER COMPANY :	CT LIGHT & POWER (866) 554-6025
FIBER COMPANY :	AT&T (800) 331-0500
eyeTower, LLC CONTACT:	TODD CARPENTER eyeTower, LLC 2711 CENTERVILLE RD, STE 400, PMB 160 WILMINGTON, DE 19808
PROFESSIONAL OF RECORD:	ROBERT J. LARA, AIA MORRISON HERSHFIELD CORPORATION RLARA@MORRISONHERSHFIELD.COM PHONE: (954) 577-4655 CT LICENSE#: 11509

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CONNECTICUT BUILDING PERFORMANCE STANDARDS WITH THE FOLLOWING CODE REFERENCES:

2005 CT STATE BUILDING CODE WITH 2013 AMENDMENTS
- 2003 INTERNATIONAL BUILDING CODE
- 2003 INTERNATIONAL MECHANICAL CODE
- 2001 NATIONAL ELECTRIC CODE (NFPA 70)
- 2003 INTERNATIONAL FIRE CODE

APPROVALS

APPROVED BY:	INITIALS:	DATE:
O.P.E./OPS:		
LEASING:		
RF:		
ZONING:		
CONSTRUCTION:		
POWER/TELCO:		

LIST OF DRAWINGS

ARCHITECTURAL

SHT.	DESCRIPTION	REV. NO.
T-1	COVER SHEET	1
G-1	NOTES	1
A-1	COMPOUND PLAN	1
A-2	EQUIPMENT LOCATION PLAN	1
A-3	TOWER ELEVATION & ANTENNA ORIENTATION	1
A-4	ANTENNA DETAILS	1
A-5	OTA TOWER ELEVATION	1
A-6	ANTENNA SPECS	1
A-7	ANTENNA SPECS	1
A-8	DETAILS	1
A-9	DETAILS	1
A-10	DETAILS	1
A-11	DETAILS	1

STRUCTURAL

S-1	STRUCTURAL NOTES AND CONC. PAD DETAILS	1

ELECTRICAL

E-1	ELECTRICAL NOTES AND ABBREVIATIONS	1
E-2	ELECTRICAL COMPOUND PLAN	1
E-3	ELECTRICAL RISER DIAGRAM	1
E-4	GROUNDING PLAN	1
E-5	GROUNDING DETAILS	1
E-6	GROUNDING DETAILS	1
E-7	GROUNDING DETAILS	1
		1

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:
eyeTOWER
2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:
CROWN CASTLE
100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:
MORRISON HERSHFIELD
8604 Cliff Cameron Drive, Suite 152
Charlotte, NC 28269
TEL: 704.499.6861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:
806372
BDL200
266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:
COVER SHEET

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No.: T-1

SCALE IS BASE ON 22" X 34" "D" SIZE

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\9.0 Sites\BDL200_HRT\9.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:45pm bfraser

1 2 3 4 5 6

ARCHITECTURAL GENERAL NOTES

1. WORK SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. ALL NECESSARY LICENSES, CERTIFICATES, ETC., REQUIRED BY AUTHORITY HAVING JURISDICTION SHALL BE PROCURED AND PAID FOR BY THE CONTRACTOR.
2. THE GENERAL CONTRACTOR AND EACH SUBCONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING DIMENSIONS AND CONDITIONS AT THE JOB SITE WHICH COULD AFFECT THE WORK UNDER THIS CONTRACT. ALL MANUFACTURERS RECOMMENDED SPECIFICATIONS, EXCEPT THOSE SPECIFICATIONS HEREIN, WHERE MOST STRINGENT SHALL BE COMPLIED WITH.
3. THE CONTRACTOR SHALL VERIFY THAT NO CONFLICTS EXIST BETWEEN THE LOCATIONS OF ANY AND ALL MECHANICAL, ELECTRICAL, PLUMBING, OR STRUCTURAL ELEMENTS, AND THAT ALL REQUIRED CLEARANCES FOR INSTALLATION AND MAINTENANCE ARE MET. NOTIFY THE CONSULTANT OF ANY CONFLICTS. THE CONSULTANT HAS THE RIGHT TO MAKE MINOR MODIFICATIONS IN THE DESIGN OF THE CONTRACT WITHOUT THE CONTRACTOR GETTING ADDITIONAL COMPENSATION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY CLEAN UP OF ALL TRADES AND REMOVE ALL DEBRIS FROM THE CONSTRUCTION SITE. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL THOROUGHLY CLEAN THE BUILDING, SITE, AND ANY OTHER SURROUNDING AREAS TO A BETTER THAN NEW CONDITION.
5. THE CONTRACTOR IS RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKAGE, COLLAPSE, ETC. ACCORDING TO APPLICABLE CODES, STANDARDS, AND GOOD CONSTRUCTION PRACTICES.
6. WHERE ONE DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY FOR ALL LIKE OR SIMILAR CONDITIONS, EVEN THOUGH NOT SPECIFICALLY MARKED ON THE DRAWINGS OR REFERRED TO IN THE SPECIFICATIONS, UNLESS NOTED OTHERWISE.
7. WHERE NEW PAVING, CONCRETE SIDEWALKS OR PATHS MEET EXISTING CONSTRUCTION, THE CONTRACTOR SHALL MATCH THE EXISTING PITCH, GRADE, AND ELEVATION SO THE ENTIRE STRUCTURE SHALL HAVE A SMOOTH TRANSITION.
8. THE GENERAL CONTRACTOR SHALL OBTAIN WRITTEN CONFIRMATION OF THE EXPECTED DATE OF COMPLETION OF THE POWER CONNECTION FROM THE POWER COMPANY.
9. IF THE POWER COMPANY IS UNABLE TO PROVIDE THE POWER CONNECTION BY OWNER'S REQUIRED DATE, THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN A TEMPORARY GENERATOR UNTIL THE POWER COMPANY CONNECTION IS COMPLETED. COSTS ASSOCIATED WITH THE TEMPORARY GENERATOR TO BE APPROVED BY THE OWNER.
10. PLANS PART OF THIS SET ARE COMPLEMENTARY. INFORMATION IS NOT LIMITED TO ONE PLAN. DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF SERVICE AND SHALL REMAIN THE PROPERTY OF THE ARCHITECT, WHETHER THE PROJECT FOR WHICH THEY ARE MADE IS EXECUTED OR NOT. THEY ARE NOT TO BE USED BY THE OWNER ON OTHER PROJECTS OR EXTENSION TO THIS PROJECT EXCEPT BY AGREEMENT IN WRITING AND WITH APPROPRIATE COMPENSATION TO MORRISON HERSHFIELD. THESE PLANS WERE PREPARED TO BE SUBMITTED TO GOVERNMENTAL BUILDING AUTHORITIES FOR REVIEW FOR COMPLIANCE WITH APPLICABLE CODES AND IT IS THE SOLE RESPONSIBILITY OF THE OWNER AND/OR CONTRACTOR TO BUILD ACCORDING TO APPLICABLE BUILDING CODES.
11. IF CONTRACTOR OR SUB-CONTRACTOR FIND IT NECESSARY TO DEVIATE FROM ORIGINAL APPROVED PLANS, THEN IT IS THE CONTRACTOR'S AND THE SUB-CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE ARCHITECT WITH 4 COPIES OF THE PROPOSED CHANGES FOR HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. IN ADDITION THE CONTRACTOR AND SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR PROCURING ALL NECESSARY APPROVALS FROM THE BUILDING AUTHORITIES FOR THE PROPOSED CHANGES BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR AND SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR PROCURING ALL NECESSARY INSPECTIONS AND APPROVALS FROM BUILDING AUTHORITIES DURING THE EXECUTION OF THE WORK.
12. IN EVERY EVENT, THESE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS SHALL BE INTERPRETED TO BE A MINIMUM ACCEPTABLE MEANS OF CONSTRUCTION BUT THIS SHALL NOT RELIEVE THE CONTRACTOR, SUB-CONTRACTOR, AND/OR SUPPLIER/MANUFACTURER FROM PROVIDING A COMPLETE AND CORRECT JOB WHEN ADDITIONAL ITEMS ARE REQUIRED TO THE MINIMUM SPECIFICATION. IF ANY ITEMS NEED TO EXCEED THESE MINIMUM SPECIFICATIONS TO PROVIDE A COMPLETE, ADEQUATE AND SAFE WORKING CONDITION, THEN IT SHALL BE THE DEEMED AND UNDERSTOOD TO BE INCLUDED IN THE DRAWINGS. FOR EXAMPLE, IF AN ITEM AND/OR PIECE OF EQUIPMENT REQUIRES A LARGER WIRE SIZE (I.E. ELECTRICAL WIRE), STRONGER OR LARGER PIPING, INCREASED QUANTITY (I.E. STRUCTURAL ELEMENTS), REDUCED SPACING, AND/OR INCREASED LENGTH (I.E. BOLT LENGTHS, BAR LENGTHS) THEN IT SHALL BE DEEMED AND UNDERSTOOD TO BE INCLUDED IN THE BID/PROPOSAL. THESE DOCUMENTS ARE MEANT AS A GUIDE AND ALL ITEMS REASONABLY INFERRED SHALL BE DEEMED TO BE INCLUDED.
13. THESE CONTRACT DOCUMENTS AND SPECIFICATIONS SHALL NOT BE CONSTRUED TO CREATE A CONTRACTUAL RELATIONSHIP OF ANY KIND BETWEEN THE ARCHITECT AND THE CONTRACTOR.

IMPORTANT NOTICE

THE EXISTING CONDITIONS REPRESENTED HEREIN ARE BASED ON VISUAL OBSERVATIONS AND INFORMATION PROVIDED BY OTHERS. MORRISON HERSHFIELD CORPORATION CANNOT GUARANTEE THE CORRECTNESS NOR COMPLETENESS OF THE EXISTING CONDITIONS SHOWN AND ASSUMES NO RESPONSIBILITY THEREOF. CONTRACTOR AND HIS SUB-CONTRACTORS SHALL VISIT THE SITE AND VERIFY ALL EXISTING CONDITIONS AS REQUIRED FOR PROPER EXECUTION OF PROJECT. REPORT ANY CONFLICTS OR DISCREPANCIES TO THE CONSULTANT PRIOR TO CONSTRUCTION.

ELECTRICAL GENERAL NOTES

A. GENERAL

1. EXAMINE THE SITE CONDITIONS VERY CAREFULLY AND THE SCOPE OF PROPOSED WORK TOGETHER WITH THE WORK OF ALL OTHER TRADES AND INCLUDE IN THE BID PRICE ALL COSTS FOR WORK SUCH AS EQUIPMENT AND WIRING MADE NECESSARY TO ACCOMMODATE THE ELECTRICAL SYSTEMS SHOWN AND SYSTEMS OF OTHER TRADES.
2. OBTAIN ALL PERMITS, PAY ASSOCIATED FEES AND SCHEDULE INSPECTION.
3. PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, INSURANCE, AND SERVICES TO COMPLETE THIS PROJECT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND PRESENT IT AS FULLY OPERATIONAL TO THE SATISFACTION OF eyeTower, LLC & LAND/TOWER OWNER
4. PRIOR TO BEGINNING WORK COORDINATE ALL POWER AND TELCO WORK WITH THE LOCAL UTILITY COMPANY AS IT MAY APPLY TO THIS SITE. ALL WORK TO COMPLY WITH THE RULES AND REGULATIONS OF THE UTILITIES INVOLVED GENERAL CONTRACTOR IS RESPONSIBLE FOR VED. REQUESTING CONNECTION OF COMMERCIAL POWER FROM THE POWER COMPANY. ELECTRICAL CONTRACTOR SHALL COORDINATE THIS WORK WITH THE GENERAL CONTRACTOR.
5. FABRICATION AND INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEM SHALL BE DONE IN A FIRST CLASS WORKMANSHIP PER NECA STANDARD 1-2000 BY QUALIFIED PERSONNEL EXPERIENCED IN SUCH WORK AND SHALL SCHEDULE THE WORK IN AN ORDERLY MANNER SO AS NOT TO IMPEDE PROGRESS OF THE PROJECT.

B. BASIC MATERIALS AND METHODS

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE EDITION OF THE NEC ACCEPTED BY THE LOCAL JURISDICTION AND TO THE APPLICABLE LOCAL CODES AND REGULATIONS.
2. ARRANGE CONDUIT, WIRING, EQUIPMENT, AND OTHER WORK GENERALLY AS SHOWN, PROVIDING PROPER CLEARANCES AND ACCESS. CAREFULLY EXAMINE ALL CONTRACT DRAWINGS AND FIT THE WORK IN EACH LOCATION WITHOUT SUBSTANTIAL ALTERATION. WHERE DEPARTURES ARE PROPOSED BECAUSE OF FIELD CONDITIONS OR OTHER CAUSES, PREPARE AND SUBMIT DETAILED DRAWINGS FOR ACCEPTANCE.
3. THE CONTRACT DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ALL OFFSETS, BENDS, FITTINGS AND ACCESSORIES ARE NOT NECESSARILY SHOWN. PROVIDE ALL SUCH ITEMS AS MAY BE REQUIRED TO FIT THE WORK TO THE CONDITIONS.
4. SEAL AROUND CONDUITS AND AROUND CONDUCTORS WITHIN CONDUITS ENTERING THE MODULAR CABINETS WHERE PENETRATION OCCURS WITH A SILICONE SEALANT TO PREVENT MOISTURE PENETRATION INTO BUILDING.

C. CONDUCTORS AND CONNECTORS

1. UNLESS NOTED OTHERWISE, ALL CONDUCTORS SHALL BE COPPER, MINIMUM SIZE #12 AWG, WITH THERMOPLASTIC INSULATION CONFORMING TO NEMA WC5 OR CROSS-LINKED POLYETHYLENE INSULATION CONFORMING TO NEMA WC7. (TYPES THHN). INSULATION SHALL BE RATED FOR 90 DEG. CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH NEC.
2. CONDUCTOR LENGTHS SHALL BE CONTINUOUS FROM TERMINATION TO TERMINATION WITHOUT SPLICES. SPLICES ARE NOT ACCEPTABLE. IF SPLICES ARE UNAVOIDABLE PRIOR APPROVAL FROM THE ENGINEER MUST BE OBTAINED.

D. GROUNDING

1. ALL LIGHTNING PROTECTION GROUNDING OF THE ELECTRICAL EQUIPMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT NFPA STANDARDS.
2. ALL GROUND LUG AND COMPRESSION CONNECTIONS SHALL BE COATED WITH ANTI-OXIDANT AGENT, SUCH AS NO-OX, NOALOX, PENETROX OR KOPRSHIELD.
3. ALL EXTERIOR GROUNDING CONDUCTORS INCLUDING EXTERIOR GROUND RING SHALL BE #2 AWG SOLID BARE TINNED COPPER. MAKE ALL GROUND CONNECTIONS AS SHORT AND DIRECT AS POSSIBLE. AVOID SHARP BENDS. THE RADIUS OF ANY BEND SHALL NOT BE LESS THAN 8" AND THE ANGLE OF ANY BEND SHALL NOT EXCEED 90°. GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARD TOWARD THE BURIED GROUND RING.
4. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY THERMO-WELDING WITH ERICO T-319 GALVANIZING BAR.
5. ALL EXTERNAL GROUND CONNECTIONS SHALL BE EXOTHERMICALLY WELDED. ALL EXOTHERMIC WELDS TO EXTERIOR GROUND RING SHALL BE THE PARALLEL TYPE, EXCEPT FOR THE GROUND RODS WHICH ARE TEE EXOTHERMIC WELDS. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY EXOTHERMIC WELDING. USE SPRAY GALVANIZER SUCH AS HOLUB LECTROSOL #15-501.

PROJECT INFORMATION

1. THIS IS AN UNMANNED AND RESTRICTED ACCESS EQUIPMENT AND WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC SERVICE.
2. THIS FACILITY WILL CONSUME NO UNRECOVERABLE ENERGY.
3. NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.
4. NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.
5. NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.
6. **eyeTower, LLC** MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

COMPOUND NOTES

1. THE MINIMUM LOWEST FIRST FLOOR ELEVATION SHALL NOT BE LESS THAN 4" ABOVE CROWN OF ROAD OR THE FEDERAL AND/OR COUNTY FLOOD CRITERIA ELEVATION, WHICHEVER IS HIGHER. CONTRACTOR SHALL SUBMIT AN ELEVATION CERTIFICATE (IF REQUIRE BY THE JURISDICTION) UPON COMPLETION OF PROJECT.
2. WORK OUTSIDE OF THE PROPERTY LINE INCLUDED IN THIS SET OF DRAWINGS SHALL BE, BUT NOT LIMITED TO, DRIVEWAYS, SODDING TO ASPHALT LINE AND UTILITY CONNECTIONS.
3. EXISTING TREES WITHIN CONSTRUCTION FOOTPRINT SHALL BE REMOVED AND PROPERLY DISPOSED OF. CONTRACTOR SHALL PROCURE PERMIT PRIOR TO REMOVAL.
4. CONTRACTOR AND SUBCONTRACTORS SHALL VERIFY ALL UTILITY SERVICE CONNECTION LOCATIONS PRIOR TO SUBMITTING BID AND PROCEEDING WITH WORK. IT IS RECOMMENDED THAT THE CONTRACTOR VISIT THE SITE AND VERIFY ALL DIMENSIONS AND NOTES BEFORE SUBMITTING BID AND PROCEEDING WITH WORK.
5. SOIL AT THIS SITE IS UNDISTURBED ROCK AND SAND ADEQUATE OF SUPPORTING THE DESIGN LOAD OF 2000 P.S.F. IF OTHER CONDITIONS ARE ENCOUNTERED, NOTIFY MIRRISON HERSHFIELD BEFORE PROCEEDING WITH WORK. THIS VALUE IS CONSIDERED SAFE WITH RESPECT TO ACTUAL FAILURE OF THE SUPPORTING GROUND, BUT DOES NOT NECESSARILY ENSURE THE PREVENTION OF EXCESSIVE FOUNDATION MOVEMENTS.
6. BURY PHONE, AND ELECTRIC SERVICE NO LESS THAN 24" BELOW FINISH GRADE WITH 1'-0" RADIUS SAND BACKFILL AROUND PIPES. COORDINATE W/ ELECTRICAL DRAWINGS.
7. IN ORDER TO AVOID ANY CONFLICTS, CONTRACTOR SHALL COORDINATE ALL HIS PRACTICAL TRADES.
8. THE POWER CABINET MUST BE CLEAR OF FLAMMABLE MATERIAL WITHIN 12 INCHES OF THE CABINET, INCLUDING ABOVE THE CABINET.
9. EXHAUST OUTLETS MUST BE LOCATED AT LEAST 10 FEET FROM ANY HVAC AIR INTAKES, WINDOWS, DOORS, AND OTHER OPENINGS INTO A BUILDING – COORDINATE IN FIELD.
10. THE POWER CABINET MUST BE MOUNTED ON THE FOUNDATION TO ALLOW WATER TO DRAIN FROM THE DRAIN OUTLET AND AWAY FROM THE CABINET.
11. TO ENSURE SERVICEABLE ABILITY, THE DOORS OF CABINETS WILL REQUIRE AN OPENING RADIUS OF 36 INCHES OF CLEARANCE FROM THE CLOSED POSITION TO THE OPEN POSITION.

SITE GENERAL NOTES

1. RESTORE EXISTING ASPHALT AND/OR CONCRETE COMPOUND TO IT'S ORIGINAL CONDITION
2. CONTRACTOR SHALL DETECT AND MARK ANY UNDERGROUND LINES, PIPING, PRIOR TO START OF EXCAVATION

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER
2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:

CROWN CASTLE
100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:

MORRISON HERSHFIELD
8604 Cliff Cameron Drive, Suite 152
Charlotte, NC 28269
TEL: 704.499.6861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

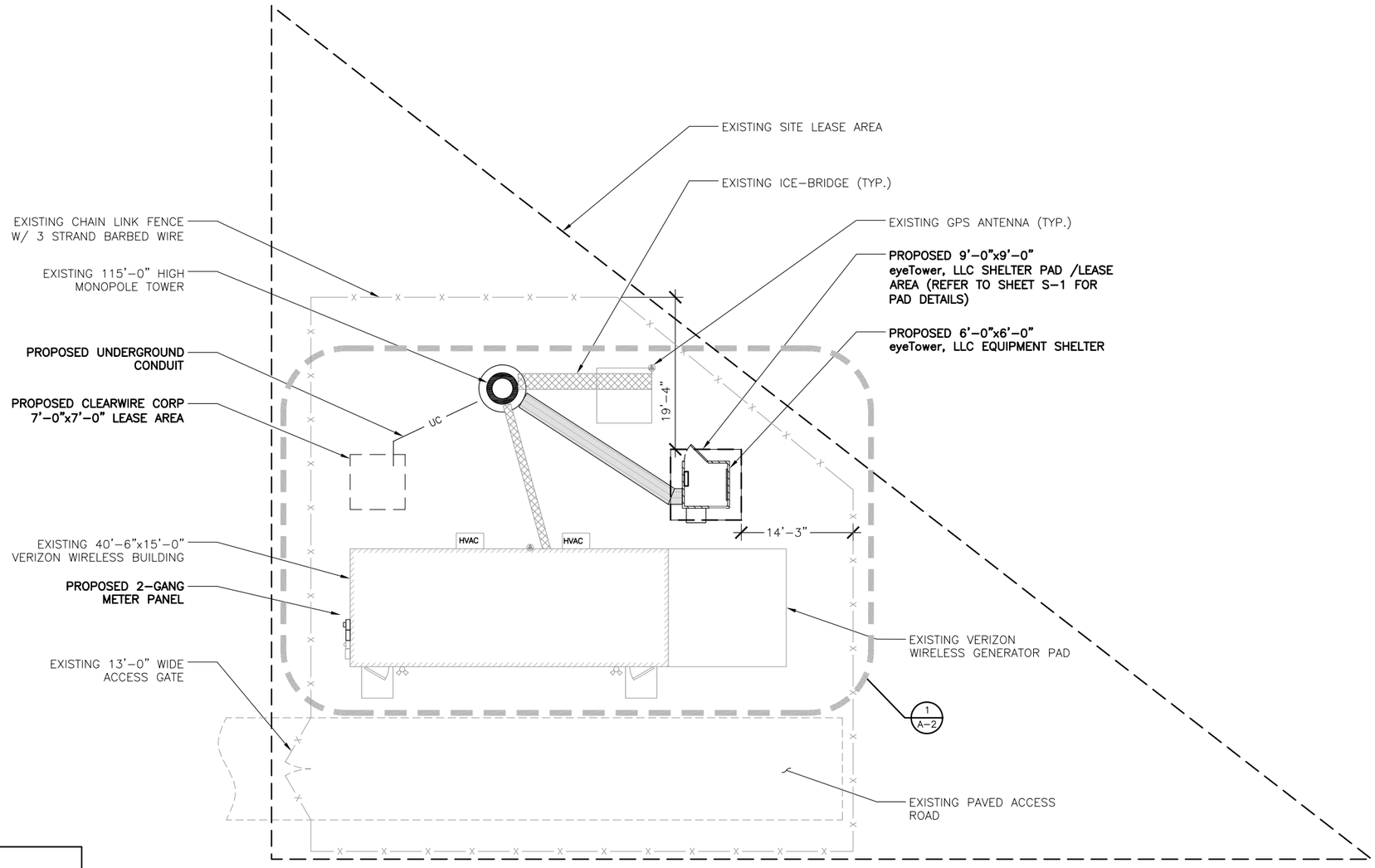
266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

NOTES

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. G-1

SCALE IS BASE ON 22" X 34" "D" SIZE



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Know what's **below.**
Call before you dig.

NOTE:
THE NEW CONSTRUCTION WILL NOT DISTURB OR DESTROY EXISTING LANDSCAPING OR TREES.

NOTE:
SITE PLAN INFORMATION CONTAINED HEREIN IS TAKEN FROM THE DOCUMENTS PROVIDED BY CLIENT. NEITHER WARRANTY NOR GUARANTEE IS GIVEN BY THE ARCHITECT NOR MORRISON HERSHFIELD CORPORATION TO THE ACCURACY NOR THE COMPLETENESS OF THE COPIED SURVEY/SITE PLAN INFORMATION.

TRUE NORTH

COMPOUND PLAN

ANSI "D" SCALE: 1/8" = 1'-0"
ANSI "B" SCALE: 1/16" = 1'-0"
8' 6' 4' 2' 0' 8'

1

STATE OF CONNECTICUT
ROBERT J. LARA
LICENSED ARCHITECT
No. 11509

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Drawing Title:
COMPOUND PLAN

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. A-1

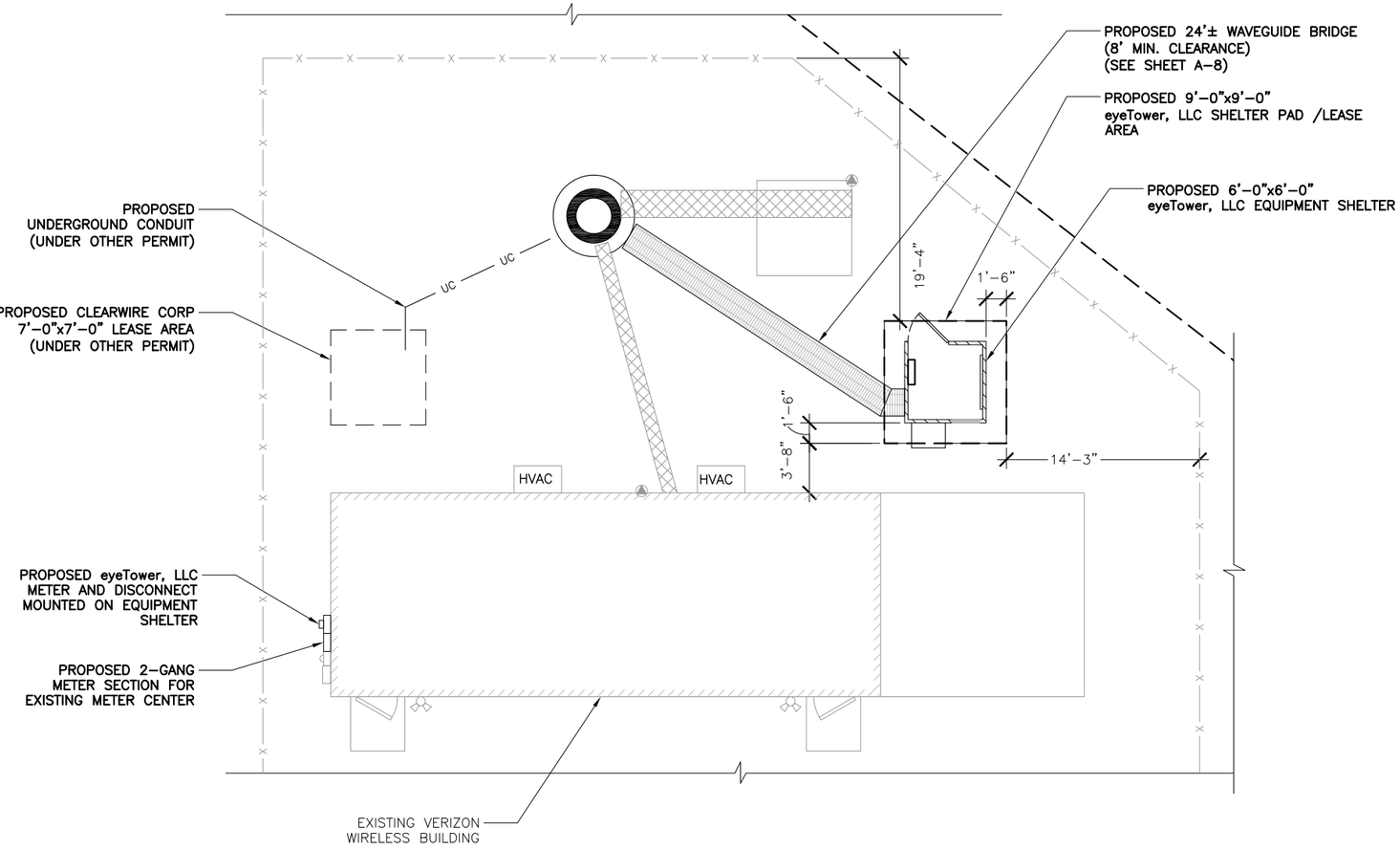
SCALE IS BASE ON 22" X 34" "D" SIZE

GENERAL REFERENCE NOTES

1. DAMAGE TO ALL UTILITIES, LAND, ACCESS AREAS, AND PROPERTY OF OTHERS DISTURBED DURING CONSTRUCTION SHALL BE RETURNED TO THE ORIGINAL CONDITION AT THE COMPLETION OF THE WORK.
2. REMOVE ANY EXISTING VEGETATION AND ORGANIC MATERIALS FROM THE LEASE AREA.
3. RE-GRADE AROUND THE EQUIPMENT SLAB AS REQUIRED TO ALLOW A MAXIMUM 4" OF PAD THICKNESS EXTENDING ABOVE THE FINISHED GRAVEL SURFACE. REPLACE GRAVEL AROUND SLAB AT COMPLETION OF INSTALLATION.
4. ALL WORK SHALL BE DONE IN A SATISFACTORY AND PROFESSIONAL WORKMANLIKE MANNER. ALL WORK SHALL BE SUBJECT TO INSPECTION DURING CONSTRUCTION AND FINAL APPROVAL BY THE CONSTRUCTION MANAGER.
5. ANY SUBSTITUTIONS OF MATERIALS, EQUIPMENT, OR DEVIATIONS FROM THE DESIGN PLAN OR SPECIFICATIONS SHALL BE COORDINATED AND APPROVED BY THE CONSTRUCTION MANAGER.
6. COLOR SELECTION FOR PAINTED ITEMS SHALL BE MADE BY THE CONSTRUCTION MANAGER.
7. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS SHOWN PRIORTO BID SUBMITTAL. AND CONFLICTS, DISCREPENCIES, ERRORS, AND/OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER.
8. CONTRACTOR SHALL CONTACT A SUBSURFACE UTILIES LOCATOR FOR EXACT LOCATIONS OF ALL EXISTING UTILITES WITHIN DISTURBED AREAS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITES BY DIGGING A TEST PIT, AS NECESSARY. THE LOCATIONS OF EXISTING UTILITES SHOWN ON THESE PLANS ARE APPROXIMATE AND ARE FOR PLANNING PURPOSES ONLY.
9. THE CONTRACTOR SHALL PROVIDE ANY NECESSARY PROTECTION FOR EXISTING UTILITES DURING CONSTRUCTION.
10. THE CONTRACTOR SHALL MAINTAIN A CLEAN SET OF CONSTRUCTION DRAWINGS AT THE SITE FOR THE PURPOSE OF DOCUMENTING "AS-BUILT" CONDITIONS AND DEVIATIONS FORM THE ORIGINAL DESIGN. THE REDLINE DRAWINGS SHALL BE TURNED OVER TO THE CONSTRUCTION MANAGER AT THE COMPLETION OF THE PROJECT.
11. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS FOR THE PROJECT FROM ALL APPLICABLE GOVERNMENT AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BE ALL THE CONDITIONS AND REQUIREMENTS OF THE PERMITS.
12. THE CONTRACTOR SHALL PROTECT ALL SURVEY STATIONS AND CONTROL POINTS DURING CONSTRUCTION AND SHALL RE-ESTABLISH ANY DISTURBED CONTROL POINTS.
13. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE GOVERING LOCAL BUILDING CODE AND ALL APPLICABLE AMENDMENTS. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL GOVERNING LOCAL OFFICAL FOR LOCAL BUILD CODE REQUIREMENTS.
14. THE CONTRACTOR SHALL VISIT THE PROJECT SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS INCLUDING SITE ACCESS PRIOR TO BID SUBMITTAL. ANY CHANGES DURING CONSTRUCTION DUE TO AN EXISTING CONDITION WHICH IS VISUALLY ASCERTAINABLE PRIOR RO BID SUBMITTAL, CANNOT BE USED AS THE BASIS FOR A CHANGE ORDER.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL WASTE DEBRIS AND VEGETATION FROM THE SITE. BURIAL AND/OR BURNING OF WASTE MATERIALS IS NOT ACCEPTABLE.

NOTES:

1. CONDUIT ROUTING IS SCHEMATIC ONLY, CONTRACTOR SHALL DETERMINE SUITABLE ROUTING IN THE FIELD.
2. CONTRACTOR TO REUSE EXISTING CONDUITS ROUTED TO EXISTING GENERATOR AS POSSIBLE. FIELD VERIFY.
3. CONTRACTOR SHALL TEST & CERTIFY CONDITION OF EXISTING GAS LINE PRIOR TO CONNECTION OF NEW GENERATOR OR REPLACE W/NEW LINE – SEE ISOMETRIC DIAGRAM DETAIL A/A-4.



TRUE NORTH

EQUIPMENT LAYOUT PLAN

ANSI "D" SCALE: 3/16" = 1'-0"
ANSI "B" SCALE: 3/32" = 1'-0"
4' 2' 0" 4'

1

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
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Drawing Title:

EQUIPMENT LOCATION PLAN

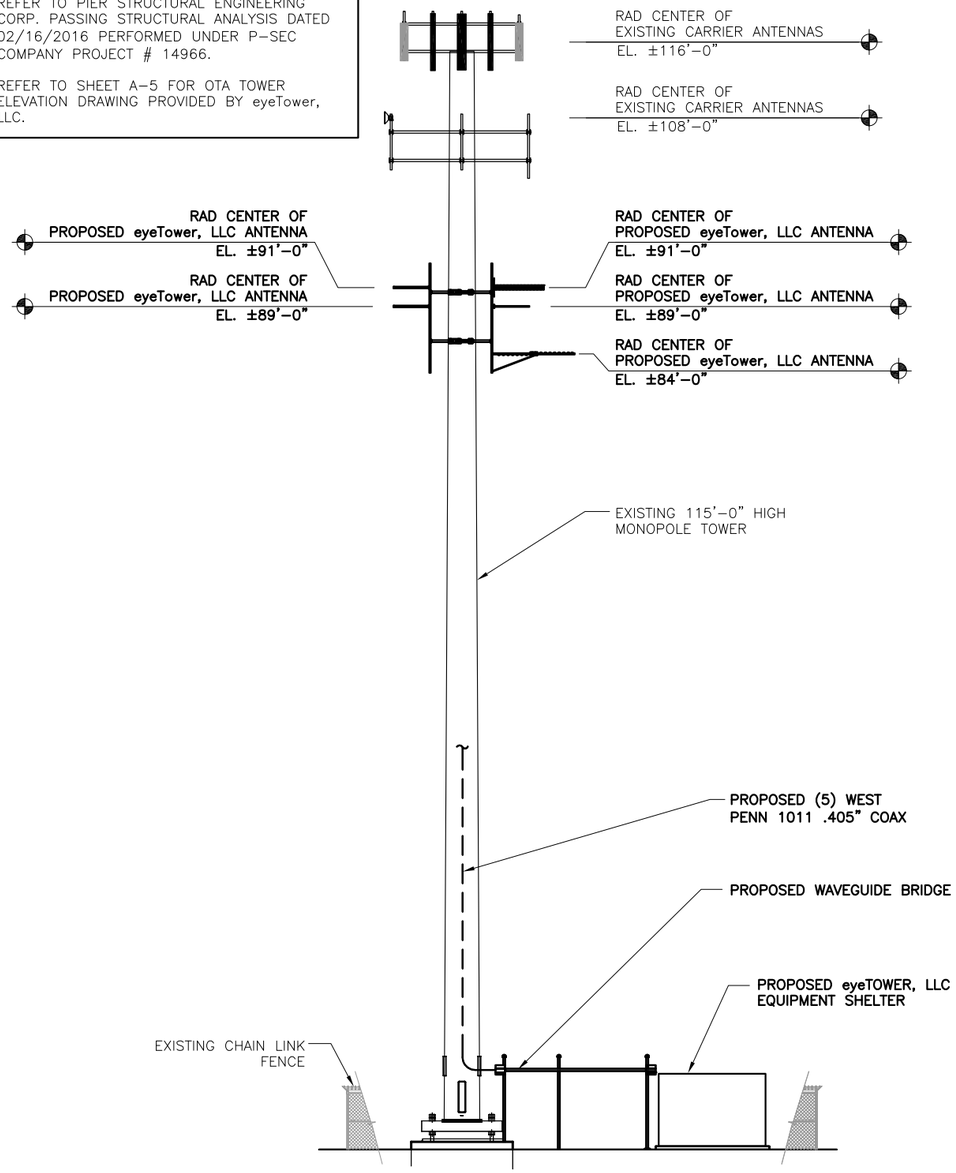
Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No.: A-2

SCALE IS BASE ON 22" X 34" "D" SIZE

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\9.0 Sites\BDL200_HRT\9.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:45pm bfraser

NOTE:
NO WORK SHALL COMMENCE WITHOUT THE APPROVED TOWER/ANTENNA MOUNT STRUCTURAL ANALYSIS REPORT SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER UNDER SEPARATE COVER. IF REQUIRED, THE CONTRACTOR SHALL MODIFY TOWER AND/OR ANTENNA MOUNTS AS INDICATED IN THE ABOVE MENTIONED STRUCTURAL REPORT OR ASSOCIATED MODIFICATION DESIGN DRAWINGS.

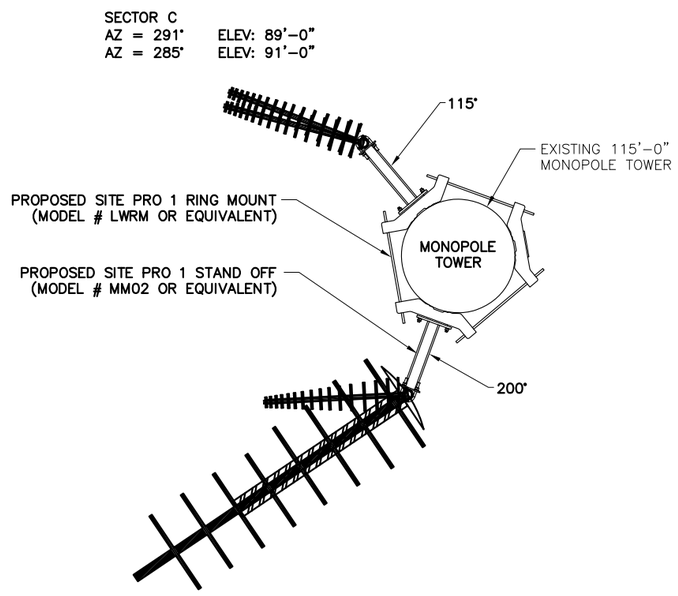
NOTE:
1. REFER TO PIER STRUCTURAL ENGINEERING CORP. PASSING STRUCTURAL ANALYSIS DATED 02/16/2016 PERFORMED UNDER P-SEC COMPANY PROJECT # 14966.
2. REFER TO SHEET A-5 FOR OTA TOWER ELEVATION DRAWING PROVIDED BY eyeTower, LLC.



TOWER ELEVATION

ANSI "D" SCALE: 1/8" = 1'-0"
ANSI "B" SCALE: 1/16" = 1'-0"
8' 6' 4' 2' 0" 8'

NOTE:
1. REFER TO ANTENNA SCHEDULE FOR ADDITIONAL INFO.
2. ADJUST ANTENNA MOUNTS AS REQUIRED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT RF SHADOWING.
3. CONTRACTOR TO FIELD VERIFY TOWER DIAMETER PRIOR TO ORDERING MOUNT.



TRUE NORTH

ANTENNA LAYOUT

ANSI "D" SCALE: 1/2" = 1'-0"
ANSI "B" SCALE: 1/4" = 1'-0"
2' 1' 0" 2'

DO NOT SCALE DRAWINGS. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND ADVISE CONSULTANTS OF ANY ERRORS OR OMISSIONS. NO VARIATIONS OR MODIFICATIONS TO WORK SHOWN SHALL BE IMPLEMENTED WITHOUT PRIOR WRITTEN APPROVAL. ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED BY THE LATEST REVISION. ALL DRAWINGS AND SPECIFICATIONS REMAIN THE PROPERTY OF MORRISON HERSHFIELD CORPORATION. NEITHER MORRISON HERSHFIELD NOR THE ARCHITECT WILL BE PROVIDING CONSTRUCTION REVIEW OF THIS PROJECT.

STATE OF CONNECTICUT
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266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:
TOWER ELEVATION & ANTENNA ORIENTATION

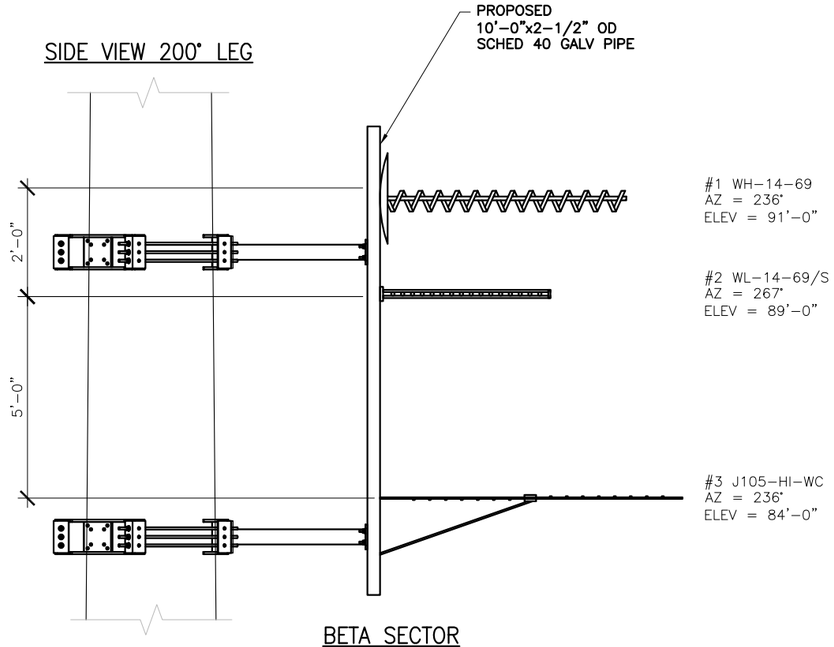
Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. A-3

SCALE IS BASE ON 22" X 34" "D" SIZE

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\9.0 Sites\BDL200_HRT\9.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:45pm bfraser

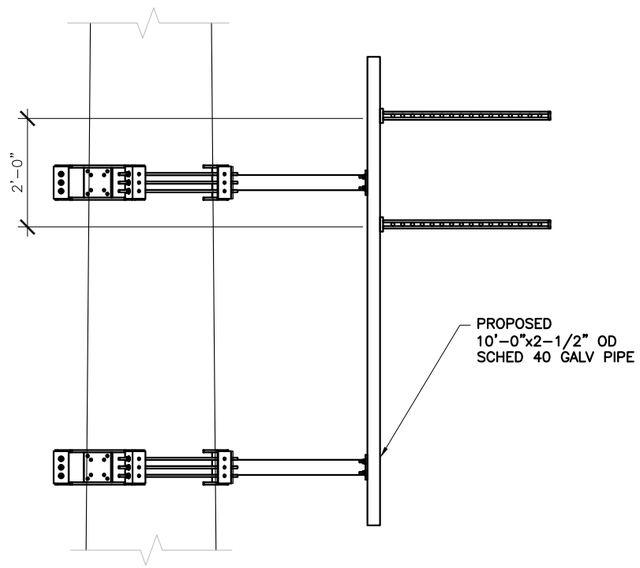
1 2 3 4 5 6

SIDE VIEW 200° LEG



BETA SECTOR

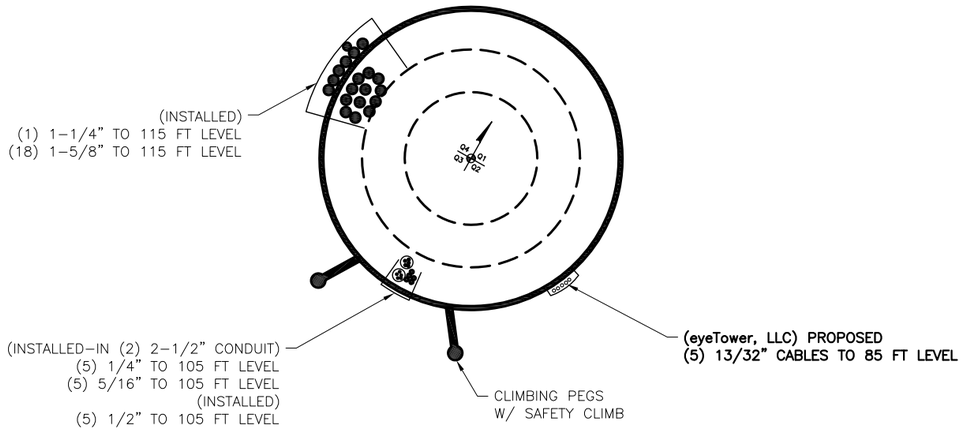
SIDE VIEW 320° LEG



GAMMA SECTOR

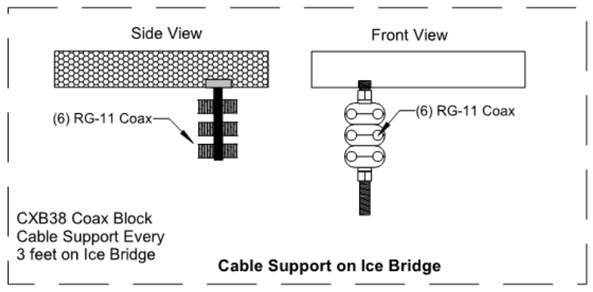
ANTENNA DETAIL — 22"x34" SCALE: NOT TO SCALE; 11"x17" SCALE: NOT TO SCALE — 1

NOTE:
1. REFER TO PIER STRUCTURAL ENGINEERING CORP. PASSING STRUCTURAL ANALYSIS DATED 02/03/2016 PERFORMED UNDER P-SEC COMPANY PROJECT # 14966.



BASE LEVEL VIEW — 22"x34" SCALE: NOT TO SCALE; 11"x17" SCALE: NOT TO SCALE — 2

Cable Support Detail



CABLE SUPPORT DETAIL — 22"x34" SCALE: NOT TO SCALE; 11"x17" SCALE: NOT TO SCALE — 3

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:
eyeTOWER
2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:
CROWN CASTLE
100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:
MORRISON HERSHFIELD
8604 Cliff Cameron Drive, Suite 152
Charlotte, NC 28269
TEL: 704.499.6861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:
806372
BDL200
266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:
ANTENNA DETAILS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No.: A-4

SCALE IS BASE ON 22" X 34" "D" SIZE

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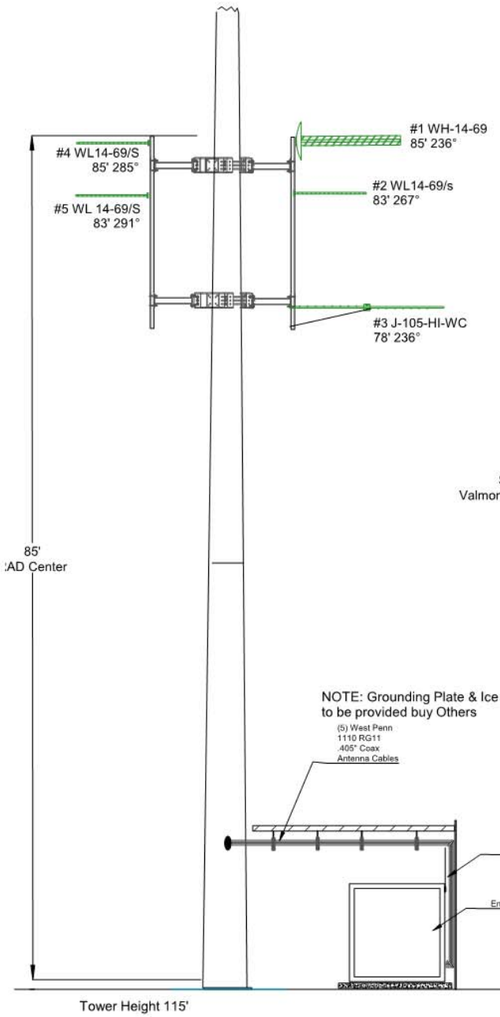

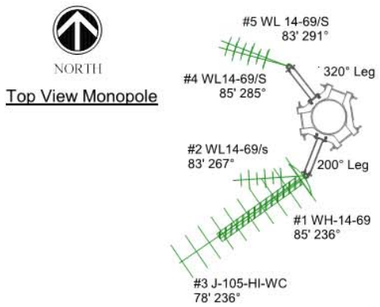

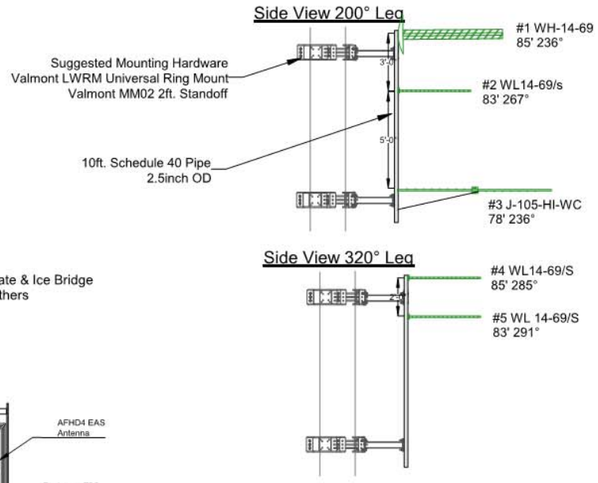

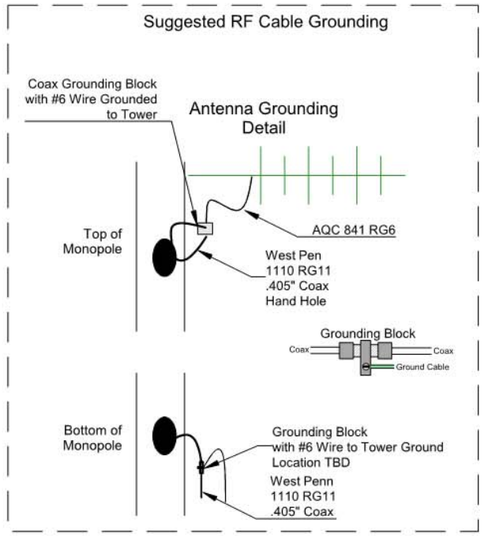

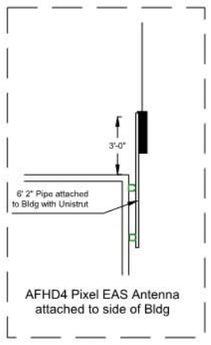

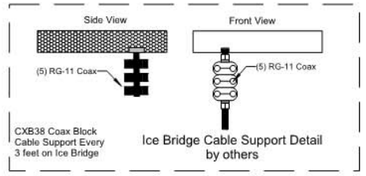

NOTE:

OTA TOWER ELEVATION DRAWING WAS PROVIDED BY eyeTower, LLC.

eye Tower LLC 806372 Hartford
266R Center St. Manchester, CT
OTA Monopole Elevations

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
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STATE OF CONNECTICUT
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0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

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eyeTOWER

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Tower Owner/Client:

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CARY, NC 27518

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TEL: 704.499.8861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

OTA TOWER ELEVATION

Project No.: 7160018

Designer:	Date:
CG	05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. A-5

SCALE IS BASE ON 22" X 34" "D" SIZE

DASCOM SYSTEMS GROUP
2415 Ventura Drive Woodbury, MN, 55125
Phone: (651) 578-1200 Fax: (651) 578-2565
www.dascomsystems.com

Title: OTA Monopole Elevations
Customer: eye Tower 806372
Project: 806372 Hartford
Revision:
Job # : 806372
Engineered By:
Drawn By: KDO
Approved By:
Scale: NTS
File Name: eT 806372 Center St. Hartford OTA Monopole 050416
Date: 05/04/16

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\9.0 Sites\BDL200_HRT\9.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:45pm bfraser

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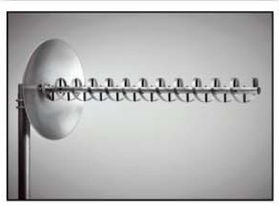
WADE Antenna, Inc.



Helical Antennas

WH14-69/24, WH14-69/32, WH14-69/43

Description

The Wade Helical Antenna is circularly polarized for CATV Off-Air reception. The WH14-69 covers the entire UHF band (470- 806 MHz), channels 14 through 69.

Available as a single antenna or a customized antenna array. Electrical performance of the WH14-69, along with the high quality of materials used in the construction of this antenna, have resulted in a superior performance and longevity even when exposed to the most extreme weather conditions.

ELECTRICAL SPECIFICATIONS

SPECIFICATION	WH14-69/24	WH14-69/32	WH14-69/43
FREQUENCY RANGE	470-806 MHz	470-806 MHz	470-806 MHz
GAIN (dBic)	17	18	19
GAIN (dBi)	14	15	16
NUMBER OF TURNS	12	12	12
VSWR MAX	1.9	1.9	1.9
VSWR TYPICAL	1.4	1.4	1.4
HPBW HORIZONTAL	30	27	24
HPBW VERTICAL	28	25.5	23
POLARIZATION	Circular	Circular	Circular
SIDELOBE SUPPRESSION	15dB	16dB	17dB
F/B RATIO (dB)	>23	>25	>27
CROSS POLARIZATION SUPPRESSION	20dB	20dB	20dB
IMPEDANCE	75 Ohm	75 Ohm	75 Ohm
CONNECTOR	"F" Connector	"F" Connector	"F" Connector
MAX. INPUT POWER	25 W	25 W	25 W
TEMPURATURE (C)	-40 to +70	-40 to +70	-40 to +70

MECHANICAL SPECIFICATIONS

SPECIFICATION	WH14-69/24	WH14-69/32	WH14-69/43
OVERALL LENGTH	65"	65"	65"
HELIX DIAMETER	5.875"	5.875"	5.875"
GROUND PLANE DIAM.	24	32	42.67
STUB LENGTH	6.5"	6.5"	6.5"
STUB OD	1.5"	1.5"	1.5"
ANTENNA WEIGHT (lbs)	12	13	14
MOUNTING OPTION	Mast	Mast	Mast
MAST OD	2.5"	2.5"	2.5"

WIND LOAD SPECIFICATIONS

SPECIFICATION	WH14-69/24	WH14-69/32	WH14-69/43
WIND AREA (Sq. ft.)			
NO ICE *	1.64	1.94	2.32
1" RADIAL ICE **	3.68	4.02	4.42
WIND LOAD (ft. lbs)			
NO ICE *	143	169	203
1" RADIAL ICE **	93	102	122
SURVIVAL WIND SPEED (no ice)	180	165	151

*Wind Speed: 100mph **Half Wind: 50mph

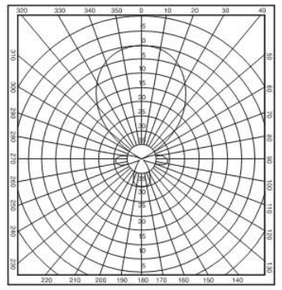
Wade Antenna's ongoing policy of continuing development may result in specification changes to its products.

WADE Antenna, Inc.
29 Sharp Road, Brantford, Ontario, N3T 5L8 Canada
Tel: 519.756.7157 Fax: 519.756.5056

1.800.463.1607
sales@wadeantenna.com
www.wadeantenna.com

SPEC0026_A01

WADE Antenna, Inc.



SINGLE UHF ANTENNA MODEL:

- WL 14-69/S

A single broadband UHF model provides optimum performance over the desired band. The 75 Ohm feed point is sealed within the boom. A short length of cable is fitted with a standard "F" connector for connection to the down lead. This light weight, high quality antenna is small in size and big on performance.

ELECTRICAL SPECIFICATIONS:

MODEL(S)	WL-14-69/S
Frequency Range (MHz)	470-800 MHz
Channels	14 to 69
Gain	11 dBi
Impedence	75 Ohm
VSWR	<1.25:1
FR:BK Ratio	>25 dB
Polarization	H or V
H. Beam Width	46 deg.
V. Beam Width	65 deg.
Side lobe Suppression	>30 dB
Connectors	"F" Connector
Std. Mount	3/8" U-bolts to fit 2-7/8" O.D. Pipe

- Where interfering signals such as co-channel, adjacent channel and ghosting are present, custom arrays can be designed to reduce the level of interference by as much as 40 db in most cases.

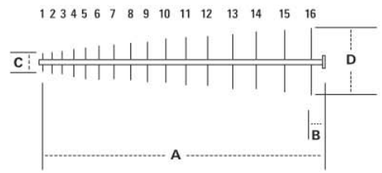
MECHANICAL SPECIFICATIONS:

MODEL(S)	WL-14-69/S
Boom length	45.25"
Weight (lbs):	
No ice	5.8
1" radial ice	35
Wind load (lbs):	
No ice*	23
1" radial ice**	15
Wind torque (ft-lbs):	
No ice*	43.5
1" radial ice**	28.5
Wind load area (sq.ft.)	
No Ice	0.63
1" Radial Ice	1.42

*** WIND SPEED - 100 M.P.H. ** HALF WIND SPEED - 50 M.P.H.**

OVERALL DIMENSIONS

MODEL(S)	WL-14-69/S
Number of Elements	16
Boom Length (A)	45.25"
Boom Length (B)	2.675"
Shortest Length (C)	3.675"
Longest Element (D)	11"



WADE Antenna Inc.
29 Sharp Road
Brantford, Ontario, N3T 5L8 Canada
Tel: 519.756.7157
Fax: 519.756.5056

(800) 463-1607
sales@wadeantenna.com

www.wadeantenna.com

STATE OF CONNECTICUT
ROBERT J. LARA
LICENSED ARCHITECT
No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
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3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER

2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:

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100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:

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TEL: 704.499.8861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

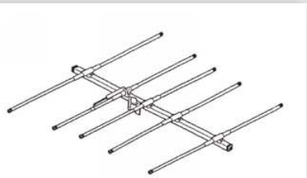
Drawing Title:

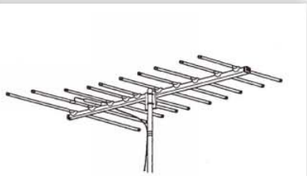
ANTENNA SPECS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. A-6

SCALE IS BASE ON 22" X 34" "D" SIZE

WADE Antenna, Inc.


J55-*


J105-*

J-Series YAGI and LOG Periodic Antenna

J55-* (Single Channel), J105-* (Single Channel), J55-LO (Log Periodic), J105-HI (Log Periodic)

Description

J-Series system antennas are specifically designed for commercial and industrial master antenna installations. Their heavy-duty construction ensures reliability under severe climatic conditions, providing a durable, trouble-free operation. Available in both cut-to-channel yagi and broadband models. Our single channel antennas feature sharp directivity for high gain, and excellent front-to-back ratios. Broadband models are of true log periodic design assuring extremely flat response and matched output over the entire band. All antennas are available with the exclusive Wade Cantilever Mount. Our J Series antennas are the answer to any system where high reliability or long life is a must.

Features

- Extra heavy-duty construction
- Seamless end-sealed chrome aluminum tubing prevents moisture penetration
- Anti-corrosion ensures maintenance free, weather resistant installation
- Stack vertically or horizontally for increased gain and directivity
- 125 mph wind velocity survival rating
- Cantilever mount available for all models

ELECTRICAL SPECIFICATIONS

	Cut Channel		Broadband	
MODEL	**J55-***	**J105-***	**J55-LO**	**J105-HI**
NO. ELEMENTS	5	10	5	10
CHANNEL*	2 to FM*	7 to 13*	2 Thru FM	7 Thru 13
GAIN	10 dBi	12.5 dBi	10 dBi	10.5 dBi
IMPEDANCE	75 Ohm	75 Ohm	75 Ohm	75 Ohm
VSWR	1.5:1	1.5:1	1.5:1	1.5:1
FR:BK RATIO	18 dB	20 dB	22 dB	22 dB
POLARIZATION	Horiz.	Horiz.	Horiz.	Horiz.
H. BEAM WIDTH	60 deg.	44 deg.	60 deg.	49 deg.
V. BEAM WIDTH	100 deg.	59 deg.	100 deg.	75 deg.
CONNECTOR	"F" Connector	"F" Connector	"F" Connector	"F" Connector
CENTRE MOUNT	Standard	Standard	Standard	Standard
CANTILEVER MOUNT	Optional	Optional	Optional	Optional
PIPE SIZE **	Up to 2.5" O.D.	Up to 2.5" O.D.	Up to 2.5" O.D.	Up to 2.5" O.D.

* Specify Channel ** Larger sizes available on request

** See reverse for Mechanical Specifications and more images. **

Wade Antenna's ongoing policy of continuing development may result in specification changes to its products.

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1.800.463.1607
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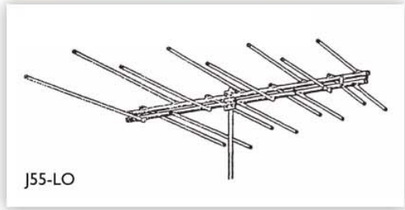
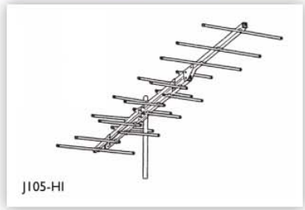
WADE Antenna, Inc.

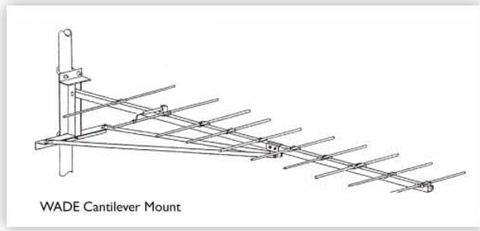

J55-LO


J105-HI

MECHANICAL SPECIFICATIONS

				THRUST (FT-Lbs)	
MODEL	**LENGTH (IN.)**	**WIDTH (IN.)**	**WEIGHT (LBS)**	**NO ICE**	**1/4" ICE**
J55-LO	94	54	24	69	109
J105-HI	104	33	19	55	77
J55-2	102	110	18	52	80
J55-3	89	100.5	18	46	72
J55-4	88	89	17	40	66
J55-5	80	77	16	36	60
J55-6	71	70	16	32	54
J55-FM	79	65	16	32	54
J105-7	98	33.5	16	35	55
J105-8	98	32.5	16	33.5	52.5
J105-9	98	31.5	15	31.5	50
J105-10	91	30.5	15	30	48.5
J105-11	91	30	15	28.5	46.3
J105-12	85	28.5	15	27.5	44
J105-13	82	27	15	26	42

* Length of longest element ** Wind speed 100mph


WADE Cantilever Mount

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WADE Antenna, Inc.
29 Sharp Road, Brantford, Ontario, N3T 5L8 Canada
Tel: 519.756.7157 Fax: 519.756.5056
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www.wadeantenna.com

SPEC0017_A02

STATE OF CONNECTICUT · ROBERT J. LARA · No. 11509 · LICENSED ARCHITECT

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
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CARY, NC 27518

A/E Consultant:
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Charlotte, NC 28269
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MANCHESTER, CT 06040

Drawing Title:
ANTENNA SPECS

Project No.: 7160018

Designer:	Date:
CG	05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No.: A-7

SCALE IS BASE ON 22" X 34" "D" SIZE

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\9.0 Sites\BDL200_HRT\9.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:46pm bfraser

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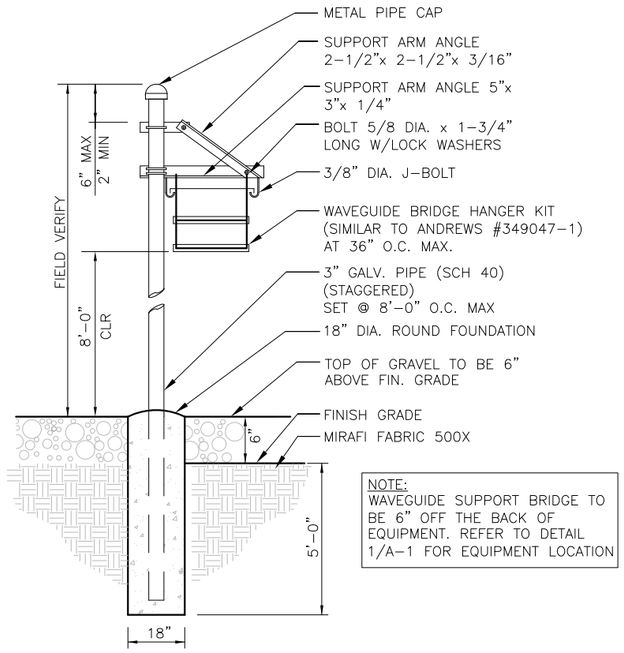


NOTE:
WAVEGUIDE SUPPORT BRIDGE TO BE 6" OFF THE BACK OF EQUIPMENT. REFER TO DETAIL 1/A-1 FOR EQUIPMENT LOCATION

WAVEGUIDE BRIDGE DETAIL

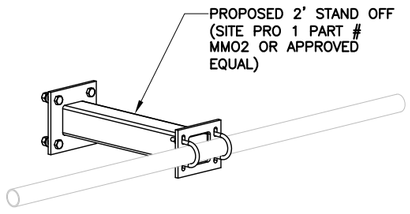
22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

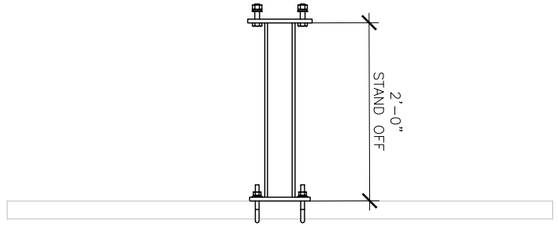
1

NOT USED

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

2





MOUNT DETAIL

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

3

NOT USED

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

4

STATE OF CONNECTICUT
ROBERT J. LARA
LICENSED ARCHITECT
No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER

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Tower Owner/Client:

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CARY, NC 27518

A/E Consultant:

MORRISON HERSHFIELD

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Charlotte, NC 28269
TEL: 704.499.6861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

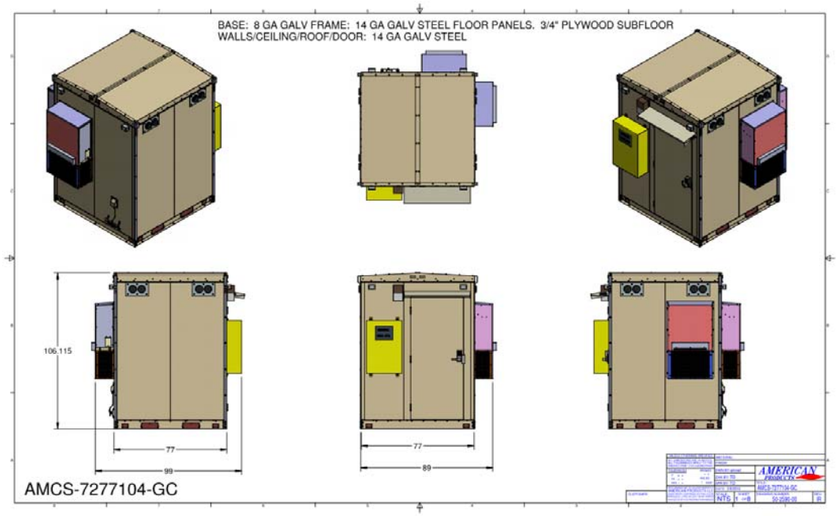
266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

DETAILS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. A-8

SCALE IS BASE ON 22" X 34" "D" SIZE



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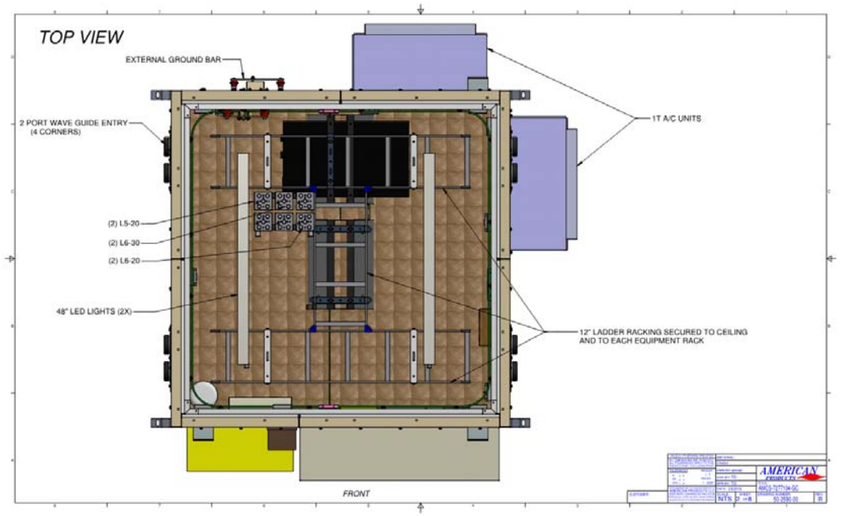

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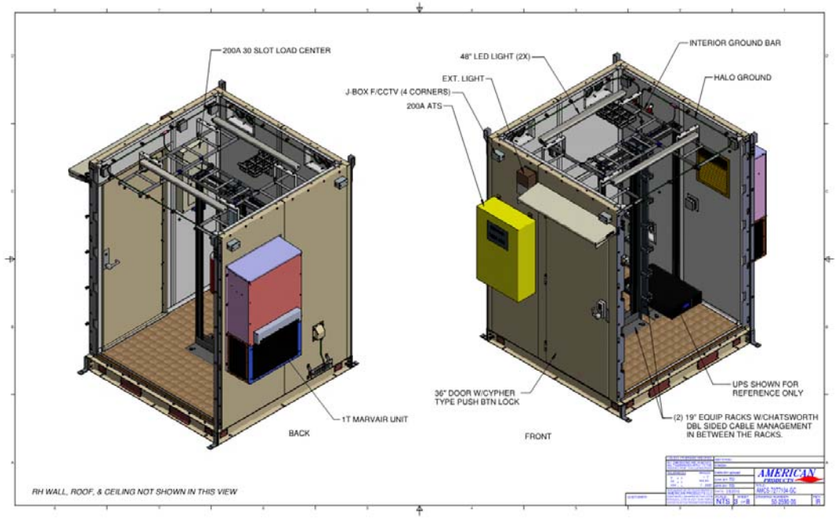

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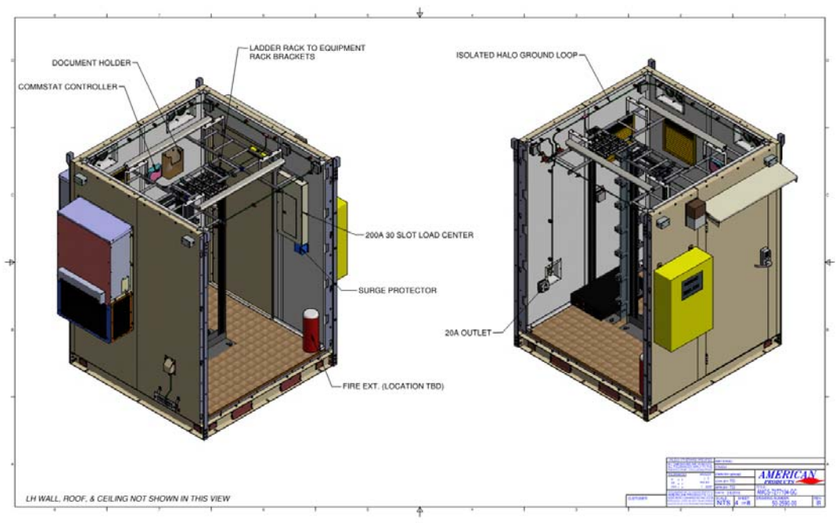

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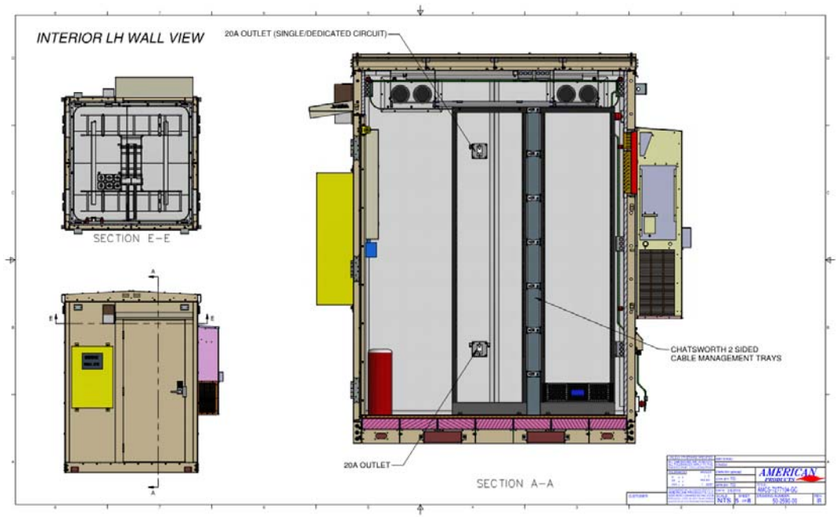

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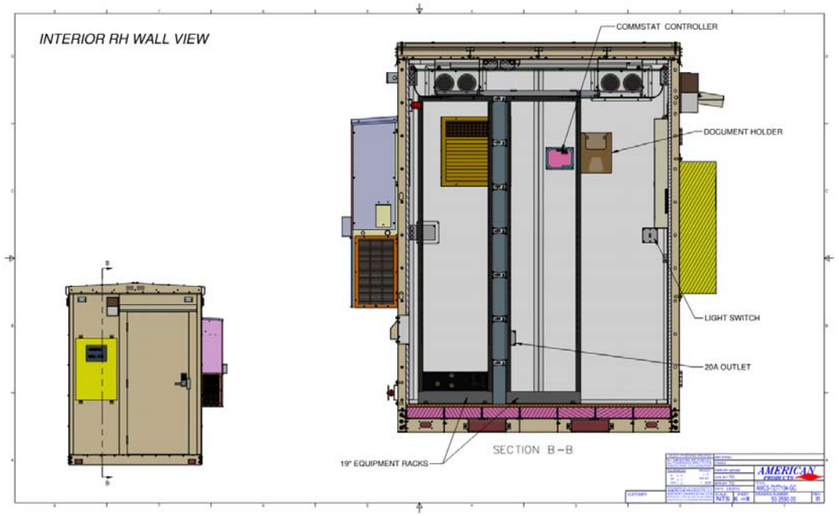

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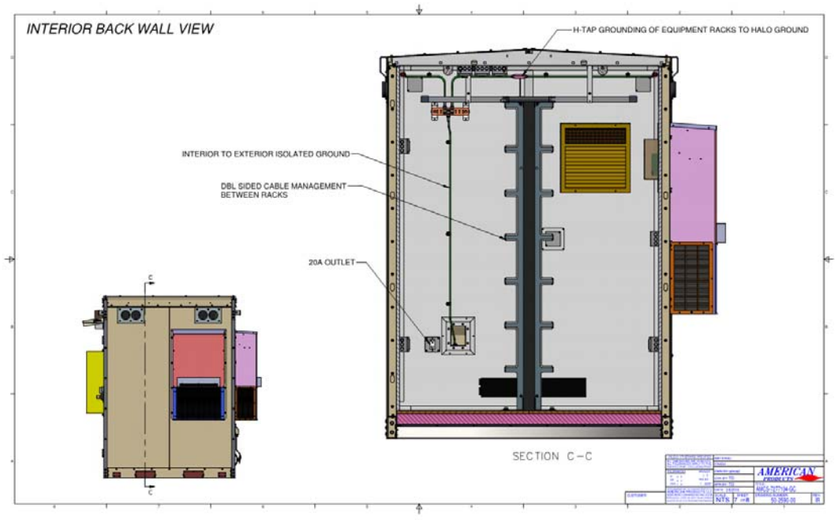

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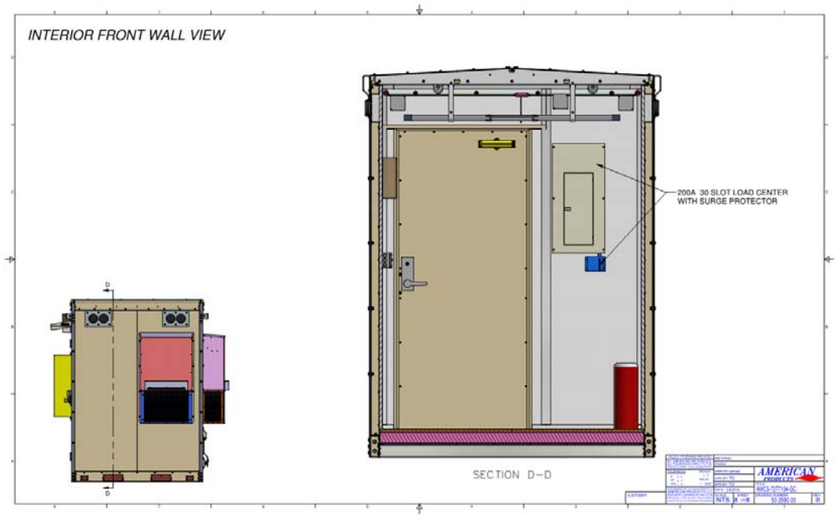

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Issue No.: 1	Drawing No.: A-10

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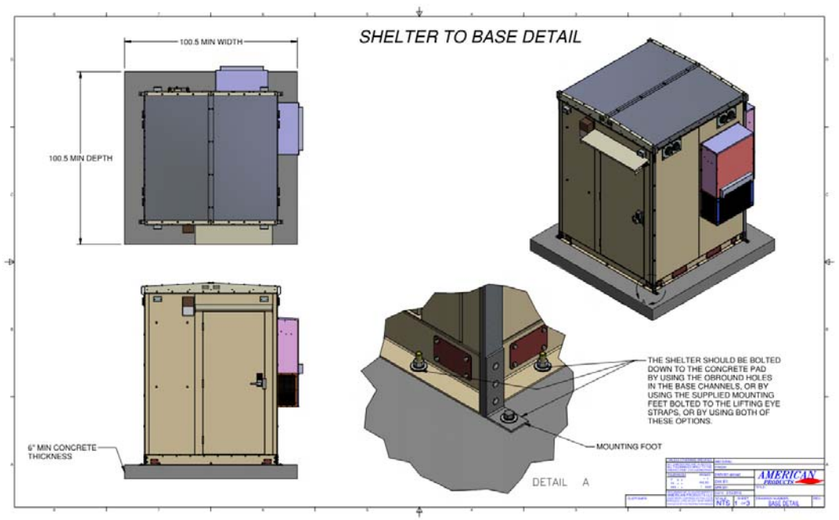
A B C



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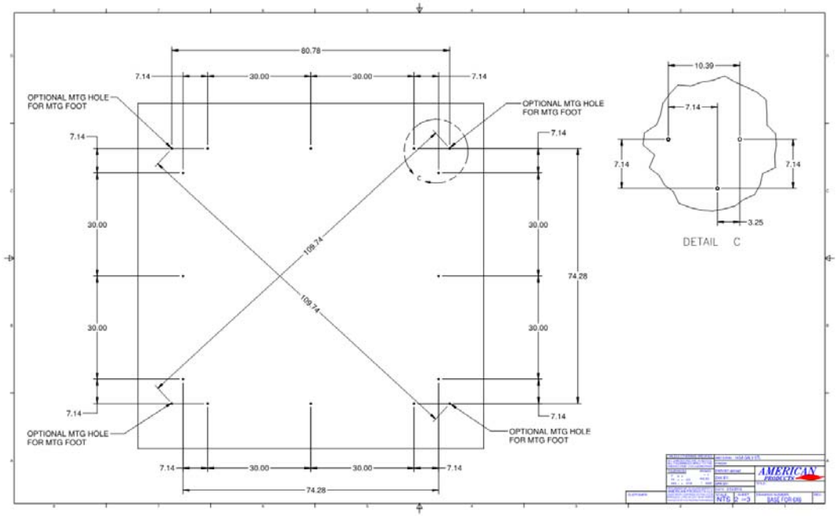

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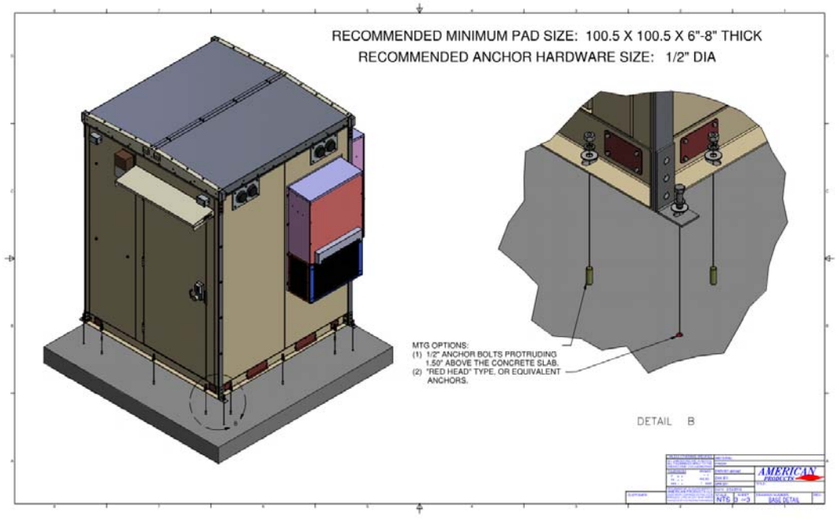

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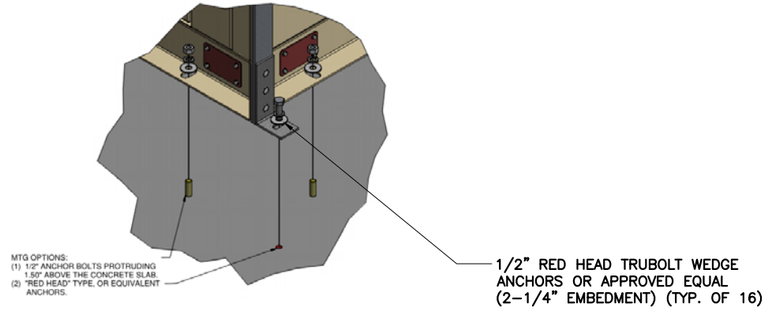

SHELTER ANCHORAGE DETAIL — 22"x34" SCALE: NOT TO SCALE; 11"x17" SCALE: NOT TO SCALE — 4

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Drawing Title:

DETAILS

Project No.: 7160018

Designer:	Date:
CG	05/10/16
Drawn By:	Checked By:
RM	RL
PM Review:	Client Approval
CG	

Issue No.: 1

Drawing No.: A-11

SCALE IS BASE ON 22" X 34" "D" SIZE

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C B A

CONCRETE:

1. ALL CONCRETE SHALLL BE 4000 PSI MIN. IN 28 DAY AND ALL WORK SHALL CONFORM TO ACI 318, " BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE " AND TO THE PROJECT SPECIFICATIONS.
2. READY-MIX CONCRETE SUPPLIERS TO BE NRMCA-CERTIFIED.
3. ALL CONCRETE IS TO BE NORMAL DENSITY CONCRETE WITH A MAXIMUM SLUMP OF 4 INCHES. MAXIMUM AGGREGATE SIZE 3/4 INCH.
4. NO ADDITIONAL WATER SHALL BE ADDED TO THE CONCRETE AT THE JOB SITE.
5. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES.
6. HOT WEATHER CONCRETE: COMPLY WITH ACI 305R.
7. PROVIDE CHAMFERS, REVEALS, REGLETS, RECESSES AND THE LIKE AS SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS.
8. NO HOLES OR SLEEVES SHALL BE MADE THROUGH CONCRETE WORK OTHER THAN THOSE INDICATED ON THE STRUCTURAL DRAWINGS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.
9. PROVIDE CAST-IN-PLACE CONCRETE FOR MECHANICAL AND ELECTRICAL DIVISIONS INCLUDING BUT NOT LIMITED TO: EQUIPMENT BASES, HOUSEKEEPING PADS, CURBS, PITS, UNDERGROUND DUCTBANKS.
10. ALL FORMWORK OFFSET TOLERANCES (PER ACI 117) TO BE CLASS A.
11. FLOOR SLAB TOLERANCE TO ASTM E1155: SPECIFIED OVERALL MINIMUM VALUE OF FLATNESS F_F=25 WITH LOCAL MINIMUM F_F=17, AND MINIMUM VALUE OF LEVELNESS F_L=20 WITH LOCAL MINIMUM F_L=15. MEASURE F_L AND F_F WITHIN 72 HOURS OF SLAB CONSTRUCTION.
12. STEEL FIBER REINFORCED CONCRETE SHALL MEET THE REQUIREMENTS OF ASTM A820 AND WITH 80 LBS/YD OF DOSAGE RATE

REINFORCING STEEL :
(IF APPLICABLE AS PER DETAIL C/S-1)

1. REINFORCING BARS: ASTM A625, GRADE 60, DEFORMED BARS.
2. WELDED WIRE MESH: TO ASTM A185. PROVIDE IN FLAT SHEETS ONLY. VERTICAL PLACEMENT TOLERANCE TO BE 3/8 INCH.
3. REINFORCING STEEL TO BE DETAILED, FABRICATED, BENT AND PLACED IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE AND ACI 315.
4. THE CONTRACTOR SHALL FABRICATE ALL REINFORCEMENT AND FURNISH ALL ACCESSORIES, BOLSTERS, CHAIRS, SPACER BARS AND SUPPORTS NECESSARY TO SECURE THE REINFORCEMENT UNLESS INDICATED OTHERWISE.

GENERATOR PAD:

1. ALLOWABLE BEARING PRESSURE USED IN DESIGN ASSUMED AS 2000 PSF IF SUSPICIOUS SOIL UNCOVERED, NOTIFY DESIGN PROFESSIONAL.

DESIGN NOTES:

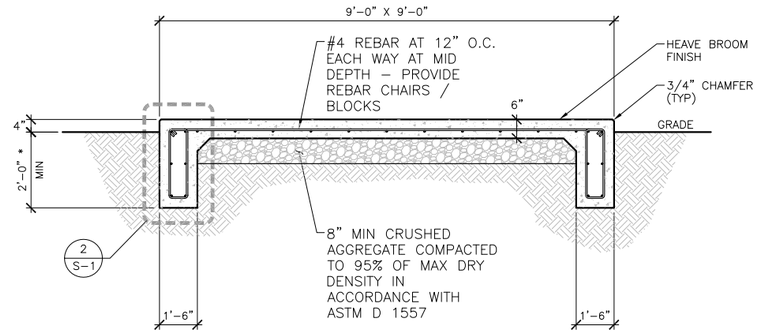
DESIGN DATA:

2003 INTERNATIONAL BUILDING CODE	
WIND SPEED	100 MPH (NOMINAL 35 GUST)
EXPOSURE	C
IMPORTANCE FACTOR	1.0

CONCRETE (28 DAYS):

SLAB	4000 PSI
ALL OTHER CONCRETE	4000 PSI
REINFORCING STEEL	A615 GRADE 60
WELDED WIRE FABRIC	A185

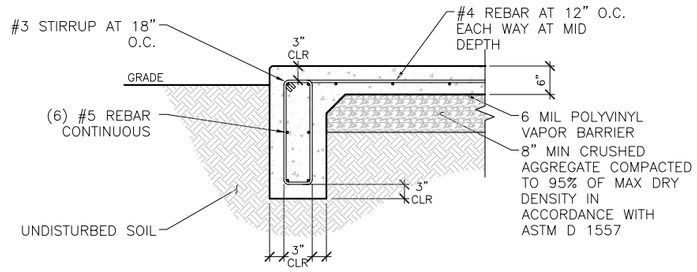
STRUCTURAL GENERAL NOTES



* PLACE BOTTOM OF FOUNDATION MIN 12" BELOW FROST LINE - VERIFY W/ JURISDICTION

SHELTER FOUNDATION SECTION

NTS | 1



PERIMETER SECTION DETAIL

NTS | 2

NOT USED

NTS | 3

DO NOT SCALE DRAWINGS. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND ADVISE CONSULTANTS OF ANY ERRORS OR OMISSIONS. NO VARIATIONS OR MODIFICATIONS TO WORK SHOWN SHALL BE IMPLEMENTED WITHOUT PRIOR WRITTEN APPROVAL. ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED BY THE LATEST REVISION. ALL DRAWINGS AND SPECIFICATIONS REMAIN THE PROPERTY OF MORRISON HERSHFIELD CORPORATION. NEITHER MORRISON HERSHFIELD NOR THE ARCHITECT WILL BE PROVIDING CONSTRUCTION REVIEW OF THIS PROJECT.

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STRUCTURAL NOTES AND CONC. PAD DETAILS

Project No.: 7160018	
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A B C

ELECTRICAL GENERAL NOTES

1. GENERAL

1. EXAMINE THE SITE CONDITIONS VERY CAREFULLY AND THE SCOPE OF PROPOSED WORK TOGETHER WITH THE WORK OF ALL OTHER TRADES AND INCLUDE IN THE BID PRICE ALL COSTS FOR WORK SUCH AS EQUIPMENT AND WIRING MADE NECESSARY TO ACCOMMODATE THE ELECTRICAL SYSTEMS SHOWN AND SYSTEMS OF OTHER TRADES.

2. SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

3. PERFORM DETAILED VERIFICATION OF WORK PRIOR TO ORDERING THE ELECTRICAL EQUIPMENT AND COMMENCING CONSTRUCTION. ISSUE A WRITTEN NOTICE TO THE CONSULTANT OF ANY DISCREPANCIES.

4. OBTAIN ALL PERMITS, PAY ASSOCIATED FEES AND SCHEDULE INSPECTION.

5. PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, INSURANCE, AND SERVICES TO COMPLETE THIS PROJECT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND PRESENT IT AS FULLY OPERATIONAL TO THE SATISFACTION OF THE OWNER.

6. CARRY OUT WORK IN ACCORDANCE WITH ALL GOVERNING STATE, COUNTY AND LOCAL CODES AND O.S.H.A.

7. PRIOR TO BEGINNING WORK COORDINATE ALL POWER AND TELCO WORK WITH THE LOCAL UTILITY COMPANY AS IT MAY APPLY TO THIS SITE. ALL WORK TO COMPLY WITH THE RULES AND REGULATIONS OF THE UTILITIES INVOLVED.

8. FABRICATION AND INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEM SHALL BE DONE IN A FIRST CLASS WORKMANSHIP PER NECA STANDARD 1–2000 BY QUALIFIED PERSONNEL EXPERIENCED IN SUCH WORK AND SHALL SCHEDULE THE WORK IN AN ORDERLY MANNER SO AS NOT TO IMPEDE PROGRESS OF THE PROJECT.

9. DURING PROGRESS OF THE WORK, MAINTAIN AN ACCURATE RECORD OF THE INSTALLATION OF THE ELECTRICAL SYSTEMS, LOCATING EACH CIRCUIT PRECISELY AND DIMENSIONING EQUIPMENT, CONDUIT AND CABLE LOCATIONS. UPON COMPLETION OF THE INSTALLATION, TRANSFER ALL RECORD DATA TO BLACK LINE PRINTS OF THE ORIGINAL DRAWINGS AND SUBMIT THESE DRAWINGS AS RECORD DRAWINGS TO THE CONSULTANT.

10. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL, OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

11. GENERAL CONTRACTOR IS RESPONSIBLE FOR REQUESTING CONNECTION OF COMMERCIAL POWER FROM THE POWER COMPANY. ELECTRICAL CONTRACTOR SHALL COORDINATE THIS WORK WITH THE GENERAL CONTRACTOR.

12. COORDINATE EXACT TELEPHONE REQUIREMENTS AND SERVICE ROUTING WITH LOCAL TELEPHONE COMPANY. APPLY FOR TELEPHONE SERVICE IMMEDIATELY UPON AWARD OF CONTRACT.

2. BASIC MATERIALS AND METHODS

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE EDITION OF THE NEC ACCEPTED BY THE LOCAL JURISDICTION AND TO THE APPLICABLE LOCAL CODES AND REGULATIONS.

2. ALL MATERIALS AND EQUIPMENT SHALL BE NEW. MATERIALS AND EQUIPMENT SHALL BE THE STANDARD PRODUCTS OF MANUFACTURER'S CURRENT DESIGN. ANY FIRST–CLASS PRODUCT MADE BY A REPUTABLE MANUFACTURER MAY BE USED PROVIDING IT CONFORMS TO THE CONTRACT REQUIREMENTS AND MEETS THE APPROVAL OF THE CONSULTANT AND THE OWNER.

3. ARRANGE CONDUIT, WIRING, EQUIPMENT, AND OTHER WORK GENERALLY AS SHOWN, PROVIDING PROPER CLEARANCES AND ACCESS. CAREFULLY EXAMINE ALL CONTRACT DRAWINGS AND FIT THE WORK IN EACH LOCATION WITHOUT SUBSTANTIAL ALTERATION. WHERE DEPARTURES ARE PROPOSED BECAUSE OF FIELD CONDITIONS OR OTHER CAUSES, PREPARE AND SUBMIT DETAILED DRAWINGS FOR ACCEPTANCE.

4. THE CONTRACT DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ALL OFFSETS, BENDS, FITTINGS AND ACCESSORIES ARE NOT NECESSARILY SHOWN. PROVIDE ALL SUCH ITEMS AS MAY BE REQUIRED TO FIT THE WORK TO THE CONDITIONS.

5. MAINTAIN ALL CLEARANCES AS REQUIRED BY NEC.

6. SEAL AROUND CONDUITS AND AROUND CONDUCTORS WITHIN CONDUITS ENTERING THE MODULAR CABINETS WHERE PENETRATION OCCURS WITH A SILICONE SEALANT TO PREVENT MOISTURE PENETRATION INTO BUILDING.

7. SILICONE SEAL AROUND ALL BOLTS AND SCREWS USED TO SECURE EQUIPMENT TO EXTERIOR OF BUILDING.

8. MAKE NECESSARY CONNECTIONS FOR BATTERY IN EMERGENCY LIGHT FIXTURE. CONNECT EXTERIOR LIGHT FIXTURE (PROVIDED BY CABINET MANUFACTURER) TO EXTERNAL JUNCTION BOX.

3. CONDUCTORS AND CONNECTORS

1. UNLESS NOTED OTHERWISE, ALL CONDUCTORS SHALL BE COPPER, MINIMUM SIZE #12 AWG, WITH THERMOPLASTIC INSULATION CONFORMING TO NEMA WC5 OR CROSS–LINKED POLYETHYLENE INSULATION CONFORMING TO NEMA WC7. (TYPES THHN OR THWN). INSULATION SHALL BE RATED FOR 90 C CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH NEC.

2. ALL CONDUCTORS USED FOR GROUNDING SHALL BE COPPER AND SHALL HAVE GREEN INSULATION.

3. FOR COPPER CONDUCTORS #6 AWG AND SMALLER USE 3M SCOTCH–LOK OR T&B STA–KON COMPRESSION TYPE CONNECTORS WITH INTEGRAL OR SEPARATE INSULATION CAPS. FOR COPPER CONDUCTORS LARGER THAN #6 AWG USE SOLDERLESS, IDENT HEX SCREW OR BOLT TYPE PRESSURE CONNECTORS OR DOUBLE COMPRESSION C–CLAMP CONNECTORS, UNLESS SPECIFIED OTHERWISE ON DRAWINGS.

4. UNLESS NOTED OTHERWISE ALL LUGS SHALL BE TIN PLATED COPPER, TWO–HOLE, LONG BARREL, COMPRESSION TYPE.

5. CONDUCTOR LENGTHS SHALL BE CONTINUOUS FROM TERMINATION TO TERMINATION WITHOUT SPLICES. SPLICES ARE NOT ACCEPTABLE. IF SPLICES ARE UNAVOIDABLE PRIOR APPROVAL FROM THE ENGINEER MUST BE OBTAINED.

4. RACEWAYS AND BOXES

1. ALL CONDUIT SHALL BE UL LABELED.

2. ALL EMPTY CONDUITS INSTALLED FOR FUTURE USE SHALL HAVE A PULL CORD.

3. SHEET METAL BOXES SHALL CONFORM TO NEMA OS1; CAST–METAL BOXES SHALL CONFORM TO NEMA 81 AND SHALL BE SIZED IN ACCORDANCE WITH NEC UNLESS NOTED OTHERWISE.

5. GROUNDING

1. ALL LIGHTNING PROTECTION GROUNDING OF THE ELECTRICAL EQUIPMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT NFPA STANDARDS.

2. GROUND LUGS ARE SPECIFIED UNDER SECTION 3 "CONDUCTORS AND CONNECTORS".

3. ALL GROUND LUG AND COMPRESSION CONNECTIONS SHALL BE COATED WITH ANTI–OXIDANT AGENT, SUCH AS NO–OX, NOALOX, PENETROX OR KOPRSHIELD.

4. GROUND ALL EXPOSED METALLIC OBJECTS ON BUILDING EXTERIOR INCLUDING BUILDING TIE DOWN BRACKETS.

5. PROVIDE LOCK WASHERS FOR ALL MECHANICAL CONNECTIONS FOR GROUND CONDUCTORS. USE STAINLESS STEEL HARDWARE THROUGHOUT.

6. DO NOT INSTALL GROUND RING OUTSIDE OF PROPERTY LINE.

7. REMOVE ALL PAINT AND CLEAN ALL DIRT FROM SURFACES REQUIRING GROUND CONNECTIONS, REPAINT TO MATCH AFTER CONNECTION IS MADE TO MAINTAIN CORROSION RESISTANCE.

8. ALL EXTERIOR GROUNDING CONDUCTORS INCLUDING EXTERIOR GROUND RING SHALL BE #2 AWG SOLID BARE TINNED COPPER. MAKE ALL GROUND CONNECTIONS AS SHORT AND DIRECT AS POSSIBLE. AVOID SHARP BENDS. THE RADIUS OF ANY BEND SHALL NOT BE LESS THAN 8" AND THE ANGLE OF ANY BEND SHALL NOT EXCEED 90°. GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARD TOWARD THE BURIED GROUND RING.

9. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY THERMO–WELDING WITH ERICO T–319 GALVANIZING BAR.

10. ALL GROUND CONNECTIONS SHALL BE APPROVED FOR THE METALS BEING CONNECTED.

11. ALL EXTERNAL GROUND CONNECTIONS SHALL BE EXOTHERMICALLY WELDED. ALL EXOTHERMIC WELDS TO EXTERIOR GROUND RING SHALL BE THE PARALLEL TYPE, EXCEPT FOR THE GROUND RODS WHICH ARE TEE EXOTHERMIC WELDS. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY EXOTHERMIC WELDING. USE SPRAY GALVANIZER SUCH AS HOLUB LECTROSOL #15–501.

12. CONTRACTOR SHALL NOTIFY eyeTower, LLC WHEN THE BURIED GROUND RING IS INSTALLED SO THE REPRESENTATIVE CAN INSPECT THE GROUND RING BEFORE IT IS BACKFILLED WITH SOIL. CONTACT: eyeTower, LLC PROJECT MGR.

13. FOR METAL FENCE POST GROUNDING, USE A HEAVY DUTY TYPE GROUNDING CLAMP OR EXOTHERMIC WELD CONNECTION TO POST.

14. WHERE MECHANICAL CONNECTORS (TWO–HOLE OR CLAMP) ARE USED, APPLY A LIBERAL PROTECTIVE COATING OF AN ANTI–OXIDE COMPOUND SUCH AS "NO OXIDE A" BY DEARBORN CHEMICAL COMPANY ON ALL CONNECTORS.

15. BOND ALL EXTERIOR CONDUITS, PIPES AND CYLINDRICAL METALLIC OBJECTS WITH A PENN–UNION GT SERIES CLAMP, BLACKBURN GUV SERIES CLAMP OR A BURNDY GAR 3900BU SERIES CLAMP ONLY, NO SUBSTITUTES ACCEPTED.

LEGEND

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON–FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
TR	TRANSFORMER
M	KILOWATT HOUR METER
	DENOTES CABLE OR CONDUIT TURNING UP IN PLAN VIEW
	DENOTES CABLE OR CONDUIT TURNING DOWN IN PLAN VIEW
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
———	ABOVE GROUND SERVICES
- - - -	UNDER GROUND SERVICES
2	DENOTES REFERENCE NOTE
●	EXOTHERMIC WELD CONNECTION
■	MECHANICAL CONNECTION (eg LUG, C–TAP)
	GROUND ROD
	GROUND BAR
	PIN AND SLEEVE RECEPTACLE
	GROUND ROD WITH INSPECTION SLEEVE

ABBREVIATIONS

AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
BFG	BELOW FINISHED GRADE
C	CONDUIT
CRGB	CELL REFERENCE GROUND BAR
CU	COPPER
C/W	COMPLETE WITH
D.T.T.	DRY TYPE TRANSFORMER
EC	EMPTY CONDUIT
G	GROUND
GE	GROUNDING ELECTRODE
GEC	GROUNDING ELECTRODE CONDUCTOR
GRC	GALVANIZED RIGID CONDUIT
MTS	MANUAL TRANSFER SWITCH
NEC	NATIONAL ELECTRICAL CODE
RNC	RIGID NON–METALLIC CONDUIT (SCHEDULE 80 PVC)
SD	SERVICE DISCONNECT SWITCH
SE	SERVICE ENTRANCE
SN	SOLID NEUTRAL
TGB	TELCO GROUND BAR
TEGB	TOWER EXIT GROUND BAR
TR	TRANSFORMER
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
WP	WEATHERPROOF – NEMA 3R
U/G	UNDERGROUND
PPC	POWER PROTECTION CABINET

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER

2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:

CROWN CASTLE

100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:

MORRISON HERSHFIELD

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Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

ELECTRICAL NOTES AND ABBREVIATIONS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-1

SCALE IS BASE ON 22" X 34" "D" SIZE

1. EXISTING 2-GANG METER CENTER UTILITY PAD MOUNT TRANSFORMER. (VERIFY IN FIELD). COORDINATE WITH POWER COMPANY FOR NEW 120/240V-1ø-3W, 200A SERVICE FOR eyeTower, LLC.

2. NEW 2-GANG METER SECTION FOR EXISTING METER CENTER.

3. EXISTING CONDUCTORS IN CONDUIT TO REMAIN.

4. NEW PANEL "PP1" WITH BRANCH CIRCUIT BREAKERS, PANEL SHALL BE A 120/240V-1ø-3W, 200A RATED, NEMA-1 42 POLE PANEL.

5. NEW 3/4" THICK, 2'X4' TELCO BACKBOARD, PAINTED BLACK.

6. EXISTING MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR BONDED TO (2) 5/8" DIA. X 10'-0" LONG COPPER CLAD GROUND RODS SPACED A MINIMUM OF 6'-0" APART. (VERIFY IN FIELD)

7. NEW 200A, 240V, 1ø, 3W UTILITY METER SOCKET PER UTILITY STANDARDS. PROVIDE MECH. ATTACHED ENGRAVED NAME PLATE INDICATING: "eyeTower, LLC METER".

8. NEW 200A-2PMAIN CIRCUIT BREAKER (INTERUPTING CAPACITY 65,000 AIC MIN) IN NEW METER CENTER SECTION FOR eyeTower, LLC.

9. EXISTING #2 AWG CU. BONDED TO GROUND RING SYSTEM. (VERIFY IN FIELD)

10. SUPPLY AND INSTALL (1) 4" RNC W/ PULL CORDS FROM EXISTING FIBER DEMARC VAULT TO eyeTower, LLC TELCO BACKBOARD IN SHELTER.

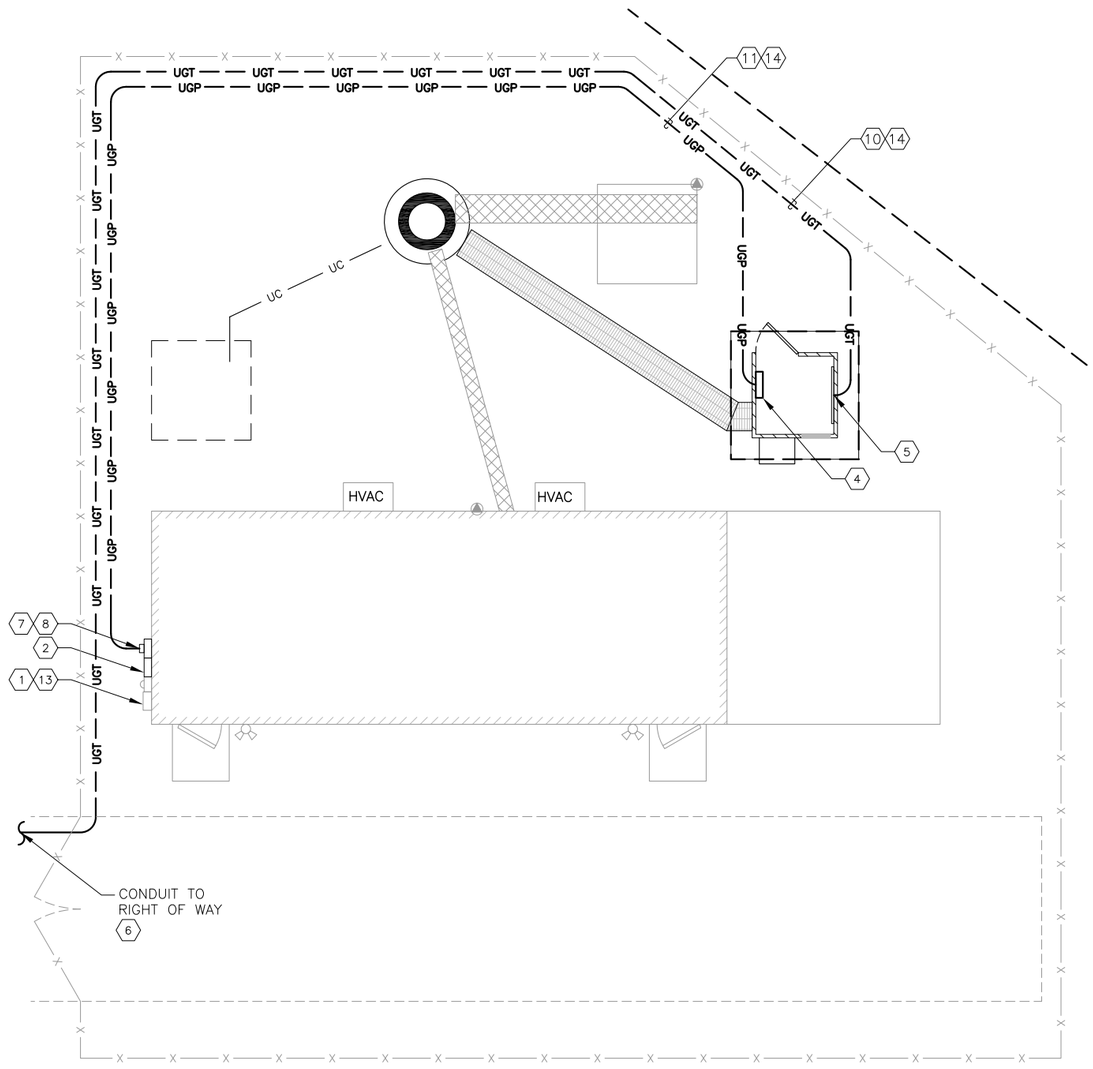
11. NEW (3) #3/0, + (1) #6 GROUND, 2"C.

12. NEW OR EXISTING FIBER DEMARC VAULT LOCATION AT RIGHT OF WAY. COORDINATE WITH FIBER PROVIDER FOR EXACT LOCATION AND ALL REQUIREMENTS.

13. EXISTING METER CENTER MOUNTED TO WALL OF VERIZON SHELTER.

14. CONTRACTOR TO ARRANGE AND PAY FOR UNDERGROUND UTILITY SURVEYS FOR ALL TRENCHING. REUSE NATIVE BACKFILL AND REINSTATE TO ORIGINAL CONDITION. INSTALL 6" WIDE METALLIC LINED RED PLASTIC MARKER TAPE 8" ABOVE ALL BURIED CONDUIT.

15. CONTRACTOR TO OBTAIN EXISTING LOAD INFORMATION FROM UTILITY COMPANY OR PERFORM A 30 DAY LOAD STUDY USING A TRUE RMS METER PER NEC 220.87 TO DETERMINE ADDITION SPACE CAPACITY OF EXISTING SERVICE METER CENTER. EXISTING PLUS NEW LOAD SHALL NOT EXCEED CAPACITY OF EXISTING METER CENTER FEEDERS.



TRUE NORTH

NOTES:

1. CONDUIT ROUTING IS SCHEMATIC ONLY, CONTRACTOR SHALL DETERMINE SUITABLE ROUTING IN THE FIELD.

2. CONTRACTOR TO REUSE EXISTING CONDUITS ROUTED TO EXISTING GENERATOR AS POSSIBLE. FIELD VERIFY.

3. CONTRACTOR TO PROVIDE PVC CONDUIT BELOW FINISH GRADE AND RGS CONDUIT ABOVE FINISH GRADE.

ELECTRICAL LAYOUT PLAN

ANSI "D" SCALE: 1/2" = 1'-0"
ANSI "B" SCALE: 1/4" = 1'-0"
2' 1' 0" 2'

1

STATE OF CONNECTICUT
ROBERT J. LARA
LICENSED ARCHITECT
No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
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Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

ELECTRICAL COMPOUND PLAN

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-2

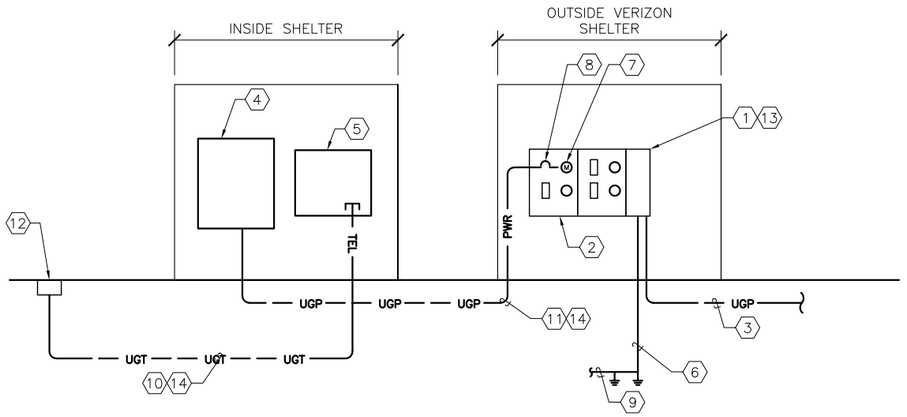
SCALE IS BASE ON 22" X 34" "D" SIZE

1. EXISTING 2–GANG METER CENTER UTILITY PAD MOUNT TRANSFORMER. (VERIFY IN FIELD). COORDINATE WITH POWER COMPANY FOR NEW 120/240V–1ø–3W, 200A SERVICE FOR eyeTower, LLC.
2. NEW 2–GANG METER SECTION FOR EXISTING METER CENTER.
3. EXISTING CONDUCTORS IN CONDUIT TO REMAIN.
4. NEW PANEL "PP1" WITH BRANCH CIRCUIT BREAKERS, PANEL SHALL BE A 120/240V–1ø–3W, 200A RATED, NEMA–1 42 POLE PANEL.
5. NEW 3/4" THICK, 2'X4' TELCO BACKBOARD, PAINTED BLACK.
6. EXISTING MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR BONDED TO (2) 5/8" DIA. X 10'–0" LONG COPPER CLAD GROUND RODS SPACED A MINIMUM OF 6'–0" APART. (VERIFY IN FIELD)
7. NEW 200A, 240V, 1ø, 3W UTILITY METER SOCKET PER UTILITY STANDARDS. PROVIDE MECH. ATTACHED ENGRAVED NAME PLATE INDICATING: "eyeTower, LLC METER".
8. NEW 200A–2PMAIN CIRCUIT BREAKER (INTERUPTING CAPACITY 65,000 AIC MIN) IN NEW METER CENTER SECTION FOR eyeTower, LLC.
9. EXISTING #2 AWG CU. BONDED TO GROUND RING SYSTEM. (VERIFY IN FIELD)
10. SUPPLY AND INSTALL (1) 4" RNC W/ PULL CORDS FROM EXISTING FIBER DEMARC VAULT TO eyeTower, LLC TELCO BACKBOARD IN SHELTER.
11. NEW (3) #3/0, + (1) #6 GROUND, 2"C.
12. NEW OR EXISTING FIBER DEMARC VAULT LOCATION AT RIGHT OF WAY. COORDINATE WITH FIBER PROVIDER FOR EXACT LOCATION AND ALL REQUIREMENTS.
13. EXISTING METER CENTER MOUNTED TO WALL OF VERIZON SHELTER.
14. CONTRACTOR TO ARRANGE AND PAY FOR UNDERGROUND UTILITY SURVEYS FOR ALL TRENCHING. REUSE NATIVE BACKFILL AND REINSTATE TO ORIGINAL CONDITION. INSTALL 6" WIDE METALLIC LINED RED PLASTIC MARKER TAPE 8" ABOVE ALL BURIED CONDUIT.
15. CONTRACTOR TO OBTAIN EXISTING LOAD INFORMATION FROM UTILITY COMPANY OR PERFORM A 30 DAY LOAD STUDY USING A TRUE RMS METER PER NEC 220.87 TO DETERMINE ADDITION SPACE CAPACITY OF EXISTING SERVICE METER CENTER. EXISTING PLUS NEW LOAD SHALL NOT EXCEED CAPACITY OF EXISTING METER CENTER FEEDERS.

NOTE 1: CONTRACTOR TO USE PVC SCHED 40 FOR UNDER GROUND CONDUIT ROUTING AND GRC FOR ABOVE GROUND ROUTING.
NOTE 2: COOR. GEN. ALARMING OPTIONS TO SHELTER BACKBOARD ALARM BLOCK W/ eyeTower, LLC.
NOTE 3: ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE RATED NEMA 3R
NOTE 4: ALL CONDUIT LENGTHS AND ROUTING TO BE VERIFIED IN FIELD BY CONTRACTOR.

ELECTRICAL REFERENCE NOTES

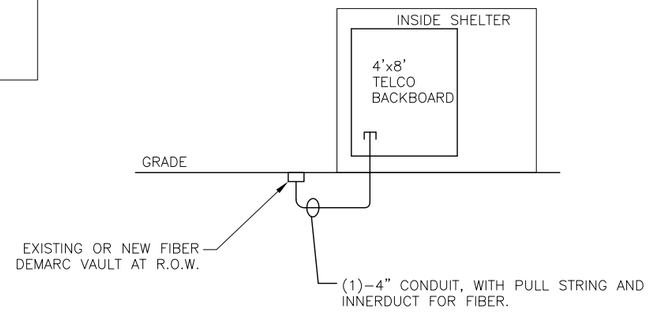
NOTE:
ALL CONDUIT ENTRY LOCATIONS AND SHELTER EQUIPMENT LOCATIONS SHALL BE COORDINATED WITH STATE APPROVED PRE–FABRICATED EQUIPMENT SHELTER SHOP DRAWINGS.



ELECTRICAL RISER DIAGRAM

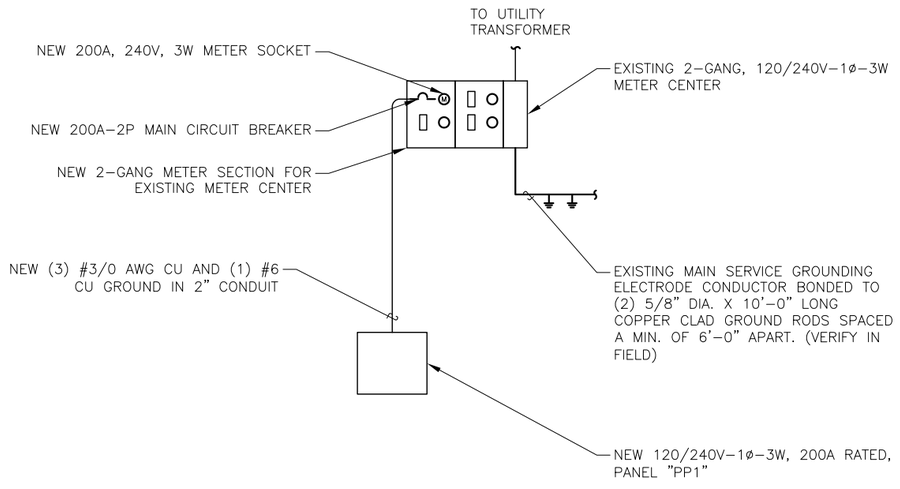
NTS | 1

NOTE:
COORDINATE EXACT REQUIREMENTS FOR NEW FIBER–TELCO SERVICE WITH FIBER PROVIDER.



TELEPHONE RISER DIAGRAM

NTS | 2



ELECTRICAL SINGLE-LINE DIAGRAM

NTS | 3

STATE OF CONNECTICUT
ROBERT J. LARA
LICENSED ARCHITECT
No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
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Project:
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Drawing Title:
ELECTRICAL RISER DIAGRAM

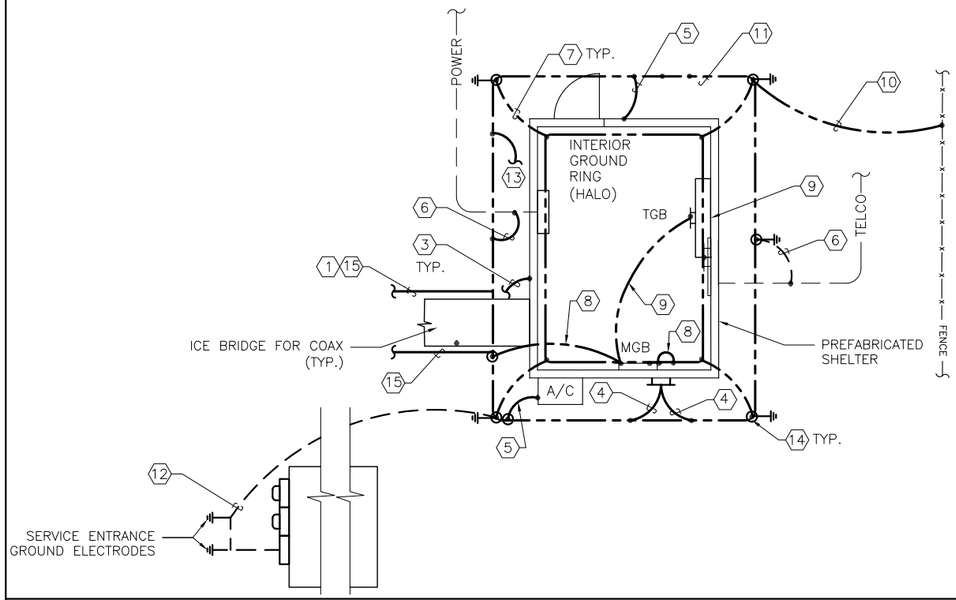
Project No.:	
7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-3

SCALE IS BASE ON 22" X 34" "D" SIZE

1 2 3 4 5 6
A B C

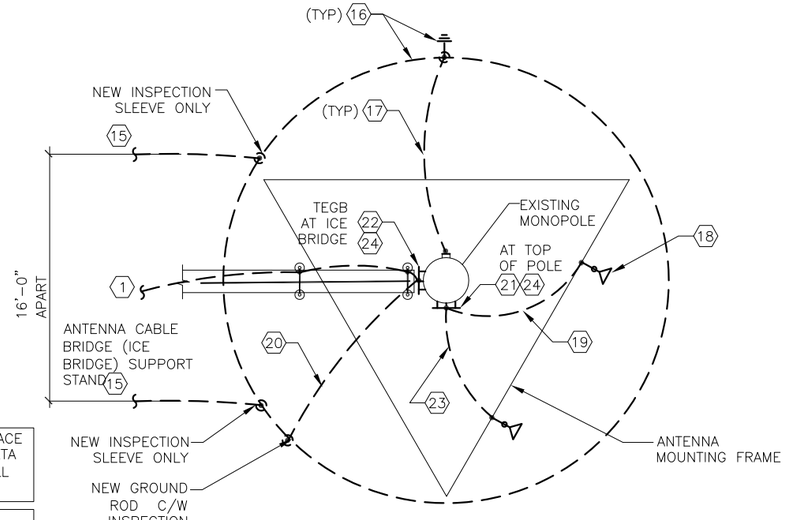
GROUNDING REFERENCE NOTES

1. PROVIDE #2 AWG. SOLID TINNED COPPER CONDUCTOR AND RUN FROM ONE ICE BRIDGE TO THE NEXT. ATTACH TO EACH SUPPORT USING GROUND CLAMP. BOND SUPPORT POST TO GROUND RING.
2. WHERE APPLICABLE, BOND ALL STEEL SUPPORT BEAMS TOGETHER, EXOTHERMICALLY WELD CONNECTIONS TO STEEL SUPPORT BEAMS. TYPICAL FOR ALL. REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF STEEL SUPPORT BEAMS.
3. BOND SHELTER STEEL TIE DOWN TO SHELTER GROUND RING. EXOTHERMICALLY WELD CONNECTION TO GROUND RING. TYPICAL OF FOUR (4).
4. PROVIDE PRIMARY GROUND RING BOND FROM WAVEGUIDE HATCH PLATE BAR NONE SOLUTION TO GROUND RING AT GROUND ROD INSPECTION SLEEVE. SUPPORT GROUND CONDUCTOR ON WALL EVERY 2 FEET. EXOTHERMICALLY WELD CONNECTIONS AT BAR NONE SOLUTION AND GROUND RING.
5. BOND A/C UNITS, DOOR FRAMES, H-FRAME POSTS, DIESEL TANK, GENERATOR HOUSING, MISCELLANEOUS METALLIC EQUIPMENT TO GROUND RING. EXOTHERMICALLY WELD CONNECTION TO EXTERIOR GROUND RING.
6. BOND SERVICE CONDUITS TO GROUND RING OUTSIDE AND HALO GROUND INSIDE SHELTER. CONNECT GROUND CONDUCTOR TO CONDUIT USING PIPE CLAMP. DO NOT EXOTHERMICALLY WELD TO CONDUIT. REFER TO TYPICAL MULTIPLE CONDUIT GROUNDING DETAIL 3/E-5.
7. PROVIDE SECONDARY GROUND RING BOND BY SHELTER DOWNLEAD CONDUCTOR FROM INTERIOR GROUND RING (HALO) SUPPLIED BY BUILDING MANUFACTURER TO THE EXTERIOR GROUND RING. EXOTHERMICALLY WELD CONNECTION TO GROUND RING. TYPICAL IN ALL FOUR (4) CORNERS OF HALO.
8. PROVIDE #2 AWG SOLID BARE TINNED COPPER CONDUCTOR FROM MASTER GROUND BAR (MGB), INSIDE SHELTER TO HALO AND EXTERIOR GROUND RING. EXOTHERMICALLY WELD CONNECTIONS AT GROUND BAR AND GROUND RING.
9. BOND TELCO GROUND BAR (TGB) TO MASTER GROUND BAR (MGB) USING ONE (1) #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR. BOND TO EXTERIOR GROUND RING USING #2 AWG SOLID TINNED COPPER CONDUCTOR. EXOTHERMICALLY WELD CONNECTIONS TO ALL CONNECTION POINTS.
10. BOND EXISTING FENCE POST TO GROUND RING AS SHOWN USING AN EXOTHERMIC WELD. BOND FENCE GATE TO POST WITH A FLEXIBLE COPPER JUMPER STRAP IF NOT ALREADY PROVIDED. PROVIDE EXOTHERMIC WELD TO BOND STRAP TO GATE AND FENCE POST. PROVIDE LENGTH AS REQUIRED TO MAKE CONNECTION.
11. PROVIDE A GROUND RING BURIED 30" BELOW GRADE OR FROST LINE, WHICHEVER IS DEEPER.
12. PROVIDE NEW BOND OR VERIFY EXISTING BOND BETWEEN SERVICE ENTRANCE GROUND ELECTRODE AND GROUND RING SYSTEM W/A #2 AWG SOLID TINNED COPPER CONDUCTOR.
13. BOND REBAR IN CONCRETE FOR SHELTER, GENERATOR PAD (WHERE APPLICABLE) AND STOOP/STEPS TO BURIED GROUND RING. EXOTHERMICALLY WELD A #2 TINNED SOLID COPPER CONDUCTOR TO THE REBAR GROUNDING PIGTAIL AND CONNECT TO THE BURIED GROUND RING. TYPICAL ON 16' CENTERS.
14. PROVIDE 5/8" x 10'-0" LONG COPPER CLAD STEEL (COPPER WELD) GROUND ROD AS SHOWN. PROVIDE INSPECTION SLEEVE AT GROUND ROD TO SHOW BOND TO EXTERIOR BURIED GROUND RING. INSTALL SO THAT TOP OF GROUND ROD IS 30" BELOW GRADE OR FROST LINE, WHICHEVER IS DEEPER. EXACT LOCATION AND NUMBER OF GROUND RODS TO BE ESTABLISHED ON SITE AND BASED ON "FALL OF POTENTIAL GROUND RESISTANCE METHOD" FOR RESISTANCE < 5 OHMS.. UNLESS OTHERWISE NOTED, DRIVEN GROUND RODS ARE BONDED TO THE BURIED GROUND RING AT 16 FEET INTERVALS.
15. SHELTER GROUND RING AND EXISTING TOWER GROUND RING SHALL BE BONDED TOGETHER IN AT LEAST TWO (2) POINTS USING A #2 AWG SOLID BARE TINNED COPPER CONDUCTOR.
16. EXISTING TOWER GROUND RING AND GROUND RODS. (TO BE VERIFIED).
17. EXISTING #2 SOLID BARE TINNED COPPER CONDUCTOR FROM TOWER GROUNDING FLANGE AT BASE OF TOWER LEG TO TOWER GROUND RING. (TO BE VERIFIED)
18. REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF ANTENNA(S) AND ANTENNA SUPPORT FRAMES.
19. EXTEND GROUNDING CONDUCTOR TO ANTENNA LOCATIONS AND BOND TO ANTENNA PIPE MOUNT. USE AN EXOTHERMIC WELD AT ANTENNA PIPE MOUNT. SUPPORT CONDUCTOR AS REQUIRED EVERY TWO (2) FEET MINIMUM.
20. PROVIDE #2 SOLID BARE TINNED COPPER CONDUCTOR FROM BAR NONE SOLUTION TO TOWER GROUND RING. TYPICAL OF TWO (2).
21. PROVIDE ANTENNA CABLE GROUND BAR AT THE TOP OF TOWER ONLY. BOND ANTENNA CABLE GROUNDING KITS AND LIGHTNING ROD TO GROUND BAR. ANTENNA CABLE GROUND KIT CONNECTION SHALL BE THE RESPONSIBILITY OF THE ANTENNA CABLE INSTALLER. PROVIDE A U.L. LISTED CONNECTOR SUITABLE FOR THE MATERIALS BEING CONNECTED. PROVIDE EXOTHERMIC WELDS FOR BONDS TO STEEL BEAM OR SUPPORT POSTS.
22. NEW BAR NONE GROUNDING SOLUTION SHALL BE INSTALLED BELOW THE TRANSMISSION LINE GROUND KITS, NEAR THE AREA OF THE TOWER AT THE POINT WHERE THE ANTENNA TRANSMISSION LINES TRANSITION FROM THE TOWER TO THE SHELTER. VERIFY EXACT LOCATION FOR PROPER CONDUCTOR LENGTH. BAR NONE SOLUTION SHALL BE PROVIDED BY THE ANTENNA CABLE INSTALLER. FINAL EXOTHERMIC WELD FROM THE BURIED GROUND RING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. COORDINATE WITH ANTENNA CABLE INSTALLER FOR SCHEDULE TO MAKE CONNECTION. PROVIDE 3/4" PVC SLEEVE WITH SWEEP BEND FOR CONNECTION OF BAR NONE SOLUTION TO TOWER GROUND RING.
23. EXTEND GROUNDING CONDUCTORS TO REMAINING SECTOR ANTENNA PIPE MOUNT LOCATIONS AND BOND WITH EXOTHERMIC WELDS. SUPPORT CONDUCTOR AS REQUIRED EVERY TWO FEET MINIMUM.
24. THE TOWER STRUCTURE STEEL SHALL BE UTILIZED FOR DISSAPATING THE LIGHTNING ENERGY. THE TOWER GROUND BARS OR BAR NONE SOLUTION FOR ANTENNA GROUNDING SHALL BE DIRECTLY FASTENED TO THE STEEL STRUCTURE WITH STAINLESS STEEL HARDWARE AND/OR ANGLE ADAPTORS (E.G. PIROD/VALMONT PART #167105 OR EQUIVALENT – WITHOUT "CHERRY" INSULATORS). THIS TYPE OF INSTALLATION SPECIFICALLY PRECLUDES THE USE OF INSULATORS BETWEEN THE TOWER STRUCTURE AND THE GROUND BARS OR BAR NONE SOLUTION AND DOES NOT ALLOW ANY DRILLING OR WELDING TO THE TOWER.



TYPICAL SHELTER AND GENERATOR GROUNDING PLAN — NTS — 1

NOTE: REFER TO ARCHITECTURAL SITE PLAN DRAWING FOR EXACT LOCATION OF CABLE BRIDGE AND ANTENNA SUPPORT STRUCTURE.



NOTE: GROUNDING FOR ONE FACE SHOWN–TYPICAL FOR ALPHA, BETA AND GAMMA FACES (EA. AND ALL ANTENNAS).

NOTE: REFER TO ARCHITECTURAL SITE PLAN DRAWING FOR EXACT LOCATION OF ANTENNA CABLE BRIDGE AND SUPPORT STRUCTURE.

TYPICAL MONOPOLE AND ANTENNA GROUNDING PLAN — NTS — 2

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Project:

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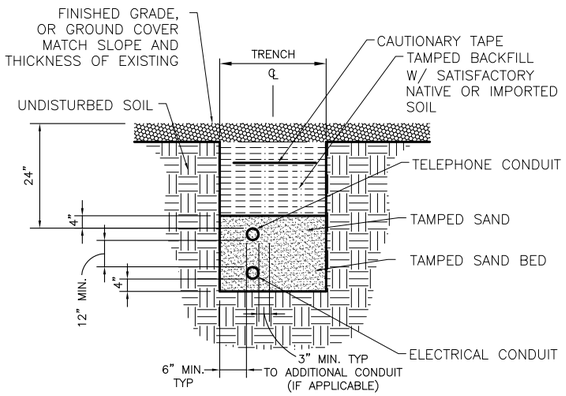
MANCHESTER, CT 06040

Drawing Title:

GROUNDING PLAN

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-4

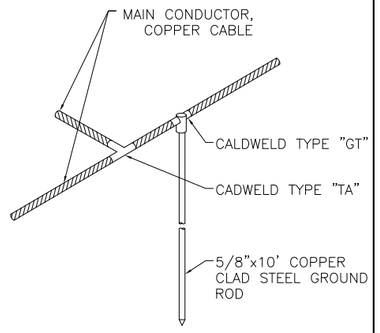
SCALE IS BASE ON 22" X 34" "D" SIZE



POWER/TELCO TRENCH

NTS

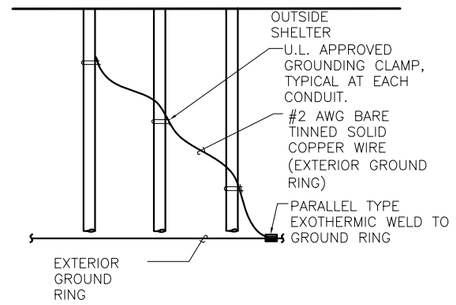
1



GROUND RING BOND

NTS

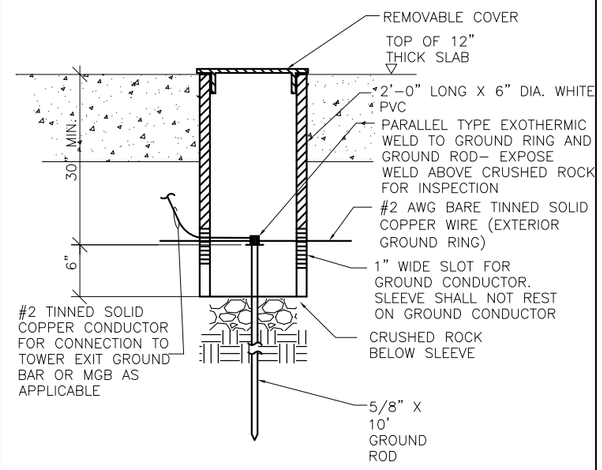
2



TYPICAL MULTIPLE CONDUITS GROUNDING DETAIL

NTS

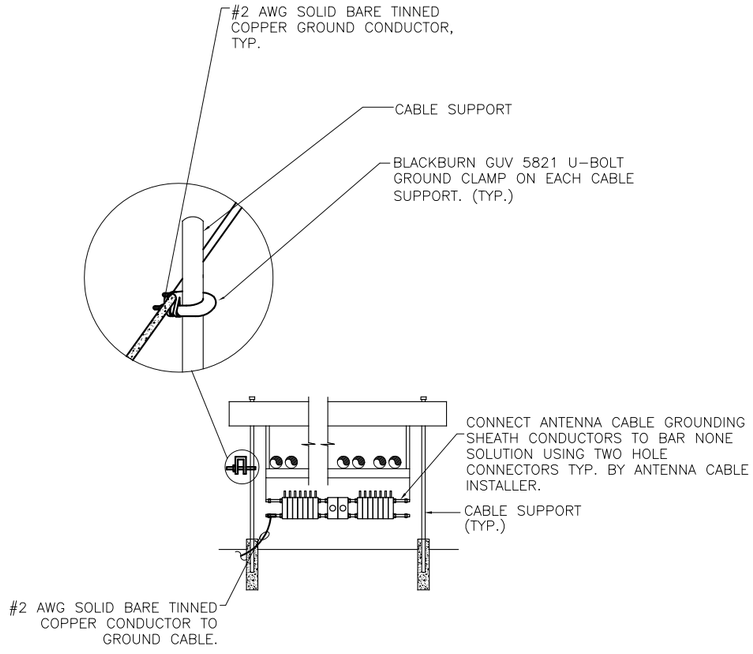
3



GROUNDING ROD INSPECTION SLEEVE DETAIL

NTS

4



WAVEGUIDE BRIDGE AND CABLE GROUNDING DETAIL

NTS

5

POWER PANEL 1 SCHEDULE (PANEL PP-1)

BUS VA A	BUS VA B	LOAD	WIRE	GND	COND	AMPS	BUS A	BUS B	AMPS	COND	GND	WIRE	LOAD	BUS VA A	BUS VA B
–		SPARE	–	–	–	30	1	2	30	3/4"	#10	#10	HVAC #1	2880	
	–						3	4							2880
–		SPARE	–	–	–	30	5	6	30	3/4"	#10	#10	HVAC #2	2880	
	–						7	8							2880
–		SPARE	–	–	–	30	9	10	–	–	–	–	SPACE	–	
	–						11	12	–	–	–	–	SPACE		–
–		SPACE	–	–	–	–	13	14	–	–	–	–	SPACE	–	
	–	SPACE	–	–	–	–	15	16	–	–	–	–	SPACE		–
–		SPACE	–	–	–	–	17	18	20	1/2"	#12	#12	INTERIOR LIGHTS	355	
	–	SPACE	–	–	–	–	19	20	20	1/2"	#12	#12	EXTERIOR LIGHT		109
–		SPACE	–	–	–	–	21	22	–	–	–	–	SPACE	–	
	–	SPACE	–	–	–	–	23	24	–	–	–	–	SPACE		–
–		SPACE	–	–	–	–	25	26	20	1/2"	#12	#12	CORD. REEL & RECEPT.	540	
	–	SPACE	–	–	–	–	27	28	20	1/2"	#12	#12	GFCI RECEPTACLE		180
–		SPACE	–	–	–	–	29	30	20	1/2"	#12	#12	EXHAUST FAN	180	
	–	SPACE	–	–	–	–	31	32	20	1/2"	#12	#12	EXTERIOR GFCI RECEPTACLE		180
–		SPACE	–	–	–	–	33	34	–	–	–	–	SPACE	–	
	–	SPACE	–	–	–	–	35	36	–	–	–	–	SPACE		–
10		POWER FAIL ALARM	#12	#12	3/4"	20	37	38	–	–	–	–	SPACE	–	
	10						39	40	–	–	–	–	SPACE		–
–		SPARE BREAKER	–	–	–	20	41	42	–	–	–	–	SPACE	–	

TOTAL VA: BUS A 6845 BUS B 6239 CONNECTED VA: 13084 AMPERES: BUS A 57 BUS B 52 TOTAL 55

RATED VOLTAGE: ☐ 120/208 ■ 120/240 ☐ 277/480 1 PHASE, 3 WIRE BRANCH POLES ☐ 12 ☐ 18 ☐ 20 ☐ 24 ☐ 30 ☐ 36 ■ 42

RATED AMPS: ☐ 100 ■ 200 ☐ 400 CABINET: ■ SURFACE ☐ FLUSH

FULL NEUTRAL BUS ■ GROUND BUS ■ HINGED DOOR ■ KEYED DOOR LATCH ENCLOSURE TYPE NEMA-1

BRANCH DEVICES ☐ FUSED ■ CIRCUIT BREAKER

■ MAIN LUGS ONLY MAIN ☐ BREAKER ☐ FUSED SWITCH

ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT CURRENT OF MINIMUM 42,000 AMPS SYMMETRICAL.

NOTES:

ALL UNUSED BREAKERS TO BE LABELED "SPARE"

NOTE: THIS PANEL SCHEDULE IS FOR REFERENCE ONLY. REFER TO STATE APPROVED SHELTER MANUFACTURER DRAWINGS FOR EXACT PANEL SCHEDULE LAYOUT.

PANEL SCHEDULE

NTS

6

STATE OF CONNECTICUT ROBERT J. LARA LICENSED ARCHITECT No. 11509

ROBERT JERRY LARA REGISTERED ARCHITECT STATE OF CONNECTICUT 11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER

2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:

CROWN CASTLE

100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:

MORRISON HERSHFIELD

8604 Cliff Cameron Drive, Suite 152
Charlotte, NC 28269
TEL: 704.499.6861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

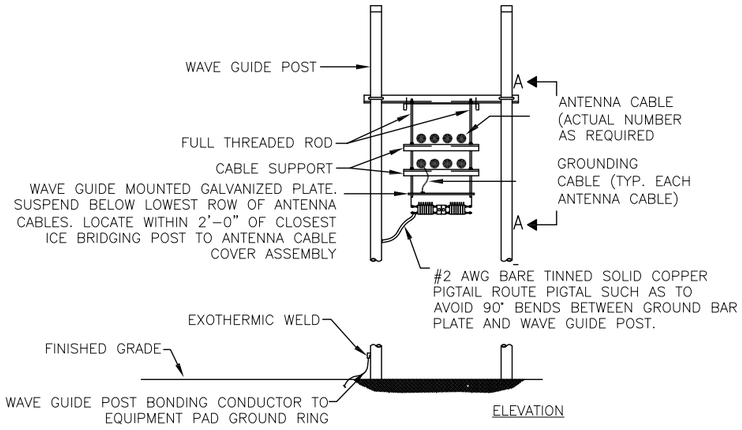
266R CENTER ST.
MANCHESTER, CT 06040

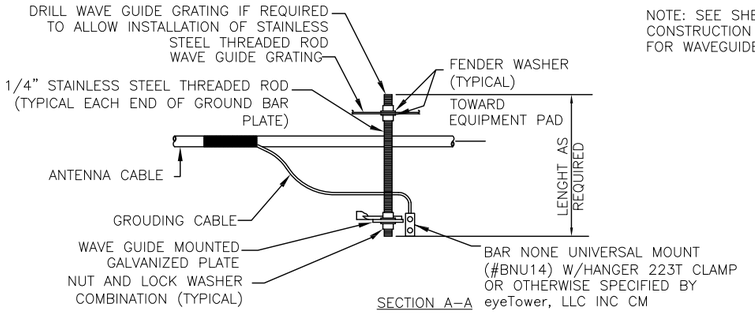
Drawing Title:

GROUNDING DETAILS

Project No.:	
7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No.: E-5

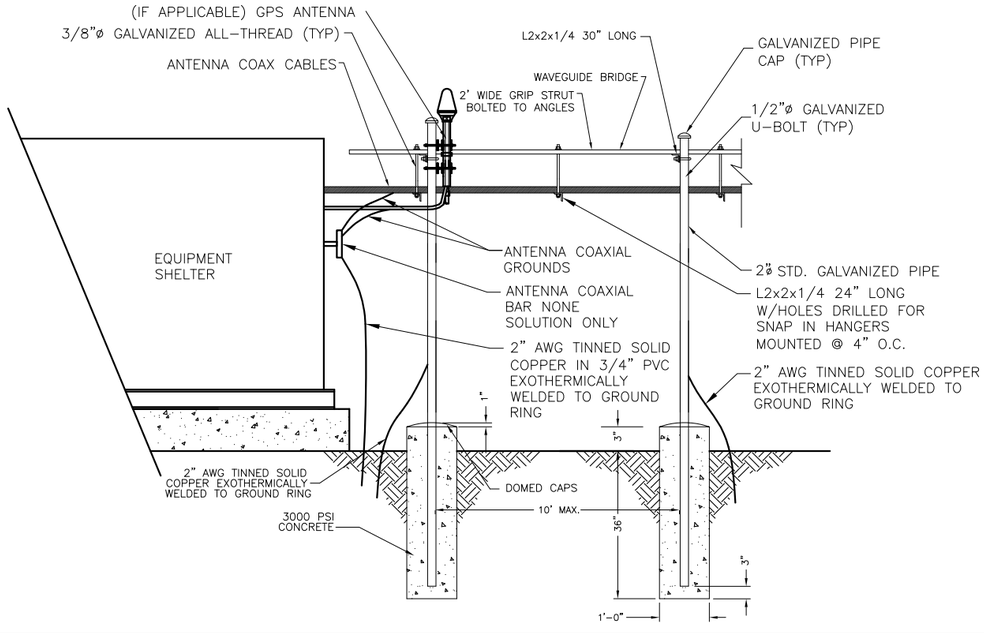
SCALE IS BASE ON 22" X 34" "D" SIZE



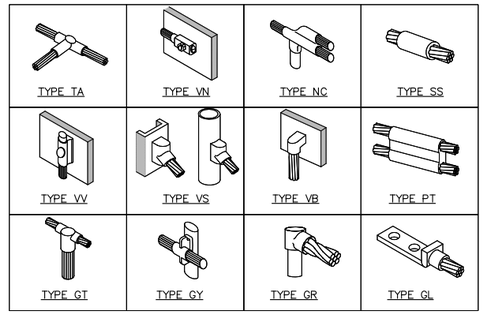


NOTE: SEE SHEET C-3 FOR CONSTRUCTION SPECIFICATIONS FOR WAVEGUIDE SUPPORT

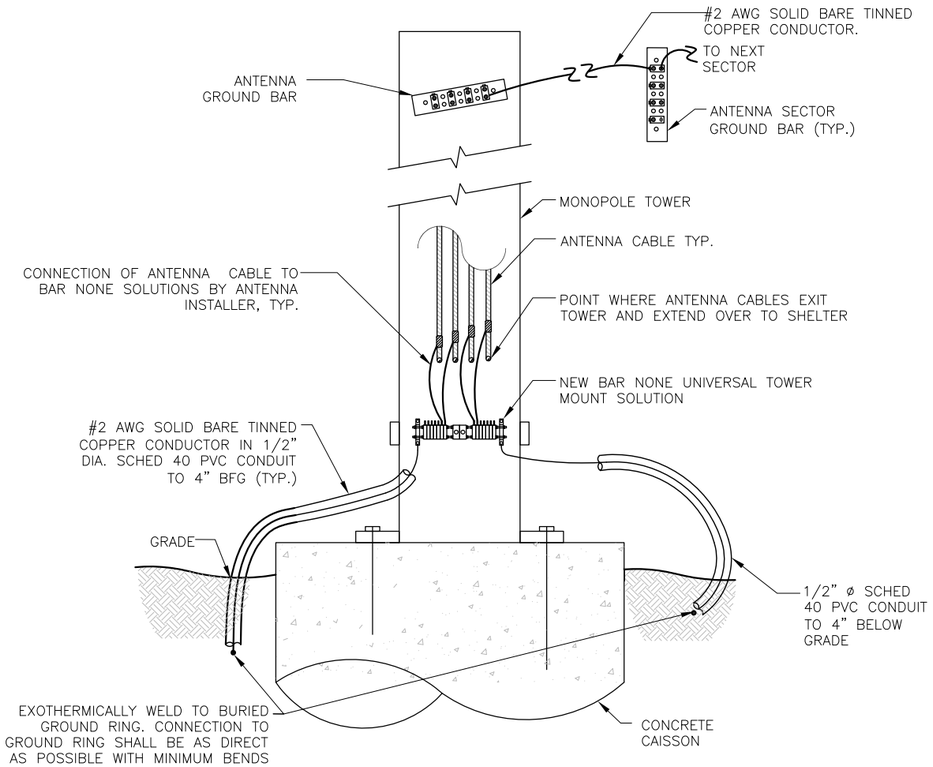
WAVEGUIDE MOUNTED BAR NONE SOLUTION INSTALLATION — NTS — 1



WAVEGUIDE BRIDGE — NTS — 3



CADWELD GROUND CONNECTION DETAIL — NTS — 2



TOWER GROUNDING DETAIL — NTS — 4

STATE OF CONNECTICUT · ROBERT J. LARA · LICENSED ARCHITECT · No. 11509

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
4	.	.
3	.	.
2	.	.
1	05/24/16	ISSUED FOR PERMIT
0	05/16/16	ISSUED FOR PERMIT
A	05/10/16	90% CD SUBMITTAL

Carrier:

eyeTOWER
2711 CENTERVILLE ROAD, STE 400, PMB 160
WILMINGTON, DE 19808

Tower Owner/Client:

CROWN CASTLE
100 REGENCY FOREST DRIVE, SUITE 150
CARY, NC 27518

A/E Consultant:

MORRISON HERSHFIELD
8604 Cliff Cameron Drive, Suite 152
Charlotte, NC 28269
TEL: 704.499.8861 FAX: 704.547.5231
www.morrisonhershfield.com

Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

GROUNDING DETAILS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-6

SCALE IS BASE ON 22" X 34" "D" SIZE

S:\716 Series\7160018.00 Crown Carolinas AE Services 2016\3.0 Sites\BDL200_HRT\3.2_Design & Development\CAD\7160018.00_806372_BDL200_Final-CDs_Rev 1_2016.05.24.dwg 05/25/2016 4:46pm bfraser

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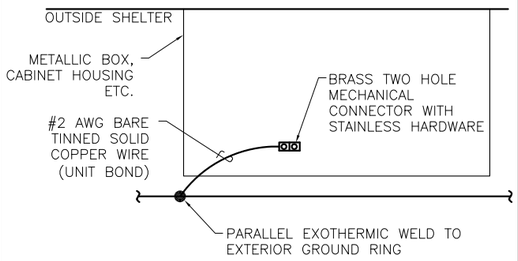
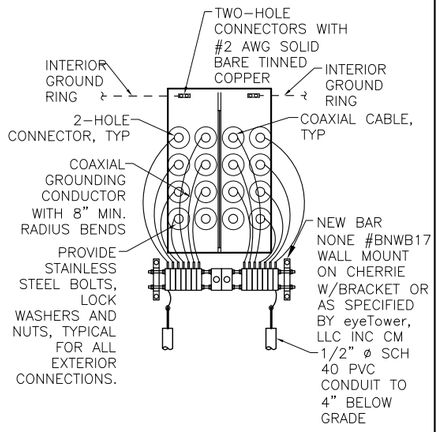
A B C



METALLIC CABINET GROUNDING DETAIL

NTS

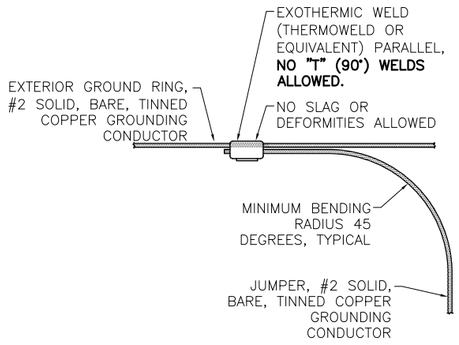
1



EXT HATCH PLATE GROUNDING DETAIL

NTS

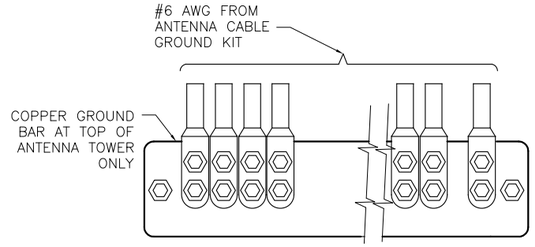
2



TYPICAL GROUNDING CONNECTION DETAIL

NTS

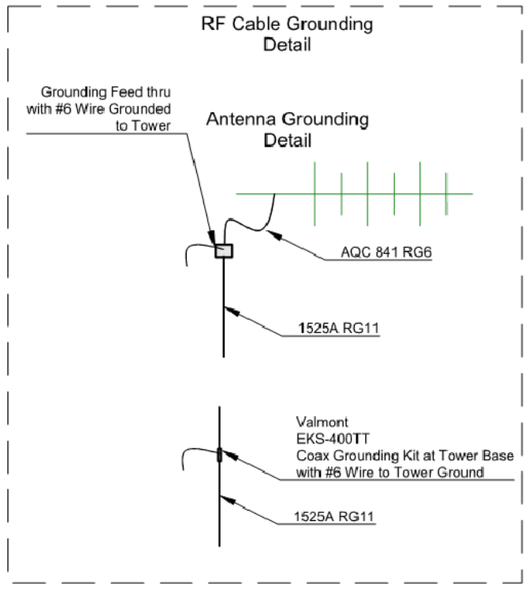
3



INSTALLATION OF GROUND WIRE TO GROUND BAR AT TOP OF TOWER

NTS

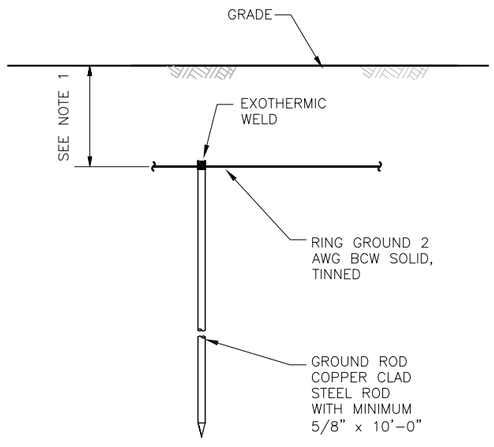
4



CONNECTION OF GROUND KIT TO ANTENNA CABLE

NTS

5



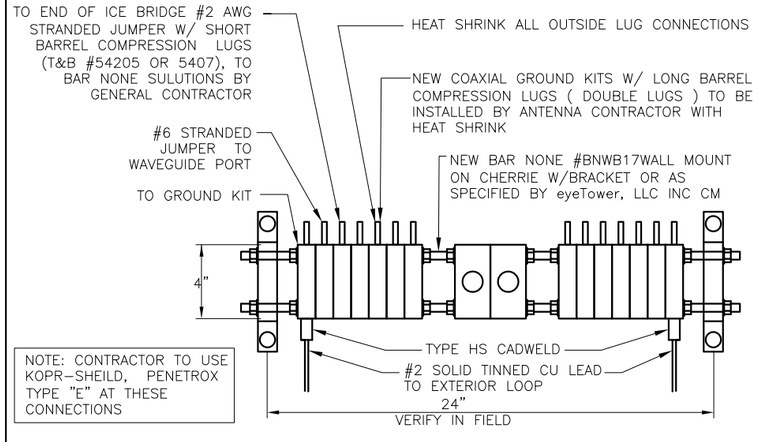
NOTES:

1. GROUND LINE TO BE A MIN. OF 30" OR BELOW FROST LINE, WHICHEVER IS DEEPER.
2. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.

GROUND ROD

NTS

6



NOTES:

1. ALL HARDWARE 8-88 STAINLESS STEEL INCLUDING BELLVILLES COAT MATING SURFACES WITH KOPR-SHEILD BEFORE ATTACHMENT.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".
4. ALL LUGS ARE DOUBLE HOLED 5. HEAT SHRINK ALL OUTSIDE LUG CONNECTIONS

GROUND BAR DETAIL

NTS

7

STATE OF CONNECTICUT · ROBERT J. LARA · No. 11509 · LICENSED ARCHITECT

ROBERT JERRY LARA
REGISTERED ARCHITECT
STATE OF CONNECTICUT
11509

No.	Date	Action
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A	05/10/16	90% CD SUBMITTAL

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Project:

806372
BDL200

266R CENTER ST.
MANCHESTER, CT 06040

Drawing Title:

GROUNDING DETAILS

Project No.: 7160018	
Designer: CG	Date: 05/10/16
Drawn By: RM	Checked By: RL
PM Review: CG	Client Approval
Issue No.: 1	Drawing No. E-7

SCALE IS BASE ON 22" X 34" "D" SIZE

Pier Structural Engineering Corp.
55 Northfield Drive E, Suite 198
Waterloo, ON N2K 3T6
Tel: 519-885-3806
Fax: 519-884-3806
www.p-sec.ca

May 20, 2016

Charles McGuirt, Tower Structural Analyst
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Subject:	**Structural Analysis Report**	
Carrier Designation:	Carrier Co-Locate:	**eyeTower**
	Carrier Site Number:	**BDL200**
	Carrier Site Name:	**BDL200**
Crown Castle Designation:	Crown Castle BU Number:	**806372**
	Crown Castle Site Name:	**HRT 093 943228**
	Crown Castle JDE Job Number:	**362485**
	Crown Castle WO Number:	**1237191**
Engineering Firm Designation:	P-SEC Project Number:	**15465 Rev 1**
Site Data:	**266R Center Street, MANCHESTER, Hartford County, CT** **Latitude *41° 46' 19"*, Longitude *-72° 31' 48.8"*** **115-ft Monopole Tower**	

Dear Charles McGuirt,

Pier Structural Engineering Corp. (P-SEC) is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 904514, in accordance with application 329104, revision 25.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F Standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

We at P-SEC appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Hamze Siblini, E.I.T.

Respectfully submitted by:

Shawn Hoffmeyer, P.E., P.Eng.
CT PE# 31228

05/20/16

tnxTower Report - version 7.0.5.1

Pier Structural Engineering Corp.
55 Northfield Drive E, Suite 198
Waterloo, ON N2K 3T6
Tel: 519-885-3806
Fax: 519-884-3806
www.p-sec.ca

May 20, 2016

Charles McGuirt, Tower Structural Analyst
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Subject:	**Structural Analysis Report**	
Carrier Designation:	Carrier Co-Locate:	**eyeTower**
	Carrier Site Number:	**BDL200**
	Carrier Site Name:	**BDL200**
Crown Castle Designation:	Crown Castle BU Number:	**806372**
	Crown Castle Site Name:	**HRT 093 943228**
	Crown Castle JDE Job Number:	**362485**
	Crown Castle WO Number:	**1237191**
Engineering Firm Designation:	P-SEC Project Number:	**15465 Rev 1**
Site Data:	**266R Center Street, MANCHESTER, Hartford County, CT** **Latitude *41° 46' 19"*, Longitude *-72° 31' 48.8"*** **115-ft Monopole Tower**	

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Structural analysis prepared by: Hamze Siblini, E.I.T.

Respectfully submitted by:

Shawn Hoffmeyer, P.E., P.Eng.
CT PE# 31228

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 115-ft Monopole tower originally designed by VALMONT in May of 1990 for a wind speed of 90 mph per EIA-222-D.

2) ANALYSIS CRITERIA

The following design parameters have been used in our analysis:

Design Standard:		TIA/EIA-222-F Standard and 2005 CT State Building Code
County/State:		Hartford County, CT
Wind Speeds:	*CASE 1*	80 mph (fastest mile)
	CASE 2	37.6 mph (fastest mile) with 1" radial solid ice *(per ASCE7 ice map)*
	CASE 3	50 mph (fastest mile) for Serviceability
Allowable Stress:		Increased 1/3rd

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
85	85	1	wade antenna	WH14-69/S	5	13/32	1
		1	wade antenna	WL 14-69/S			
		2	--	Pipe Mount [PM 601-1]			
	83	2	wade antenna	WL 14-69/S			
	78	1	wade antenna	J105-HI			

Notes:
1) Proposed equipment

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115	116	6	commscope	HBXX-6517DS-A2M	--	--	2
		3	commscope	LNX-6514DS-A1M			
		3	alcatel lucent	RRH-2X40W-700-MHZ			
		3	alcatel lucent	RRH2X60-AWS			
		6	decibel	DB844G65ZAXY	18 1	1-5/8 1-1/4	1
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
	115	1	--	Miscellaneous [NA 510-1]			
		1	--	Platform Mount [LP 1201-1]			
		3	antel	BXA-185085-12CF-EDIN-2	--	--	3
		2	antel	BXA-70063/6CFx4			
		1	antel	BXA-70063/6CFx6			
		1	antel	BXA-171063-12BF			
		2	antel	BXA-171085-12BF-EDIN-2			
		3	alcatel lucent	RRH2x40-AWS			
105	108	2	andrew	VHLP1-23	5 5	1/2 5/16	1
		1	andrew	VHLP2-11-2GR			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
105	108	4	dragonwave	HORIZON COMPACT	5	1/4	1
		3	samsung	WIMAX DAP HEAD			
	105	1	--	Platform Mount [LP 602-1]			

Notes:
1) Existing equipment
2) Reserved equipment
3) Equipment to be removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
112	112	4	--	PD10017	--	--
		1	--	Platform		
106	106	12	--	PD1132	--	--
99	99	1	--	Platform	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Testwell Craig, dated 4/12/1990	262174	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH, Proj. # 10-06100E N1 dated 6/21/2010	2668863	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, Proj. # 10665-90 dated 5/1/1990	262172	CCISITES
APPLICATION	eyeTower LLC., Revision # 25 dated 5/11/2016	329104	CCISITES

3.1) Analysis Method

tnxTower (7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower\structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) P-SEC did not analyze antenna supporting mounts as part of this analysis report and assumed they are structurally sufficient. It is the carrier's responsibility to ensure structural compliance of their existing and/or proposed antenna supporting mounts.

6) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package dated 5/18/2016.

This analysis may be affected if any assumptions are not valid or have been made in error. P-SEC should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	115 - 72.3333	Pole	TP30.45x21.91x0.2188	1	-8.02	1013.90	62.2	Pass
L2	72.3333 - 29.3333	Pole	TP38.61x29.0784x0.3125	2	-14.43	1944.14	67.3	Pass
L3	29.3333 - 0	Pole	TP43.85x36.8519x0.375	3	-22.19	2729.12	67.9	Pass
							Summary	
						Pole (L3)	67.9	Pass
						RATING =	**67.9**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
2	Anchor Rods	--	63.1	Pass
2	Base Plate	--	40.2	Pass
2	Base Foundation - Soil	--	81.8	Pass
2	Base Foundation - Structural	--	76.5	Pass

Structure Rating (max from all components) =	**81.8%**

Notes: 1) See full member breakdown and section capacities in Appendix A.
2) See additional documentation in Appendix C for supporting calculations.
3) Stresses up to 105% (steel) and 110% (foundations) are within engineering tolerance and considered acceptable.

4.1) Recommendations

The existing 115-ft monopole tower located in Hartford County (HRT 093 943228), CT is structurally acceptable based on the TIA/EIA-222-F Standard and local code requirements based upon a wind speed of 80 mph fastest mile.

No modifications are required for the proposed loading.

Should you have any questions, please call us anytime at 519-885-3806.

encl.
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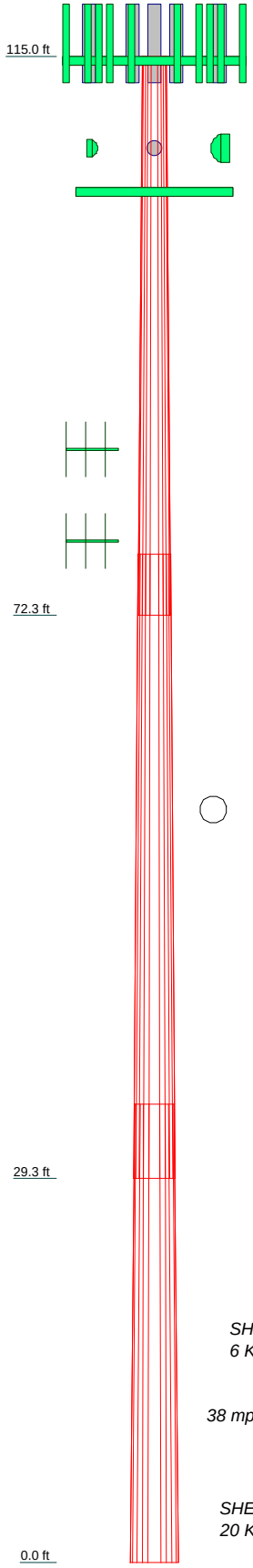
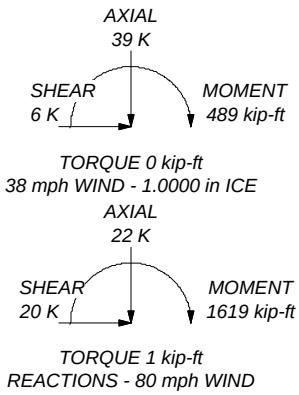
APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	42'8-1/32"	12	0.2188	4'8-1/32"	21.9100	30.4500		2.7
2	47'8-1/32"	12	0.3125	5'8-1/32"	29.0784	38.6100	S-22	5.5
3	35'	12	0.3750		36.8519	43.8500		5.7
								13.9





TORQUE 0 kip-ft
38 mph WIND - 1.0000 in ICE

TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	115	DB-T1-6Z-8AB-0Z (Carrier 115' E)	115
(2) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	115	Miscellaneous [NA 510-1] (Carrier 115' E)	115
(2) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	115	Platform Mount [LP 1201-1] (Carrier 115' E)	115
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	115	HORIZON COMPACT (Carrier 105' E)	105
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	115	HORIZON COMPACT (Carrier 105' E)	105
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	115	(2) HORIZON COMPACT (Carrier 105' E)	105
RRH-2X40W-700-MHZ (Carrier 115' R)	115	WIMAX DAP HEAD (Carrier 105' E)	105
RRH-2X40W-700-MHZ (Carrier 115' R)	115	WIMAX DAP HEAD (Carrier 105' E)	105
RRH-2X40W-700-MHZ (Carrier 115' R)	115	WIMAX DAP HEAD (Carrier 105' E)	105
RRH2X60-AWS (Carrier 115' R)	115	(2) 5' x 2" Pipe Mount (Carrier 105' E)	105
RRH2X60-AWS (Carrier 115' R)	115	(2) 5' x 2" Pipe Mount (Carrier 105' E)	105
RRH2X60-AWS (Carrier 115' R)	115	(2) 5' x 2" Pipe Mount (Carrier 105' E)	105
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	115	Platform Mount [LP 602-1] (Carrier 105' E)	105
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	115	VHLP1-23 (Carrier 105' E)	105
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	115	VHLP2-11-2GR (Carrier 105' E)	105
		VHLP1-23 (Carrier 105' E)	105
		WL 14-69/S (Carrier 85' P)	85
		WL 14-69/S (Carrier 85' P)	85
		Pipe Mount [PM 601-1] (Carrier 85' P)	85
		Pipe Mount [PM 601-1] (Carrier 85' P)	85
		J105-HI (Carrier 85' P)	85
		WH14-69/S (Carrier 85' P)	85
		WL 14-69/S (Carrier 85' P)	85

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
S-22	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. -
6. E - Existing, R - Reserved, P - Proposed
7. Proposed loading at 90 ft elevation
8. TOWER RATING: 67.9%

Pier Structural Engineering Corp.
198-55 Northfield Drive East
Waterloo, ON N2K 3T6
Phone: (519) 885-3806
FAX: (519) 886-0076

Job:	***PSEC 15465 Rev 1 (eyeTower, LLC)***		
Project:	***806372 - HRT 093 943228***		
Client: CROWN CASTLE	Drawn by: HS		App'd:
Code: TIA/EIA-222-F	Date: 05/20/16		Scale: NTS
Path: H:\PROJECTS\JOB 15000 - 15999\JOB 15400 - 15499\15465 - CCI - 806372 - HRT 093 943228\Rev. 1\806372_LC7_20160520_rev 1.eri			Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
- -.
E - Existing, R - Reserved, P - Proposed.
Proposed loading at 90 ft elevation.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
√ Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
√ Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
√ Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
Sort Capacity Reports By Component
√ Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-G Bracing Resist. Exemption
Use TIA-222-G Tension Splice Exemption

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets

Tapered Pole Section Geometry

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
L1	115'-72'3-31/32"	42'8-1/32"	4'8-1/32"	12	21.9100	30.4500	0.2188	0.8750	S-22 (65 ksi)
L2	72'3-31/32"-29'3-31/32"	47'8-1/32"	5'8-1/32"	12	29.0784	38.6100	0.3125	1.2500	S-22 (65 ksi)
L3	29'3-31/32"-0'	35'		12	36.8519	43.8500	0.3750	1.5000	S-22 (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	22.6829	15.2788	917.5793	7.7655	11.3494	80.8484	1859.2645	7.5197	5.2856	24.163
	31.5242	21.2941	2484.0378	10.8228	15.7731	157.4857	5033.3340	10.4803	7.5743	34.626
L2	31.0703	28.9457	3057.2254	10.2982	15.0626	202.9676	6194.7676	14.2462	6.9555	22.258
	39.9720	38.5369	7214.4482	13.7105	20.0000	360.7228	14618.4279	18.9667	9.5100	30.432
L3	39.3249	44.0458	7480.4209	13.0587	19.0893	391.8652	15157.3608	21.6780	8.8713	23.657
	45.3969	52.4961	12664.6112	15.5641	22.7143	557.5611	25661.9358	25.8370	10.7468	28.658

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	Double Angle Stitch Bolt Spacing Redundants in
L1 115'-72'3-31/32"				1	1	1			
L2 72'3-31/32"-29'3-31/32"				1	1	1			
L3 29'3-31/32"-0'				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 plf
LDF7-50A(1-5/8") (Carrier 115' E)	C	No	CaAa (Out Of Face)	115' - 0'	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8") (Carrier 115' E)	C	No	CaAa (Out Of Face)	115' - 0'	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
HB114-21U3M12-XXXF(1-1/4) (Carrier 115' E)	C	No	CaAa (Out Of Face)	115' - 0'	1	No Ice	0.15	1.22
						1/2" Ice	0.25	2.47
						1" Ice	0.35	4.32
						2" Ice	0.55	9.87
						4" Ice	0.95	28.29
LDF7-50A(1-5/8") (Carrier 115' E)	C	No	Inside Pole	115' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
FSJ4-50B(1/2") (Carrier 105' E)	B	No	Inside Pole	105' - 0'	5	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
9207(5/16") (Carrier 105' E)	B	No	Inside Pole	105' - 0'	5	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.00	0.60
						4" Ice	0.00	0.60
FSJ1-50A(1/4") (Carrier 105' E)	B	No	Inside Pole	105' - 0'	5	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
						2" Ice	0.00	0.04
						4" Ice	0.00	0.04
***								
1110(13/32'') (Carrier 85' P)	**B**	**No**	**CaAa (Out Of Face)**	**85' - 0'**	**1**	**No Ice**	**0.04**	**0.05**
						1/2'' Ice	**0.14**	**0.60**
						1'' Ice	**0.24**	**1.77**
						2'' Ice	**0.44**	**5.93**
						4'' Ice	**0.84**	**21.58**
1110(13/32'') (Carrier 85' P)	**B**	**No**	**CaAa (Out Of Face)**	**85' - 0'**	**4**	**No Ice**	**0.00**	**0.05**
						1/2'' Ice	**0.00**	**0.60**
						1'' Ice	**0.00**	**1.77**
						2'' Ice	**0.00**	**5.93**
						4'' Ice	**0.00**	**21.58**
***								
2.25" Rigid Conduit (Carrier 105' E)	B	No	Inside Pole	105' - 0'	2	No Ice	0.00	3.15
						1/2" Ice	0.00	3.15
						1" Ice	0.00	3.15
						2" Ice	0.00	3.15
						4" Ice	0.00	3.15

Discrete Tower Loads

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) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice	8.98	6.96	0.07
						1/2" Ice	9.65	8.18	0.14
						1" Ice	10.29	9.14	0.21
						2" Ice	11.59	11.02	0.40
						4" Ice	14.32	15.03	0.91
(2) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice	8.98	6.96	0.07
						1/2" Ice	9.65	8.18	0.14
						1" Ice	10.29	9.14	0.21
						2" Ice	11.59	11.02	0.40
						4" Ice	14.32	15.03	0.91
(2) HBXX-6517DS-A2M w/ Mount Pipe (Carrier 115' R)	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice	8.98	6.96	0.07
						1/2" Ice	9.65	8.18	0.14
						1" Ice	10.29	9.14	0.21
						2" Ice	11.59	11.02	0.40
						4" Ice	14.32	15.03	0.91
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice	8.65	7.08	0.06
						1/2" Ice	9.31	8.27	0.13
						1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39
						4" Ice	13.87	15.06	0.90
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice	8.65	7.08	0.06
						1/2" Ice	9.31	8.27	0.13
						1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	13.87	15.06	0.90
LNX-6514DS-A1M w/ Mount Pipe (Carrier 115' R)	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.65 9.31 9.93 11.20 13.87	7.08 8.27 9.18 11.02 15.06	0.06 0.13 0.21 0.39 0.90
RRH-2X40W-700-MHZ (Carrier 115' R)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.22 3.46 3.71 4.23 5.39	1.93 2.13 2.34 2.78 3.76	0.05 0.08 0.10 0.17 0.35
RRH-2X40W-700-MHZ (Carrier 115' R)	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.22 3.46 3.71 4.23 5.39	1.93 2.13 2.34 2.78 3.76	0.05 0.08 0.10 0.17 0.35
RRH-2X40W-700-MHZ (Carrier 115' R)	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.22 3.46 3.71 4.23 5.39	1.93 2.13 2.34 2.78 3.76	0.05 0.08 0.10 0.17 0.35
RRH2X60-AWS (Carrier 115' R)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS (Carrier 115' R)	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS (Carrier 115' R)	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	0.03 0.08 0.13 0.26 0.62
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	0.03 0.08 0.13 0.26 0.62
(2) DB844G65ZAXY w/ Mount Pipe (Carrier 115' E)	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	0.03 0.08 0.13 0.26 0.62
DB-T1-6Z-8AB-0Z (Carrier 115' E)	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
Miscellaneous [NA 510-1]	C	None		0.0000	115'	No Ice	6.00	6.00	0.26

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Carrier 115' E)						1/2" Ice	8.50	8.50	0.34
						1" Ice	11.00	11.00	0.42
						2" Ice	16.00	16.00	0.59
						4" Ice	26.00	26.00	0.93
Platform Mount [LP 1201-1]	C	None		0.0000	115'	No Ice	23.10	23.10	2.10
(Carrier 115' E)						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
						2" Ice	37.90	37.90	3.70
						4" Ice	52.70	52.70	5.30
***									
HORIZON COMPACT	A	From Leg	4.00	0.0000	105'	No Ice	0.84	0.43	0.01
(Carrier 105' E)			0'			1/2" Ice	0.97	0.52	0.02
			3'			1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
HORIZON COMPACT	B	From Leg	4.00	0.0000	105'	No Ice	0.84	0.43	0.01
(Carrier 105' E)			0'			1/2" Ice	0.97	0.52	0.02
			3'			1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
(2) HORIZON COMPACT	C	From Leg	4.00	0.0000	105'	No Ice	0.84	0.43	0.01
(Carrier 105' E)			0'			1/2" Ice	0.97	0.52	0.02
			3'			1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
WIMAX DAP HEAD	A	From Leg	4.00	0.0000	105'	No Ice	1.80	0.78	0.03
(Carrier 105' E)			0'			1/2" Ice	1.99	0.92	0.04
			3'			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	B	From Leg	4.00	0.0000	105'	No Ice	1.80	0.78	0.03
(Carrier 105' E)			0'			1/2" Ice	1.99	0.92	0.04
			3'			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	C	From Leg	4.00	0.0000	105'	No Ice	1.80	0.78	0.03
(Carrier 105' E)			0'			1/2" Ice	1.99	0.92	0.04
			3'			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
(2) 5' x 2" Pipe Mount	A	From Leg	4.00	0.0000	105'	No Ice	1.00	1.00	0.03
(Carrier 105' E)			0'			1/2" Ice	1.39	1.39	0.04
			0'			1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
(2) 5' x 2" Pipe Mount	B	From Leg	4.00	0.0000	105'	No Ice	1.00	1.00	0.03
(Carrier 105' E)			0'			1/2" Ice	1.39	1.39	0.04
			0'			1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
(2) 5' x 2" Pipe Mount	C	From Leg	4.00	0.0000	105'	No Ice	1.00	1.00	0.03
(Carrier 105' E)			0'			1/2" Ice	1.39	1.39	0.04
			0'			1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
Platform Mount [LP 602-1]	C	None		0.0000	105'	No Ice	32.03	32.03	1.34
(Carrier 105' E)						1/2" Ice	38.71	38.71	1.80

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	45.39	45.39	2.26
						2" Ice	58.75	58.75	3.17
						4" Ice	85.47	85.47	5.00
***									
J105-HI	**C**	**From Leg**	**2.00**	**0.0000**	**85'**	**No Ice**	**1.81**	**1.81**	**0.02**
(Carrier 85' P)			**0'**			**1/2''**	**3.26**	**3.26**	**0.14**
			-7'			**Ice**	**4.71**	**4.71**	**0.27**
						1'' Ice	**7.61**	**7.61**	**0.52**
						2'' Ice	**13.41**	**13.41**	**1.03**
						4'' Ice			
WH14-69/S	**C**	**From Leg**	**2.00**	**0.0000**	**85'**	**No Ice**	**1.94**	**1.94**	**0.01**
(Carrier 85' P)			**0'**			**1/2''**	**0.00**	**0.00**	**0.14**
			0'			**Ice**	**4.02**	**4.02**	**0.27**
						1'' Ice	**0.00**	**0.00**	**0.55**
						2'' Ice	**0.00**	**0.00**	**1.22**
						4'' Ice			
WL 14-69/S	**C**	**From Leg**	**2.00**	**0.0000**	**85'**	**No Ice**	**0.63**	**0.63**	**0.01**
(Carrier 85' P)			**0'**			**1/2''**	**1.02**	**1.02**	**0.07**
			-2'			**Ice**	**1.42**	**1.42**	**0.13**
						1'' Ice	**2.21**	**2.21**	**0.26**
						2'' Ice	**3.79**	**3.79**	**0.52**
						4'' Ice			
WL 14-69/S	**B**	**From Leg**	**2.00**	**0.0000**	**85'**	**No Ice**	**0.63**	**0.63**	**0.01**
(Carrier 85' P)			**0'**			**1/2''**	**1.02**	**1.02**	**0.07**
			0'			**Ice**	**1.42**	**1.42**	**0.13**
						1'' Ice	**2.21**	**2.21**	**0.26**
						2'' Ice	**3.79**	**3.79**	**0.52**
						4'' Ice			
WL 14-69/S	**B**	**From Leg**	**2.00**	**0.0000**	**85'**	**No Ice**	**0.63**	**0.63**	**0.01**
(Carrier 85' P)			**0'**			**1/2''**	**1.02**	**1.02**	**0.07**
			-2'			**Ice**	**1.42**	**1.42**	**0.13**
						1'' Ice	**2.21**	**2.21**	**0.26**
						2'' Ice	**3.79**	**3.79**	**0.52**
						4'' Ice			
Pipe Mount [PM 601-1]	**B**	**From Leg**	**1.00**	**0.0000**	**85'**	**No Ice**	**3.00**	**0.90**	**0.07**
(Carrier 85' P)			**0'**			**1/2''**	**3.74**	**1.12**	**0.08**
			0'			**Ice**	**4.48**	**1.34**	**0.09**
						1'' Ice	**5.96**	**1.78**	**0.12**
						2'' Ice	**8.92**	**2.66**	**0.18**
						4'' Ice			
Pipe Mount [PM 601-1]	**C**	**From Leg**	**1.00**	**0.0000**	**85'**	**No Ice**	**3.00**	**0.90**	**0.07**
(Carrier 85' P)			**0'**			**1/2''**	**3.74**	**1.12**	**0.08**
			0'			**Ice**	**4.48**	**1.34**	**0.09**
						1'' Ice	**5.96**	**1.78**	**0.12**
						2'' Ice	**8.92**	**2.66**	**0.18**
						4'' Ice			
**********									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight
				ft	°	°	ft	ft		ft^2	K
VHLP1-23 (Carrier 105' E)	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 3'	0.0000		105'	1.27	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.28 1.45 1.62 1.97 2.66	0.01 0.02 0.03 0.04 0.07
VHLP2-11-2GR (Carrier 105' E)	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 3'	0.0000		105'	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.20
VHLP1-23 (Carrier 105' E)	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 3'	0.0000		105'	1.27	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.28 1.45 1.62 1.97 2.66	0.01 0.02 0.03 0.04 0.07

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 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service

Comb. No.	Description
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	38.67	-0.00	0.00
	Max. H_x	11	22.20	20.00	0.04
	Max. H_z	2	22.20	0.05	20.00
	Max. M_x	2	1616.52	0.05	20.00
	Max. M_z	5	1610.29	-19.97	-0.01
	Max. Torsion	13	0.71	10.03	17.33
	Min. Vert	8	22.20	-0.03	-20.00
	Min. H_x	5	22.20	-19.97	-0.01
	Min. H_z	8	22.20	-0.03	-20.00
	Min. M_x	8	-1617.89	-0.03	-20.00
	Min. M_z	11	-1614.61	20.00	0.04
	Min. Torsion	7	-0.72	-10.00	-17.32

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	22.20	-0.00	0.00	0.59	0.83	0.00
Dead+Wind 0 deg - No Ice	22.20	-0.05	-20.00	-1616.52	6.76	-0.57
Dead+Wind 30 deg - No Ice	22.20	10.00	-17.31	-1398.31	-805.79	-0.16
Dead+Wind 60 deg - No Ice	22.20	17.31	-9.98	-805.16	-1395.47	0.05
Dead+Wind 90 deg - No Ice	22.20	19.97	0.01	2.25	-1610.29	0.26
Dead+Wind 120 deg - No Ice	22.20	17.30	10.01	809.76	-1394.54	0.57
Dead+Wind 150 deg - No Ice	22.20	10.00	17.32	1401.29	-806.20	0.72
Dead+Wind 180 deg - No Ice	22.20	0.03	20.00	1617.89	-2.55	0.51
Dead+Wind 210 deg - No Ice	22.20	-9.96	17.33	1401.70	803.74	0.15
Dead+Wind 240 deg - No Ice	22.20	-17.32	9.96	804.13	1398.30	0.00
Dead+Wind 270 deg - No Ice	22.20	-20.00	-0.04	-3.87	1614.61	-0.26
Dead+Wind 300 deg - No Ice	22.20	-17.33	-10.02	-810.21	1399.11	-0.56
Dead+Wind 330 deg - No Ice	22.20	-10.03	-17.33	-1400.92	811.67	-0.71
Dead+Ice+Temp	38.67	0.00	-0.00	5.07	5.03	0.00
Dead+Wind 0 deg+Ice+Temp	38.67	-0.01	-5.74	-477.04	6.63	-0.31
Dead+Wind 30 deg+Ice+Temp	38.67	2.87	-4.96	-412.02	-235.94	-0.09
Dead+Wind 60 deg+Ice+Temp	38.67	4.97	-2.86	-235.22	-412.14	0.09
Dead+Wind 90 deg+Ice+Temp	38.67	5.74	0.00	5.55	-476.41	0.25
Dead+Wind 120 deg+Ice+Temp	38.67	4.97	2.87	246.43	-411.87	0.38
Dead+Wind 150 deg+Ice+Temp	38.67	2.87	4.97	422.87	-235.94	0.41
Dead+Wind 180 deg+Ice+Temp	38.67	0.01	5.74	487.49	4.30	0.29
Dead+Wind 210 deg+Ice+Temp	38.67	-2.86	4.97	422.98	245.20	0.09
Dead+Wind 240 deg+Ice+Temp	38.67	-4.97	2.86	245.02	422.69	-0.07
Dead+Wind 270 deg+Ice+Temp	38.67	-5.74	-0.01	4.02	487.37	-0.25
Dead+Wind 300 deg+Ice+Temp	38.67	-4.98	-2.87	-236.48	422.92	-0.38
Dead+Wind 330 deg+Ice+Temp	38.67	-2.88	-4.97	-412.67	247.27	-0.41

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - Service	22.20	-0.02	-7.81	-631.45	3.16	-0.22
Dead+Wind 30 deg - Service	22.20	3.90	-6.76	-546.11	-314.40	-0.06
Dead+Wind 60 deg - Service	22.20	6.76	-3.90	-314.30	-544.85	0.02
Dead+Wind 90 deg - Service	22.20	7.80	0.01	1.25	-628.86	0.10
Dead+Wind 120 deg - Service	22.20	6.76	3.91	316.84	-544.49	0.22
Dead+Wind 150 deg - Service	22.20	3.91	6.77	548.02	-314.56	0.28
Dead+Wind 180 deg - Service	22.20	0.01	7.81	632.73	-0.48	0.20
Dead+Wind 210 deg - Service	22.20	-3.89	6.77	548.18	314.64	0.06
Dead+Wind 240 deg - Service	22.20	-6.76	3.89	314.64	547.00	0.00
Dead+Wind 270 deg - Service	22.20	-7.81	-0.02	-1.14	631.59	-0.10
Dead+Wind 300 deg - Service	22.20	-6.77	-3.91	-316.27	547.32	-0.22
Dead+Wind 330 deg - Service	22.20	-3.92	-6.77	-547.14	317.74	-0.28

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	115 - 72.3333	19.694	33	1.5109	0.0010
L2	77 - 29.3333	8.883	33	1.0927	0.0009
L3	35 - 0	1.825	33	0.4675	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
115'	(2) HBXX-6517DS-A2M w/ Mount Pipe	33	19.694	1.5109	0.0010	26641
108'	VHLP1-23	33	17.556	1.4413	0.0008	19029
105'	HORIZON COMPACT	33	16.647	1.4111	0.0008	13320
85'	J105-HI	33	10.914	1.1932	0.0009	4439

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	115 - 72.3333 (1)	TP30.45x21.91x0.2188	42'8-1/32"	0'	0.0	36.858	20.6362	-8.02	760.62	0.011
L2	72.3333 - 29.3333 (2)	TP38.61x29.0784x0.3125	47'8-1/32"	0'	0.0	39.000	37.3967	-14.43	1458.47	0.010
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	35'	0'	0.0	39.000	52.4961	-22.19	2047.35	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	115 - 72.3333 (1)	TP30.45x21.91x0.2188	371.30	30.132	36.858	0.818	0.00	0.000	36.858	0.000
L2	72.3333 - 29.3333 (2)	TP38.61x29.0784x0.3125	978.64	34.580	39.000	0.887	0.00	0.000	39.000	0.000
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	1619.07	34.846	39.000	0.893	0.00	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	115 - 72.3333 (1)	TP30.45x21.91x0.2188	12.29	0.596	26.000	0.047	0.27	0.010	26.000	0.000
L2	72.3333 - 29.3333 (2)	TP38.61x29.0784x0.3125	16.57	0.443	26.000	0.035	0.57	0.010	26.000	0.000
L3	29.3333 - 0 (3)	TP43.85x36.8519x0.375	20.04	0.382	26.000	0.030	0.71	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	115 - 72.3333 (1)	0.011	0.818	0.000	0.047	0.000	0.829 ✔	1.333	H1-3+VT ✔
L2	72.3333 - 29.3333 (2)	0.010	0.887	0.000	0.035	0.000	0.897 ✔	1.333	H1-3+VT ✔
L3	29.3333 - 0 (3)	0.011	0.893	0.000	0.030	0.000	0.905 ✔	1.333	H1-3+VT ✔

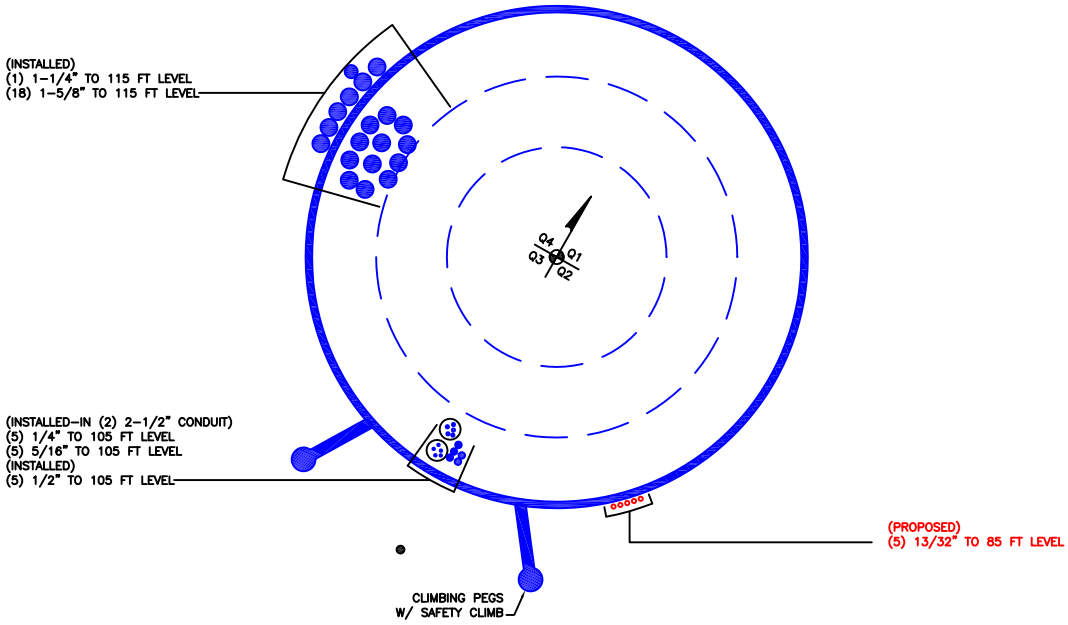
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	115 - 72.3333	Pole	TP30.45x21.91x0.2188	1	-8.02	1013.90	62.2	Pass
L2	72.3333 - 29.3333	Pole	TP38.61x29.0784x0.3125	2	-14.43	1944.14	67.3	Pass
L3	29.3333 - 0	Pole	TP43.85x36.8519x0.375	3	-22.19	2729.12	67.9	Pass
							Summary	
						Pole (L3)	67.9	Pass
						RATING =	**67.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

TX LINE LAYOUT



BUSINESS UNIT: 806372 TOWER ID: C_BASELEVEL

Clients

CROWN CASTLE

Professional Stamp

Revisions

No.	Description	Date
A	ISSUED FOR REVIEW	5.20.16

Engineering Firm

P-SEC
ph: 519-885-3806
fx: 519-886-0076
www.p-sec.ca
PIER STRUCTURAL ENGINEERING CORP
55 NORTHFIELD DR. E, SUITE 198
WATERLOO, ON N2K 3T6

PSEC Job No.

15465 Rev 1

Site Name

806372
HRT 093 943228

Site Design

Sheet Title

TX LINES

Drawn by	Sheet
HS	A-1
Checked by	
Approved By	

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*806372*
Site Name:	*HRT 093 943228*
App #:	*329104 REV 25*
Pole Manufacturer:	*Other*

Reactions		
Moment:	1619	ft-kips
Axial:	22	kips
Shear:	20	kips

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	51.9	in

Plate Data		
Diam:	57.9	in
Thick:	2.625	in
Grade:	60	ksi
Single-Rod B-eff:	11.75	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	43.85	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	122.9 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	63.1% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	
Base Plate Stress:	24.1 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	40.2% **Pass**	0.75*Fy*ASIF
		Y.L. Length: 27.76

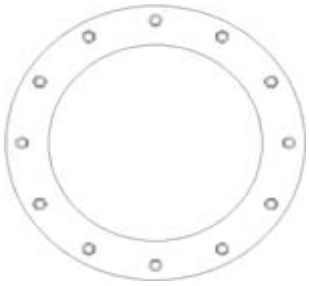
n/a

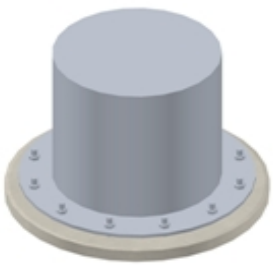
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 20/05/2016

BU:	806372
Site Name:	HRT 093 943228
App Number:	329104 REV 25
Work Order:	1237191

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

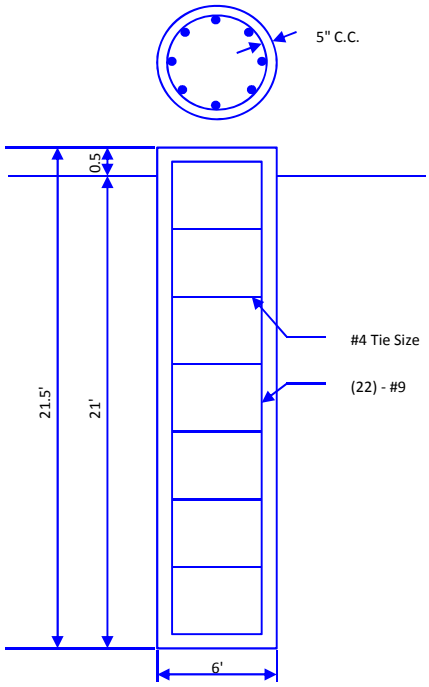
Compression	22	kips
Shear	20	kips
Moment	1619	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	6	ft
Ext. above grade:	0.5	ft
Depth below grade:	21	ft

Material Properties

Number of Rebar:	22	
Rebar Size:	9	
Tie Size	4	
Rebar tensile strength:	60	ksi
Concrete Strength:	3000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	5	in



Soil Profile: soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.33	0	3.33	105	0	0	0	0	0	
2	3.67	3.33	7	105	0	28	0	0	0	
3	5	7	12	106	0	29	0	0	0	
4	5	12	17	120	0	33	0	0	0	
5	5	17	22	111	0	30	0	0		10

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	5.46	ft
Max Moment, Mu:	1726.47	k-ft
Soil Safety Factor:	2.45	
Safety Factor Req'd:	2	
RATING:	81.8%	

Soil Axial Capacity

Skin Friction (k):	0.00	kips
End Bearing (k):	79.98	kips
Comp. Capacity (k), ϕCn:	79.98	kips
Comp. (k), Cu:	28.60	kips
RATING:	35.8%	

Concrete/Steel Check

Mu (from soil analysis)	2244.41	k-ft
ϕMn	2933.51	k-ft
RATING:	76.5%	

rho provided	0.54	
rho required	0.33	OK

Rebar Spacing	7.42	
Spacing required	18.05	OK

Dev. Length required	15.13	
Dev. Length provided	49.43	OK

Overall Foundation Rating: 81.8%

BU: 806372
HRT 093 943228

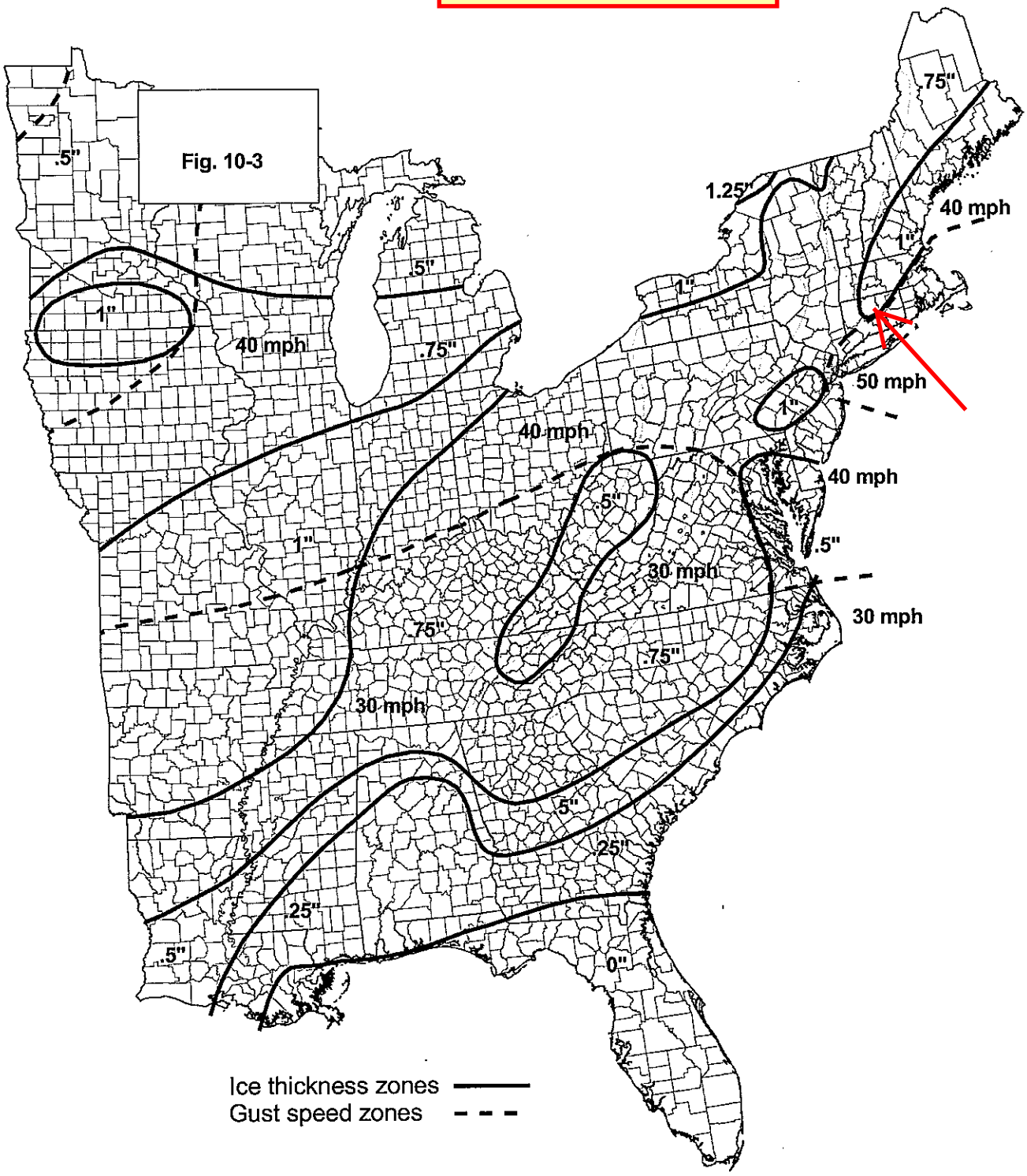


FIGURE 10-2 (continued) 50-YEAR MEAN RECURRENCE INTERVAL UNIFORM ICE THICKNESSES DUE TO FREEZING RAIN WITH CONCURRENT 3-SECOND GUST SPEEDS: CONTIGUOUS 48 STATES.

SITESAFE
RF COMPLIANCE EXPERTS
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200 North Glebe Road, Suite 1000, Arlington, VA 22203-3728
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Crown Castle
on behalf of eyeTower
BU – 806372
Site Name – HRT 092 943228
eyeTower Application ID – 329104
Site Compliance Report

266R Center Street
Manchester, CT 06040

Latitude: N41-46-19.00
Longitude: W72-31-48.80
Structure Type: Monopole

Report generated date: May 31, 2016
Report by: Kevin Smith
Customer Contact: Joe Franzen

The Site Will Be Compliant based on FCC Rules and Regulations.

Crown Castle on behalf of eyeTower
HRT 092 943228 - 806372
Radio Frequency (RF) Site Compliance Report

266R Center Street, Manchester, CT 06040

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703.276.1100 · info@sitesafe.com

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1 Executive Summary

Crown Castle on behalf of eyeTower has contracted with Sitesafe, Inc. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 806372 - HRT 092 943228, located at 266R Center Street, Manchester, CT, is in compliance with Federal Communication Commission (FCC) Rules and Regulations for RF emissions.

This report contains a detailed summary of the RF environment at the site including:

- diagram of the site;
- inventory of the make / model of all antennas
- theoretical MPE based on modeling.

This report addresses exposure to radio frequency electromagnetic fields in accordance with the FCC Rules and Regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled." This **site will be compliant** with the FCC rules and regulations, as described in OET Bulletin 65. The corrective actions needed to make this site compliant are located in Section 3.2.

This document and the conclusions herein are based on the information provided by Crown Castle on behalf of eyeTower.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

2 Regulatory Basis

2.1 FCC Rules and Regulations

In 1996, the Federal Communication Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

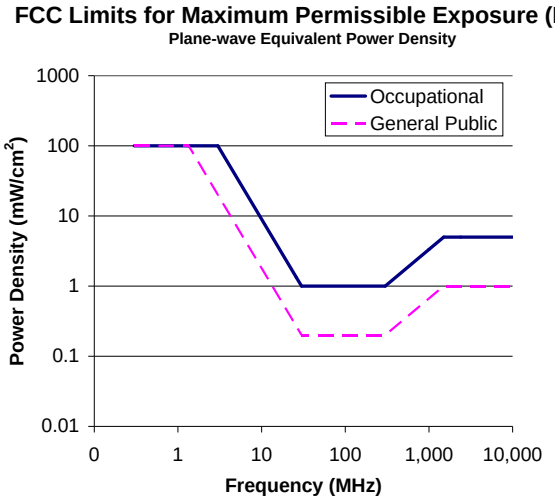
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (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

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (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

2.2 OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lock Out Tag Out procedure aimed to control the unexpected energization or start up of machines when maintenance or service is being performed.

3 Site Compliance

3.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

This **site will be compliant** with the FCC rules and regulations, as described in OET Bulletin 65. The corrective actions needed to make this site compliant are located in Section 3.2.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the eyeTower's proposed deployment plan could result in the site being rendered non-compliant.

3.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site will be made compliant if the following are implemented:

Base of Tower

Ensure a Yellow caution sign is installed at the base of the tower.

Note: Existing signage may already be in place. As this site was modeled with no site visit to verify existing signage, Crown Castle should ensure that the site is and remains in compliance with the recommended signage and access controls.

4 Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 5 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

5 Analysis

5.1 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

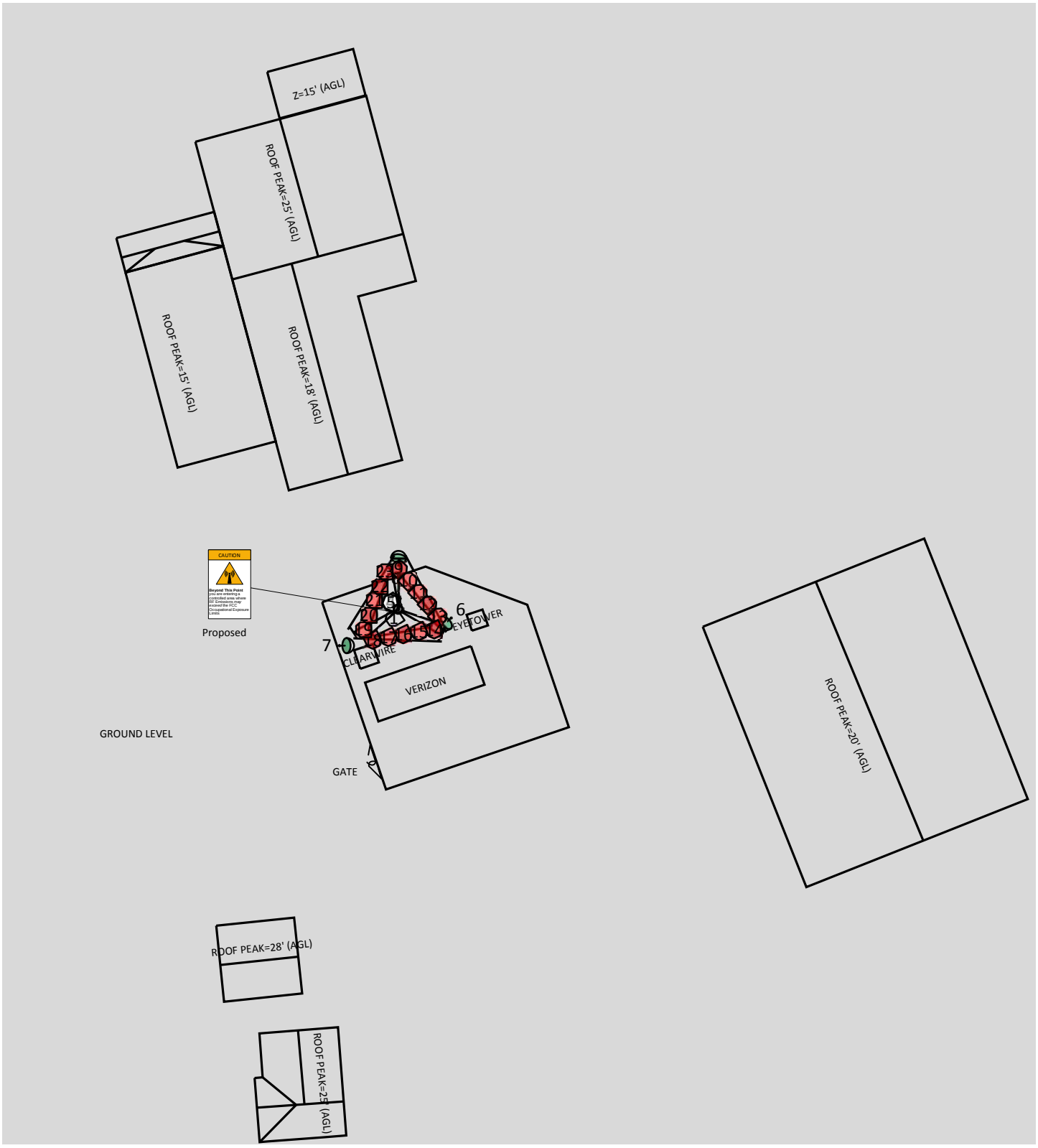
Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Composite View
RF Exposure Simulation For: HRT 092 943228



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)

0 24.6 49.2

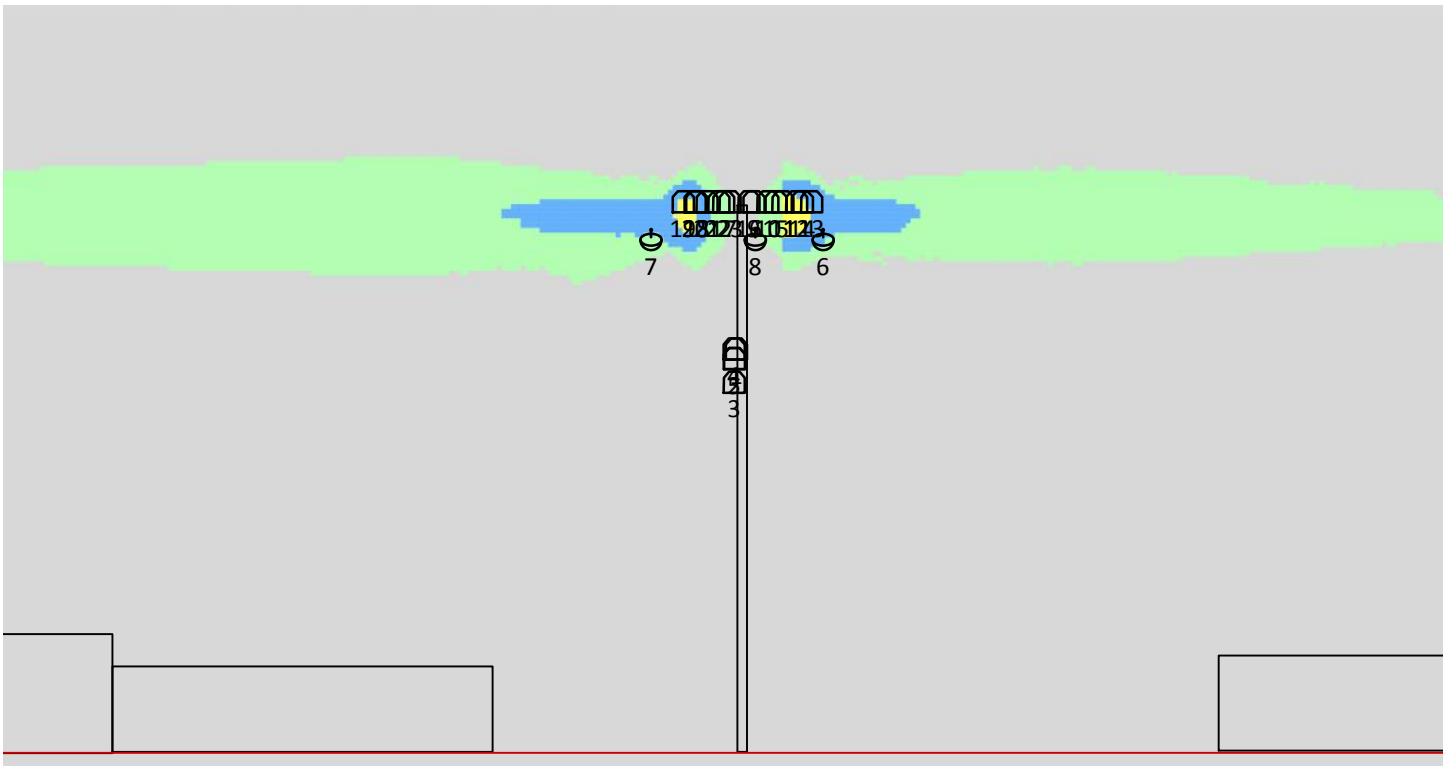
>= 5000 >= 500 >= 100 >= 5 < 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

www.sitesafe.com
Site Name:HRT 092 943228
5/27/2016 3:05:21 PM

SitesafeTC Version:1.0.0.0 - 0.0.0.247
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

Elevation View
RF Exposure Simulation For: HRT 092 943228



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 20.2 40.4
www.sitesafe.com
Site Name:HRT 092 943228
5/31/2016 9:51:54 AM

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

SitesafeTC Version:1.0.0.0 - 0.0.0.247
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

6 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 806372 - HRT 092 943228. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other carriers at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

The following antenna inventory, on this and the following page, were provided by the customer and were utilized to create the site model diagrams:

Table 3: Antenna Inventory												
Ant #	Operated By	TX Freq (MHz)	ERP (Watts)	Antenna Gain (dBd)	Az (Deg)	Antenna Model	Ant Type	Len (ft)	Horizontal Half Power Beamwidth (Deg)	Location		
										X	Y	Z (AGL)
1	eyeTower (Rx Only)	470	0*	13.86	236	Wade Antennas WH14-69/S	Yagi	1.2	60	190'	262.7'	85'
2	eyeTower (Rx Only)	470	0*	8.86	267	Wade Antennas WL 14-69/S	Yagi	1.2	60	189'	268.3'	83'
3	eyeTower (Rx Only)	174	0*	8.36	236	Wade Antennas J105-HI	Yagi	3	76	189'	268.2'	78'
4	eyeTower (Rx Only)	470	0*	8.86	285	Wade Antennas WL 14-69/S	Yagi	1.2	60	188.9'	268.3'	85'
5	eyeTower (Rx Only)	470	0*	8.86	291	Wade Antennas WL 14-69/S	Yagi	1.2	60	189'	268.3'	83'
6	CLEARWIRE	23325	23.8	32.66	48.4	Generic	Aperture	1	2	208.6'	261.1'	108'
7	CLEARWIRE	11265	49.4	31.16	270	Generic	Aperture	2	2	173.1'	253'	108'
8	CLEARWIRE	23000	18.5	32.66	187	Generic	Aperture	1	2	191.7'	284.1'	108'
9	VERIZON WIRELESS	850	1778.6	13.47	45	Andrew DB844G65ZAXY	Panel	4	65	191.8'	280.3'	116'
10	VERIZON WIRELESS	1900	5002.4	16.2	45	Andrew HBXX-6517DS-VTM	Panel	6.2	66	195.2'	276'	116'
11	VERIZON WIRELESS	751	1888.4	13.73	45	Andrew LNX-6514DS-VTM	Panel	6.1	65	198.8'	271.8'	116'
12	VERIZON WIRELESS	2100	5638.7	16.72	45	Andrew HBXX-6517DS-VTM	Panel	6.2	65	202.2'	267.6'	116'
13	VERIZON WIRELESS	850	1778.6	13.47	45	Andrew DB844G65ZAXY	Panel	4	65	205.9'	263.3'	116'
14	VERIZON WIRELESS	850	1778.6	13.47	155	Andrew DB844G65ZAXY	Panel	4	65	204.4'	258.5'	116'
15	VERIZON WIRELESS	1900	5002.4	16.2	155	Andrew HBXX-6517DS-VTM	Panel	6.2	66	199'	257.9'	116'
16	VERIZON WIRELESS	751	1888.4	13.73	155	Andrew LNX-6514DS-VTM	Panel	6.1	65	193.4'	256.8'	116'
17	VERIZON WIRELESS	2100	5638.7	16.72	155	Andrew HBXX-6517DS-VTM	Panel	6.2	65	188.1'	255.8'	116'
18	VERIZON WIRELESS	850	1778.6	13.47	155	Andrew DB844G65ZAXY	Panel	4	65	182.5'	254.9'	116'
19	VERIZON WIRELESS	850	1778.6	13.47	270	Andrew DB844G65ZAXY	Panel	4	65	179.2'	258.6'	116'
20	VERIZON WIRELESS	1900	5002.4	16.2	270	Andrew HBXX-6517DS-VTM	Panel	6.2	66	181.2'	263.7'	116'
21	VERIZON WIRELESS	751	1888.4	13.73	270	Andrew LNX-6514DS-VTM	Panel	6.1	65	183.1'	269.1'	116'
22	VERIZON WIRELESS	2100	5638.7	16.72	270	Andrew HBXX-6517DS-VTM	Panel	6.2	65	185'	274'	116'
23	VERIZON WIRELESS	850	1778.6	13.47	270	Andrew DB844G65ZAXY	Panel	4	65	186.8'	279.3'	116'

NOTE: X, Y and Z indicate relative position of the antenna to the origin location on the site, displayed in the model results diagram. **Specifically, the Z reference indicates antenna height above the ground level.** ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other carriers at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

* *Antennas are operating as receive only configuration.*

7 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms that:

I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Sitesafe, Inc., in Arlington, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Kevin Smith.

May 31, 2016

Appendix A – Statement of Limiting Conditions

Sitesafe will not be responsible for matters of a legal nature that affect the site or property.

Due to the complexity of some wireless sites, Sitesafe performed this analysis and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e., mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by eyeTower, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

Appendix B – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur, but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where RFR exposure may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

***OSHA* (Occupational Safety and Health Administration)** – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Radiation – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy an average sized human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with FCC rules and regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All eyeTower employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal RF Exposure monitor, successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.

2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:

- adding new antennas that may have been located on the site
- removing of any existing antennas
- changes in the radiating power or number of RF emitters

4. Post the appropriate **NOTICE**, **CAUTION,** or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Appendix B, to inform <u>everyone</u> who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. The signs below are examples of signs meeting FCC guidelines.

5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.

6. For a General Public environment the four color levels identified in this analysis can be interpreted in the following manner:

- Gray represents area at below 5% of the General Public MPE limits or below. This level is safe for a worker to be in at any time.
- Green represents areas predicted to be between 5% and 100% of the General Public MPE limits. This level is safe for a worker to be in at any time.

- Blue represents areas predicted to be between 100% and 500% of the General Public MPE limits. This level is safe for a worker to be in at any time.
- Yellow represents areas predicted to be between 500% and 5000% of the General Public MPE limits. This level is safe for a worker to be in.
- Red areas indicated predicted levels greater than 5000% of the General Public MPE limits. This level is not safe for the General Public to be in.

7. For an Occupational environment the four color levels identified in this analysis can be interpreted in the following manner:

- Areas indicated as Gray are at 5% of the Occupational MPE limits or below. This level is safe for a worker to be in at any time.
- Green represents areas predicted to be between 5% and 20% of the Occupational MPE limits. This level is safe for a worker to be in at any time.
- Yellow represents areas predicted to be between 20% and 100% of the Occupational MPE limits. Only individuals that have been properly trained in RF Health and Safety should be allowed to work in this area. This is not an area that is suitable for the General Public to be in.
- Red areas indicated predicted levels greater than 100% of the Occupational MPE limits. This level is not safe for the Occupational worker to be in for prolonged periods of time. Special procedures must be adhered to such as lock out tag out procedures to minimize the workers exposure to EME.

8. Use of a Personal Protective Monitor: When working around antennas, Sitesafe strong recommends the use of a Personal Protective Monitor (PPM). Wearing a PPM will properly forewarn the individual prior to entering an RF exposure area.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

Additional Information

Additional RF information is available by visiting both www.Sitesafe.com and www.fcc.gov/oet/rfsafety. OSHA has additional information available at: http://www.osha-slc.gov/SLTC/radiofrequencyradiation.