MCLANE MIDDLETON

TYLER P. HAYNES
Direct Dial: 603.628.1405
Email: tyler.haynes@mclane.com
Admitted in MA and NY
900 Elm Street, P.O. Box 326
Manchester, NH 03105-0326
T 603.625.6464
F 603.625.5650

May 11, 2017

VIA HAND DELIVERY

Christopher A. Pfaff, Chairman
c/o Abigail McCabe, Town Planner
Planning Board
Town of Westwood
50 Carby Street
Westwood, MA 02090

Re: Environmental Impact and Design Review for Eligible Facilities Request
Applicant: Cellco Partnership d/b/a Verizon Wireless ("Verizon")
Address: 100 Lowder Brook Drive, Westwood (Map 06, Block 017) (the "Property")

Dear Mr. Pfaff:

The purpose of this letter is to deliver the environmental impact and design review application and supporting materials (the "Application") in support of Verizon's proposed wireless telecommunications facility to be installed on the above-referenced property. The application is for the collocation of wireless communications equipment on the existing monopole located on 100 Lowder Brook Drive in the Town of Westwood, Massachusetts (the "Property"), located within the Admin-Research-Office district, and covered by the Wireless Communication Overlay District ('WCOD"). Verizon's equipment will not substantially change the physical dimensions of the existing wireless tower. Accordingly, Verizon's application represents an eligible facilities request under federal law, and subject therefore must be approved within sixty (60) days of the request made on April 18, 2017. Failure to approve this eligible facilities request by June 12, 2017 results in constructive approval under federal law.

I. ENCLOSED MATERIALS

In support of the Application, enclosed please find eleven (11) copies of the following materials and documents for your review and consideration:

1) Check in the amount of $750.00 for the application fee;

2) Town of Westwood Environmental Impact and Design Review application;

3) Copy of eligible facilities request transmittal letter, dated April 14, 2017, and submitted April 18, 2017;

4) Letter of Authorizations;

5) Structural Analysis;

6) Copy of prior approvals, including: special permit granted to AT&T wireless services dated October 7, 1998, Environmental Impact and Design Review approval in favor of MetroPCS Massachusetts LLC dated August 16, 2008, and Environmental Impact and Design Review approval in favor of New Cingular Wireless PCS, LLC d/b/a AT&T Mobility dated March 30, 2011;

7) FCC Licensure;

8) Certified List of Abutters; and

9) Four (4) copies of 24" x 36" plans and seven (7) copies of reduced 11" x 17" plans.

II. PROJECT NARRATIVE

The proposed wireless equipment will be installed on the existing 140' monopole at the Property. The proposed equipment includes the installation of three (3) panel antennas at a center line of 104', six (6) remote radio heads, diesel powered generator, two (2) equipment cabinets, cables, and other appurtenant equipment (collectively, the "Facility") as more fully described on the plans enclosed herewith.

This Facility is unmanned and requires minimal site visitation for maintenance. The Facility requires no sewer, septic, or water from the municipality and will not affect related utilities, schools, or traffic.

III. ENVIRONMENTAL IMPACT AND DESIGN REVIEW CRITERIA

Verizon's application substantially complies with the Zoning Bylaw of the Town of Westwood (the "Zoning Bylaw"). *Zoning Bylaw of the Town of Westwood, Massachusetts*, amended May 2, 2016. The Zoning Bylaw sets forth the standards for Planning Board environmental impact and design review standards, providing a frame of reference for project development. *Id.* Verizon lists (in *italics*) and addresses relevant approval criteria from the Lunenburg Telecommunication Ordinance.

7.3.8 ***Environmental Impact and Design Standards.*** *The following standards shall be utilized by the Planning Board to review and evaluate all applications pursuant to this Section. These standards are intended to provide a frame of reference for the Applicant in the development of their project and building plans as well as criteria for review by the Planning Board. These standards shall not be regarded as inflexible requirements. They are not intended to discourage creativity, invention and innovation. The specification of one or more particular architectural styles is not included in these standards. The standards of review outlined in this Section shall*

also apply to all accessory buildings, structures, freestanding signs and other site features, however related to the principal buildings or structures.

The application is for the collocation of wireless communications equipment on the existing monopole located on 100 Lowder Brook Drive, within the WCOD. Verizon's equipment will not substantially change the physical dimensions of the existing wireless tower. Accordingly, Verizon's application represents an eligible facilities request under federal law.

7.3.8.1 ***Preservation of Landscape.*** *The landscape shall be preserved in its natural state, insofar as practicable. Tree and soil removal shall be minimized, and any grade changes shall be consistent with the general appearance of neighboring developed areas. Due regard shall be given to the attractive utilization of the natural features of the area, including trees, woods, streams and ponds. All open areas which cannot be preserved in their natural state shall be replanted as far as practicable with as many trees and plantings as previously existed.*

The proposed Facility will have no substantial impact on the surrounding landscape, successfully maintaining the general character of the property in its current state. The property currently includes a 140' monopole, as well as ground space to house appurtenant telecommunications equipment. Verizon proposes to collocate three (3) additional panel antenna, and all ground equipment shall be located on existing, vacant concrete pads at the Property. There shall be no tree or soil removal, and there will be minimal impacts to the existing viewshed.

7.3.8.2 ***Relation of Buildings to Environment.*** *The proposed development shall be related harmoniously to the terrain and to the use, scale and architecture of existing buildings in the vicinity that have functional or visual relationship to the proposed building. The Planning Board may require a modification in massing so as to reduce the effect of shadows on abutting property, public open space or streets.*

The proposed Facility is compatible with surrounding uses and is sited on property that currently houses a monopole. The equipment cabinets will be housed adjacent to the existing equipment cabinets, utilizing vacant concrete pads.

7.3.8.3 ***Open Space.*** *All open space shall be so designed as to add to the visual amenities of the vicinity by maximizing its visibility for persons passing the site or overlooking it from nearby properties.*

Not applicable. There shall be no open space. The facility consists of three (3) additional antenna reaching a height of approximately 107'.

7.3.8.4 ***Circulation, Traffic Impact and Alternative Means of Transportation.*** *With respect to vehicular and pedestrian circulation and traffic, including entrances, ramps, walkways, drives and parking, special attention shall be given to location, number and function of access points to the public streets (especially in relation to existing traffic flow, traffic controls and mass transit facilities), width of interior drives and access points, general interior circulation, separation of*

pedestrian and vehicular traffic, access to community facilities, the arrangement, safety and convenience of both vehicle and bicycle parking areas and the effect thereof upon the use and enjoyment of proposed buildings and structures and the neighboring properties, and the traffic impact of the proposed development on nearby public and private streets. Each proposed facility is encouraged to incorporate alternative means of transportation, including bicycle and shuttle bus, and shall make adequate provision for the convenience of vehicular and pedestrian movement within the site in which the facility is to be located, and in relation to nearby streets, property and improvements.

The Facility poses no traffic impact in Westwood, is unmanned, and requires minimal maintenance visits.

7.3.8.5 ***Stormwater Drainage and Erosion Control.*** *Special attention shall be given to proper site surface drainage (i) so that removal of surface waters will not adversely affect neighboring properties or the public storm drainage system and (ii) so as to minimize any adverse impact upon nearby "downstream" properties. Stormwater shall be removed from all roofs, canopies and paved areas in a manner complying with the stormwater management standards adopted and as amended from time to time by the Massachusetts Department of Environmental Protection. Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic and will not create puddles in the paved area. Erosion and sediment controls must be implemented to prevent any negative impacts during construction or other land disturbance activities. Permanent post-development erosion controls must be implemented and maintained where necessary.*

The Facility poses no drainage or storm water impact in Westwood.

7.3.8.6 ***Advertising Features.*** *The size, location, design, color texture, lighting and materials of all permanent signs and outdoor advertising structures or features shall not detract from the use and enjoyment of proposed buildings and structures and the surrounding properties.*

No signs or other advertising features shall be utilized at any point in connection with the proposed Facility.

7.3.8.7 ***Special Features.*** *Exposed storage areas, exposed machinery installations, service areas, truck loading areas, utility buildings and structures shall be subject to such setbacks, screen plantings or other screening methods as shall reasonably be required to prevent their being incongruous with the existing or contemplated environment and the surrounding properties. All towers, antennas and poles shall be sited, designed and sized to have minimal visual impact on nearby properties.*

The ground equipment shall be located within the existing chained link fence with barbed wire, and will be housed on an existing vacant concrete pad. The equipment is consistent with the existing equipment shelters currently located within the fenced area.

7.3.8.8 ***Safety.*** *With respect to personal safety, all open and enclosed spaces shall be designed to facilitate building evacuation and maximize accessibility by fire, police and other emergency personnel and equipment. Insofar as practicable, all exterior spaces and interior public and semi-public spaces shall be designed to minimize the fear and probability of personal harm or injury by increasing the potential surveillance by neighboring residents and passersby of an accident or attempted criminal act. Traffic to and from any facility shall not cause safety hazards or increased congestion in nearby residential neighborhoods.*

Not applicable. There is no building proposed with this application.

7.3.8.9 ***Heritage.*** *With respect to the Town's heritage, removal or disruption of historic, traditional or significant uses, structures or architectural elements shall be minimized insofar as practicable, whether these exist on the site or on adjacent properties.*

The Facility shall be located within the WCOD. The proposal will not have any impact on the Town's heritage, as Verizon seeks to utilize existing infrastructure to locate its equipment, minimizing the number of telecommunication facilities within the Town of Westwood.

7.3.8.10 ***Microclimate.*** *With respect to the localized climatic characteristics of a given area, any development which proposes new structures, new hard-surface ground coverage or the installation of machinery which emits heat, vapor or fumes, shall endeavor to minimize, insofar as practicable, any adverse impact on light, air and water resources or on noise and temperature levels of the immediate environment.*

Not applicable. There are no new structures or hard-surface ground coverage to be installed. The installation of equipment cabinets will have minimal adverse impacts on light, air and water resources, or on noise and temperature levels.

7.3.8.11 ***Energy Efficiency.*** *To the maximum extent reasonably practicable, proposals shall utilize energy-efficient technology and renewable energy resources and shall adhere to the principles of energy-conscious design with regard to orientation, building materials, shading, landscaping and other elements. Efforts shall be made to harmonize energy-related components with the character of the building and its surroundings and to prevent adverse effects on the energy consumption of neighboring structures and on the environment.*

The Facility shall abide by all FCC equipment requirements.

7.3.8.12 ***Detrimental Effects.*** *No proposed facility shall be detrimental to the health, safety or welfare of persons working or living in the neighborhood, or by reason of danger of fire or explosion, environmental pollution, corrosion, toxic or noxious fumes, gas, smoke, soot, dust, odors, noise or vibrations or other hazards.*

There shall be no detrimental effects as a result of the proposed collocation of antennae and related ground equipment.

7.3.8.13 ***Nearby Properties.*** *Nearby properties shall be protected against detrimental uses on the site.*

The proposed Facility is in harmony with the current use of the Property, and shall collocate its antennae on the existing 140' monopole.

7.3.8.14 ***Specific Standards for High and Washington Street.*** *Where the nature of the following design features is considered significant to the preservation or enhancement of the desirable visual quality and property values of a particular part of High Street or Washington Street, any new structure or alteration shall be harmoniously related to nearby pre-existing structures and the street facade in terms of color, texture, materials, scale, height, setbacks, roof and cornice lines, signs and design elements such as door and window size and location and door and window detailing, including materials for sills, lintels, frames and thresholds and any other major design elements.*

The proposed Facility is not a new structure, is adjacent to interstate 95, and will not change the visual quality or property values.

7.3.8.15 ***Air Quality.*** *Any use whose emissions are such as to cause it to be classified as a major new stationary source of air pollution, as defined by the Environmental Protection Agency (EPA) under the Clean Air Act, and any use required to apply to the Massachusetts Department of Environmental Protection under 310 CMR 7.00 or to EPA under Section 112 of the Clean Air Act for permission to emit asbestos, benzene, beryllium, mercury, vinyl chloride, or radionuclides shall be permitted only upon determination by the Planning Board that compliance with the requirements of those agencies is assured, and that health and safety are adequately protected.*

Not applicable.

7.3.8.16 ***Plants and Animals.*** *Location and design shall not cause avoidable damage to wildlife habitats or corridors, or to any plant species listed as endangered, threatened or of special concern by the Massachusetts Natural Heritage Program, or to any tree with more than a twenty-four (24) inch trunk diameter one (1) foot above grade. An application for a MBD special permit must include documentation to the Planning Board of having consulted with the Conservation Commission and the Massachusetts Natural Heritage Program regarding these considerations, and that the proposed site either contains no such habitats or materials, or that all feasible efforts to avoid, minimize or compensate for damage have been reflected in the development proposal.*

The proposed Facility will have no substantial impact on wildlife. The equipment shall be located on the existing monopole, with all ground based equipment being housed within the fenced area on an existing concrete pad.

7.3.8.17 ***Vibration.*** *Except for blasting and other activities within the jurisdiction of the Board of Fire Prevention Regulations, no use shall be allowed which produces vibration at or beyond the boundaries of the premises exceeding two-thirds (2/3) the frequency/amplitude limitations established by the Board of Fire Prevention Regulations at 527 CMR 13.11 (18) for three (3) minutes or more in any hour between 7:00 am and 9:00 pm or for thirty (30) seconds or more in any hour between 9:00 pm and 7:00 am.*

No vibrations shall be produced.

7.3.8.18 ***Electrical Disturbances.*** *No EMF emission shall be permitted which adversely affects the operation of any equipment on other properties.*

The Facility shall have no adverse effect on operation of equipment on neighboring properties.

7.3.8.19 ***Historic and Archaeological Sites.*** *Location and design shall not cause avoidable damage or impairment to the historic or archaeological value of buildings on sites recorded on the Massachusetts Register of Historic Places. An application for a MBD special permit shall submit documentation that either the site does not contain or impact such buildings or sites, or that any potential damage or impairment has been effectively mitigated.*

The Property is not a historical site, and the proposed Facility will not change the existing footprint on the Property.

7.3.8.20 ***Solid Waste.*** *Each development must document arrangements for satisfactory disposal of tree stumps and debris resulting from construction, and must make permanent arrangement for satisfactory on-site storage of refuse pending its removal, such storage to be screened from public view, secure from vermin, birds or other animals, and located to present minimal hazard in the event of fire and minimal threat to water quality in the event of container failure.*

Not applicable. Any refuse produced shall be immediately removed.

7.3.8.21 ***Water Quality.*** *Any development subject to review pursuant to this Section which involves a use prohibited or requiring a special permit in a Water Resource Protection Overlay District pursuant to Section 9.3 may be allowed if such development is located outside of the Water Resource Protection Overlay District and if the material regulated is less than twenty (20) gallons liquid or less than one hundred fifty (150) pounds dry weight. If exceeding those limits the use shall be allowed only if the Planning Board, in its review of the application pursuant to this Section, determines that the Applicant has documented that adequate safeguards for protecting the integrity of groundwater quality have been assured. Any development subject to review pursuant to this Section which involves a use prohibited or requiring a special permit under Section 9.3 and is located within a Water Resource Protection Overlay District may be allowed if such development has been granted a special permit pursuant to the provisions of Section 9.3.*

The Property is not located within the Water Resource Protection Overlay District. As depicted on the enclosed Plans, the work shall be limited to the existing monopole and ground space within the fenced area.

IV. WAIVERS UNDER 7.2 OF THE RULES AND REGULATIONS

Verizon lists (in *italics*) and addresses, and respectfully requests a waiver, from each of the below submittal requirements.

7.2.4 Stormwater Management Report. The proposed Facility will not have an effect on stormwater. The installation entails additional antennae on the existing 140' monopole, strengthening the structural integrity of the monopole, and utilizing existing concrete pads to house Verizon's ground equipment. As such, Verizon respectfully requests a waiver.

7.2.5 Traffic Impact Study. This Facility is unmanned and requires approximately 1-2 maintenance visits per month. As a result, there will be no impact on traffic.

7.2.6 Fill Removal Report. This section is inapplicable, as Verizon will not import or export fill to the Property.

7.2.7 Radio Frequency Report. As an eligible facilities request under federal law, Verizon respectfully requests a waiver.

7.2.8 Demonstration of Need. As an eligible facilities request under federal law, Verizon respectfully requests a waiver.

V. SUMMARY

In light of the foregoing discussion, Verizon respectfully requests the Planning Board evaluate the attached application materials and add Verizon to the Board's June 12th agenda. Please do not hesitate to contact me with any questions.

Thank you for your assistance and attention to this matter.

Sincerely,

Tyler P. Haynes

Enclosures
ec: G. Costello (SAI)

TOWN OF WESTWOOD

COMMONWEALTH of MASSACHUSETTS

Abigail McCabe, Town Planner
amccabe@townhall.westwood.ma.us
(781) 251-2581

Janice Barba, Planning & Land Use Specialist
jbarba@townhall.westwood.ma.us
(781)-320-1366

PLANNING BOARD

APPLICATION, INSTRUCTIONS & CHECKLIST

Environmental Impact and Design Review (EIDR) – Zoning Bylaw Section 7.3 and / or Special Permit Pursuant to Various Sections of the Westwood Zoning Bylaw

Checklist:

☐ **Application Filing Fee:** Check payable to the Town of Westwood. See the Board's Rules and Regulations for the current fees. *The Applicant will be billed later from the newspaper for the publication of the legal ad in the Westwood Press.*

☐ **11 Copies of the complete submittal package and one electronic PDF of the following:**

- Application Form
- Narrative
- Plans: Site and Architectural Plans (7 sets of reduced plans 11" x 17" and 4 full size of 24" x 36")
- Required Reports

Instructions:

All applications for Planning Board review will be acted upon and all information must be complete and correct to the best of the Applicant's knowledge. Incomplete applications may cause delays and may be the basis for a denial of the application. If you have any questions regarding the Board's procedure, please contact the Town Planner at (781) 251-2581.

It is important to review the applicable section of the Westwood Zoning Bylaw relating to the requested approval, and the relevant Rules and Regulations, to ensure that all requirements for application submittal are met, including the submission of electronic copies of application materials.

The Zoning Bylaw, Zoning Map, and all of the Planning Board's Rules and Regulations are available on the Planning Board section of the Town's web site (www.townhall.westwood.ma.us).

When Ready to File:

One complete application packet must be filed by the Applicant in the Office of the Town Clerk at Town Hall, 580 High St. for recording (reduced size plans to Clerk), and the 10 remaining packets must be stamped by the Town Clerk's office prior to filing with the Planning Department at 50 Carby Street, Monday – Friday 8:30 a.m. – 1:00 p.m. Electronic copies may be submitted on a CD to the Planning Office or emailed to Janice Barba and/or Abby McCabe at the above email addresses.

If you intend to request one or more waivers of the application requirements, a written request for each specific waiver must be included in the application submission packet. In such case, the application will not be deemed complete until all requested waivers are granted by the Planning Board, or until all application requirements are fully satisfied.

WESTWOOD PLANNING BOARD APPLICATION FOR HEARING

1. Requested Approval(s):
   Environmental Impact and Design Review for eligible facilities request in the Wireless Communication Overlay District.

2. Brief Narrative of Proposal:

   Verizon proposes to utilize the existing 140' monopole located at 100 Lowder Brook Drive to collocate telecommunications equipment. The facility shall consist of three (3) panel antennas at 107' located on the monopole, nine (9) remote radio heads twelve (12) diplexers, two (2) equipment cabinets, power cabinet, updated meter, cables, and other appurtenant equipment as shown on the enclosed plans. The proposal will also incorporate cable bands every 4' to strengthen the structural integrity.

3. Address/Location of Property Subject to Hearing:
   100 Lowder Brook Drive, Westwood, MA 02090

4. Assessor's Map and Parcel Number(s): Map 06, Block 017; PID: 349

5. Size of Parcel: 36.84 acres

6. Name of Applicant:
   Cellco Partnership d/b/a Verizon Wireless

7. Applicant's Mailing Address:
   c/o Tyler Haynes, McLane Middleton, P.A.
   900 Elm Street, Manchester, NH 03101

8. Applicant's Telephone: (H) 603-628-1405 (W) 603-628-1405

9. Applicant's E-Mail Address: tyler.haynes@mclane.com

10. Applicant is: Owner __ Tenant x Licensee __ Prospective Purchaser __ Other __

11. Name of Property Owner(s):
    Medical Information Tech, Inc.

12. Property Owner's Mailing Address:
    c/o Tyler Haynes, McLane Middleton, P.A.
    900 Elm St., Manchester, NH 03101

13. Deed Recorded in:
    a. County Registry of Deeds, Book 11955 Page 266
    b. Registry District of the Land Court, Certificate Number 150050
       Page 50 Book 751

14. Has any Application ever been filed with the Planning Board regarding this Property?

x Yes, When? October 7, 1998 (Special Permit), August 16, 2008 (EIDR), March 30, 2011 (EIDR)
__ No

15. Has the Lot been surveyed by a Registered Land Surveyor?

x Yes, When? _____
__ No

The Applicant hereby requests a public hearing before the Westwood Planning Board and consents to pay for the cost of all legal advertisements required by the Zoning Bylaw and/or Planning Board Rules and Regulations, which will be billed directly to the Applicant by the newspaper at a later date. The Applicant also consents to pay for all costs required pursuant to applicable sections of the Westwood Zoning Bylaw and/or Planning Board Rules and Regulations, unless expressly waived by the Planning Board, including all project review fees, inspection fees, and costs associated transcription, in addition to all other fees, expenses and costs in connection with the Planning Board's review and evaluation of this Application.

Signed: _____
Applicant (or Agent) Signature

Tyler P. Haynes, Attorney for Verizon Wireless
Printed Name of Applicant

Signed: Please see Letter of Authorization
Property Owner(s) of Record Signature(s)

Please see Letter of Authorization
Printed Name(s) of Property Owner(s) of Record

Date: _____

Payments Received: Application Fee: $ 750.00

Project Review Fees: (if applicable) $ _____

Inspection Fees: (if applicable) $ _____

Other Fees: (if applicable) $ _____

TYLER P. HAYNES
Direct Dial: 603.628.1405
Email: tyler.haynes@mclane.com
Admitted in MA and NY
900 Elm Street, P.O. Box 326
Manchester, NH 03105-0326
T 603.625.6464
F 603.625.5650

MCLANE MIDDLETON

April 14, 2017

VIA OVERNIGHT DELIVERY

Abigail McCabe, Town Planner
Joseph Doyle, Jr., Building Inspector
Town of Westwood
50 Carby Street
Westwood, MA 02090

Re: Eligible Facilities Request to Collocate Additional Antennae
Applicant: Cellco Partnership d/b/a Verizon Wireless ("Verizon")
Address: 100 Lowder Brook Drive (Map: 06, Block: 017) (the "Property")

Dear Ms. McCabe and Mr. Doyle:

The purpose of this letter is to deliver the enclosed building permit application for an eligible facilities request. The application is for the collocation of wireless communications equipment on the existing monopole located on 100 Lowder Brook Drive in the Town of Westwood, Massachusetts (the "Property"), located within the Admin-Research-Office district, and covered by the Wireless Communication Overlay District ('WCOD"). Verizon's equipment will not substantially change the physical dimensions of the existing wireless tower. Accordingly, Verizon's application represents an eligible facilities request under federal law. As a result, the municipality may not deny, and must approve the application. Moreover, it must do so within sixty (60) days of the date of this request, or a constructive approval will result.

We understand that collocation under the Westwood Zoning Bylaws ("WZB") would ordinarily require a WCOD Special Permit from the Planning Board. Recent federal law, however, preempts many local requirements for an ***"eligible facilities request"*** that does not result in a substantial change to an existing telecommunications facility or base station. The law first appeared in Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012 (also known as the "JOBS Act" or the "Spectrum Act"). More recently, the Federal Communications Commission issued ruling No. 14-153 dated October 17, 2014 (the "FCC Rule"), clarifying and implementing Section 6409. The FCC Rule is now codified at 47 C.F.R. § 1.40001 (the "Regulation"). A copy of the Regulation is enclosed at Tab 9 for your convenience.

All that is required for an eligible facilities request is evidence that the request satisfies the federal statutory definitions of an "eligible facilities request." We present with this application information sufficient for you to make that determination, along with information supporting

issuance of the building permit. We are of course available to answer any additional questions you may have or to provide any additional information you may need.

I. ENCLOSED MATERIALS

In support of the foregoing request, enclosed please find the following materials and documents for your review and consideration:

1) Completed Town of Westwood Building Permit Application;

2) Structural Analysis;

3) 11" x 17" copy of Plans prepared by AEG Advanced Engineering Group, PC, last revised 11/11/2015, consisting of pages T-1, C-1, A-1, A-2, A-3, A-4, E-1, and E-2.

4) Letter of Authorization from Crown Castle;

5) Copy of Construction Supervisor's Licenser;

6) Copy of Workers' Compensation Insurance Affidavit;

7) Evidence of Verizon's FCC Licensure;

8) Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C § 1455(a);

9) 47 C.F.R. § 1.40001, which implements Section 6409 and the FCC Rule;

10) Municipal Client Memorandum entitled "*New FCC Rule Impacting Proposed Modifications to Wireless Facilities*," prepared by the law firm of Kopelman and Paige, P.C. for the 2015 Massachusetts Municipal Association Annual Meeting; and

11) June 12, 2013, opinion of the Office of the Attorney General of the Commonwealth of Massachusetts advising the Town of Mount Washington, Massachusetts, of the impact of section 6409 on municipal treatment of eligible facilities requests and advising the municipality that any discretionary review is prohibited by federal law.

II. PROJECT NARRATIVE

The proposed wireless equipment will be installed on the existing 140' monopole at the Property. The proposed equipment includes the installation of three (3) panel antennas at a center line of 104', six (6) remote radio heads, diesel powered generator, two (2) equipment cabinets, cables,

and other appurtenant equipment as more fully described on the plans enclosed herewith at Tab 3.

III. FEDERAL AND STATE LAW REQUIRE APPROVAL OF VERIZON'S APPLICATION

Verizon seeks to collocate its wireless facility on the existing monopole where other wireless service facilities are currently located. Pursuant to federal law, this monopole constitutes an eligible support structure and this application constitutes an eligible facilities request. Accordingly, Westwood must grant Verizon's application within sixty (60) days, or a constructive grant will result. Analysis of relevant law follows.

Realizing the continued need to expedite the development of telecommunications infrastructure, Congress expanded the TCA by enacting the Middle Class Tax Relief and Job Creation Act of 2012 (hereinafter the "Spectrum Act"). Pub. L. No. 112-96, 126 Stat. 156 (2012). At its core, the Spectrum Act furthers the TCA's goal of rapid telecommunications deployment, stating that

> **A State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.** The Spectrum Act § 6409, 47 U.S.C. § 1455(a)(1) (emphasis added).

In 2015, this legislative language was expanded with relevant definitions and standards through FCC rulemaking proceedings, ultimately promulgated in the Code of Federal Regulations as Wireless Facility Modifications § 1.40001, 47 C.F.R. § 1.40001(a) (hereinafter "WFM"). The following definitions provide substantial guidance when interpreting the Spectrum Act, and are defined in relevant part below:

- **Site.** For towers that are not in public rights-of-way, the "site" extends to the "current boundaries of the leased or owned property surrounding the tower." 47 C.F.R. § 1.40001(b)(6).

- **Eligible Facilities Request.** The definition of an "eligible facilities request" under Section 6409(a)(2) of the Act includes any request to collocate new transmission equipment on an existing wireless tower or base station. *See* 47 C.F.R. § 1.40001(b)(3). As set forth above, the Property currently hosts telecommunications equipment on the monopole, and includes all components of a tower. The Facility, as a proposed collocation of additional telecommunications equipment at the "site," is therefore an eligible facilities request under Section 6409.

- **Tower.** A "tower" is defined as "any structure built for the sole or primary purpose of supporting any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable,

and regular and backup power supply." 47 C.F.R. § 1.40001(b)(9). The existing 140' tower was constructed for the sole purpose of installing and supporting Commission-licensed antennae. The existing structure, therefore, constitutes an existing "tower", as defined by the regulation, and mandates approval of the proposed Facility.

- **Collocation.** The term "collocation" refers to the "mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes." *See* 47 C.F.R. § 1.40001(b)(2). The tower in question is currently in service and fully capable of supporting the antennae proposed by Verizon.

- **Eligible Support Structure.** The term "eligible support structure" includes "any tower or base station…existing at the time the relevant application is filed with the…local government." *See* 47 C.F.R. § 1.40001(b)(4). The tower in question is currently in service and supports the equipment of other wireless carriers. Therefore, the existing tower constitutes an eligible support structure.

- **Transmission Equipment.** The term "transmission equipment" is defined as any equipment that facilitates "Commission-licensed or authorized wireless communication service, including, but not limited to, radio receivers, antennas, coaxial or fiber-optic cable, and regular and back-up power supply." *See* 47 C.F.R. § 1.40001(b)(8). Verizon seeks to collocate antennae to the existing monopole to facilitate its Commission-licensed wireless communication network. Evidence of Verizon's FCC licensure is included herewith at Tab 7.

- **Substantially Change the Physical Dimensions.** The FCC Rule and resulting Regulation set forth objective standards for determining when a proposed modification does or does not "substantially change the physical dimensions" of an existing tower or base station. *See* FCC Rule ¶ ¶188, *et seq.*; *see also* Municipal Client Memorandum entitled "*New FCC Rule Impacting Proposed Modifications to Wireless Facilities*" prepared by the law firm of Kopelman and Paige, P.C. for the 2015 Massachusetts Municipal Association Annual Meeting; 47 C.F.R. § 1.40001(b)(7).

  A modification substantially changes the physical dimensions of a tower or base station **only** if it meets any of the following six criteria:

  1. *For towers outside of public rights-of-way, it increases the height of the tower by more than 10%, or by the height of one additional antenna array with separation from the existing antenna not to exceed twenty feet, whichever is greater;*

     The request before you will not increase the height of the existing monopole.

2. *For towers outside of public rights-of-way, it protrudes from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater;*

   This criterion is inapplicable to the request before you, because the proposed antennae shall not protrude by more than twenty feet, or more than the width of the tower structure. Indeed they protrude by less than five (5) feet.

3. *It involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets;*

   As shown on the enclosed Plans, the request before you does not exceed the standard number of new equipment, and includes the installation of only two cabinets. Therefore, under this criterion, the request before you does not represent a substantial change to the physical dimensions to the site.

4. *It entails any excavation or deployment outside the current site of the tower or base station;*

   The request before you does not propose any excavation outside the current site.

5. *It would defeat the existing concealment elements of the tower or base station; or*

   There are no concealment features of the existing tower.

6. *It does not comply with conditions associated with prior approval of construction or modification of the tower or base station unless the non-compliance is due to an increase in height, increase in width, addition of cabinets, or new excavation does not exceed the corresponding "substantial change" thresholds set forth above.*

   As set forth above and on the Plans, each of the foregoing criterion is inapplicable.

   Conditions of the original tower approval stated that the pole must "accommodate one additional wireless communication carrier," and that the "antennae of an additional carrier shall be mounted at a height of no less than one hundred twenty-three (123) feet above ground level." Nonetheless, subsequent approvals, including August 19, 2008 and March 30, 2011, permitted the installation of additional antennae at the heights of

107' and 117', respectively. Verizon's proposed installation is consistent with the previously approved installations and modifications, and will be taking the place of the previously approved antennae at 107'.

Furthermore, the decision to grant the construction of the monopole, dated October 7, 1998, conditions the design to accommodate one additional wireless communication carrier. Such a condition runs entirely counter to the Rule, and the restriction inhibits the rapid deployment of wireless facilities as set forth in the TCA. Restricting accommodation for collocation to one carrier would therefore be unenforceable as it is preempted by the federal law. Therefore, under this criterion Verizon's application does not propose a substantial change.

Attorney General's Opinion
(June 2013)

On June 12, 2013, the Office of the Attorney General of Massachusetts provided municipalities with further guidance with respect to the applicability of Section 6409(a) for collocation requests in the Commonwealth of Massachusetts. This letter states, in relevant part, that the *"**Act's requirement that a local government 'may not deny, and shall approve, any eligible facilities request' means that a request for a modification to an existing facility that does not substantially change the physical dimensions of the tower or base station must be approved. Such qualifying requests also cannot be subject to a discretionary special permit.**"* (emphasis added). Moreover, this letter affirms the requirement under the federal Telecommunications Act of 1996, 47 U.S.C. § 332 (7)(B)(i)(I), that municipalities may not unreasonably discriminate among providers of functionally equivalent services. A copy of this letter is enclosed for your review at Tab 11.

IV. TIMING AND PROCESS

In addition to requiring approval of eligible facilities request, the FCC Rule and Regulation also impose certain procedural requirements. Paragraphs 215 – 216 of the FCC Rule and Section 1.40001(c)(2) of the Regulation provide for a 60-day period of review of applications for eligible facilities requests. If an application covered by Section 6409(a) has not been approved by a local government within 60 days from the date of filing, the reviewing authority will have violated Section 6409(a)'s mandate to approve and not deny the request, and the request will be deemed granted.

The 60-day review period is subject to tolling in the event that the reviewing municipality informs the requestor in a timely manner that the request is incomplete. Under Paragraph 217 of the FCC Rule and Section 1.40001(c)(3)(i) of the Regulation, an initial determination of incompleteness tolls the running of the 60-day review period *only if* the local government provides notice to the requestor in writing within 30 days of the application's submission.

Moreover, the Rule requires that any notice of incompleteness must clearly and specifically delineate the missing information in writing. Further, the municipality may only specify as missing information any supporting documents that are reasonably related to determining whether the request meets the requirements of Section 6409(a). An application may not be deemed incomplete for a lack of special permit application or discretionary review. Accordingly, we have provided the additional information as a matter of convenience, and reserve all rights relative to such requirements in the event of any subsequent exercise by Verizon of any and all remedies available under applicable law.

V. SUMMARY

In light of the foregoing and as illustrated on the enclosed Plans, the facility proposed by Verizon in the request is an "eligible facilities request" under Section 6409 that does not result in a "substantial change" to the existing "tower" at 100 Lowder Brook Drive. Therefore, in accordance with state and federal law, the Town of Westwood is precluded from imposing a discretionary special permit review process, and must approve Verizon's request to install a wireless communications facility on the Property within the federally-prescribed approval period.

The materials submitted and the discussion provided enable you to determine that the application constitutes an eligible facilities request. In addition, the enclosed materials satisfy the requirements for a building permit. Accordingly, Verizon respectfully requests that you issue such permit at your earliest opportunity.

Thank you for your assistance and attention to this matter.

Sincerely,

Tyler P. Haynes
Enclosures
ec: G. Costello (SAI)

CROWN CASTLE

3530 Toringdon Way Suite 300
Charlotte, NC 28277

Phone: (704) 405-6623
Fax: (724) 416-6591
www.crowncastle.com

Crown Castle Letter of Authorization

MA-WESTWOOD
Planning Department
580 High Street
Westwood, MA 02090

Re: Application for Zoning/Building Permit
Crown Castle telecommunications site at: 100 LOWDER BROOK DRIVE, WESTWOOD, MA 02090

CCATT LLC ("Crown Castle") hereby authorizes VERIZON WIRELESS, including their Agent, to act as our Agent in the processing of all zoning applications, building permits and approvals through the MA-WESTWOOD for the existing wireless communications site described below:

Crown Site ID/Name: 842905/WESTWOOD LOWDER BROOK (MA0057)
Customer Site ID: 20130930927/Westwood 6, MA
Site Address: 100 LOWDER BROOK DRIVE, WESTWOOD, MA 02090

Crown Castle

By: Sarah Brown Date: 2/9/2017

Sarah Brown
Real Estate Specialist – East Area

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

October 3, 2014

VIA Email

EMAIL: mgiglia@meditech.com

Re: 842905 / WESTWOOD LOWDER BROOK / 100 LOWDER BROOK DRIVE, WESTWOOD, MA 02090
Lease Agreement between Medical Information Technology Inc and New Cingular Wireless PCS LLC as as Amended "Lease"
Consent for Sublease / App # 216288

Dear Landlord:

Pursuant to an agreement between NCWPCS MPL 28 - Year Sites Tower Holdings LLC, successor in interest to New Cingular Wireless PCS, LLC ("AT&T") and CCATT LLC ("CCATT"), CCATT manages and operates the tower site that is subject to the Lease on behalf of AT&T. CCATT is a Crown Castle company. CCATT and its affiliates and subsidiaries own and operate shared wireless communication facilities.

In order to better serve the public and minimize the amount of towers in an area where this property is located, AT&T plans to sublease to Verizon Wireless. The sublease will not alter the character or use of the site nor will it change the nature of AT&T's occupancy at the site.

AT&T has authorized CCATT to contact you and request consent to the subletting of ground and tower space. Pursuant to Paragraph(s) 13 & 2(a) of the Lease, AT&T is required to obtain your consent, which consent cannot be unreasonably withheld, delayed or conditioned. Therefore, CCATT, on behalf of AT&T, respectfully requests your consent to this sublease/modification.

As used in this letter, the term sublease shall include any arrangement by which a third party can install and operate its equipment on the property subject to the Lease. AT&T and CCATT will continue to be responsible for performing all of the obligations under the Lease.

Please indicate your consent by executing this letter where indicated below and return one original of same to the address indicated above. A prepaid envelope is included for your convenience.

Thank you for your continued cooperation with Crown Castle. If you have any questions concerning this issue, please contact: Heather Simeone at (980) 209-8236 or heather.simeone.contractor@crowncastle.com.

Yours truly,

Heather Simeone
Real Estate Specialist - East Area

Agreed and accepted this 21 day of JANUARY, 2015

(Lessor's signature)

L. ANTHONY POLIMENI

(Print Name)

PJF PAUL J. FORD & COMPANY

Date: **March 04, 2016**

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

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jwoolley@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	20130930927
	Carrier Site Name:	Westwood 6, MA
Crown Castle Designation:	**Crown Castle BU Number:**	842905
	Crown Castle Site Name:	WESTWOOD LOWDER BROOK (MA0057)
	Crown Castle JDE Job Number:	259485
	Crown Castle Work Order Number:	1202751
	Crown Castle Application Number:	216288 Rev. 11
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-0873.001.7700
Site Data:	**100 LOWDER BROOK DRIVE, WESTWOOD, Norfolk County, MA**	
	Latitude *42° 14' 25.6"*, Longitude *-71° 12' 17.2"*	
	140 Foot - Monopole Tower	

Dear Timothy Howell,

Paul J Ford and Company is pleased to submit this **"Structural Modification 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 878907, in accordance with application 216288, revision 11.

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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2009 International Building Code as amended by the 2010 Massachusetts State Building Code, Eighth Edition, and the TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 40 mph with 1.0 inch ice thickness and 60 mph under service loads, exposure category B.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

John J. Woolley, E.I. BKK
Structural Designer

tnxTower Report - version 7.0.5.1

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED
PROFESSIONAL ENGINEER

3/10/16

PAUL J. FORD & COMPANY

Date: **March 04, 2016**

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

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jwoolley@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	20130930927
	Carrier Site Name:	Westwood 6, MA
Crown Castle Designation:	**Crown Castle BU Number:**	842905
	Crown Castle Site Name:	WESTWOOD LOWDER BROOK (MA0057)
	Crown Castle JDE Job Number:	259485
	Crown Castle Work Order Number:	1202751
	Crown Castle Application Number:	216288 Rev. 11
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-0873.001.7700
Site Data:	**100 LOWDER BROOK DRIVE, WESTWOOD, Norfolk County, MA**	
	Latitude *42° 14' 25.6"*, Longitude *-71° 12' 17.2"*	
	140 Foot - Monopole Tower	

Dear Timothy Howell,

Paul J Ford and Company is pleased to submit this **"Structural Modification 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 878907, in accordance with application 216288, revision 11.

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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2009 International Building Code as amended by the 2010 Massachusetts State Building Code, Eighth Edition, and the TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 40 mph with 1.0 inch ice thickness and 60 mph under service loads, exposure category B.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Antenna and Cable Information
Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE
Table 3 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 4 - Section Capacity (Summary)
Table 5 – Tower Components vs. Capacity
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by VALMONT in October of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2009 International Building Code as amended by the 2010 Massachusetts State Building Code, Eighth Edition, and the TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 40 mph with 1.0 inch ice thickness and 60 mph under service loads, exposure category B.

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
103.0	104.0	3	commscope	SBNHH-1D65B w/ Mount Pipe	18	1-1/4	-
	103.0	1	tower mounts	Pipe Mount [PM 601-3]			

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
134.0	134.0	6	powerwave technologies	P90-14-XLH-RR w/ Mount Pipe	9	1-5/8	1
		1	tower mounts	T-Arm Mount [TA 702-3]			
125.0	125.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12 1	7/8 1-5/8	1
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Side Arm Mount [SO 102-3]			
		3	ericsson	Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	-	-	2
		3	ericsson	RRUS 11 B12			
114.0	115.0	3	ericsson	RRUS A2 MODULE	1 2 3	3/8 3/4 1-5/8	1
		3	ericsson	RRUS-11 1900MHz			
		3	kathrein	800 10121 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	114.0	1	tower mounts	Pipe Mount [PM 601-3]			
103.0	103.0	2	kathrein	800 10606 w/ Mount Pipe	1 8	1/4 7/8	3
		4	kathrein	860 10118			
		2	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	CHA, 5925.07.86, 8/6/1997	4291786	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2010527.00, 5/5/2010	4432987	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 140875, 12/8/14	5459726	CCISITES
4-POST-MODIFICATION INSPECTION	FDH, 16BADU1500, 2/4/16	6089540	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont, 17955-98, 10/6/1998	4433003	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 17955-98, 10/5/1998	4432990	CCISITES

3.1) Analysis Method

tnxTower (version 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 and 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) Monopole has been reinforced in conformance with the referenced modification documents.
5) Monopole will be reinforced in conformance with the attached modification documents.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	140 - 90.25	Pole	TP20.27x12.81x0.188	1	-4.56	818.85	87.0	Pass
L2	90.25 - 82.5	Pole	TP21.058x19.332x0.219	2	-5.85	1051.88	94.1	Pass
L3	82.5 - 78.5	Pole	TP21.659x21.058x0.447	3	-6.49	1308.37	84.2	Pass
L4	78.5 - 66.5	Pole	TP23.459x21.659x0.566	4	-8.87	1795.44	77.4	Pass
L5	66.5 - 65.5	Pole	TP23.609x23.459x0.709	5	-9.12	2249.43	63.5	Pass
L6	65.5 - 44.5	Pole	TP26.76x23.609x0.457	6	-12.27	1894.87	93.5	Pass
L7	44.5 - 43.5	Pole	TP26.472x25.17x0.518	7	-13.93	2157.66	89.1	Pass
L8	43.5 - 18	Pole	TP30.299x26.472x0.644	8	-21.33	2671.62	94.9	Pass
L9	18 - 16.5	Pole	TP30.524x30.299x0.786	9	-21.86	3159.43	82.1	Pass
L10	16.5 - 4	Pole	TP32.4x30.524x0.597	10	-25.57	3096.83	91.6	Pass
L11	4 - 0	Pole	TP33x32.4x0.97	11	-27.39	4637.83	64.5	Pass
							Summary	
						Pole (L8)	94.9	Pass
						RATING =	**94.9**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	65.8	Pass
1	Base Plate	0	55.2	Pass
1	Base Foundation Structural Steel	0	15.6	Pass
1	Base Foundation Soil Interaction	0	81.4	Pass

Structure Rating (max from all components) =	**94.9%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

See attached modification drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Norfolk County, Massachusetts.
2) Basic wind speed of 105 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.00 ft.
7) Nominal ice thickness of 1.000 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.00 pcf.
10) A wind speed of 40 mph is used in combination with ice.
11) Temperature drop of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

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	140.00-90.25	49.75	3.75	12	12.810	20.270	0.188	0.752	A572-65 (65 ksi)
L2	90.25-82.50	11.50	0.00	12	19.332	21.058	0.219	0.876	A572-65 (65 ksi)
L3	82.50-78.50	4.00	0.00	12	21.058	21.659	0.447	1.786	Reinf 37.83 ksi (38 ksi)
L4	78.50-66.50	12.00	0.00	12	21.659	23.459	0.566	2.264	Reinf 37.95 ksi (38 ksi)
L5	66.50-65.50	1.00	0.00	12	23.459	23.609	0.709	2.837	Reinf 37.93 ksi

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
L6	65.50-44.50	21.00	4.50	12	23.609	26.760	0.457	1.829	(38 ksi) Reinf 44.29 ksi (44 ksi)
L7	44.50-43.50	5.50	0.00	12	25.170	26.472	0.518	2.074	Reinf 44.32 ksi (44 ksi)
L8	43.50-18.00	25.50	0.00	12	26.472	30.299	0.644	2.577	Reinf 38.30 ksi (38 ksi)
L9	18.00-16.50	1.50	0.00	12	30.299	30.524	0.786	3.146	Reinf 37.24 ksi (37 ksi)
L10	16.50-4.00	12.50	0.00	12	30.524	32.400	0.597	2.390	Reinf 44.64 ksi (45 ksi)
L11	4.00-0.00	4.00		12	32.400	33.000	0.970	3.881	Reinf 40.87 ksi (41 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	13.262	7.641	155.376	4.519	6.636	23.416	314.834	3.761	2.929	15.581
	20.985	12.157	625.778	7.189	10.500	59.599	1267.997	5.983	4.929	26.216
L2	20.597	13.478	628.422	6.842	10.014	62.755	1273.353	6.633	4.594	20.977
	21.801	14.696	814.602	7.461	10.908	74.677	1650.604	7.233	5.057	23.09
L3	21.801	29.636	1607.087	7.379	10.908	147.327	3256.394	14.586	4.447	9.959
	22.423	30.499	1751.598	7.594	11.219	156.125	3549.212	15.011	4.608	10.319
L4	22.423	38.439	2182.842	7.551	11.219	194.564	4423.029	18.919	4.288	7.576
	24.287	41.720	2790.900	8.196	12.152	229.669	5655.119	20.533	4.770	8.429
L5	24.287	51.954	3432.150	8.144	12.152	282.439	6954.466	25.570	4.386	6.185
	24.442	52.297	3500.506	8.198	12.230	286.234	7092.974	25.739	4.427	6.241
L6	24.442	34.083	2331.857	8.288	12.230	190.674	4724.974	16.775	5.102	11.159
	27.704	38.722	3419.361	9.416	13.862	246.677	6928.553	19.058	5.946	13.006
L7	27.161	41.153	3192.191	8.825	13.038	244.832	6468.244	20.254	5.356	10.332
	27.406	43.326	3725.121	9.291	13.713	271.655	7548.104	21.324	5.705	11.005
L8	27.406	53.575	4561.794	9.246	13.713	332.670	9243.432	26.368	5.368	8.333
	31.368	61.513	6904.573	10.616	15.695	439.927	13990.537	30.275	6.394	9.925
L9	31.368	74.730	8307.936	10.565	15.695	529.342	16834.132	36.780	6.013	7.646
	31.601	75.300	8499.482	10.646	15.811	537.553	17222.255	37.060	6.073	7.723
L10	31.601	57.568	6580.801	10.714	15.811	416.205	13334.486	28.333	6.579	11.013
	33.543	61.176	7897.417	11.385	16.783	470.558	16002.309	30.109	7.082	11.855
L11	33.543	98.193	12380.619	11.252	16.783	737.685	25086.491	48.328	6.083	6.269
	34.164	100.069	13103.587	11.467	17.094	766.561	26551.419	49.251	6.244	6.435

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 140.00-90.25				1	1	1			
L2 90.25-82.50				1	1	1			
L3 82.50-78.50				1	1	1			
L4 78.50-66.50				1	1	1			
L5 66.50-65.50				1	1	1			
L6 65.50-44.50				1	1	1			
L7 44.50-43.50				1	1	1			
L8 43.50-18.00				1	1	1			
L9 18.00-16.50				1	1	1			

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
L10 16.50-4.00				1	1	1			
L11 4.00-0.00				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)	C	No	CaAa (Out Of Face)	134.00 - 0.00	2	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	134.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
LDF7-50A(1-5/8)	C	No	Inside Pole	134.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF5-50A(7/8)	C	No	Inside Pole	125.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	114.00 - 103.00	1	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	114.00 - 0.00	3	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
FB-L98B-034-XXXXXX(3/8)	C	No	Inside Pole	114.00 - 0.00	1	No Ice	0.00	0.05
						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	114.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	103.00 - 0.00	16	No Ice	0.00	0.60
						1/2" Ice	0.00	1.85
						1" Ice	0.00	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	103.00 - 0.00	2	No Ice	0.16	0.60
						1/2" Ice	0.25	1.85
						1" Ice	0.35	3.72
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	70.00 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	44.50 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	84.00 - 64.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-90.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.793	0.69
L2	90.25-82.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.187	0.20

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L3	82.50-78.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.699	0.10
L4	78.50-66.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.313	0.31
L5	66.50-65.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.022	0.03
L6	65.50-44.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	18.222	0.54
L7	44.50-43.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.022	0.03
L8	43.50-18.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	26.073	0.66
L9	18.00-16.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.534	0.04
L10	16.50-4.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	12.781	0.32
L11	4.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.090	0.10

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-90.25	A	2.263	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	51.118	5.72
L2	90.25-82.50	A	2.202	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.465	2.32
L3	82.50-78.50	A	2.187	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.890	1.13
L4	78.50-66.50	A	2.164	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	32.646	3.32
L5	66.50-65.50	A	2.144	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.348	0.27
L6	65.50-44.50	A	2.104	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	57.069	5.54
L7	44.50-43.50	A	2.058	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.306	0.26
L8	43.50-18.00	A	1.984	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	81.122	6.07
L9	18.00-16.50	A	1.874	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.600	0.33
L10	16.50-4.00	A	1.778	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	37.078	2.63
L11	4.00-0.00	A	1.511	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.747	0.69

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	140.00-90.25	-0.330	0.191	-0.698	0.403
L2	90.25-82.50	-0.520	0.300	-1.070	0.618
L3	82.50-78.50	-0.620	0.358	-1.222	0.705
L4	78.50-66.50	-0.699	0.403	-1.325	0.765
L5	66.50-65.50	-0.853	0.493	-1.487	0.859
L6	65.50-44.50	-0.777	0.449	-1.412	0.815
L7	44.50-43.50	-0.885	0.511	-1.591	0.918
L8	43.50-18.00	-0.905	0.523	-1.640	0.947
L9	18.00-16.50	-0.923	0.533	-1.682	0.971
L10	16.50-4.00	-0.932	0.538	-1.690	0.976
L11	4.00-0.00	-0.942	0.544	-1.651	0.953

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

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
***									
(2) P90-14-XLH-RR w/ Mount Pipe	A	From Leg	1.00 0 0	0.000	134.00	No Ice 1/2" Ice 1" Ice	5.30 5.69 6.09	4.05 4.67 5.29	0.05 0.09 0.15
(2) P90-14-XLH-RR w/ Mount Pipe	B	From Leg	1.00 0 0	0.000	134.00	No Ice 1/2" Ice 1" Ice	5.30 5.69 6.09	4.05 4.67 5.29	0.05 0.09 0.15
(2) P90-14-XLH-RR w/ Mount Pipe	C	From Leg	1.00 0 0	0.000	134.00	No Ice 1/2" Ice 1" Ice	5.30 5.69 6.09	4.05 4.67 5.29	0.05 0.09 0.15
T-Arm Mount [TA 702-3]	C	None		0.000	134.00	No Ice 1/2" Ice 1" Ice	5.64 6.55 7.46	5.64 6.55 7.46	0.34 0.43 0.52
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	1.00 0 0	0.000	125.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ATMAA1412D-1A20	A	From Leg	1.00 0 0	0.000	125.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	1.00 0	0.000	125.00	No Ice 1/2"	6.33 6.78	5.64 6.43	0.11 0.17

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
			0			Ice	7.21	7.13	0.23
						1" Ice			
ATMAA1412D-1A20	B	From Leg	1.00	0.000	125.00	No Ice	1.00	0.41	0.01
			0			1/2"	1.13	0.50	0.02
			0			Ice	1.26	0.59	0.03
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	1.00	0.000	125.00	No Ice	6.33	5.64	0.11
			0			1/2"	6.78	6.43	0.17
			0			Ice	7.21	7.13	0.23
						1" Ice			
ATMAA1412D-1A20	C	From Leg	1.00	0.000	125.00	No Ice	1.00	0.41	0.01
			0			1/2"	1.13	0.50	0.02
			0			Ice	1.26	0.59	0.03
						1" Ice			
Side Arm Mount [SO 102-3]	C	None		0.000	125.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice			
Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	A	From Leg	1.00	0.000	125.00	No Ice	10.97	9.25	0.16
			0			1/2"	11.58	10.53	0.25
			0			Ice	12.16	11.60	0.35
						1" Ice			
RRUS 11 B12	A	From Leg	1.00	0.000	125.00	No Ice	2.83	1.18	0.05
			0			1/2"	3.04	1.33	0.07
			0			Ice	3.26	1.48	0.10
						1" Ice			
Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	B	From Leg	1.00	0.000	125.00	No Ice	10.97	9.25	0.16
			0			1/2"	11.58	10.53	0.25
			0			Ice	12.16	11.60	0.35
						1" Ice			
RRUS 11 B12	B	From Leg	1.00	0.000	125.00	No Ice	2.83	1.18	0.05
			0			1/2"	3.04	1.33	0.07
			0			Ice	3.26	1.48	0.10
						1" Ice			
Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	C	From Leg	1.00	0.000	125.00	No Ice	10.97	9.25	0.16
			0			1/2"	11.58	10.53	0.25
			0			Ice	12.16	11.60	0.35
						1" Ice			
RRUS 11 B12	C	From Leg	1.00	0.000	125.00	No Ice	2.83	1.18	0.05
			0			1/2"	3.04	1.33	0.07
			0			Ice	3.26	1.48	0.10
						1" Ice			
***									
RRUS A2 MODULE	A	From Leg	1.00	0.000	114.00	No Ice	1.60	0.38	0.02
			0			1/2"	1.76	0.47	0.03
			1			Ice	1.92	0.57	0.04
						1" Ice			
RRUS-11 1900MHz	A	From Leg	1.00	0.000	114.00	No Ice	2.52	1.02	0.04
			0			1/2"	2.72	1.16	0.06
			1			Ice	2.92	1.30	0.09
						1" Ice			
800 10121 w/ Mount Pipe	A	From Leg	1.00	0.000	114.00	No Ice	5.74	4.95	0.07
			0			1/2"	6.34	6.02	0.12
			1			Ice	6.86	6.81	0.18
						1" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.000	114.00	No Ice	0.92	0.92	0.02
			0			1/2"	1.46	1.46	0.04
			1			Ice	1.64	1.64	0.06
						1" Ice			
RRUS A2 MODULE	B	From Leg	1.00	0.000	114.00	No Ice	1.60	0.38	0.02
			0			1/2"	1.76	0.47	0.03
			1			Ice	1.92	0.57	0.04
						1" Ice			
RRUS-11 1900MHz	B	From Leg	1.00	0.000	114.00	No Ice	2.52	1.02	0.04
			0			1/2"	2.72	1.16	0.06

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
			1			Ice	2.92	1.30	0.09
						1" Ice			
800 10121 w/ Mount Pipe	B	From Leg	1.00	0.000	114.00	No Ice	5.74	4.95	0.07
			0			1/2"	6.34	6.02	0.12
			1			Ice	6.86	6.81	0.18
						1" Ice			
RRUS A2 MODULE	C	From Leg	1.00	0.000	114.00	No Ice	1.60	0.38	0.02
			0			1/2"	1.76	0.47	0.03
			1			Ice	1.92	0.57	0.04
						1" Ice			
RRUS-11 1900MHz	C	From Leg	1.00	0.000	114.00	No Ice	2.52	1.02	0.04
			0			1/2"	2.72	1.16	0.06
			1			Ice	2.92	1.30	0.09
						1" Ice			
800 10121 w/ Mount Pipe	C	From Leg	1.00	0.000	114.00	No Ice	5.74	4.95	0.07
			0			1/2"	6.34	6.02	0.12
			1			Ice	6.86	6.81	0.18
						1" Ice			
Pipe Mount [PM 601-3]	C	None		0.000	114.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice			
***									
SBNHH-1D65B w/ Mount Pipe	A	From Leg	1.00	0.000	103.00	No Ice	8.40	7.07	0.07
			0			1/2"	8.96	8.26	0.14
			1			Ice	9.49	9.18	0.21
						1" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	1.00	0.000	103.00	No Ice	8.40	7.07	0.07
			0			1/2"	8.96	8.26	0.14
			1			Ice	9.49	9.18	0.21
						1" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	1.00	0.000	103.00	No Ice	8.40	7.07	0.07
			0			1/2"	8.96	8.26	0.14
			1			Ice	9.49	9.18	0.21
						1" Ice			
Pipe Mount [PM 601-3]	C	None		0.000	103.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice			

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 140.00-90.25	113.64	1.025	27.42	70.991	A	0.000	70.991	70.991	100.00	0.000	0.000
					B	0.000	70.991		100.00	0.000	0.000
					C	0.000	70.991		100.00	0.000	14.793
L2 90.25-82.50	86.34	0.948	25.41	13.691	A	0.000	13.691	13.691	100.00	0.000	0.000
					B	0.000	13.691		100.00	0.000	0.000
					C	0.000	13.691		100.00	0.000	4.187
L3 82.50-78.50	80.49	0.929	24.90	7.371	A	0.000	7.371	7.371	100.00	0.000	0.000
					B	0.000	7.371		100.00	0.000	0.000
					C	0.000	7.371		100.00	0.000	2.699
L4 78.50-66.50	72.42	0.901	24.16	23.355	A	0.000	23.355	23.355	100.00	0.000	0.000
					B	0.000	23.355		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	23.355		100.00	0.000	9.313
L5 66.50-65.50	66.00	0.878	23.53	2.030	A	0.000	2.030	2.030	100.00	0.000	0.000
					B	0.000	2.030		100.00	0.000	0.000
					C	0.000	2.030		100.00	0.000	1.022
L6 65.50-44.50	54.78	0.832	22.31	45.628	A	0.000	45.628	45.628	100.00	0.000	0.000
					B	0.000	45.628		100.00	0.000	0.000
					C	0.000	45.628		100.00	0.000	18.222
L7 44.50-43.50	44.00	0.782	20.96	2.274	A	0.000	2.274	2.274	100.00	0.000	0.000
					B	0.000	2.274		100.00	0.000	0.000
					C	0.000	2.274		100.00	0.000	1.022
L8 43.50-18.00	30.46	0.704	18.87	62.447	A	0.000	62.447	62.447	100.00	0.000	0.000
					B	0.000	62.447		100.00	0.000	0.000
					C	0.000	62.447		100.00	0.000	26.073
L9 18.00-16.50	17.25	0.7	18.77	3.936	A	0.000	3.936	3.936	100.00	0.000	0.000
					B	0.000	3.936		100.00	0.000	0.000
					C	0.000	3.936		100.00	0.000	1.534
L10 16.50-4.00	10.19	0.7	18.77	33.929	A	0.000	33.929	33.929	100.00	0.000	0.000
					B	0.000	33.929		100.00	0.000	0.000
					C	0.000	33.929		100.00	0.000	12.781
L11 4.00-0.00	1.99	0.7	18.77	11.284	A	0.000	11.284	11.284	100.00	0.000	0.000
					B	0.000	11.284		100.00	0.000	0.000
					C	0.000	11.284		100.00	0.000	4.090

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 140.00-90.25	113.64	1.025	3.98	2.263	89.757	A	0.000	89.757	89.757	100.00	0.000	0.000
						B	0.000	89.757		100.00	0.000	0.000
						C	0.000	89.757		100.00	0.000	51.118
L2 90.25-82.50	86.34	0.948	3.69	2.202	16.614	A	0.000	16.614	16.614	100.00	0.000	0.000
						B	0.000	16.614		100.00	0.000	0.000
						C	0.000	16.614		100.00	0.000	15.465
L3 82.50-78.50	80.49	0.929	3.61	2.187	8.828	A	0.000	8.828	8.828	100.00	0.000	0.000
						B	0.000	8.828		100.00	0.000	0.000
						C	0.000	8.828		100.00	0.000	9.890
L4 78.50-66.50	72.42	0.901	3.51	2.164	27.682	A	0.000	27.682	27.682	100.00	0.000	0.000
						B	0.000	27.682		100.00	0.000	0.000
						C	0.000	27.682		100.00	0.000	32.646
L5 66.50-65.50	66.00	0.878	3.41	2.144	2.388	A	0.000	2.388	2.388	100.00	0.000	0.000
						B	0.000	2.388		100.00	0.000	0.000
						C	0.000	2.388		100.00	0.000	3.348
L6 65.50-44.50	54.78	0.832	3.24	2.104	52.992	A	0.000	52.992	52.992	100.00	0.000	0.000
						B	0.000	52.992		100.00	0.000	0.000
						C	0.000	52.992		100.00	0.000	57.069
L7 44.50-43.50	44.00	0.782	3.04	2.058	2.624	A	0.000	2.624	2.624	100.00	0.000	0.000
						B	0.000	2.624		100.00	0.000	0.000
						C	0.000	2.624		100.00	0.000	3.306
L8 43.50-18.00	30.46	0.704	2.74	1.984	70.880	A	0.000	70.880	70.880	100.00	0.000	0.000
						B	0.000	70.880		100.00	0.000	0.000
						C	0.000	70.880		100.00	0.000	81.122
L9 18.00-16.50	17.25	0.7	2.72	1.874	4.404	A	0.000	4.404	4.404	100.00	0.000	0.000
						B	0.000	4.404		100.00	0.000	0.000
						C	0.000	4.404		100.00	0.000	4.600
L10 16.50-4.00	10.19	0.7	2.72	1.778	37.634	A	0.000	37.634	37.634	100.00	0.000	0.000
						B	0.000	37.634		100.00	0.000	0.000
						C	0.000	37.634		100.00	0.000	37.078
L11 4.00-0.00	1.99	0.7	2.72	1.511	12.292	A	0.000	12.292	12.292	100.00	0.000	0.000
						B	0.000	12.292		100.00	0.000	0.000
						C	0.000	12.292		100.00	0.000	10.747

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 140.00-90.25	113.64	1.025	8.01	70.991	A	0.000	70.991	70.991	100.00	0.000	0.000
					B	0.000	70.991		100.00	0.000	0.000
					C	0.000	70.991		100.00	0.000	14.793
L2 90.25-82.50	86.34	0.948	7.42	13.691	A	0.000	13.691	13.691	100.00	0.000	0.000
					B	0.000	13.691		100.00	0.000	0.000
					C	0.000	13.691		100.00	0.000	4.187
L3 82.50-78.50	80.49	0.929	7.28	7.371	A	0.000	7.371	7.371	100.00	0.000	0.000
					B	0.000	7.371		100.00	0.000	0.000
					C	0.000	7.371		100.00	0.000	2.699
L4 78.50-66.50	72.42	0.901	7.06	23.355	A	0.000	23.355	23.355	100.00	0.000	0.000
					B	0.000	23.355		100.00	0.000	0.000
					C	0.000	23.355		100.00	0.000	9.313
L5 66.50-65.50	66.00	0.878	6.87	2.030	A	0.000	2.030	2.030	100.00	0.000	0.000
					B	0.000	2.030		100.00	0.000	0.000
					C	0.000	2.030		100.00	0.000	1.022
L6 65.50-44.50	54.78	0.832	6.52	45.628	A	0.000	45.628	45.628	100.00	0.000	0.000
					B	0.000	45.628		100.00	0.000	0.000
					C	0.000	45.628		100.00	0.000	18.222
L7 44.50-43.50	44.00	0.782	6.12	2.274	A	0.000	2.274	2.274	100.00	0.000	0.000
					B	0.000	2.274		100.00	0.000	0.000
					C	0.000	2.274		100.00	0.000	1.022
L8 43.50-18.00	30.46	0.704	5.51	62.447	A	0.000	62.447	62.447	100.00	0.000	0.000
					B	0.000	62.447		100.00	0.000	0.000
					C	0.000	62.447		100.00	0.000	26.073
L9 18.00-16.50	17.25	0.7	5.48	3.936	A	0.000	3.936	3.936	100.00	0.000	0.000
					B	0.000	3.936		100.00	0.000	0.000
					C	0.000	3.936		100.00	0.000	1.534
L10 16.50-4.00	10.19	0.7	5.48	33.929	A	0.000	33.929	33.929	100.00	0.000	0.000
					B	0.000	33.929		100.00	0.000	0.000
					C	0.000	33.929		100.00	0.000	12.781
L11 4.00-0.00	1.99	0.7	5.48	11.284	A	0.000	11.284	11.284	100.00	0.000	0.000
					B	0.000	11.284		100.00	0.000	0.000
					C	0.000	11.284		100.00	0.000	4.090

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice

Comb. No.	Description
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 90.25	Pole	Max Tension	9	0.00	0.00	0.00
			Max. Compression	26	-21.35	4.68	-2.45
			Max. Mx	20	-4.56	280.59	-0.11
			Max. My	14	-4.56	0.25	-280.46
			Max. Vy	20	-11.11	280.59	-0.11
			Max. Vx	14	11.12	0.25	-280.46
			Max. Torque	25			0.44
L2	90.25 - 82.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.91	7.11	-3.84
			Max. Mx	20	-5.85	416.14	-0.19
			Max. My	14	-5.85	0.39	-415.97
			Max. Vy	20	-12.45	416.14	-0.19
			Max. Vx	14	12.45	0.39	-415.97
			Max. Torque	25			0.64
L3	82.5 - 78.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.81	8.13	-4.42
			Max. Mx	20	-6.49	467.00	-0.22
			Max. My	14	-6.49	0.45	-466.81
			Max. Vy	20	-12.97	467.00	-0.22
			Max. Vx	14	12.97	0.45	-466.81
			Max. Torque	25			0.75
L4	78.5 - 66.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.96	11.27	-6.23
			Max. Mx	20	-8.87	632.73	-0.33
			Max. My	14	-8.87	0.64	-632.45
			Max. Vy	20	-14.64	632.73	-0.33
			Max. Vx	14	14.64	0.64	-632.45
			Max. Torque	25			1.12
L5	66.5 - 65.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-34.52	11.54	-6.38
			Max. Mx	20	-9.12	647.45	-0.34
			Max. My	14	-9.12	0.66	-647.18
			Max. Vy	20	-14.79	647.45	-0.34
			Max. Vx	14	14.79	0.66	-647.18
			Max. Torque	25			1.16
L6	65.5 - 44.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.57	16.04	-8.97
			Max. Mx	20	-12.27	909.39	-0.51
			Max. My	14	-12.27	0.95	-909.00
			Max. Vy	20	-16.95	909.39	-0.51
			Max. Vx	14	16.95	0.95	-909.00
			Max. Torque	25			1.73
L7	44.5 - 43.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.42	17.53	-9.83
			Max. Mx	20	-14.13	1004.93	-0.56
			Max. My	14	-14.13	1.04	-1004.51
			Max. Vy	20	-17.76	1004.93	-0.56
			Max. Vx	14	17.76	1.04	-1004.51
			Max. Torque	25			1.94
L8	43.5 - 18	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.54	24.25	-13.70
			Max. Mx	20	-21.33	1497.12	-0.85
			Max. My	14	-21.33	1.54	-1496.50
			Max. Vy	20	-20.85	1497.12	-0.85
			Max. Vx	14	20.85	1.54	-1496.50
			Max. Torque	25			2.96
L9	18 - 16.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.46	24.63	-13.92
			Max. Mx	20	-21.86	1528.54	-0.86
			Max. My	14	-21.86	1.57	-1527.91
			Max. Vy	20	-21.03	1528.54	-0.86
			Max. Vx	14	21.03	1.57	-1527.91
			Max. Torque	25			3.02
L10	16.5 - 4	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.10	27.62	-15.64
			Max. Mx	20	-25.57	1800.65	-1.01
			Max. My	14	-25.57	1.83	-1799.92
			Max. Vy	20	-22.50	1800.65	-1.01
			Max. Vx	14	22.50	1.83	-1799.92
			Max. Torque	25			3.58
L11	4 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.69	28.40	-16.09
			Max. Mx	20	-27.39	1891.68	-1.06
			Max. My	14	-27.39	1.92	-1890.91
			Max. Vy	20	-23.00	1891.68	-1.06
			Max. Vx	14	23.00	1.92	-1890.91
			Max. Torque	25			3.76

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	70.69	-0.00	0.00
	Max. H_x	20	27.39	22.99	-0.00
	Max. H_z	2	27.39	0.00	22.99
	Max. M_x	2	1888.77	0.00	22.99
	Max. M_z	8	1887.83	-22.99	-0.00
	Max. Torsion	25	3.76	11.50	19.91
	Min. Vert	21	20.55	22.99	-0.00
	Min. H_x	8	27.39	-22.99	-0.00
	Min. H_z	14	27.39	0.00	-22.99
	Min. M_x	14	-1890.91	0.00	-22.99
	Min. M_z	20	-1891.68	22.99	-0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Torsion	13	-3.76	-11.50	-19.91

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	22.83	0.00	-0.00	0.86	1.55	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	27.39	-0.00	-22.99	-1888.77	1.92	-3.28
0.9 Dead+1.6 Wind 0 deg - No Ice	20.55	-0.00	-22.99	-1869.70	1.42	-3.28
1.2 Dead+1.6 Wind 30 deg - No Ice	27.39	11.50	-19.91	-1635.66	-943.05	-1.92
0.9 Dead+1.6 Wind 30 deg - No Ice	20.55	11.50	-19.91	-1619.20	-933.88	-1.92
1.2 Dead+1.6 Wind 60 deg - No Ice	27.39	19.91	-11.50	-943.90	-1634.81	-0.05
0.9 Dead+1.6 Wind 60 deg - No Ice	20.55	19.91	-11.50	-934.51	-1618.56	-0.05
1.2 Dead+1.6 Wind 90 deg - No Ice	27.39	22.99	0.00	1.06	-1887.83	1.84
0.9 Dead+1.6 Wind 90 deg - No Ice	20.55	22.99	0.00	0.79	-1868.95	1.84
1.2 Dead+1.6 Wind 120 deg - No Ice	27.39	19.91	11.50	946.03	-1634.81	3.23
0.9 Dead+1.6 Wind 120 deg - No Ice	20.55	19.91	11.50	936.09	-1618.56	3.23
1.2 Dead+1.6 Wind 150 deg - No Ice	27.39	11.50	19.91	1637.80	-943.05	3.76
0.9 Dead+1.6 Wind 150 deg - No Ice	20.55	11.50	19.91	1620.78	-933.88	3.76
1.2 Dead+1.6 Wind 180 deg - No Ice	27.39	-0.00	22.99	1890.91	1.92	3.28
0.9 Dead+1.6 Wind 180 deg - No Ice	20.55	-0.00	22.99	1871.28	1.42	3.28
1.2 Dead+1.6 Wind 210 deg - No Ice	27.39	-11.50	19.91	1637.80	946.89	1.92
0.9 Dead+1.6 Wind 210 deg - No Ice	20.55	-11.50	19.91	1620.79	936.73	1.92
1.2 Dead+1.6 Wind 240 deg - No Ice	27.39	-19.91	11.50	946.04	1638.66	0.05
0.9 Dead+1.6 Wind 240 deg - No Ice	20.55	-19.91	11.50	936.10	1621.42	0.05
1.2 Dead+1.6 Wind 270 deg - No Ice	27.39	-22.99	0.00	1.06	1891.68	-1.84
0.9 Dead+1.6 Wind 270 deg - No Ice	20.55	-22.99	0.00	0.79	1871.81	-1.84
1.2 Dead+1.6 Wind 300 deg - No Ice	27.39	-19.91	-11.50	-943.91	1638.65	-3.23
0.9 Dead+1.6 Wind 300 deg - No Ice	20.55	-19.91	-11.50	-934.51	1621.42	-3.23
1.2 Dead+1.6 Wind 330 deg - No Ice	27.39	-11.50	-19.91	-1635.67	946.89	-3.76
0.9 Dead+1.6 Wind 330 deg - No Ice	20.55	-11.50	-19.91	-1619.20	936.73	-3.76
1.2 Dead+1.0 Ice+1.0 Temp	70.69	0.00	-0.00	16.09	28.40	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	70.69	0.00	-3.53	-316.40	28.46	-0.96
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	70.69	1.76	-3.06	-271.85	-137.80	-0.56
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	70.69	3.06	-1.76	-150.14	-259.51	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	70.69	3.53	-0.00	16.13	-304.06	0.54

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
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	70.69	3.06	1.76	182.39	-259.51	0.95
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	70.69	1.76	3.06	304.10	-137.80	1.10
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	70.69	0.00	3.53	348.65	28.46	0.96
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	70.69	-1.76	3.06	304.10	194.72	0.56
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	70.69	-3.06	1.76	182.39	316.44	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	70.69	-3.53	-0.00	16.13	360.99	-0.54
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	70.69	-3.06	-1.76	-150.14	316.44	-0.95
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	70.69	-1.76	-3.06	-271.85	194.73	-1.10
Dead+Wind 0 deg - Service	22.83	0.00	-4.20	-342.75	1.61	-0.00
Dead+Wind 30 deg - Service	22.83	2.10	-3.64	-296.71	-170.21	-0.01
Dead+Wind 60 deg - Service	22.83	3.64	-2.10	-170.93	-296.00	-0.01
Dead+Wind 90 deg - Service	22.83	4.20	-0.00	0.89	-342.03	-0.01
Dead+Wind 120 deg - Service	22.83	3.64	2.10	172.71	-296.00	-0.01
Dead+Wind 150 deg - Service	22.83	2.10	3.64	298.49	-170.21	-0.01
Dead+Wind 180 deg - Service	22.83	0.00	4.20	344.53	1.61	0.00
Dead+Wind 210 deg - Service	22.83	-2.10	3.64	298.49	173.43	0.01
Dead+Wind 240 deg - Service	22.83	-3.64	2.10	172.71	299.21	0.01
Dead+Wind 270 deg - Service	22.83	-4.20	-0.00	0.89	345.25	0.01
Dead+Wind 300 deg - Service	22.83	-3.64	-2.10	-170.93	299.21	0.01
Dead+Wind 330 deg - Service	22.83	-2.10	-3.64	-296.71	173.43	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-22.83	0.00	-0.00	22.83	0.00	0.001%
2	0.00	-27.39	-22.99	0.00	27.39	22.99	0.003%
3	0.00	-20.55	-22.99	0.00	20.55	22.99	0.004%
4	11.50	-27.39	-19.91	-11.50	27.39	19.91	0.000%
5	11.50	-20.55	-19.91	-11.50	20.55	19.91	0.000%
6	19.91	-27.39	-11.50	-19.91	27.39	11.50	0.000%
7	19.91	-20.55	-11.50	-19.91	20.55	11.50	0.000%
8	22.99	-27.39	0.00	-22.99	27.39	-0.00	0.005%
9	22.99	-20.55	0.00	-22.99	20.55	-0.00	0.007%
10	19.91	-27.39	11.50	-19.91	27.39	-11.50	0.000%
11	19.91	-20.55	11.50	-19.91	20.55	-11.50	0.000%
12	11.50	-27.39	19.91	-11.50	27.39	-19.91	0.000%
13	11.50	-20.55	19.91	-11.50	20.55	-19.91	0.000%
14	0.00	-27.39	22.99	0.00	27.39	-22.99	0.003%
15	0.00	-20.55	22.99	0.00	20.55	-22.99	0.004%
16	-11.50	-27.39	19.91	11.50	27.39	-19.91	0.000%
17	-11.50	-20.55	19.91	11.50	20.55	-19.91	0.000%
18	-19.91	-27.39	11.50	19.91	27.39	-11.50	0.000%
19	-19.91	-20.55	11.50	19.91	20.55	-11.50	0.000%
20	-22.99	-27.39	0.00	22.99	27.39	-0.00	0.005%
21	-22.99	-20.55	0.00	22.99	20.55	-0.00	0.007%
22	-19.91	-27.39	-11.50	19.91	27.39	11.50	0.000%
23	-19.91	-20.55	-11.50	19.91	20.55	11.50	0.000%
24	-11.50	-27.39	-19.91	11.50	27.39	19.91	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
25	-11.50	-20.55	-19.91	11.50	20.55	19.91	0.000%
26	0.00	-70.69	0.00	-0.00	70.69	0.00	0.001%
27	0.00	-70.69	-3.53	-0.00	70.69	3.53	0.001%
28	1.76	-70.69	-3.06	-1.76	70.69	3.06	0.001%
29	3.06	-70.69	-1.76	-3.06	70.69	1.76	0.001%
30	3.53	-70.69	0.00	-3.53	70.69	0.00	0.001%
31	3.06	-70.69	1.76	-3.06	70.69	-1.76	0.001%
32	1.76	-70.69	3.06	-1.76	70.69	-3.06	0.001%
33	0.00	-70.69	3.53	-0.00	70.69	-3.53	0.001%
34	-1.76	-70.69	3.06	1.76	70.69	-3.06	0.001%
35	-3.06	-70.69	1.76	3.06	70.69	-1.76	0.001%
36	-3.53	-70.69	0.00	3.53	70.69	0.00	0.001%
37	-3.06	-70.69	-1.76	3.06	70.69	1.76	0.001%
38	-1.76	-70.69	-3.06	1.76	70.69	3.06	0.001%
39	0.00	-22.83	-4.20	-0.00	22.83	4.20	0.002%
40	2.10	-22.83	-3.64	-2.10	22.83	3.64	0.002%
41	3.64	-22.83	-2.10	-3.64	22.83	2.10	0.002%
42	4.20	-22.83	0.00	-4.20	22.83	0.00	0.002%
43	3.64	-22.83	2.10	-3.64	22.83	-2.10	0.002%
44	2.10	-22.83	3.64	-2.10	22.83	-3.64	0.002%
45	0.00	-22.83	4.20	-0.00	22.83	-4.20	0.002%
46	-2.10	-22.83	3.64	2.10	22.83	-3.64	0.002%
47	-3.64	-22.83	2.10	3.64	22.83	-2.10	0.002%
48	-4.20	-22.83	0.00	4.20	22.83	0.00	0.002%
49	-3.64	-22.83	-2.10	3.64	22.83	2.10	0.002%
50	-2.10	-22.83	-3.64	2.10	22.83	3.64	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	19	0.00002687	0.00009271
3	Yes	18	0.00003347	0.00012818
4	Yes	23	0.00000001	0.00010232
5	Yes	22	0.00000001	0.00013606
6	Yes	23	0.00000001	0.00010462
7	Yes	22	0.00000001	0.00013923
8	Yes	18	0.00005022	0.00010225
9	Yes	17	0.00006275	0.00014233
10	Yes	23	0.00000001	0.00010860
11	Yes	22	0.00000001	0.00014467
12	Yes	23	0.00000001	0.00010067
13	Yes	22	0.00000001	0.00013372
14	Yes	19	0.00002686	0.00009279
15	Yes	18	0.00003347	0.00012826
16	Yes	23	0.00000001	0.00010746
17	Yes	22	0.00000001	0.00014293
18	Yes	23	0.00000001	0.00010501
19	Yes	22	0.00000001	0.00013953
20	Yes	18	0.00005019	0.00010242
21	Yes	17	0.00006272	0.00014250
22	Yes	23	0.00000001	0.00010141
23	Yes	22	0.00000001	0.00013467
24	Yes	23	0.00000001	0.00010949
25	Yes	22	0.00000001	0.00014584
26	Yes	17	0.00000001	0.00003152
27	Yes	21	0.00012698	0.00004730
28	Yes	21	0.00012689	0.00005071
29	Yes	21	0.00012686	0.00005089
30	Yes	21	0.00012697	0.00004420
31	Yes	21	0.00012675	0.00005754
32	Yes	21	0.00012677	0.00005610
33	Yes	21	0.00012685	0.00005231
34	Yes	21	0.00012661	0.00006870

35	Yes	21	0.00012662	0.00006781
36	Yes	21	0.00012685	0.00005303
37	Yes	21	0.00012675	0.00006066
38	Yes	21	0.00012674	0.00006283
39	Yes	17	0.00000001	0.00002783
40	Yes	17	0.00000001	0.00003247
41	Yes	17	0.00000001	0.00003281
42	Yes	17	0.00000001	0.00002777
43	Yes	17	0.00000001	0.00003260
44	Yes	17	0.00000001	0.00003309
45	Yes	17	0.00000001	0.00002796
46	Yes	17	0.00000001	0.00003359
47	Yes	17	0.00000001	0.00003325
48	Yes	17	0.00000001	0.00002802
49	Yes	17	0.00000001	0.00003346
50	Yes	17	0.00000001	0.00003297

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 90.25	26.178	47	1.753	0.000
L2	94 - 82.5	10.784	47	1.221	0.000
L3	82.5 - 78.5	8.097	47	0.976	0.000
L4	78.5 - 66.5	7.302	47	0.921	0.000
L5	66.5 - 65.5	5.159	47	0.783	0.000
L6	65.5 - 44.5	4.996	47	0.774	0.000
L7	49 - 43.5	2.739	47	0.531	0.000
L8	43.5 - 18	2.152	47	0.484	0.000
L9	18 - 16.5	0.345	47	0.193	0.000
L10	16.5 - 4	0.287	47	0.180	0.000
L11	4 - 0	0.013	47	0.030	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
134.00	(2) P90-14-XLH-RR w/ Mount Pipe	47	23.953	1.714	0.000	19202
125.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	47	20.665	1.649	0.000	7680
114.00	RRUS A2 MODULE	47	16.826	1.544	0.000	4430
103.00	SBNHH-1D65B w/ Mount Pipe	47	13.315	1.393	0.000	3112

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 90.25	142.980	20	9.595	0.025
L2	94 - 82.5	59.021	20	6.687	0.015
L3	82.5 - 78.5	44.328	20	5.346	0.013
L4	78.5 - 66.5	39.981	20	5.047	0.012
L5	66.5 - 65.5	28.251	20	4.292	0.011
L6	65.5 - 44.5	27.359	20	4.240	0.010
L7	49 - 43.5	15.003	18	2.909	0.007
L8	43.5 - 18	11.785	18	2.651	0.007
L9	18 - 16.5	1.891	18	1.060	0.003
L10	16.5 - 4	1.570	18	0.984	0.002
L11	4 - 0	0.069	18	0.165	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
134.00	(2) P90-14-XLH-RR w/ Mount Pipe	20	130.854	9.384	0.023	3689
125.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	20	112.931	9.031	0.022	1473
114.00	RRUS A2 MODULE	20	91.999	8.458	0.020	845
103.00	SBNHH-1D65B w/ Mount Pipe	20	72.845	7.630	0.017	590

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 90.25 (1)	TP20.27x12.81x0.188	49.75	0.00	0.0	11.816	-4.56	818.85	0.006
L2	90.25 - 82.5 (2)	TP21.058x19.332x0.219	11.50	0.00	0.0	14.696	-5.85	1051.88	0.006
L3	82.5 - 78.5 (3)	TP21.659x21.058x0.447	4.00	0.00	0.0	30.499	-6.49	1308.37	0.005
L4	78.5 - 66.5 (4)	TP23.459x21.659x0.566	12.00	0.00	0.0	41.720	-8.87	1795.44	0.005
L5	66.5 - 65.5 (5)	TP23.609x23.459x0.709	1.00	0.00	0.0	52.297	-9.12	2249.43	0.004
L6	65.5 - 44.5 (6)	TP26.76x23.609x0.457	21.00	0.00	0.0	37.728	-12.27	1894.87	0.006
L7	44.5 - 43.5 (7)	TP26.472x25.17x0.518	5.50	0.00	0.0	42.931	-13.93	2157.66	0.006
L8	43.5 - 18 (8)	TP30.299x26.472x0.644	25.50	0.00	0.0	61.513	-21.33	2671.62	0.008
L9	18 - 16.5 (9)	TP30.524x30.299x0.786	1.50	0.00	0.0	75.300	-21.86	3159.43	0.007
L10	16.5 - 4 (10)	TP32.4x30.524x0.597	12.50	0.00	0.0	61.176	-25.57	3096.83	0.008
L11	4 - 0 (11)	TP33x32.4x0.97	4.00	0.00	0.0	100.069	-27.39	4637.83	0.006

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	140 - 90.25 (1)	TP20.27x12.81x0.188	280.63	325.08	0.863	0.00	325.08	0.000
L2	90.25 - 82.5 (2)	TP21.058x19.332x0.219	416.22	445.44	0.934	0.00	445.44	0.000
L3	82.5 - 78.5 (3)	TP21.659x21.058x0.447	467.10	558.14	0.837	0.00	558.14	0.000
L4	78.5 - 66.5 (4)	TP23.459x21.659x0.566	632.87	823.66	0.768	0.00	823.66	0.000
L5	66.5 - 65.5 (5)	TP23.609x23.459x0.709	647.60	1025.97	0.631	0.00	1025.97	0.000
L6	65.5 - 44.5 (6)	TP26.76x23.609x0.457	909.60	979.67	0.928	0.00	979.67	0.000
L7	44.5 - 43.5 (7)	TP26.472x25.17x0.518	987.47	1116.90	0.884	0.00	1116.90	0.000
L8	43.5 - 18 (8)	TP30.299x26.472x0.644	1497.49	1592.25	0.940	0.00	1592.25	0.000
L9	18 - 16.5 (9)	TP30.524x30.299x0.786	1528.92	1879.56	0.813	0.00	1879.56	0.000
L10	16.5 - 4 (10)	TP32.4x30.524x0.597	1801.09	1985.04	0.907	0.00	1985.04	0.000
L11	4 - 0 (11)	TP33x32.4x0.97	1892.14	2960.63	0.639	0.00	2960.63	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	140 - 90.25 (1)	TP20.27x12.81x0.188	11.12	409.42	0.027	0.05	659.16	0.000
L2	90.25 - 82.5 (2)	TP21.058x19.332x0.219	12.45	525.94	0.024	0.05	903.22	0.000
L3	82.5 - 78.5 (3)	TP21.659x21.058x0.447	12.97	654.18	0.020	0.05	1131.73	0.000
L4	78.5 - 66.5 (4)	TP23.459x21.659x0.566	14.65	897.72	0.016	0.05	1670.12	0.000
L5	66.5 - 65.5 (5)	TP23.609x23.459x0.709	14.80	1124.72	0.013	0.05	2080.35	0.000
L6	65.5 - 44.5 (6)	TP26.76x23.609x0.457	16.95	947.44	0.018	0.05	1986.48	0.000
L7	44.5 - 43.5 (7)	TP26.472x25.17x0.518	17.76	1088.76	0.016	0.05	2264.72	0.000
L8	43.5 - 18 (8)	TP30.299x26.472x0.644	20.85	1335.81	0.016	0.05	3228.58	0.000
L9	18 - 16.5 (9)	TP30.524x30.299x0.786	21.03	1579.72	0.013	0.05	3811.15	0.000
L10	16.5 - 4 (10)	TP32.4x30.524x0.597	22.50	1548.42	0.015	0.05	4025.04	0.000
L11	4 - 0 (11)	TP33x32.4x0.97	23.00	2318.92	0.010	0.05	6003.22	0.000

Pole Interaction Design Data

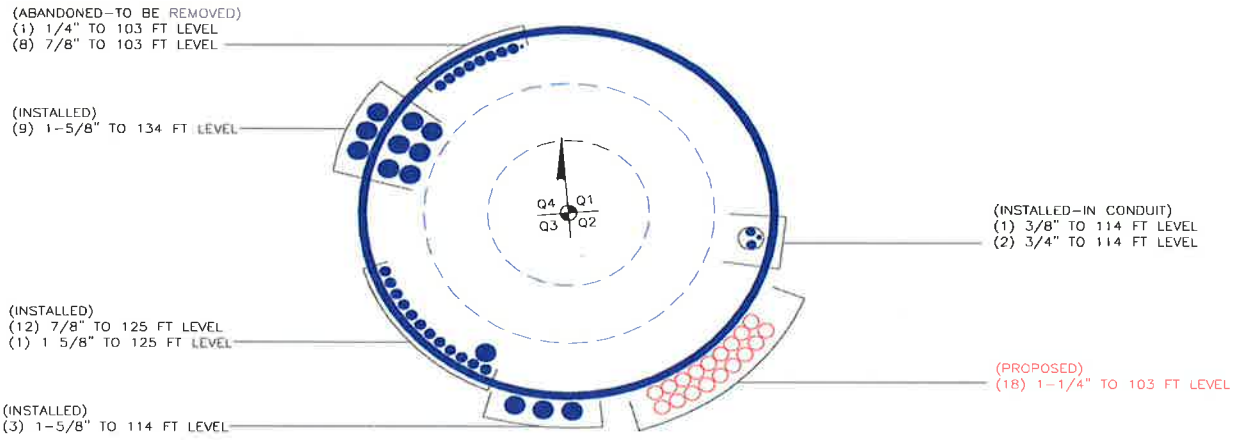
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 90.25 (1)	0.006	0.863	0.000	0.027	0.000	0.870 ✔	1.000	4.8.2 ✔
L2	90.25 - 82.5 (2)	0.006	0.934	0.000	0.024	0.000	0.941 ✔	1.000	4.8.2 ✔
L3	82.5 - 78.5 (3)	0.005	0.837	0.000	0.020	0.000	0.842 ✔	1.000	4.8.2 ✔
L4	78.5 - 66.5 (4)	0.005	0.768	0.000	0.016	0.000	0.774 ✔	1.000	4.8.2 ✔
L5	66.5 - 65.5 (5)	0.004	0.631	0.000	0.013	0.000	0.635 ✔	1.000	4.8.2 ✔
L6	65.5 - 44.5 (6)	0.006	0.928	0.000	0.018	0.000	0.935 ✔	1.000	4.8.2 ✔
L7	44.5 - 43.5 (7)	0.006	0.884	0.000	0.016	0.000	0.891 ✔	1.000	4.8.2 ✔
L8	43.5 - 18 (8)	0.008	0.940	0.000	0.016	0.000	0.949 ✔	1.000	4.8.2 ✔
L9	18 - 16.5 (9)	0.007	0.813	0.000	0.013	0.000	0.821 ✔	1.000	4.8.2 ✔
L10	16.5 - 4 (10)	0.008	0.907	0.000	0.015	0.000	0.916 ✔	1.000	4.8.2 ✔
L11	4 - 0 (11)	0.006	0.639	0.000	0.010	0.000	0.645 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	140 - 90.25	Pole	TP20.27x12.81x0.188	1	-4.56	818.85	87.0	Pass
L2	90.25 - 82.5	Pole	TP21.058x19.332x0.219	2	-5.85	1051.88	94.1	Pass
L3	82.5 - 78.5	Pole	TP21.659x21.058x0.447	3	-6.49	1308.37	84.2	Pass
L4	78.5 - 66.5	Pole	TP23.459x21.659x0.566	4	-8.87	1795.44	77.4	Pass
L5	66.5 - 65.5	Pole	TP23.609x23.459x0.709	5	-9.12	2249.43	63.5	Pass
L6	65.5 - 44.5	Pole	TP26.76x23.609x0.457	6	-12.27	1894.87	93.5	Pass
L7	44.5 - 43.5	Pole	TP26.472x25.17x0.518	7	-13.93	2157.66	89.1	Pass
L8	43.5 - 18	Pole	TP30.299x26.472x0.644	8	-21.33	2671.62	94.9	Pass
L9	18 - 16.5	Pole	TP30.524x30.299x0.786	9	-21.86	3159.43	82.1	Pass
L10	16.5 - 4	Pole	TP32.4x30.524x0.597	10	-25.57	3096.83	91.6	Pass
L11	4 - 0	Pole	TP33x32.4x0.97	11	-27.39	4637.83	64.5	Pass
							Summary	
						Pole (L8)	94.9	Pass
						RATING =	**94.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

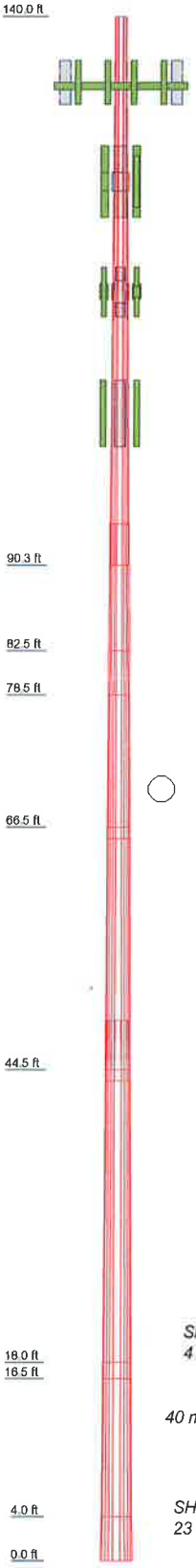

(ABANDONED-TO BE REMOVED)
(1) 1/4" TO 103 FT LEVEL
(8) 7/8" TO 103 FT LEVEL
(INSTALLED)
(9) 1-5/8" TO 134 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 114 FT LEVEL
(2) 3/4" TO 114 FT LEVEL
(INSTALLED)
(12) 7/8" TO 125 FT LEVEL
(1) 1 5/8" TO 125 FT LEVEL
(PROPOSED)
(18) 1-1/4" TO 103 FT LEVEL
(INSTALLED)
(3) 1-5/8" TO 114 FT LEVEL

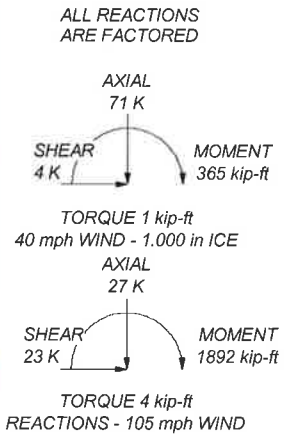
APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 7.0.5.1 - 2/1/2016 File:G:/TOWER/375_Crown_Castle/2016/37516-0873_842905_WESTWOOD LOWDER BROOK (/37516-0873.001.7700_SDD_1202751/37516-0873.001.7700_Reinforced.eri

Section	1	2	3	4	5	6	7	8	9	10	11
Length (ft)	49.75	11.50	4.00	12.00	1.00	21.00	5.50	25.50	1.50	12.50	4.00
Number of Sides	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.188	0.219	0.447	0.566	0.709	0.457	0.518	0.644	0.786	0.597	0.970
Socket Length (ft)	3.75					4.50					
Top Dia (in)	12.810	19.332	21.056	21.659	23.459	23.609	25.170	26.472	30.299	30.524	32.400
Bot Dia (in)	20.270	21.058	21.659	23.459	23.609	26.760	26.472	30.299	30.524	32.400	33.000
Grade	A572-65		Reinf 37.83 ksi	Reinf 37.95 ksi		Reinf 37.93 ksi	Reinf 44.29 ksi	Reinf 44.32 ksi	Reinf 38.30 ksi	Reinf 37.24 ksi	Reinf 44.64 ksi
Weight (K)	1.7	0.6	0.4	1.6	0.2	2.6	0.8	5.0	0.4	2.5	1.3





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) P90-14-XLH-RR w/ Mount Pipe	134	RRUS 11 B12	125
(2) P90-14-XLH-RR w/ Mount Pipe	134	Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	125
(2) P90-14-XLH-RR w/ Mount Pipe	134	RRUS 11 B12	125
T-Arm Mount [TA 702-3]	134	RRUS A2 MODULE	114
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125	RRUS-11 1900MHz	114
ATMAA1412D-1A20	125	800 10121 w/ Mount Pipe	114
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125	DC6-48-60-18-8F	114
ATMAA1412D-1A20	125	RRUS A2 MODULE	114
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125	RRUS-11 1900MHz	114
ATMAA1412D-1A20	125	800 10121 w/ Mount Pipe	114
Side Arm Mount [SO 102-3]	125	RRUS A2 MODULE	114
Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	125	RRUS-11 1900MHz	114
RRUS 11 B12	125	800 10121 w/ Mount Pipe	114
Ericsson Air 21 B4A B12P-B8P 6FT w/ Mount Pipe	125	Pipe Mount [PM 601-3]	114
		SBNHH-1D65B w/ Mount Pipe	103
		SBNHH-1D65B w/ Mount Pipe	103
		SBNHH-1D65B w/ Mount Pipe	103
		Pipe Mount [PM 601-3]	103

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 44.32 ksi	44 ksi	56 ksi
Reinf 37.83 ksi	38 ksi	48 ksi	Reinf 38.30 ksi	38 ksi	48 ksi
Reinf 37.95 ksi	38 ksi	48 ksi	Reinf 37.24 ksi	37 ksi	47 ksi
Reinf 37.93 ksi	38 ksi	48 ksi	Reinf 44.64 ksi	45 ksi	56 ksi
Reinf 44.29 ksi	44 ksi	56 ksi	Reinf 40.87 ksi	41 ksi	52 ksi

TOWER DESIGN NOTES

1. Tower is located in Norfolk County, Massachusetts.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 94.9%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: 140' Monopole / Westwood Lowder Brook			
Project: PJF 37515-3401.001.7805 / BU 842905			
Client: CCI	Drawn by: John J. Woolley	App'd:	
Code: TIA-222-G	Date: 03/08/16	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

v4.4 - Effective 7-12-13

Date: 3/4/2016
PJF Project: 37516-0873.001.7700
Client Ref. # 806902
Site Name:
Description:
Owner:
Engineer: JJW

Asymmetric Anchor Rod Analysis

Moment =	1892	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	28.0	kips	ASIF =	N/A	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	23.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	12							

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	40.67	0.00	3.98	167.25	162.59	171.09	0.00	260.00	65.8%
2	2.250	#18J A615 Gr 75	75	100	45.0	40.67	0.00	3.98	167.36	162.69	171.20	0.00	260.00	65.8%
3	2.250	#18J A615 Gr 75	75	100	90.0	40.67	0.00	3.98	158.73	154.06	162.56	0.00	260.00	62.5%
4	2.250	#18J A615 Gr 75	75	100	135.0	40.67	0.00	3.98	156.36	151.70	160.20	0.00	260.00	61.6%
5	2.250	#18J A615 Gr 75	75	100	180.0	40.67	0.00	3.98	153.84	149.17	157.67	0.00	260.00	60.6%
6	2.250	#18J A615 Gr 75	75	100	225.0	40.67	0.00	3.98	141.50	136.83	145.33	0.00	260.00	55.9%
7	2.250	#18J A615 Gr 75	75	100	270.0	40.67	0.00	3.98	134.91	130.24	138.75	0.00	260.00	53.4%
8	2.250	#18J A615 Gr 75	75	100	315.0	40.67	0.00	3.98	150.19	145.52	154.02	0.00	260.00	59.2%
9	2.250	A193 Gr B7	105	125	101.0	53.50	0.00	3.98	202.72	198.06	206.55	0.00	325.00	63.6%
10	2.250	A193 Gr B7	105	125	202.0	53.50	0.00	3.98	197.82	193.16	201.65	0.00	325.00	62.0%
11	2.250	A193 Gr B7	105	125	259.0	53.50	0.00	3.98	180.14	175.48	183.97	0.00	325.00	56.6%
12	2.250	A193 Gr B7	105	125	338.0	53.50	0.00	3.98	209.15	204.49	212.99	0.00	325.00	65.5%
								47.74						

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	40.67	in

Plate Data		
Diam:	46.67	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	13.26	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:	33	in
Thick:	0.21875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	1118.6	ft-kips
Axial, Pu:	18.7	kips
Shear, Vu:	15.3	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Reactions adjusted to account for additional anchors

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

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	171.2 Kips	Rigid
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	AISC LRFD
Anchor Rod Stress Ratio:	65.8% **Pass**	φ*Tn

Base Plate Results Flexural Check

Base Plate Stress:	29.8 ksi	Rigid
Allowable Plate Stress:	54.0 ksi	AISC LRFD
Base Plate Stress Ratio:	55.2% **Pass**	φ*Fy
		Y.L. Length: 23.77

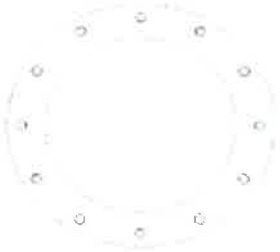
n/a

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

PJF job no. **37515-3401.001.7805** Project name **0**

foundation loads

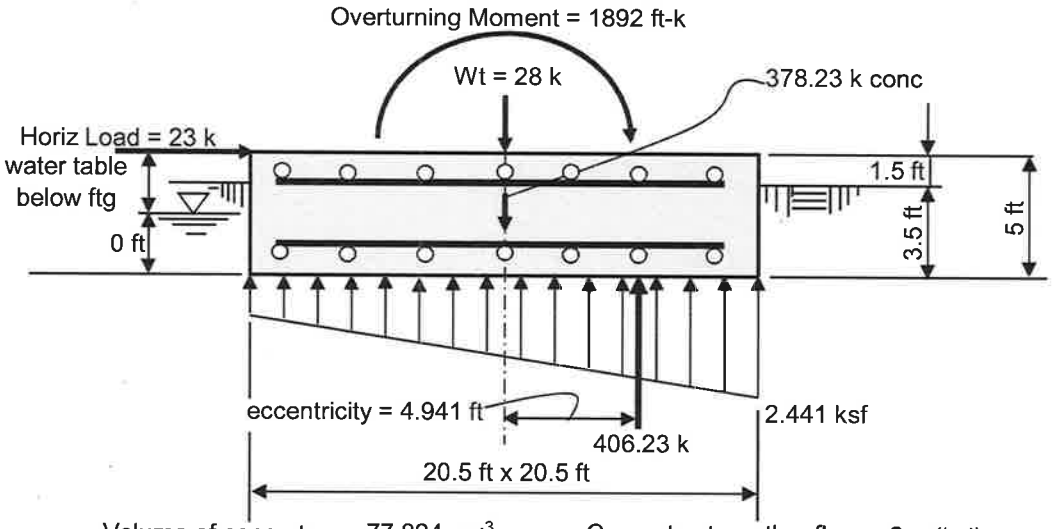
Limit states Tower or Pole Weight =	**28**	kips
limit states total horizontal force =	**23**	kips
limit states overturning moment =	**1892**	ft-kips

soil properties

Safety factor against overturning =	**1**	
Soil Density =	**120**	pcf
Ultimate soil bearing =	**4**	ksf
Depth to water table =	**99**	ft

mat dimensions

depth to bottom of footing =	**3.5**	ft
Footing thickness =	**5**	ft
Footing Width =	**20.5**	ft
Footing Length =	**20.5**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 77.824 yd^3 Concrete strength = f'_c = **3** (ksi)

Rebar = (64) #10 bars by 20 ft long

reinforcing steel = **(16) #10 @ 16 in o.c. ea way top and bottom**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.643)

Calculated Ultimate Overturning Moment = 2007 ft-kips

Resisting Moment = 3122.9 ft-kips

Factor of Safety against overturning = 1.556 **> 1 okay**

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

Soil Bearing (Stress Ratio = 0.814) **< CONTROLLING CRITERIA**

Limit States Maximum Net Soil Bearing = 3 ksf

Calculated limit states Soil Bearing Pressure = 2.441 **ksf < 3 ksf okay**

Bending Moment (Stress Ratio = 0.156)

Ultimate Bending Moment Resistance = 4949 ft-kips

Calculated Ultimate Bending Moment = 774 **ft-kips < 4949 ft-kips okay**

Bending Shear (Stress Ratio = 0.122)

Ultimate Bending Shear Resistance = 1262 kips

Calculated Ultimate Bending Shear = 154 **kips < 1262 kips okay**

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)

100 LOWDER BROOK DRIVE
WESTWOOD, MASSACHUSETTS 02090
NORFOLK COUNTY
LAT: 42° 14' 25.6"; LONG: -71° 12' 17.2"
APP: 216288 REV. 11; WO: 1202751

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: MICHAEL RULEY AT MICHAEL.RULEY@CROWNCASTLE.COM
PH: (508) 789-7023

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2009 IBC
NOMINAL WIND SPEED (3-SECOND GUST)	105 MPH
ICE THICKNESS	1.0 IN
ICE WIND SPEED	40 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	B
Kzt	1.0

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
REMOVE EXISTING STIFFENERS
FIELD WELDED ANCHOR BRACKETS
POST INSTALLED ANCHOR RODS
PAINT REINFORCING TO MATCH POLE
REMOVE BARK/CLADDING FOR INSTALLATION OF REINFORCING

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	BASE PLATE DETAILS
S-5	MISC DETAILS
S-6	MI CHECKLIST

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1157502

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37510-0873.001.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY	
DATE	3-4-2016

TITLE SHEET

T-1

37510-0873.001.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV_3, 02/05/2015)

1. **GENERAL NOTES**
   - 1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
   - 1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK.
   - 1.3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
   - 1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
   - 1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.
   - 1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
   - 1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
   - 1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
   - 1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
   - 1.10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.
   - 1.11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.
   - 1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.
   - 1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.
   - 1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
     3434 ENCRETE LANE, MORAINE, OHIO 45439
     PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. **STRUCTURAL STEEL**
   - 2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
     - 2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
       - 2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
       - 2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
       - 2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
     - 2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
       - 2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
       - 2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"
   - 2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.
   - 2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
   - 2.4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   - 2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
   - 2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
   - 2.9. FIELD CUTTING OF STEEL:
     - 2.9.1. IMPORTANT CUTTING AND WELDING SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY CUTTING AND WELDING SAFETY PLAN (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
     - 2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. **BASE PLATE GROUT - (NOT REQUIRED)**

4. **FOUNDATION WORK - (NOT REQUIRED)**

5. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

6. **EPOXY GROUTED REINFORCING ANCHOR RODS**
   - 6.1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BARS CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BARS ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.
   - 6.2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A123.
   - 6.3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS. PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY, CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
   - 6.4. HILTI HIT RE-500 SD OR ITW RED HEAD EPCON G5 EPOXY SHALL BE USED TO ANCHOR THE BAR IN THE DRILL HOLES. IF THE DESIGNED EMBEDMENT IS GREATER THAN 12 FT, CONTRACTOR HAS THE OPTION TO USE PILE ANCHOR GROUT BY E-CHEM AS AN ALTERNATE. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO CONSTRUCTION.
   - 6.5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHORS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING SHEETS FOR SPECIFIED ANCHOR ROD TARGET TENSION LOAD.
   - 6.6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED THE CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

7. **TOUCH UP OF GALVANIZING**
   - 7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
   - 7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1.
   - 7.3. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
   - 7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. **HOT-DIP GALVANIZING**
   - 8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
   - 8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.
   - 8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
   - 9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
   - 9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
   - 9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT, ACCORDING TO ANSI/TIA-222-G-2-2009 SECTION 14.2. "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

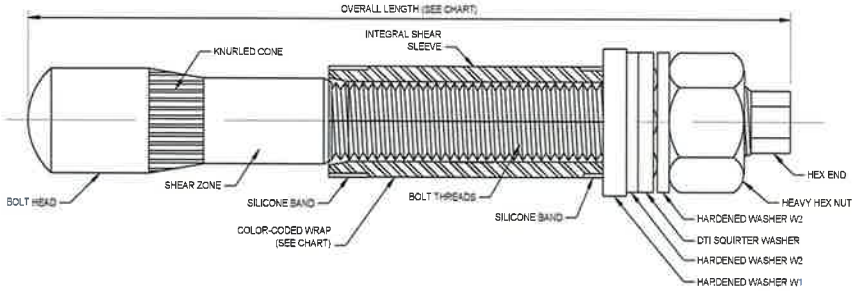
PROJECT No	37516-0873.001.7700
DRAWN BY	S.M.S.
DESIGNED BY	J.J.W.
CHECKED BY	
DATE	2-4-2015

GENERAL NOTES

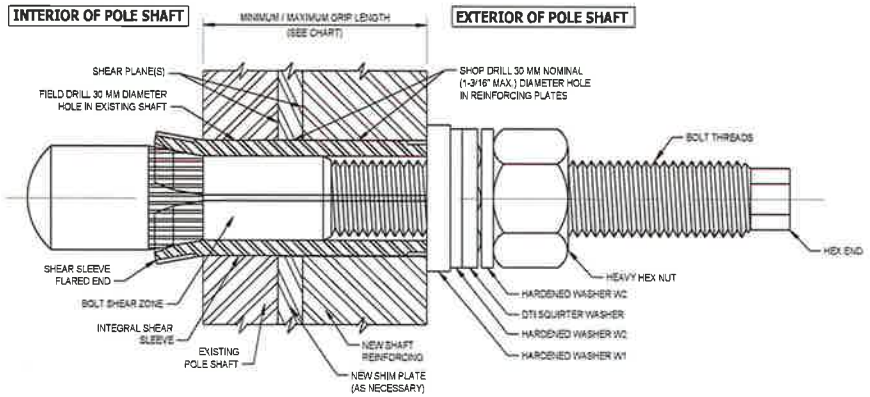
S-1

37516-0873.001.DWG

FORGBolt™ NOTE SHEET: A325/PC8.8 PORTRAIT VERSION DATE 04/24/2015



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1 S-2A



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 S-2A

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	135	5.31	1.3	3/8" to 1"	--	RED
2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

INSTALLATION NOTES:
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

BOLT HOLE NOTES:
1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8
(Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: 888-926-4857
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	S.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY:	
DATE:	3-4-2016

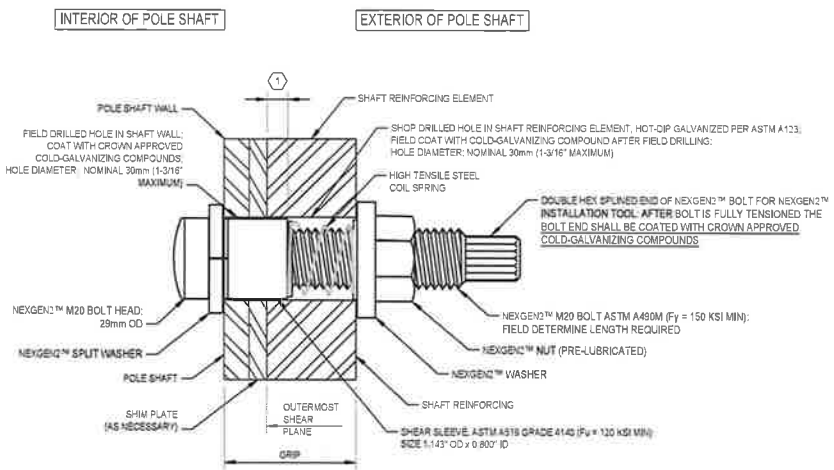
FORGBolt™ DETAILS

S-2A

37516.0873.001.0XG

NEXGEN2™ BOLT NOTE SHEET: REV. 1.01, 04-15-2015

① **NOTE: SHEAR SLEEVE LENGTH:** THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL ① S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
M20x36	M20x95	11/16"	15/16"	1 7/16"
M20x48	M20x95	1 3/16"	1 7/16"	1 7/8"
M20x57	M20x95	1 5/8"	1 7/8"	2 1/4"
M20x68	M20x135	2"	2 1/4"	2 11/16"
M20x96	M20x135	2 7/16"	2 11/16"	3 3/4"
M20x127	M20x165	3"	3 3/4"	5"
M20x212	M20x250	4"	5"	8 5/16"

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 400 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

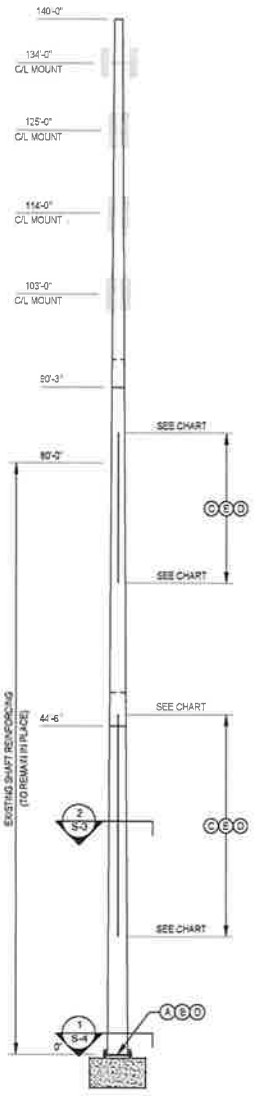
MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	B.M.E.
DESIGNED BY:	J.J.W.
CHECKED BY:	
DATE:	3-4-2016

NEXGEN2™ BOLT DETAIL

S-2B

37516-0873.001.DWG



POLE ELEVATION 1 S-3

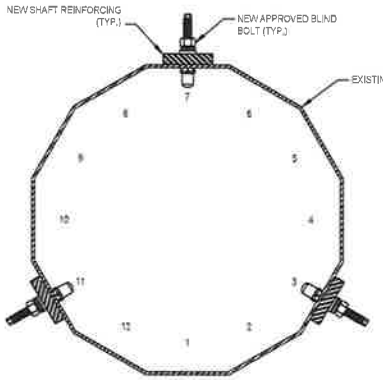
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE										
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
15'-0"	45'-0"	F1, F7 & F11	CCI-SFP-045100030	30'-0"	3	28	84	6	6	20"	1078 LBS
64'-0"	84'-0"	F1, F7 & F11	CCI-SFP-045100020	20'-0"	3	20	66	6	6	20"	519 LBS
							150				2297 LBS

NOTES:

1. ALL STEEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC BRAND ZINC RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC MANUFACTURER'S RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
2. ALL REINFORCING SHALL BE ASTM A572 GR 65
3. WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS
4. HOLES FOR BOLTS ARE 35mm UNLESS NOTED OTHERWISE
5. ALL SHIMS SHALL BE ASTM A36
6. ALL HOLES ARE TO BE DRILLED, DO NOT BURN OR PUNCH.
7. SHAFT REINFORCING PLATES NEAR THE BASE OF THE POLE OR ADJACENT TO WELDED STIFFENERS SHALL BE INSTALLED WITHIN ± 1" TOLERANCE OF THE BOTTOM ELEVATION SHOWN IN THE CHART ABOVE. ALL OTHER SHAFT REINFORCING PLATES SHALL BE INSTALLED WITHIN ± 3" TOLERANCE OF THE TOP AND BOTTOM ELEVATIONS IN THE CHART ABOVE

NEW SHIM CHART				
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
42	0	4-1/2"	4-1/2"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



CONTRACTOR NOTE: THERE IS NOT A SAFETY CLIMB SYSTEM ATTACHED TO POLE. POLE IS MAN-LIFT ONLY

SECTION 2 S-3

SHAFT SECTION DATA							
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	49.75	0.1875	45.00	12.810	20.370	65	12-SIDED
2	49.50	0.2188	54.00	19.333	26.760	65	12-SIDED
3	49.00	0.2813		25.647	33.000	65	12-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

MODIFICATIONS:

- (A) REMOVE EXISTING STIFFENERS AT BASE PLATE. SEE SHEET S-4.
- (B) INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-4.
- (C) INSTALL NEW SHAFT REINFORCING. SEE CHART ON THIS SHEET.
- (D) PAINT MODIFICATIONS TO MATCH EXISTING POLE.
- (E) REMOVE EXSITING BARK CLADDING TO BARE STEEL FOR INSTALLATION OF NEW REINFORCING.

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 400 Columbus, OH 43215
Phone 614.221.6679 www.paulford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	S.M.D.
DESIGNED BY:	J.J.W.
CHECKED BY:	
DATE:	3-4-2016

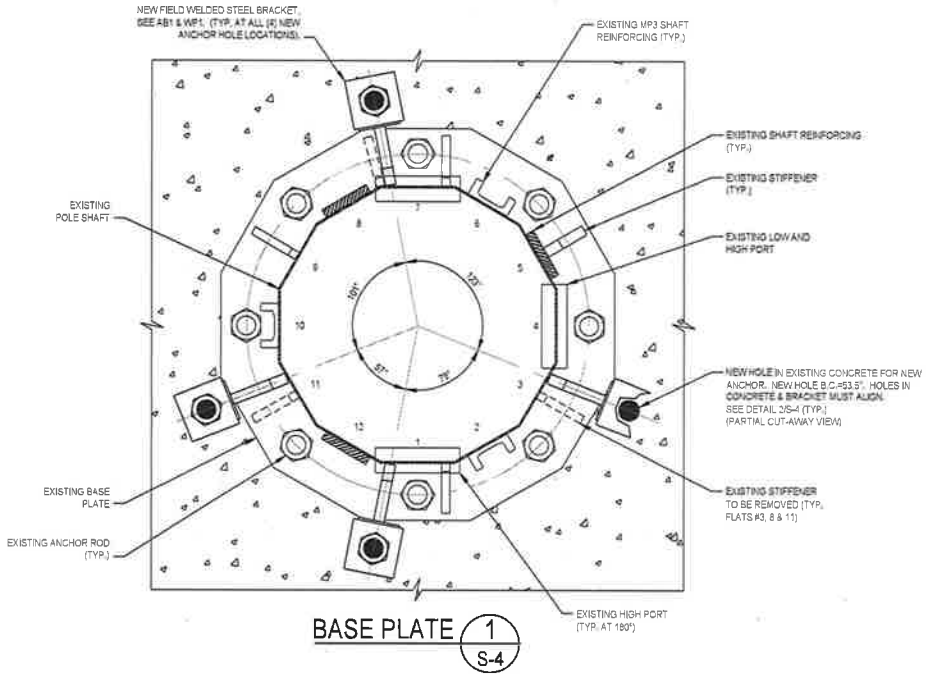
MONOPOLE PROFILE

S-3

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712, 7,849,658, 8,424,269 AND PATENT PENDING

37516-0873.001.DWG

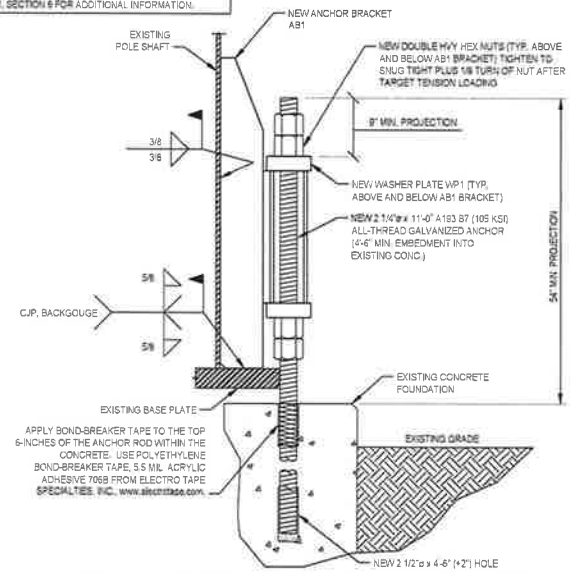
BASE SPECIFICATIONS	
BASE PLATE	46.67" 12-SIDED, 2" THK, Fy=50 KSI
ANCHOR RODS	(8) 2 1/4"ø; A615 GRADE 75; 40.67" B.C.



BASE PLATE 1 S-4

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE TESTED TO A TARGET TENSION LOAD OF 100 KIPS. ONCE THE TENSION LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-1, SECTION 6 FOR ADDITIONAL INFORMATION.

NEW ANCHOR RODS				
PART #	DIAMETER (IN)	LENGTH (IN)	MATERIAL	EMBEDMENT DEPTH (IN)
CUSTOM	2 1/4	111	A193 GR B7	54



NEW ANCHOR & BRACKET DETAIL 2 S-4

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY:	
DATE:	3-4-2016

BASE PLATE DETAILS

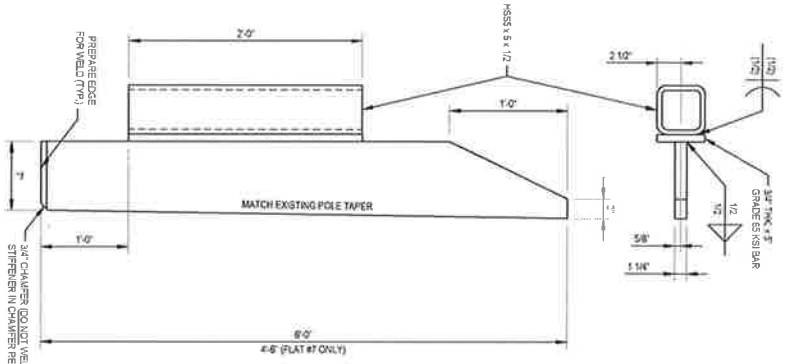
S-4

37516-0873.001.DWG

37516-0873.001.DWG

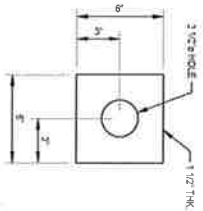
ANCHOR BRACKET MK~AB1

(4 REQUIRED) (TUBE F_y = 46 KSI) (STIFFENER F_y = 65 KSI)



WASHER PLATE MK~WP1

(5 REQUIRED) (F_y = 50 KSI)



MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

PROJECT No.	37516-0873.001 TTRD
DRAWN BY	B.M.S.
DESIGNED BY	J.A.W.
CHECKED BY	
DATE	3/4/2016

MISC DETAILS

S-5

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   1.1. THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE EOR.
   1.2. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.
   1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM
      2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
      2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
      2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN CASTLE.

3. **GENERAL CONTRACTOR**
   3.1. THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:
      3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
      3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
      3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS
      3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT.
      4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
      4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
      4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
      4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
      4.1.5. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

6. **CORRECTION OF FAILING MI'S**
   6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
      6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI
      6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   7.3. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

8. **PHOTOGRAPHS**
   8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
      8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
      8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
      8.1.3. RAW MATERIALS
      8.1.4. PHOTOS OF ALL CRITICAL DETAILS
      8.1.5. FOUNDATION MODIFICATIONS
      8.1.6. WELD PREPARATION
      8.1.7. BOLT INSTALLATION AND TORQUE
      8.1.8. FINAL INSTALLED CONDITION
      8.1.9. SURFACE COATING REPAIR
      8.1.10. POST CONSTRUCTION PHOTOGRAPHS
      8.1.11. FINAL INFIELD CONDITION
      8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
      8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
      9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
      9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   9.6. GENERAL
      9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   9.7. FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)
   9.8. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   9.9. STRUCTURAL STEEL
      9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
      9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
      9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      9.9.4. INSPECT ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
      9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      9.9.8. CHECK, THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
      9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   9.10. WELDING:
      9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
      9.10.3. APPROVE FIELD WELDING SEQUENCE.
      9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
      9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
         9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
         9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
         9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
         9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
         9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
         9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
         9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   9.11. REPORTS:
      9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
      9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
      9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
      9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: 'X' DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600- Columbus, OH 43215
Phone 614.221.6679
www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (714) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY:	
DATE:	3-8-2016

MI CHECKLIST

S-6

37516-0873.001.DWG

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)

100 LOWDER BROOK DRIVE
WESTWOOD, MASSACHUSETTS 02090
NORFOLK COUNTY
LAT: 42° 14' 25.6"; LONG: -71° 12' 17.2"
APP: 216288 REV. 11; WO: 1202751

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: MICHAEL RULEY AT MICHAEL.RULEY@CROWNCASTLE.COM
PH: (508) 789-7023

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2009 IBC
NOMINAL WIND SPEED (3-SECOND GUST)	105 MPH
ICE THICKNESS	1.0 IN
ICE WIND SPEED	40 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	B
Kzt	1.0

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
REMOVE EXISTING STIFFENERS
FIELD WELDED ANCHOR BRACKETS
POST INSTALLED ANCHOR RODS
PAINT REINFORCING TO MATCH POLE
REMOVE BARK/CLADDING FOR INSTALLATION OF REINFORCING

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	BASE PLATE DETAILS
S-5	MISC DETAILS
S-6	MI CHECKLIST

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1157502

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED
PROFESSIONAL ENGINEER
3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416 2000

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY	BMS
DESIGNED BY	JJW
CHECKED BY	[illegible]
DATE	3-4-2016

TITLE SHEET

T-1

37516-0873.001.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. **GENERAL NOTES**

1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.

1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK.

1.3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.

1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.

1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.

1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

1.10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.

1.11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.

1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.

1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.

1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
3434 ENCRETE LANE, MORAINE, OHIO 45439
PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. **STRUCTURAL STEEL**

2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
- 2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
  - 2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
  - 2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
  - 2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
- 2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
  - 2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
  - 2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"

2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS", DEC. 31, 2009.

2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.

2.4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION 7 NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.

2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.

2.9. FIELD CUTTING OF STEEL:
- 2.9.1. **IMPORTANT CUTTING AND WELDING SAFETY GUIDELINES:** THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. **PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12/07/2006 CROWN CASTLE DIRECTIVE "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10011) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES AND/OR OTHER** EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- 2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. **BASE PLATE GROUT - (NOT REQUIRED)**

4. **FOUNDATION WORK - (NOT REQUIRED)**

5. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

6. **EPOXY GROUTED REINFORCING ANCHOR RODS**

6.1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BARS CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BARS ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.

6.2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A123.

6.3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.

6.4. HILTI HIT RE-500 SD OR ITW RED HEAD EPCON G5 EPOXY SHALL BE USED TO ANCHOR THE BAR IN THE DRILL HOLES. IF THE DESIGNED EMBEDMENT IS GREATER THAN 12 FT, CONTRACTOR HAS THE OPTION TO USE PILE ANCHOR GROUT BY E-CHEM AS AN ALTERNATE. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO CONSTRUCTION.

6.5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHORS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING SHEETS FOR SPECIFIED ANCHOR ROD TARGET TENSION LOAD.

6.6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED THE CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/3 TURN OF NUT.

7. **TOUCH UP OF GALVANIZING**

7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED **DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC MANUFACTURER RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**

7.2. **CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1.** CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.

7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. **HOT-DIP GALVANIZING**

8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.

8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.

8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.

9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED **CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**

9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF **THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO ANSI/TIA-222-G-2-2009 SECTION 14.2, "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE** WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED PROFESSIONAL ENGINEER

3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

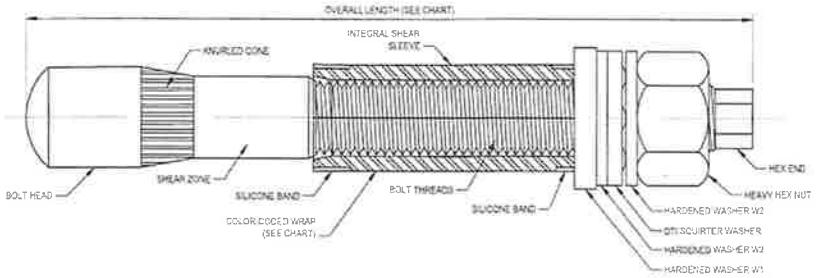
MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0673.001.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY:	BKA
DATE:	3-4-2016

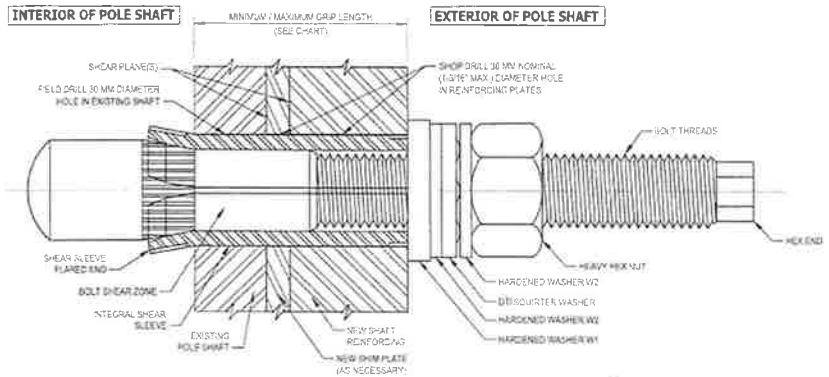
GENERAL NOTES

S-1

FORGBolt™ NOTE SHEET: A325/PC8.8 PORTRAIT VERSION DATE 04/24/2015



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1 / S-2A



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 / S-2A

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)					
GROUP A		FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8	1	135	5.31	1.3	3/8" to 1"	--	RED
	2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
	3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
	4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
	5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
	6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note		Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

INSTALLATION NOTES:
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

BOLT HOLE NOTES:
1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8
(Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: 888-926-4857
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED
PROFESSIONAL ENGINEER
3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St, Sto 600, Columbus, OH 43215
Phone 614.221.6679 www.paulfford.com

CROWN CASTLE
3353 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (704) 405-6500

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37510-0673.001.7720
DRAWN BY:	B.M.S.
DESIGNED BY:	J.J.N.
CHECKED BY:	R.W.H.
DATE:	3-4-2016

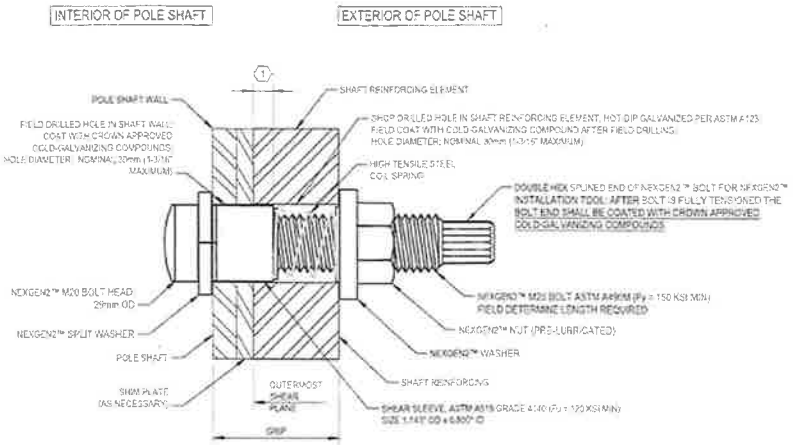
FORGBolt™ DETAILS

S-2A

37510-0673.001.CWD

NEXGEN2™ BOLT NOTE SHEET - REV. 1.01, 04-15-2015

① NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL ① S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
M20x36	M20x95	11/16"	15/16"	1 7/16"
M20x48	M20x95	1 3/16"	1 7/16"	1 7/8"
M20x57	M20x95	1 5/8"	1 7/8"	2 1/4"
M20x68	M20x135	2"	2 1/4"	2 11/16"
M20x86	M20x135	2 7/16"	2 11/16"	3 3/4"
M20x127	M20x165	3"	3 3/4"	5"
M20x212	M20x250	4"	5"	8 5/16"

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED
PROFESSIONAL ENGINEER

3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St - Ste 670 - Columbus, OH 43215
Phone 614.221.6679
www.paulford.com

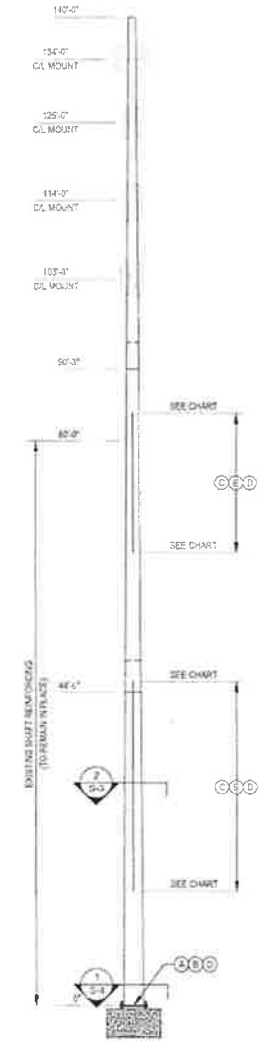
CROWN CASTLE
3530 TORINGDON WAY - SUITE 300, CHARLOTTE, NC 28277
PH: (704) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE
BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.1710
DRAWN BY:	B.M.S.
DESIGNED BY:	R.J.M.
CHECKED BY:	BWH
DATE:	3-4-2016

NEXGEN2™ BOLT DETAIL

S-2B



POLE ELEVATION 1 / S-3

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
18'-0"	45'-0"	F3, F7 & F11	CCI-SFP-045100-30	30'-0"	3	28	84	6	6	20"	1378 LBS
64'-0"	84'-0"	F3, F7 & F11	CCI-SFP-045100-20	20'-0"	3	22	66	6	6	20"	919 LBS
							150				2297 LBS

NOTES:

1.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC MANUFACTURER'S RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-0275 FOR PRODUCT INFORMATION.

2.) ALL REINFORCING SHALL BE ASTM A572 GR 65

3.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.

4.) HOLES FOR BOLTS ARE 36mm UNLESS NOTED OTHERWISE.

5.) ALL SHIMS SHALL BE ASTM A36.

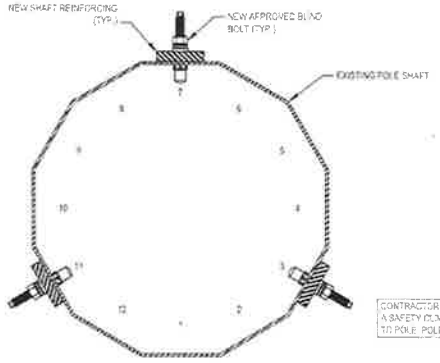
6.) ALL HOLES ARE TO BE DRILLED, DO NOT BURN OR PUNCH.

7.) SHAFT REINFORCING PLATES NEAR THE BASE OF THE POLE OR ADJACENT TO WELDED STIFFENERS SHALL BE INSTALLED WITHIN ± 1" TOLERANCE OF THE BOTTOM ELEVATION SHOWN IN THE CHART ABOVE. ALL OTHER SHAFT REINFORCING PLATES SHALL BE INSTALLED WITHIN ± 3" TOLERANCE OF THE TOP AND BOTTOM ELEVATIONS IN THE CHART ABOVE.

NEW SHIM CHART

1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
42	0	4-1/2"	4-1/2"	1-1/8"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



SECTION 2 / S-3

CONTRACTOR NOTE: THERE IS NOT A SAFETY CLIMB SYSTEM ATTACHED TO POLE. POLE IS MAN-LIFT ONLY.

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (KSI)	POLE SHAPE
1	46.75	0.1875	45.00	12.810	20.270	65	12-SIDED
2	49.50	0.2165	54.00	19.333	26.760	65	12-SIDED
3	46.00	0.2813		25.647	33.000	65	12-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES.

ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONDITIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

MODIFICATIONS

(A) REMOVE EXISTING STIFFENERS AT BASE PLATE. SEE SHEET S-4

(B) INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-4

(C) INSTALL NEW SHAFT REINFORCING. SEE CHART ON THIS SHEET.

(D) PAINT MODIFICATIONS TO MATCH EXISTING POLE.

(E) REMOVE EXISTING BARK CLADDING TO BARE STEEL FOR INSTALLATION OF NEW REINFORCING.

PJF PAUL J. FORD & COMPANY
250 E Broad St Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.paulford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (704) 405-2093

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37510-0872.001.7700
DRAWN BY:	R.M.S.
DESIGNED BY:	J.J.W.
CHECKED BY:	B.W.C.
DATE:	3-4-2016

MONOPOLE PROFILE

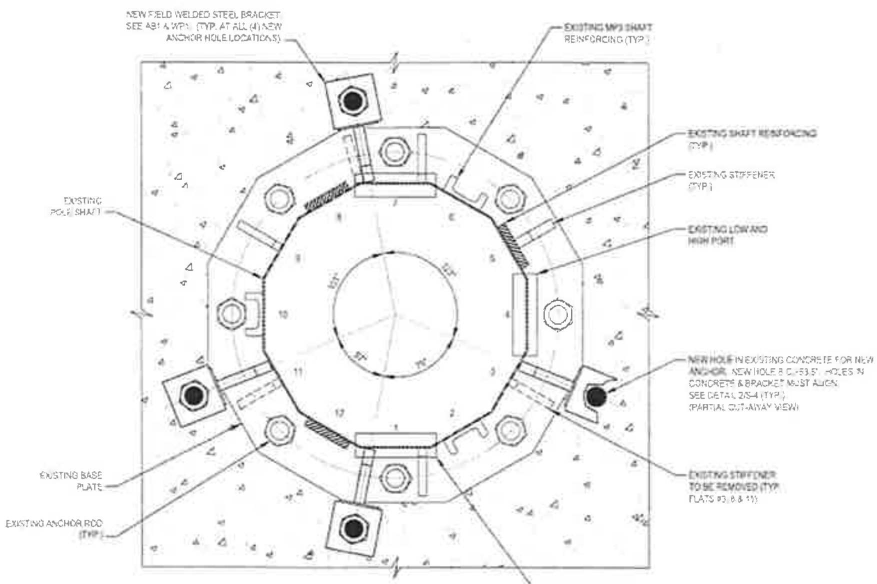
S-3

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED
PROFESSIONAL ENGINEER

3/10/16

CROWN CASTLE US PATENT NOS 8,046,972, 8,196,712, 7,849,658, 8,424,269 AND PATENT PENDING

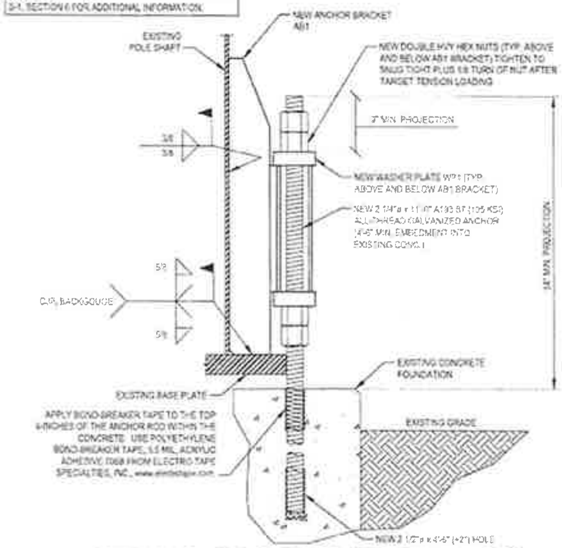
BASE SPECIFICATIONS	
BASE PLATE	46.67" 12-SIDED; 2" THK.; Fy=60 KSI
ANCHOR RODS	(8) 2 1/4"ø A615 GRADE 75; 46.67" B.C.



BASE PLATE 1/S-4

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE TESTED TO A TARGET TENSION LOAD OF 180 KIPS. ONCE THE TENSION LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-1, SECTION 6 FOR ADDITIONAL INFORMATION.

NEW ANCHOR RODS				
PART #	DIAMETER (IN)	LENGTH (IN)	MATERIAL	EMBEDMENT DEPTH (IN)
CUSTOM	2 1/4	111	A193 GR B7	54



NEW ANCHOR & BRACKET DETAIL 2/S-4

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED PROFESSIONAL ENGINEER
3/10/16

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

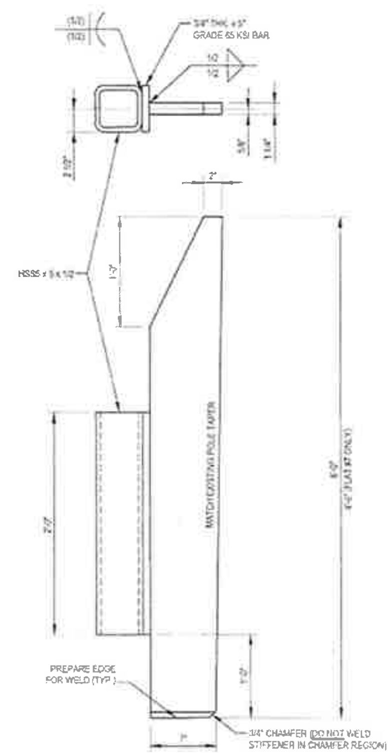
MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No.	37515-0873.001.7700
DRAWN BY:	KMS
DESIGNED BY:	JJW
CHECKED BY:	BKK
DATE:	3-4-2016

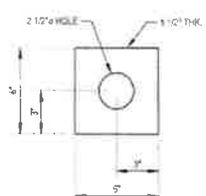
BASE PLATE DETAILS

S-4



ANCHOR BRACKET MK~AB1

(4 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



WASHER PLATE MK~WP1

(8 REQUIRED) (Fy = 50 KSI)

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED PROFESSIONAL ENGINEER

3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0873.001.7700
DRAWN BY:	B.M.S
DESIGNED BY:	J.J.W
CHECKED BY:	BRK
DATE:	3-4-2016

MISC DETAILS

S-5

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE EOR.
   - 1.2. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
     - 4.1.5. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

6. **CORRECTION OF FAILING MI'S**
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

8. **PHOTOGRAPHS**
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. GENERAL
     - 9.6.1. PERFORM PERIODIC ON SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)
   - 9.8. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   - 9.9. STRUCTURAL STEEL
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.
     - 9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. WELDING
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 9.11. REPORTS
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

COMMONWEALTH OF MASSACHUSETTS
RICHARD W. HOFFMAN
STRUCTURAL
No. 42531
REGISTERED PROFESSIONAL ENGINEER

3/10/16

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140' MONOPOLE

BU #842905; WESTWOOD LOWDER BROOK (MA0057)
WESTWOOD, MASSACHUSETTS

PROJECT No:	37516-0971.001.7700
DRAWN BY:	BMS
DESIGNED BY:	JJW
CHECKED BY:	BKK
DATE:	3-4-2016

MI CHECKLIST

S-6

31

807537

Norfolk County Registry District
RECEIVED FOR REGISTRATION

OCT 15 1998

10 O'CLOCK 48 m A M

NOTED ON CERTIFICATE NO. 15-0050

IN REGISTRATION BOOK 751 PAGE 50

TOWN OF WESTWOOD

COMMONWEALTH OF MASSACHUSETTS

BOARD OF APPEALS

NOTICE OF DECISION

In compliance with Chapter 40A of the General Laws of the Commonwealth of Massachusetts you are hereby notified that the Board of Appeals has unanimously voted to grant the Petitioners, Wireless PSC Inc., d/b/a AT&T Wiirless, their request for a special permit under Section 10A(b)(1) and 10A(b)(5)(ii) of the Westwood Zoning Bylaw to erect a telecommunications facility with antennas, an equipment shelter and fencing.. Said Special Permit is granted subject to certain conditions as set forth in the written decision. Land affected: 120 High Street/100 Lowderbrook Road, Westwood, Massachusetts

Appeals, if any, shall be filed within twenty days after the date of this notice, in the office of the Town Clerk.

Alan A. Ward
Clerk
Westwood Board of Appeals

DATED

DECISION OF THE BOARD OF APPEALS
OF THE
TOWN OF WESTWOOD

PETITIONER: AT&T Wireless Services
400 Blue Hill Drive

LAND AFFECTED: 120 High Street
Westwood, MA

HEARING: The Board of Appeals for the Town of Westwood held a Public Hearing according to the General Laws of the Commonwealth of Massachusetts on Thursday, August 14, 1997 and continued this hearing until February 19, 1998 at 7:30 P.M. in the Westwood Town Hall, Selectmen's Room to consider the petition for a special permit pursuant to the provisions of Section 10A(b)(10, section 10A(b)(5)(ii), Section 17, Section 18(e) of the Westwood Zoning Bylaw and M.G.L. Ch. 40A Section 9 to erect a monopole with antennas, an equipment shelter and fencing. Land affected: 120 High Street/100 Lowderbrook Road, Westwood, Massachusetts

BOARD MEMBERS: Ronald T. Peterson, Chairman
John J. Clancy
Richard A. Russo

APPLICABLE SECTION OF THE WESTWOOD ZONING BYLAW

SECTION 10A. ADMINISTRATIVE-RESEARCH-OFFICE DISTRICTS

(b) Uses by Special Permit Only.

The following uses may be authorized by special permit from the Zoning Board of Appeals upon the Board's determination that doing so is consistent with the purpose of the Zoning Bylaw [Section 1], the district intent [Section 3(b)], any applicable specific provisions of the Bylaw, such as the performance standards of Section 16A(d), and generally applicable requirements for special permits [Section 22(c)].

(1) Any public utility use, or any use operated by the Town or other governmental agency not specifically set forth hereinbefore.

(5) The uses enumerated below as accessory uses incidental to and in support of any of the principal uses permitted under Section 10A(a) or permissible under this Section 10A(b), namely:

(ii) Operations or building services required to maintain any such principal uses.

SECTION 17. ACCESSORY USES

(a) Accessory Uses in All Districts.

The following are allowed as Accessory uses in all districts.

(1) Any use allowed in that district as a Principal Use or, on special permit, any use permissible in that district on special permit as a Principal Use, subject to the same conditions as a principal use.

(2) Uses, whether or not on the same parcel as activities permitted as a matter of right, accessory to activities permitted by right, which are necessary in connection with scientific research or scientific development or related production, may be permitted in all districts by special permit of the Permit Granting Authority provided said Authority finds that the proposed Accessory Use does not substantially derogate from the public good.

(b) Accessory Uses in Residential Districts.

In all Residential Districts, the following uses are hereby specifically declared to be accessory uses, permitted by special permit if so indicated and otherwise by right, subject to the conditions herein specified:

(1) Private garage for not more than three (3) motor vehicles (including not more than one commercial vehicle) except in the case of a use operated by the Town or other governmental agency.

(2) Private greenhouse, stable, tool shed, playhouse, tennis court, swimming pool, or other similar building or structure for domestic use. Every swimming pool shall be enclosed by an approved fence four (4) feet in height and firmly secured at ground level, such enclosure, including gates therein, shall not be less than four (4) feet above the ground, and any gate shall be self-latching with latches placed three (3) feet above the ground or otherwise made inaccessible from the outside to children up to eight (8) years of age. Fences are not required for pools less than twenty-four (24) inches deep. This shall not apply to any such pool having a surface area less than two hundred and fifty (250) square feet except when such pool is permanently equipped with a water recirculating system or involves structural materials. Pools four (4) feet above ground must only have removable ladders.

(3) The raising or keeping of animals, livestock or poultry as pets or for use by residents of the premises.

(4) The renting of rooms by a resident owner, or the furnishing of table board in a dwelling by a resident owner, to not more than three (3) persons other than members of the family.

(5) The use of a portion of a dwelling or of a building or structure accessory thereto by a resident of the premises as an office, studio or workroom for the conduct of a profession or customary home occupation, subject to the conditions that (i) not more than two persons other than residents of the premises are regularly employed thereon in connection with such use, (ii) no stock in trade is regularly maintained except for products of the occupation itself, or for goods or materials customarily used incidental to its performance, (iii) such use does not produce noise or other effects observable at the lot lines in amounts exceeding those normal to residential property, (iv) no external change is made which alters the residential appearance of the buildings or structures on the premises, and (v) there is no exterior display or other outward evidence that the premises are being used for any purpose other than residential (except for an accessory sign as hereinafter permitted). In particular, uses permitted hereunder may include, but are not limited to, the office of a physician, dentist, lawyer, architect, engineer, real estate agent or insurance agent, the studio of an artist, musician or teacher, or the workroom of a dressmaker, milliner, photographer.

SECTION 18. NON-CONFORMING AND TEMPORARY USES

(e) Temporary Uses.

In any district, the Permit Granting Authority may authorize by special permit a temporary building, structure or use not in conformity with the provisions of this Bylaw provided that such use will not be detrimental or injurious to persons, property or improvements in the vicinity and the Town. Such authorization shall not be for more than one year at a time nor be extended over more than a total of three years (whether or not consecutive).

STATEMENT OF FACTS

The Petitioner, Wireless PSC Inc., d/b/a AT&T Wireless is requesting a special permit pursuant to the provisions of Section 10A(b)(1), Section 10A(b)(5)(ii), Section 17, Section 18(e) of the Westwood Zoning Bylaw and M.G.L. Ch.40A Section 9 erect a monopole with antennas, an equipment shelter, and fencing at 120 High Street/100 Lowderbrook Road. Wireless PSC Inc., d/b/a AT&T Wireless ("AT&T"), a wholly owned subsidiary of AT&T Corporation by their legal counsel, Mr. Jowdy, presented the following facts to the Board.

Route 128 runs north and south, Route 109 runs east and west and by locating a monopole at 120 High Street/100 Lowderbrook Road it will fill a substantial hole in the network that AT&T has developed. AT&T is trying to provide a continuous connection to their system. By locating at this particular site AT&T feels it would be less sensitive, more desirable for telecommunications facilities as also they are very close to 128 which is where thy ar trying to provide the service.

The monopole would be located in a wooded area between a parking lot and Route 128. Efforts were made to locate this monopole in the median strip of Route 128 but the Massachusetts Highway Department have a policy that the area where the monopole is located must be accessible by a curb cut and in this particular stretch of Route 128 there is no curb cut. Given those constraints it gave AT&T no alternative but to seek permission to place the monopole at this particular location. To locate the antennas on the tower that currently is on the prison property would not be feasible since it would not give AT&T the coverage they seek. Also there currently is a dispute between the state and county as to who will get the rental money for that tower and until it is resolved no more antennas can be mounted at that particular site.

Tom Schnorr from Palmer and Dodge gave a lengthy definition of the FCC rulings and the DPU rulings. Wireless communications services have been treated as public utilities in other states and until recently there never was a debate as to whether wireless communications services were public utilities for zoning purposes.

Mr. Blake Haskell, Site Acquisition Coordinator testified that the tower will be approximately 150 feet in height and will be designed to house a minimum of two carriers and will provide space for the life of the structure for the town to mount their communication equipment if there was a need. Also, Mr. Haskell informed the Board that AT&T had made application to the FAA and felt confident that the FAA would not require a light on the top of the tower.

Several abutters spoke in opposition to this application stating their concerns to maintain the residential atmosphere of the town and the tower would be obtrusive.

To the extent necessary the minutes of the hearing held Thursday, August 14, 1997 and February 19, 1998, filed with the Board of Appeals and the Town Clerk, are hereby incorporated by reference, together with any exhibits submitted in connection therewith.

DECISION

The Board of Appeals voted unanimously to **grant** the Petitioner, Wireless PSC Inc., d/b/a AT&T Wireless, request for a special permit pursuant to the provisions of Section 10A(b)(1) and 10A(b)(5)(ii) of the Westwood Zoning Bylaw and M.G.L. Ch.40A Section 9 to erect a telecommunications facility with antennas, an equipment shelter and fencing at 100 Lowderbrook Road/120 High Street which will provide more and improved telecommunications in the Westwood area of Route 128/95

Wireless PSC Inc., d/b/a AT&T Wireless will install its equipment after all necessary permits have been obtained from local authorities, such as electrical and building inspectors, and state and federal authorities, such as the FCC, the FAA and the Massachusetts Department of Public Health.

This special permit is given with the condition that construction will be in accordance with the Impact Decision approval pursuant to Section 16A of the Westwood Zoning Bylaw detailed by the Planning Board.

The board by unanimous vote makes the following specific findings based upon the testimony and exhibits submitted at the hearing:

The premises in question are reasonably adaptable to the proposed use and will allow for the proper layout for the proposed use including adequate separation of buildings or structures and open areas from adjacent premises.

The proposed use will not have a material adverse effect on the value of land and building, or structures in the neighborhood or on the amenities thereof.

The proposed use will not produce noise, vibration, smoke, dust, odors, heat or glare observable at the lot lines in amounts clearly detrimental to the normal use of adjacent property.

WESTWOOD ZONING BOARD OF APPEALS

Ronald T. Peterson, Chairman

John J. Clancy

Richard A. Russo

Dated

For title see Deed to Westwood Executive Center Limited Partnership filed with Norfolk County Registry District of the Land Court as ~~Document No. 13022~~ certif. title #150050

I hereby certify that the notice of approval by the Westwood Board of Appeals allowing this Variance/Special Permit was received in this office on 2/24/98 and that: ___ 20 days have elapsed and no appeal has been filed; or ___ the appeal filed ___ has been dismissed or denied.

Town Clerk of Westwood

DECISION

The Planning Board, by a vote of three in favor and two abstentions, hereby submits its Impact Decision ***approval*** pursuant to Section 16A of the Westwood Zoning Bylaw for the Project as described in the application therefor dated July 17, 1997, related submissions and the site plan dated July 8, 1997 and revised through September 24, 1998, consisting of six (6) sheets (together hereinafter referred to as the "Project Plans") filed with the Planning Board by or on behalf of AT&T Wireless Services.

1. Except as modified by the conditions and findings hereof, the Project shall comply with the Project Plans in all respects, and the Applicant shall pursue completion of the Project with reasonable diligence and continuity.

2. The Applicant shall comply with the condition set forth in the memorandum from the Health Director, dated August 7, 1997, requiring approval from the Massachusetts Department of Public Health, Radiation Control Program.

3. The highest point of the pole shall not exceed one hundred forty (140) feet above ground level. A thin lightning rod shall not project more than ten (10) feet from the highest point.

4. The maximum diameter of the pole shall not exceed forty-five (45) inches.

5. The pole shall be constructed from a tree bark-like material and designed to accommodate one additional wireless communication carrier. The primary construction material and final design shall be submitted to the Planning Board for their review and approval.

6. The antennae shall be mounted flush with the pole, consistent with a three unit cross polar-type antennae, at a height no less than one hundred thirty-two (132) feet and no more than one hundred forty (140) feet above ground level. The antennae of an additional carrier shall be mounted at a height no less than one hundred twenty-three (123) feet above ground level.

7. The cable encasement, brackets and climbing pegs and any other attachments shall be concealed to the fullest practical extent. The design of these attachments shall be submitted to the Planning Board for their review and approval prior to installation.

8. The equipment shelter shall be reasonably screened by landscaping.

9. The chain link fence surrounding the site shall not be topped with barbed wire or any other sharp material. Evergreen trees shall be planted around it to provide adequate screening.

10. A performance bond of thirty thousand dollars ($30,000) must be posted by the Applicant prior to the issuance of a building permit for this Project. If the Applicant abandons or discontinues use of the pole for a period exceeding three (3) consecutive months, the pole must be removed in its entirety at the Applicant's sole expense

within a period of six (6) months, unless otherwise specified. If the Applicant fails to remove the pole within the specified time period, the Town will secure any or all amounts from the bond and proceed with the removal. The lease agreement shall contain this provision.

11. All wireless communication carriers to co-locate on this pole must submit plans for the design of their antennae to the Planning Board for review and approval.

12. The Impact Decision for this Project shall be valid for a period of five (5) years. At the end of this period, the pole must be removed unless the Applicant receives approval from the Planning Board to renew the Impact Decision for a specified time period to be determined by the Board.

Diane Beecham
Diane Beecham
Planning and Land Use Administrator

DATED: October 7, 1998

COMMONWEALTH OF MASSACHUSETTS

NORFOLK, SS OCTOBER 14, 1998

Then personally appeared the above-named DIANE BEECHAM, PLANNING AND LAND USE ADMINISTRATOR OF THE TOWN OF WESTWOOD, and acknowledged the foregoing to be her free act and deed and that of the Town of Westwood Planning Board.

Raymond F. Jowdy
Notary Public

Bk 28752 Pg126 #38184
04-22-2011 @ 10:30a

TOWN OF WESTWOOD

Commonwealth of Massachusetts

PLANNING BOARD

DECISION OF THE PLANNING BOARD
WIRELESS COMMUNICATIONS OVERLAY DISTRICT
ENVIRONMENTAL IMPACT AND DESIGN REVIEW

APPLICANT: New Cingular Wireless PCS, LLC d/b/a AT&T Mobility

PROPERTY OWNER: Medical Information Tech, Inc.

PROPERTY LOCUS: 100-200 Lowder Brook Drive
Assessor's Map 6, Lot 17

BACKGROUND AND PROJECT SUMMARY

The Applicant proposes to install three (3) panel antennas at an antenna centerline height of 117' on the existing monopole at 100-200 Lowder Brook Drive, in place of three (3) existing antennas which are currently at the 117' height, and to relocate those three (3) existing antennas to a new location at an antenna centerline height of 136' on the same monopole.

The Applicant also proposes to install appurtenant antenna equipment, new fiber and coax conduits and related wireless communications equipment. Proposed electronic equipment will be installed with the existing shelter located at the base of the wireless monopole.

STATEMENT OF FINDINGS

After having reviewed all the plans and reports filed by the Applicants and their representatives, and having considered the technical analysis, supplemental information provided during the course of the public hearing, correspondence and testimony from representatives from various boards and commissions and departments within the Town of Westwood and from all other interested parties, the Town of Westwood Planning Board makes the following procedural findings and project findings:

PROCEDURAL FINDINGS:

1. On January 24, 2011, an application was filed by or on behalf of New Cingular Wireless PCS, LLC d/b/a AT&T Mobility (hereinafter "Applicant") pursuant to Section 9.4 [Wireless Communication Overlay District (WCOD)] and Section 7.3 [Environmental Impact and Design Review (EIDR)] of the Westwood Zoning Bylaw with the Westwood Planning Board and the Westwood Town Clerk (hereinafter "Application").

cf

2. Pursuant to M.G.L. Chapter 40A, Section 9 and 11 and the applicable provisions of the Westwood Zoning Bylaw and the Rules and Regulations of the Westwood Planning Board (hereinafter "Rules and Regulations"), the Planning Board caused notice of the public hearing to be published in *The Westwood press*, a newspaper of general circulation in Westwood, on February 3, 2011 and again on February 10, 2011. Notice of the public hearing was posted in the Westwood Town Hall commencing on January 31, 2011, and continuing through the opening of the public hearing on February 17, 2011. Said notice of the public hearing was mailed postage prepaid to all Parties in Interest as defined in M.G.L. Chapter 40A, Section 11 on January 31, 2011.

3. The Planning Board provided copies of the Application to other Town of Westwood boards and commissions, departments and officials including, but not limited to, the Board of Health, Board of Selectmen, Building Commissioner, Conservation Commission, Department of Public Works, Economic Development Officer, Fire Chief, Police Chief and Town Engineer.

4. After notice and publication was provided pursuant to M.G.L. Chapter 40A, Sections 9 and 11, the public hearing on the Application was held on February 17, 2011 in the Champagne Meeting Room at the Carby Street Municipal Office Building, 50 Carby Street, Westwood, Massachusetts.

5. Westwood Planning Board members Steven H. Olanoff, Bruce H. Montgomery, and Carol E. Chafetz were present for the public hearing and deliberated on the Application at a duly authorized meeting on February 17, 2011.

PROJECT FINDINGS:

1. The subject property consists of approximately 36.84 acres located at 100-200 Lowder Brook Drive and is shown as Map 6, Lot 17 on the Westwood Board of Assessors' Map (hereinafter "Project Site").

2. A Wireless Communications Overlay District Special Permit (WCOD Special Permit) was issued by the Westwood Planning Board on October 7, 1998 for the installation of a one hundred and forty foot (140') high monopole style wireless communication facility at 100-200 Lowder Brook Drive. Wireless Communications Overlay District Environmental Impact Design Review (WCOD EIDR) Approvals were granted by the Westwood Planning Board on January 5, 2000, September 26, 2005, and August 16, 2008, for the installation of additional antennas and relocations of existing antennas on the existing monopole at 100-200 Lowder Brook Drive.

3. The Applicant proposes to undertake certain modifications to an existing wireless communication facility (hereinafter "Project"), including the installation of three (3) panel antennas at an antenna centerline height of 117' on the existing monopole at 100-200 Lowder Brook Drive, in place of three (3) existing antennas which are currently at the 117' height, and the relocation of those three (3) existing antennas to a new location at an antenna centerline height of 136' on the same monopole. The Project also includes the installation of appurtenant antenna equipment, new fiber and coaxial conduits and related wireless communications equipment. Proposed electronic equipment will be installed within the existing shelter located at the base of the wireless monopole.

4. The Project Site is located within the Administrative-Office-Research (ARO) zoning district. A wireless communications facility is a permitted use in this district, subject to all necessary approvals pursuant to Sections 9.4 and 7.3 of the Westwood Zoning Bylaw.

5. The Project, as modified by the conditions of this decision, is consistent with all applicable standards under Section 9.4 and 7.3 of the Westwood Zoning Bylaw.

6. The Project, as modified by the conditions of this decision, will not present a public safety hazard to the Town, or the surrounding residential properties.

7. The Project, as modified by the conditions of this decision, will not be detrimental to the Town or to the general character or visual appearance of the surrounding residential properties, and will be consistent with all applicable standards set forth in Section 7.3.7 of the Westwood Zoning Bylaw.

DECISION

The Planning Board, by a vote of three in favor and none opposed, hereby submits its WCOD EIDR ***Approval*** pursuant to Sections 9.4 and 7.3 of the Westwood Zoning Bylaw for the Project as described above and in the application therefor dated January 21, 2011, and filed in the office of the Town Clerk on January 24, 2011, and the following related submissions filed with the Planning Board by or on behalf of the Applicants:

1. Plan entitled "AT&T, Site Number: MA1210, Site Name: 100 Lowder Brook", prepared by ,Hudson Design Group, LLC, 1600 Osgood Street, Building 20 North, Suite 2-101, N. Andover, MA 01845, dated July 7, 2010 and revised through January 7, 2011, consisting of the following six (6) sheets:

   Sheet T-1, entitled "Title Sheet", dated July 7, 2010 and revised through January 7, 2011;

   Sheet GN-1, entitled "General Notes", dated July 7, 2010 and revised through January 7, 2011;

   Sheet C-1, entitled "Plot Plan", dated July 7, 2010 and revised through January 7, 2011;

   Sheet A-1, entitled "Compound & Equipment Plan", dated July 7, 2010 and revised through January 7, 2011;

   Sheet A-2, entitled "Antenna Layout and Elevation", dated July 7, 2010 and revised through January 7, 2011;

   Sheet G-1, entitled "Plumbing Diagram & Details", dated July 7, 2010 and revised through January 7, 2011;

2. Existing Radiofrequency coverage map entitled "Current AT&T LTE Coverage in Westwood, MA", undated;

3. Proposed Radiofrequency coverage map entitled "AT&T LTE Coverage from Site MAL01210", undated;

4. Document entitled "Application to Westwood Planning Board, Special Permit – Wireless Communication Facility, Property Situated at 100 Lowder Brook Drive", submitted by AT&T Mobility, 550 Cochituate Road, Framingham, MA, dated January 21, 2011, consisting of twenty-five (25) pages;

5. Document entitled "Revised Structural Analysis Report", prepared by GPD Associates, 520 South Main St., Suite 2531, Akron, Ohio 44311, dated January 18, 2011, consisting of twenty-three (23) pages;

6. Memorandum to Nora Loughnane, Town Planner, from Sgt. Paul R. Sicard, Safety Officer, re: Cell Tower Requests, dated February 9, 2011, consisting of one (1) page;

7. Memorandum to Nora Loughnane, Town Planner, from Jeffrey Bina, Town Engineer, re: EIDR and Wireless Communications Facility Special Permit, 100 Lowder Brook, dated February 14, 2011, consisting of one (1) page;

8. Memorandum to Nora Loughnane, Town Planner, from Linda R. Shea, REHS/RS, Health Director re: Application for Wireless Communication Facility Special Permit and Environmental Impact and Design Review (EIDR) Approval for New Cingular Wireless PCS, LLC d/b/a AT&T Mobility at 100-200 Lowderbrook Drive, Westwood, dated February 16, 2011, consisting of one (1) page;

9. All of the foregoing plans and reports are hereby incorporated by reference and made part of this Decision.

WAIVERS, MODIFICATIONS AND REDUCTIONS

The following waivers are hereby granted by the Planning Board in accordance with Section 7.3 of the Westwood Zoning Bylaw:

1. Section 7.3.6.2 requiring the submission of an exterior lighting plan shall be waived. The Planning Board finds that such submission is not necessary for consideration of the proposed modification to an existing wireless communication facility. The Planning Board finds that this waiver is consistent with the intent of the Zoning Bylaw.

2. Section 7.3.6.3 requiring the submission of a traffic study shall be waived. The Planning Board finds that such submission is not necessary for consideration of the proposed modification to an existing wireless communication facility. The Planning Board finds that this waiver is consistent with the intent of the Zoning Bylaw.

3. Section 7.3.6.4 requiring the submission of a model shall be waived. The Planning Board finds that such submission is not necessary for consideration of the proposed modification to an existing wireless communication facility. The Planning Board finds that this waiver is consistent with the intent of the Zoning Bylaw.

CONDITIONS

The foregoing approval is issued to the Applicants for the aforementioned Project in accordance with the terms and conditions set forth below, all of which are an integral part hereof:

1. Except as modified by the conditions and findings hereof, the Project shall comply with the Project Plans, and with all conditions of prior approvals, in all respects, and the Applicants shall pursue completion of the Project with reasonable diligence and continuity;

2. The antenna array, mounting brackets and associated cabling shall be the identical color of the existing monopole and shall be repainted as necessary to minimize any fading or discoloration.

3. The visual and aesthetic impact of the antennas, mounting brackets and any other attachments shall be minimized to the fullest practical extent. All cables shall be bundled in the most unobtrusive manner possible, shall be secured directly to the existing monopole without the use of cable trays, and shall be located on the portion of the monopole which is least visible from any public way.

4. The Applicant shall obtain approval of the radiation frequency study for the proposed antennas from the Westwood Board of Health.

5. All antennas, cabling and accessory equipment shall be removed within six (6) months of abandonment or discontinuance of use. The Planning Board shall receive timely notification of any abandonment or discontinuance of use.

RECORD OF VOTE

The following members of the Planning Board voted to grant a WCOD EIDR Approval pursuant to Sections 9.4 and 7.3 of the Zoning Bylaw for the abovementioned Project: B. Montgomery, C. Chafetz and S. Olanoff.

The following members of the Planning Board voted in opposition to a WCOD EIDR Approval pursuant to Sections 9.4 and 7.3 of the Zoning Bylaw for the abovementioned Project: the abovementioned Project: None.

Nora Loughnane
Town Planner
DATED: March 30, 2011

I hereby certify that the notice of approval of this plan by the Westwood Planning Board was received in this office on 3-31-2011 and no appeal was received during the twenty days next after such receipt and recording of said notice.

Teresa A. Riordan
Town Clerk of Westwood – Assistant

TOWN OF WESTWOOD
Commonwealth of Massachusetts

PLANNING BOARD

DECISION OF THE PLANNING BOARD OF THE TOWN OF WESTWOOD

APPLICANT: MetroPCS Massachusetts LLC

PROPERTY LOCUS: 100-200 Lowder Brook Drive, Assessors Map 6, Parcel 17

HEARING: The Planning Board of the Town of Westwood held a public hearing in accordance with the General Laws of the Commonwealth of Massachusetts on Monday, August 4, 2008 at 7:00 pm in the Champagne Meeting Room at the Carby Street Municipal Office Building, 50 Carby Street, Westwood, Massachusetts, and continued to August 12, 2008 at 7:00 PM at the same location, to consider the application of MetroPCS Massachusetts LLC for Environmental Impact and Design Review approval pursuant to Sections 7.3 and 9.4 of the Westwood Zoning Bylaw.

STATEMENT OF FACTS

MetroPCS Massachusetts LLC proposes to install six (6) antennas flush mounted on the existing one hundred sixty (160) foot high monopole, at a height of one hundred and seven (107) feet (antenna centerline).

The dimensions of the proposed antennas are approximately 54.1 inches by 6.1 inches by 2.7 inches. Each antenna will be mounted from the monopole as shown on the submitted plans. The antennas will not extend above the height of the existing monopole.

The applicant also proposes to install equipment cabinets, back-up battery cabinets and a power/telephone demarcation cabinet along with associated cabling within the existing fenced compound area. The proposed equipment cabinets will not exceed six feet (6') in height.

WESTWOOD PLANNING BOARD DECISION

The Planning Board has evaluated the application in relation to the standards and objectives in Section 9.4 [Wireless Communications Overlay District] of the Westwood Zoning Bylaw and finds that if the conditions hereinafter set forth are satisfied, the Project will meet said objectives pursuant to said Section 9.4.

The Planning Board, by a vote of three in favor and none opposed, hereby submits its ***approval*** pursuant to Sections 7.3 and 9.4 of the Westwood Zoning Bylaw for the Project as described in the application therefor dated June 19, 2008 and all related submissions (together hereinafter referred to as the "Project Plans") filed with the Planning Board by or on behalf of MetroPCS Massachusetts LLC:

1. Plan entitled "MetroPCS Unlimit Yourself, BOS0296A, Cingular Lowder Brook Westwood", prepared by Atlantis Group, 15 Cypress Street, Suite 300, Newton Centre, MA 02459, dated June 15, 2008, revised through August 8, 2008, and stamped by Registered Architect Hossein V. Vahedi, consisting of the following three (3) sheets:

   Sheet T-1, entitled "Title Sheet", dated June 15, 2008 and revised through August 8, 2008;

   Sheet C-1, entitled "Site Plan Elevation and Detail", dated June 15, 2008 and revised through August 8, 2008;

   Sheet A-1, entitled "Equipment Details" dated June 15, 2008 and revised through August 8, 2008;

2. Report entitled " Wireless Communications Facility Project narrative, Metro PCS Massachusetts LLC, Application for Environmental Impact and Design Review, Town of Westwood Planning Board, 200 Lowder Brook Westwood, MA – Assessor Map 6, Parcel 17", dated June 15, 2008, consisting of twenty-eight (28) pages;

3. Memorandum from Sgt. Paul R. Sicard, Safety Officer, to Nora Loughnane, Town Planner, re: Communication Tower Requests, dated July 24, 2008, consisting of one (1) page;

4. Memorandum from Linda R. Shea, Health Director, to Nora Loughnane, Town Planner, dated July 28, 2008, consisting of one (1) page;

5. All of the foregoing plans and reports are hereby incorporated by reference and made part of this Decision.

CONDITIONS

The foregoing approval is issued to the Applicant for the aforementioned Project in accordance with the terms and conditions set forth below, all of which are an integral part hereof:

1. Except as modified by the conditions and findings hereof, the Project shall comply with the Project Plans in all respects, and the Applicant shall pursue completion of the Project with reasonable diligence and continuity.

2. The antenna array, mounting brackets and associated cabling shall be the identical color of the existing monopole and shall be repainted as necessary to minimize any fading or discoloration.

3. The visual and aesthetic impact of the antennas, mounting brackets and any other attachments shall be minimized to the fullest practical extent. All cables shall be bundled in the most unobtrusive manner possible and shall be secured directly to the existing monopole without the use of cable trays.

4. All antennas, cabling and accessory equipment shall be removed within six (6) months of abandonment or discontinuance of use. The Planning Board shall receive notification of any abandonment or discontinuance of use.

RECORD OF VOTE

The following members of the Planning Board voted to grant EIDR Approval for the abovementioned Project: Steven H. Olanoff, Robert E. Moore, Jr., and Robert C. Malster.

The following members of the Planning Board voted in opposition to EIDR Approval for the abovementioned Project: None.

Nora Loughnane
Town Planner
DATED: August 16, 2008

I hearby certify that the notice of approval by the Westwood Board of Appeals allowing this Variance/Special Permit was received in this office on August 19, and that ✓ 20 days have elapsed and no appeal has been filed; or _____ the appeal filed _____ has been dismissed or denied.

Town Clerk of Westwood

ULS License

PCS Broadband License - KNLH242 - Cellco Partnership

Call Sign	KNLH242	Radio Service	CW - PCS Broadband
Status	Active	Auth Type	Regular

Market

Market	BTA051 - Boston, MA	Channel Block	F
Submarket	0	Associated Frequencies (MHz)	001890.00000000-001895.00000000 001970.00000000-001975.00000000

Dates

Grant	07/23/2007	Expiration	06/27/2017
Effective	12/16/2010	Cancellation	

Buildout Deadlines

1st	06/27/2002	2nd	

Notification Dates

1st	05/17/2002	2nd	

Licensee

FRN	0003290673	Type	Joint Venture

Licensee

Cellco Partnership
1120 Sanctuary Pkwy, #150 GASA5REG
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Contact

Verizon Wireless
Licensing - Manager
LicensingCompliance@VerizonWireless.com
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Ownership and Qualifications

Radio Service Type	Mobile		
Regulatory Status	Common Carrier	Interconnected	Yes

Alien Ownership

Is the applicant a foreign government or the representative of any foreign government?	No
Is the applicant an alien or the representative of an alien?	No
Is the applicant a corporation organized under the laws of any foreign government?	No
Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	No

Is the applicant directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?	**Yes**
If the answer to the above question is 'Yes', has the applicant received a ruling(s) under Section 310(b)(4) of the Communications Act with respect to the same radio service involved in this application?	

Basic Qualifications
The Applicant answered "No" to each of the Basic Qualification questions.

Tribal Land Bidding Credits
This license did not have tribal land bidding credits.

Demographics

Race

Ethnicity Gender

ULS License

700 MHz Upper Band (Block C) License - WQJQ689 - Cellco Partnership

This license has pending applications: 0005826903

Call Sign	WQJQ689	Radio Service	WU - 700 MHz Upper Band (Block C)
Status	Active	Auth Type	Regular

Market

Market	REA001 - Northeast	Channel Block	C
Submarket	0	Associated Frequencies (MHz)	000746.00000000-000757.00000000 000776.00000000-000787.00000000

Dates

Grant	11/26/2008	Expiration	06/13/2019
Effective	09/16/2013	Cancellation	

Buildout Deadlines

1st	06/13/2013	2nd	06/13/2019

Notification Dates

1st	2nd

Licensee

FRN	0003290673	Type	General Partnership

Licensee

Cellco Partnership
1120 Sanctuary Pkwy, #150 GASA5REG
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Contact

Verizon Wireless
Licensing Manager
LicensingCompliance@VerizonWireless.com
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Ownership and Qualifications

Radio Service Type	Mobile		
Regulatory Status	Common Carrier	Interconnected	Yes

Alien Ownership
The Applicant answered "No" to each of the Alien Ownership questions.

Basic Qualifications
The Applicant answered "No" to each of the Basic Qualification questions.

Tribal Land Bidding Credits
This license did not have tribal land bidding credits.

Demographics

Race

Ethnicity

Gender

ULS License

AWS, 1710-1755/2110-2155 MHz bands License - WQGB266 - Cellco Partnership

Call Sign	WQGB266	Radio Service	AW - AWS, 1710-1755/2110-2155 MHz bands
Status	Active	Auth Type	Regular
Market			
Market	CMA006 - Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH	Channel Block	A
Submarket	0	Associated Frequencies (MHz)	001710.00000000-001720.00000000 002110.00000000-002120.00000000
Dates			
Grant	11/29/2006	Expiration	11/29/2021
Effective	08/23/2012	Cancellation	
Buildout Deadlines			
1st		2nd	
Notification Dates			
1st		2nd	

Licensee

FRN	0003290673	Type	General Partnership

Licensee

Cellco Partnership
1300 I Street, NW - Suite 400 West
Washington, DC 20005
ATTN Michael Samsock

P:(202)589-3768
F:(202)589-3750
E:michael.samsock@verizon.com

Contact

Wiley Rein LLP

1776 K Street, NW
Washington, DC 20006
ATTN Nancy J. Victory

P:(202)719-7344
F:(202)719-7049
E:nvictory@wileyrein.com

Ownership and Qualifications

Radio Service Type	Mobile		
Regulatory Status	Common Carrier	Interconnected	Yes

Alien Ownership

Is the applicant a foreign government or the representative of any foreign government?	No
Is the applicant an alien or the representative of an alien?	No

Is the applicant a corporation organized under the laws of any foreign government?	No
Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	No
Is the applicant directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?	**Yes**
If the answer to the above question is 'Yes', has the applicant received a ruling(s) under Section 310(b)(4) of the Communications Act with respect to the same radio service involved in this application?	**Yes**

Basic Qualifications
The Applicant answered "No" to each of the Basic Qualification questions.

Tribal Land Bidding Credits
This license did not have tribal land bidding credits.

Demographics

Race

Ethnicity Gender

ULS License

AWS, 1710-1755/2110-2155 MHz bands License - WQGA900 - Cellco Partnership

Call Sign	WQGA900	Radio Service	AW - AWS, 1710-1755/2110-2155 MHz bands
Status	Active	Auth Type	Regular

Market

Market	BEA003 - Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	Channel Block	B
Submarket	1	Associated Frequencies (MHz)	001720.00000000-001730.00000000 002120.00000000-002130.00000000

Dates

Grant	11/29/2006	Expiration	11/29/2021
Effective	09/13/2012	Cancellation	

Buildout Deadlines

1st	2nd

Notification Dates

1st	2nd

Licensee

FRN 0003290673 Type General Partnership

Licensee

Cellco Partnership
1120 Sanctuary Pkwy, Ste 150 GASA5REG
Alpharetta, GA 30009
ATTN Licensing Manager

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Contact

Verizon Wireless

1120 Sanctuary Pkwy, Ste 150 GASA5REG
Alpharetta, GA 30009
ATTN Licensing Manager

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Ownership and Qualifications

Radio Service Type	Fixed, Mobile		
Regulatory Status	Non-Common Carrier	Interconnected	No

Alien Ownership

Is the applicant a foreign government or the representative of any foreign government?	No
Is the applicant an alien or the representative of an alien?	No

Is the applicant a corporation organized under the laws of any foreign government?	No
Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	No
Is the applicant directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?	**Yes**
If the answer to the above question is 'Yes', has the applicant received a ruling(s) under Section 310(b)(4) of the Communications Act with respect to the same radio service involved in this application?	**Yes**

Basic Qualifications
The Applicant answered "No" to each of the Basic Qualification questions.

Tribal Land Bidding Credits
This license did not have tribal land bidding credits.

Demographics

Race

Ethnicity Gender

ULS License

Cellular License - KNKA201 - Cellco Partnership

Call Sign	KNKA201	Radio Service	CL - Cellular
Status	Active	Auth Type	Regular
Market			
Market	CMA006 - Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH	Channel Block	B
Submarket	0	Phase	2
Dates			
Grant	08/26/2014	Expiration	10/01/2024
Effective	08/26/2014	Cancellation	
Five Year Buildout Date			
08/27/1989			
Control Points			
3	500 W. Dove Rd., TARRANT, Southlake, TX P: (800)264-6620		

Licensee

FRN	0003290673	Type	General Partnership

Licensee

Cellco Partnership
1120 Sanctuary Pkwy, #150 GASA5REG
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Contact

Verizon Wireless
Licensing Manager
1120 Sanctuary Pkwy, #150 GASA5REG
Alpharetta, GA 30009-7630
ATTN Regulatory

P:(770)797-1070
F:(770)797-1036
E:LicensingCompliance@VerizonWireless.com

Ownership and Qualifications

Radio Service Type	Mobile		
Regulatory Status	Common Carrier	Interconnected	Yes

Alien Ownership
The Applicant answered "No" to each of the Alien Ownership questions.

Basic Qualifications
The Applicant answered "No" to each of the Basic Qualification questions.

Demographics

Race

Ethnicity

Gender

ABUTTERS FOR 100-200 LOWDER BROOK DR

MAP 06, LOT 017

WESTWOOD BOARD OF ASSESSORS

ABUTTERS LIST FOR 100-200 LOWDER BROOK DR
WESTWOOD, MA

MAP & LOT	OWNER	CO-OWNER	Mailing Address	City	St Zip	Location
05041	DESAI INDIRA		P.O. BOX 788	NEWTON	MA 02460	HIGH ST
06001	DESAI INDIRA		101 HIGH ST	WESTWOOD	MA 02090	101 HIGH ST
06002	DESAI INDIRA		P. O. BOX 788	NEWTON	MA 02460	HIGH ST
06003	LEONARD MARTHA B		20 GROVE ST	WESTWOOD	MA 02090	20 GROVE ST
06012	WALSH MARK	SHARON WALSH	29 GROVE ST	WESTWOOD	MA 02090	29 GROVE ST
06013	RASAPALLI SIVAPPA	GEETHA VANGA	45 HIGH ST	WESTWOOD	MA 02090	45 HIGH ST
06014	NOBLE RONALD A	SILVANIA NOBLE	37 HIGH ST	WESTWOOD	MA 02090	37 HIGH ST
06017	MEDICAL INFORMATION TECH		MEDITECH CIR	WESTWOOD	MA 02090	100-200 LOWDER BROOK DR
06017T	CINGULAR WIRELESS	ATTN: NREA TAX	575 MOROSGO DRIVE	ATLANTA	GA 30324	LOWDER BROOK DR
06018	FOX HILL VILLAGE HOMEOWNE		10 LONGWOOD DR	WESTWOOD	MA 02090	10 LONGWOOD DR
0601801	FOX HILL VILLAGE HOMEOWNE		10 LONGWOOD DR	WESTWOOD	MA 02090	10 LONGWOOD DR
0601802	FOX HILL VILLAGE PARTNERS		30 LONGWOOD DRIVE	WESTWOOD	MA 02090	30 LONGWOOD DR
0601803	WHITE OAKS COTTAGES LLC		10 LONGWOOD DR	WESTWOOD	MA 02090	6 LONGWOOD DR
0601804	WHITE OAKS COTTAGES LLC		10 LONGWOOD DR	WESTWOOD	MA 02090	2-4 LONGWOOD DR
06019	100 HIGH STREET REALY TRU		C/O NAI HUNNEMAN	BOSTON	MA 02210	100 HIGH ST
06021	JENNIFER L & MATTHEW S EN	JENNIFER L ENGEL REVOCABL	39 GROVE ST	WESTWOOD	MA 02090	39 GROVE ST
10058	TOWN OF WESTWOOD	CONSERVATION COMMISSION	580 HIGH ST	WESTWOOD	MA 02090	REAR HIGH ST

05041
DESAI INDIRA
P.O. BOX 788
NEWTON, MA 02460

06001
DESAI INDIRA
101 HIGH ST
WESTWOOD, MA 02090

06002
DESAI INDIRA
P. O. BOX 788
NEWTON, MA 02460

06003
LEONARD MARTHA B
20 GROVE ST
WESTWOOD, MA 02090

06012
WALSH MARK
SHARON WALSH
29 GROVE ST
WESTWOOD, MA 02090

06013
RASAPALLI SIVAPPA
GEETHA VANGA
45 HIGH ST
WESTWOOD, MA 02090

06014
NOBLE RONALD A
SILVANIA NOBLE
37 HIGH ST
WESTWOOD, MA 02090

06017
MEDICAL INFORMATION TECH INC
MEDITECH CIR
WESTWOOD, MA 02090

06017T
CINGULAR WIRELESS
ATTN: NREA TAX
575 MOROSGO DRIVE
SUITE 13-F WEST TOWER
ATLANTA, GA 30324

06018
FOX HILL VILLAGE HOMEOWNERS CORP
10 LONGWOOD DR
WESTWOOD, MA 02090

0601801
FOX HILL VILLAGE HOMEOWNERS CORP
10 LONGWOOD DR
WESTWOOD, MA 02090

0601802
FOX HILL VILLAGE PARTNERSHIP
30 LONGWOOD DRIVE
WESTWOOD, MA 02090

0601803
WHITE OAKS COTTAGES LLC
10 LONGWOOD DR
WESTWOOD, MA 02090

0601804
WHITE OAKS COTTAGES LLC
10 LONGWOOD DR
WESTWOOD, MA 02090

06019
100 HIGH STREET REALY TRUST
C/O NAI HUNNEMAN
303 CONGRESS ST
BOSTON, MA 02210

06021
JENNIFER L & MATTHEW S ENGEL TRUS
JENNIFER L ENGEL REVOCABLE TRUST
39 GROVE ST
WESTWOOD, MA 02090

10058
TOWN OF WESTWOOD
CONSERVATION COMMISSION
580 HIGH ST
WESTWOOD, MA 02090

verizonwireless

400 FRIBERG PARKWAY, WESTBOROUGH, MA 01581

WESTWOOD 6

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

MONOPOLE COLOCATION

VICINITY MAP

VICINITY MAP
SCALE: NTS

PROJECT SUMMARY

SITE NAME:	WESTWOOD 6
SITE ADDRESS:	100 LOWDER BROOK DRIVE WESTWOOD, MA 02090
ASSESSOR'S PARCEL NO.:	MAP: 06 BLK: 017
CONSTRUCTION TYPE:	MONOPOLE COLOCATION
PROPERTY OWNER:	MEDICAL INFORMATION TECHNOLOGY, INC. MEDITECH CIRCLE WESTWOOD, MA 02090
STRUCTURE OWNER:	NA
APPLICANT, LESSEE/LICENSEE, PROJECT OWNER:	CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS 400 FRIBERG PARKWAY WESTBOROUGH, MA 01581

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	14
C-1	PLOT PLAN & NOTES	14
A-1	COMPOUND PLAN & ELEVATION	14
A-2	EQUIPMENT PLAN & DETAILS	14
A-3	DETAILS & NOTES	14
S-1	CANOPY PLANS & DETAILS	14
S-2	CANOPY PLAN & DETAILS	14
E-1	ELECTRICAL AND GROUNDING PLAN,	14
	DETAILS & NOTES	
E-1	ELECTRICAL AND GROUNDING DETAILS	14

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SITE ACCESS NOTE:

ATTENTION ALL CONTRACTOR(S):
ANYTIME A CROWN CASTLE SITE IS ACCESSED FOR ANY REASON YOU MUST CALL CROWN CASTLE NOC (PHONE NO: 800-788-7011) UPON ARRIVAL AND DEPARTURE.

verizonwireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

ADVANCED ENGINEERING GROUP, P.C.

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A/E _____

AEG PROJECT NO: NA
DRAWN BY: DD
CHECKED BY: SA

SUBMITTALS

14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

ZONING SUMMARY TABLE

ZONING DISTRICT: ADMIN-RESEARCH-OFFICE W/ WCOD OVERLAY
ASSESSORS MAP: MAP: 06 LOT: 017
PROPOSED USE: WIRELESS COMMUNICATION FACILITY

DIMENSION:	REQUIRED MINIMUM	PROVIDED
LOT AREA	80,000 SQ. FT.	38.84± AC.
FRONT YARD SETBACK*	30 FT	930± FT
SIDE YARD SETBACK*	30 FT	112± FT
REAR YARD SETBACK*	30 FT	68± FT
MAXIMUM STRUCTURE HEIGHT	39 FT (45 FT) BY SPEC. PERMIT	98± FT

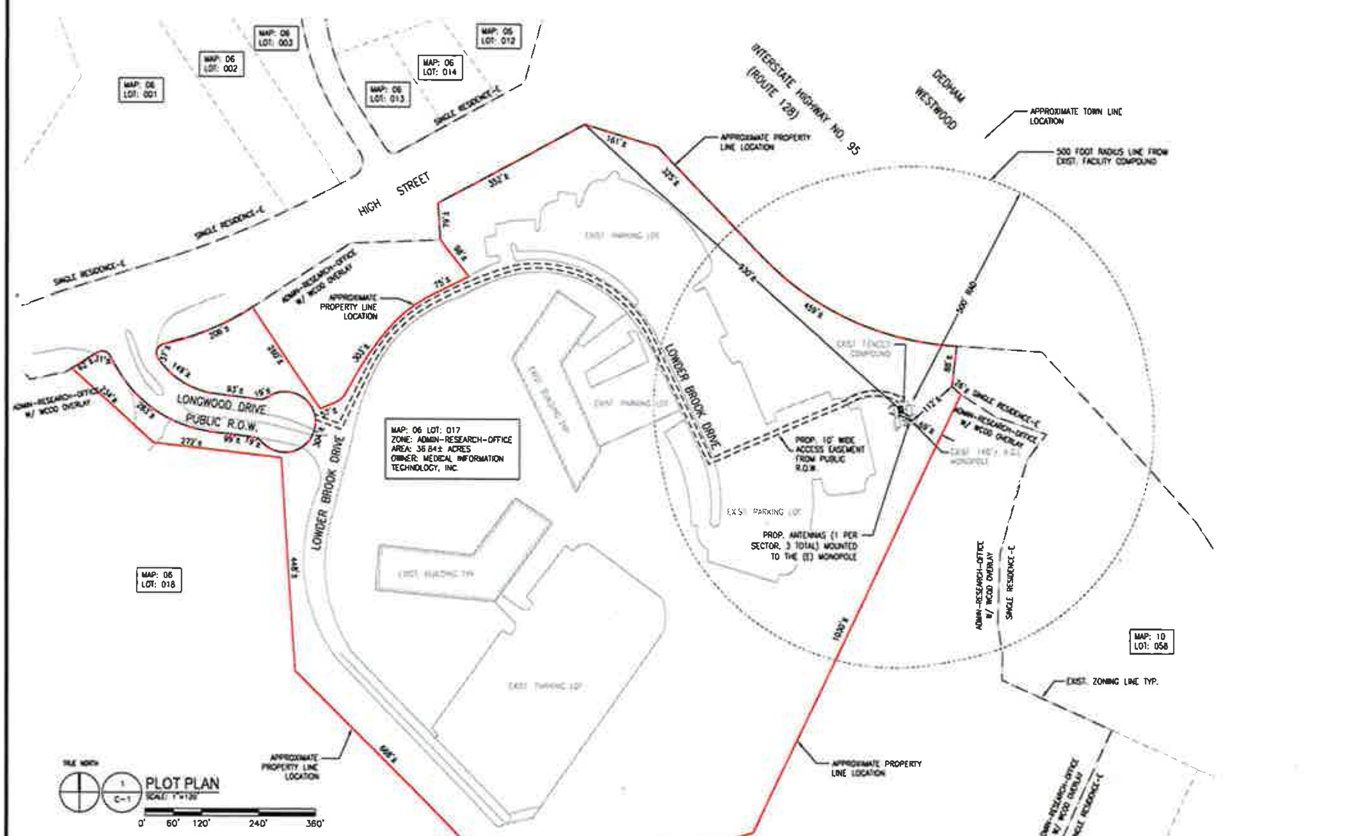
* DIMENSIONS MEASURED FROM CLOSEST ANTENNAS AND EQUIPMENT TO NEAREST LOT LINE

GENERAL NOTES:

1. THE TYPE, DIMENSIONS, MOUNTING HARDWARE, AND POSITIONS OF ALL PROJECT OWNER'S EQUIPMENT ARE SHOWN IN ILLUSTRATIVE FASHION. THESE DRAWINGS ARE NOT INTENDED FOR CONSTRUCTION. ACTUAL HARDWARE DETAILS AND FINAL LOCATIONS MAY DIFFER SLIGHTLY FROM WHAT IS SHOWN.
2. THE PROJECT OWNER'S PCS FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. ONCE THE FACILITY BECOMES FULLY OPERATIONAL, NORMAL AND ROUTINE MAINTENANCE BY PROJECT OWNER'S TECHNICIANS WILL BE PERFORMED ON A MONTHLY BASIS. THEREFORE, THE ESTIMATED VEHICLE TRIP GENERATION RATE IS 2 TRIPS PER MONTH. THE AVERAGE DAILY TRIP GENERATION RATE (ADT) IS 0.07.
4. PER FCC MANDATE, ENHANCED EMERGENCY (E911) SERVICE IS REQUIRED TO MEET NATIONWIDE STANDARDS FOR WIRELESS COMMUNICATIONS SYSTEMS. PROJECT OWNER'S IMPLEMENTATION REQUIRES DEPLOYMENT OF EQUIPMENT AND ANTENNAS GENERALLY DEPICTED ON THIS PLAN, ATTACHED TO OR MOUNTED IN CLOSE PROXIMITY TO THE BTS RADIO CABINETS. PROJECT OWNER'S RESERVES THE RIGHT TO MAKE REASONABLE MODIFICATIONS TO E911 EQUIPMENT AND LOCATION AS TECHNOLOGY EVOLVES TO MEET REQUIRED SPECIFICATIONS.

GENERAL SITE NOTES:

1. PROPERTY OWNER: MEDICAL INFORMATION TECHNOLOGY, INC. MEDITECH CIRCLE WESTWOOD, MA 02090
2. SITE ADDRESS: 100 LOWDER BROOK DRIVE WESTWOOD, MA 02090
3. APPLICANT: CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS 400 FRIBERG PARKWAY WESTBOROUGH, MA 01581
4. JURISDICTION: TOWN OF WESTWOOD
5. TAX ID: MAP: 06 LOT: 017
6. DEED REFERENCE: DEED BOOK: 11855 PAGE: 298
7. PLAN REFERENCES: TOWN OF WESTWOOD ASSESSORS MAPS & PLAN REFERENCES AS INDICATED BELOW
8. ZONING JURISDICTION: ADMIN-RESEARCH-OFFICE W/ WCOD OVERLAY TOWN OF WESTWOOD
9. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK. CALL THE FOLLOWING FOR ALL PRE-CONSTRUCTION NOTIFICATION 72-HOURS PRIOR TO ANY EXCAVATION ACTIVITY:
   DIG SAFE SYSTEM (MA, ME, NH, RI, VT): 1-888-344-7233
   CALL BEFORE YOU DIG (CT): 1-800-922-4455
10. PROPERTY LINE INFORMATION IS COMPILED FROM ASSESSORS PLAN AND RECORD DOCUMENTS AND IS NOT TO BE CONSTRUED AS HAVING BEEN OBTAINED AS THE RESULT OF A FIELD BOUNDARY SURVEY, AND IS SUBJECT TO CHANGE AS AN ACCURATE FIELD SURVEY MAY DISCLOSE. A FULL BOUNDARY SURVEY WAS NOT PERFORMED.
11. THE PURPOSE OF THIS PLAN IS TO SUPPORT THE DESIGN AND CONSTRUCTION OF A TELECOMMUNICATION FACILITY. USE OF THIS PLAN BY ANYONE OTHER THAN VERIZON WIRELESS, AND USE OF THIS PLAN FOR ANY PURPOSE NOT RELATED TO THE DESIGN OF THE INTENDED FACILITY IS STRICTLY PROHIBITED.
12. THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.



PLOT PLAN
SCALE: 1"=120'
0' 60' 120' 240' 360'

NOTES:
1. PLOT PLAN BASED ON TAX MAPS FROM THE TOWN OF WESTWOOD AND GIS DATA FROM MASSGIS ONLINE.
2. SETBACKS ARE TAKEN FROM FACE OF PROPOSED ANTENNAS TO PROPERTY LINES.
4. A METES AND BOUNDS SURVEY WAS NOT CONDUCTED BY ADVANCED ENGINEERING GROUP, P.C.

LEGEND

PROPERTY LINE	
ABUTTING PROPERTY LINE	
EXIST. R.O.W. LAYOUT	
PROP. EASEMENT/LEASE AREA	
EXIST. ZONING BOUNDARY	
EXIST. CHAIN LINK FENCE	
PROP. CHAIN LINK FENCE	
EXIST. TREE LINE	
EXIST. CONTOUR	
PROP. CONTOUR	
EXIST. OVERHEAD UTILITIES	
PROP. OVERHEAD UTILITIES	
EXIST. UNDERGROUND UTILITIES	
PROP. UNDERGROUND UTILITIES	
UTILITY POLE	WATER MANHOLE
HYDRANT	DRAINAGE MANHOLE
DRILL HOLE	SEWAGE MANHOLE
STONE/CONC. BOUND	CATCH BASIN
TELCO MANHOLE	GAS VALVE
	WATER VALVE
SINGLE RESIDENCE-E	ZONING
ADMIN-RESEARCH-OFFICE W/ WCOD OVERLAY	ZONING

ANTENNA ORIENTATION KEY

TRUE NORTH
SECTOR A
SECTOR B
SECTOR C

verizon wireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

ADVANCED ENGINEERING GROUP, P.C.

APPROVALS

LANDLORD ______
LEASING ______
R.F. ______
ZONING ______
CONSTRUCTION ______
A/E ______

AEG PROJECT NO: NA
DRAWN BY: DD
CHECKED BY: SA

SUBMITTALS

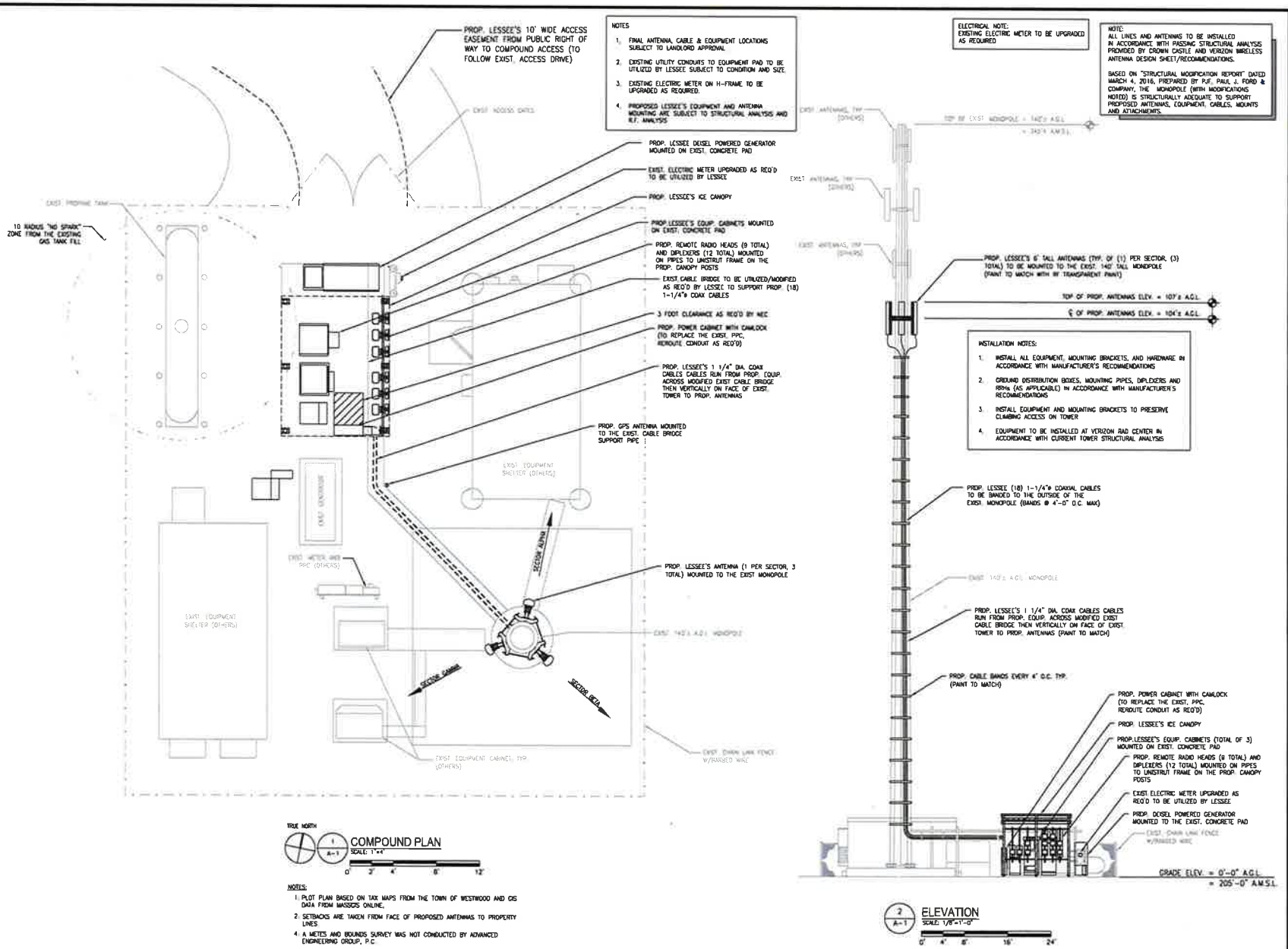
14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
PLOT PLAN AND NOTES

SHEET NUMBER
C-1



verizonwireless
400 FOREST PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering • Site Development Surveying • Telecommunications
[illegible]

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A/E _____

AEC PROJECT NO:	NA
DRAWN BY:	DD
CHECKED BY:	SA

SUBMITTALS

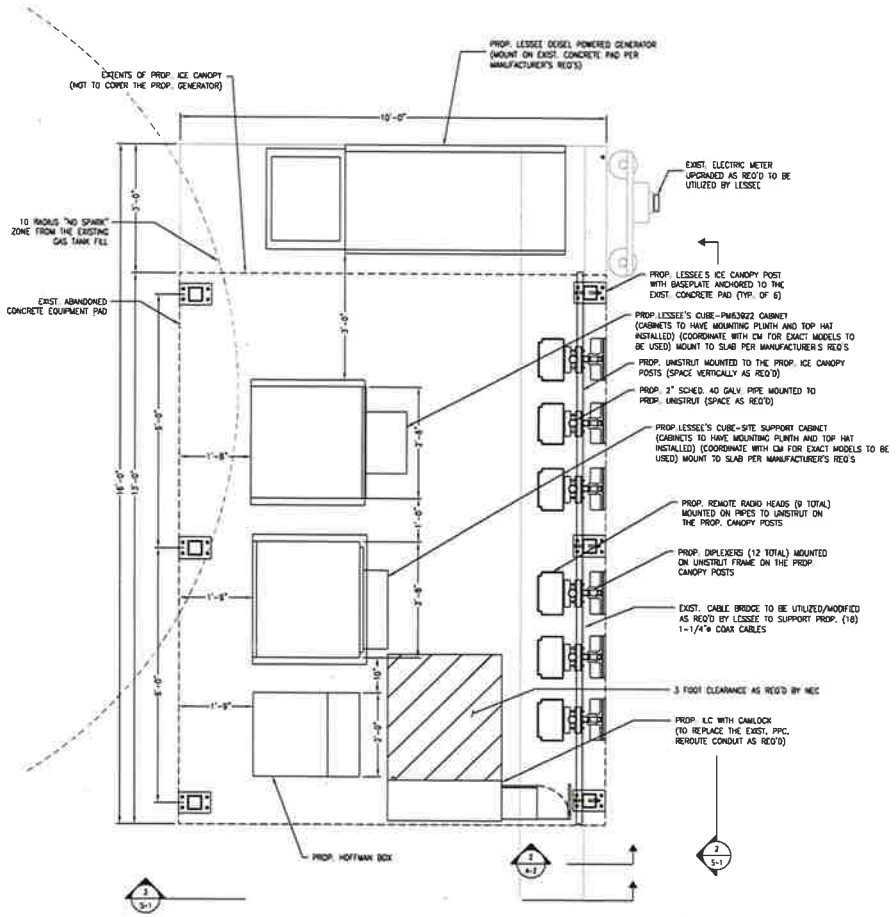
14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

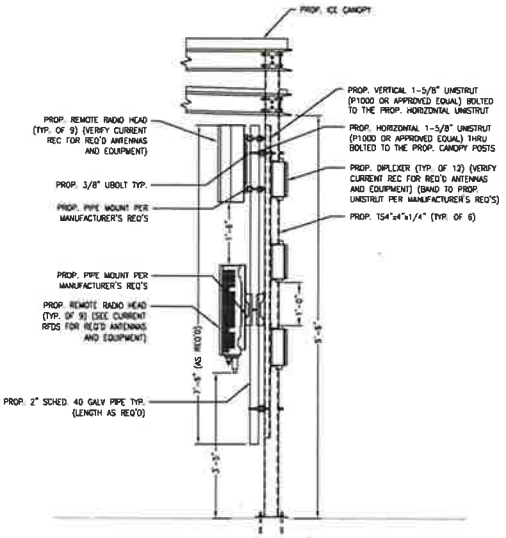
WESTWOOD 6
CROWN # -842905

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
COMPOUND PLAN & ELEVATION

SHEET NUMBER
A-1





verizonwireless
900 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

AEG ADVANCED ENGINEERING GROUP, P.C.

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A/E _____

AEG PROJECT NO:	NA
DRAWN BY:	DD
CHECKED BY:	SA

SUBMITTALS

14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

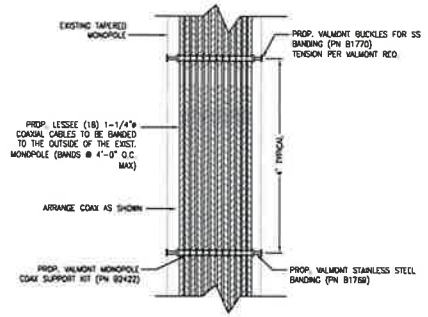
100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

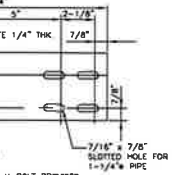
SHEET TITLE

EQUIPMENT PLAN & DETAILS

SHEET NUMBER

A-2





NOTE: OVERSIZE U-BOLT PROVIDED TO ALLOW ± 2° TILT/ADJUSTMENT TO ACHIEVE TOLERANCE.

MOUNTING BRACKET PLATE

BILL OF MATERIALS

ITEM#	DESCRIPTION	QUANTITY (each)
1	1-1/4"ø sch. 40 x 18" LG. MIN SS OR GALV. PIPE	1
2	PLATE 1/4 x 4-1/8 x 18-1/4" LG. GALV.(A-36)	1
3	STD. U-BOLT FOR 2"ø PIPE W/ DOUBLE HEX NUTS AND WASHER, GALV.	2
4	STD. U-BOLT FOR 2"ø PIPE W/ DOUBLE HEX NUTS AND WASHER, GALV. (SEE NOTE 3)	2

NOTE:

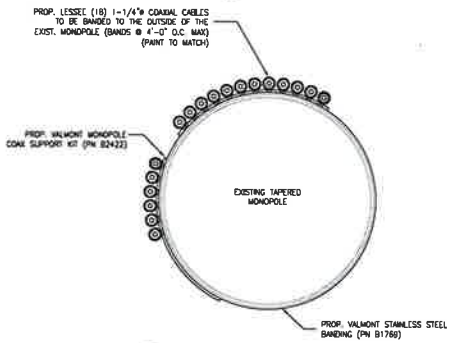
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1-1/4" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 18 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. THE MOUNTING PLATE SHALL BE FABRICATED AS SHOWN AND ATTACHED TO THE APPROPRIATE SUPPORT STRUCTURE USING U-BOLTS. THE SUPPORT PIPE SHALL THEN BE ATTACHED TO THE MOUNTING PLATE USING THE OVERSIZE U-BOLTS PROVIDED TO ALLOW ADJUSTMENT. IT IS CRITICAL THAT THE GPS ANTENNA IS MOUNTED SUCH THAT IT IS WITHIN 2 DEGREES OF VERTICAL AND THE BASE OF THE ANTENNA IS WITHIN 2 DEGREES OF LEVEL.

INSTALLATION NOTES:

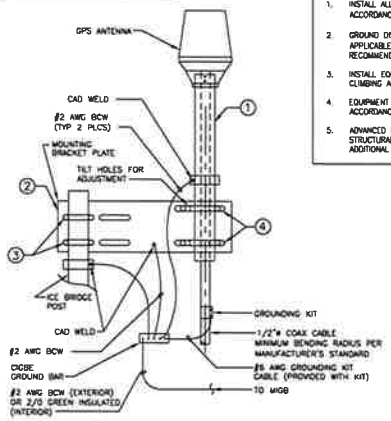
1. INSTALL ALL EQUIPMENT, MOUNTING BRACKETS, AND HARDWARE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS
2. GROUND DISTRIBUTION BOXES, MOUNTING PIPES, AND RRHs (AS APPLICABLE) IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS
3. INSTALL EQUIPMENT AND MOUNTING BRACKETS TO PRESERVE CLIMBING ACCESS ON TOWER
4. EQUIPMENT TO BE INSTALLED AT VERIZON RAD CENTER IN ACCORDANCE WITH CURRENT TOWER STRUCTURAL ANALYSIS
5. ADVANCED ENGINEERING GROUP, P.C. HAS NOT PERFORMED A STRUCTURAL ANALYSIS OF THE EXISTING UNIPOLE TO CARRY THE ADDITIONAL LOADING

NOTES:

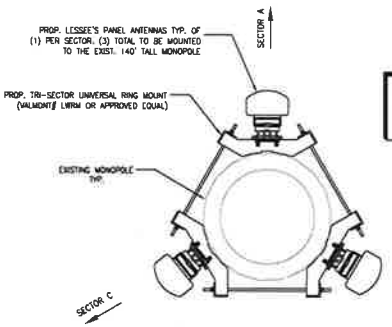
1. FOR ANTENNA, EQUIPMENT & CABLE REQUIREMENTS SEE CURRENT RFDS SHEET
2. EXISTING UTILITY CONDUITS TO EQUIPMENT PAD TO BE UTILIZED BY LESSEE SUBJECT TO CONDITION AND SIZE
3. EXISTING ELECTRIC METER ON H-FRAME TO BE UPGRADED AS REQUIRED
3. LESSEE'S PROPOSED CANOPY SHELTER, EQUIPMENT AND ANTENNA MOUNTING ARE SUBJECT TO STRUCTURAL AND R.F. ANALYSIS
4. ADVANCED ENGINEERING GROUP, P.C. HAS NOT PERFORMED A STRUCTURAL ANALYSIS OF THE EXISTING UNIPOLE OR EXISTING CONCRETE EQUIPMENT PAD TO CARRY THE PROPOSED LOADS



2 / A-3 COAX MOUNTING DETAIL
SCALE: NTS



1 / A-2 GPS ANTENNA MOUNTING TYP.
SCALE: N.T.S.

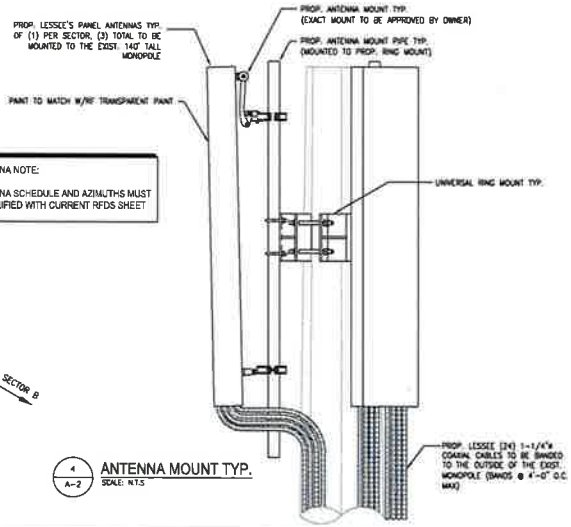


APPROX. NORTH

3 / A-2 ANTENNA PLAN
SCALE: N.T.S.

ANTENNA NOTE:

ANTENNA SCHEDULE AND AZIMUTHS MUST BE VERIFIED WITH CURRENT RFDS SHEET



4 / A-2 ANTENNA MOUNT TYP.
SCALE: N.T.S.

GENERAL NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND SPECIFICATIONS AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS TO ENSURE THAT WORK PROGRESSION IS NOT INTERRUPTED.
2. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A NEAT AND ORDERLY SITE, YARD AND GROUNDS. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND/OR OFFSITE DISPOSAL OF ALL RUBBISH, WASTE MATERIALS, PETRO-CHEMICAL SPILLS, STAINS AND OTHER FOREIGN DEPOSITS. THE GROUNDS ARE TO BE RAKED TO A SMOOTH EVEN-TEXTURED SURFACE.
3. THE PLANS SHOW SOME KNOWN SUBSURFACE STRUCTURES. THE EXACT LOCATION OF ABOVE GROUND STRUCTURES AND/OR UTILITIES BELIEVED TO EXIST IN THE WORKING AREA, MAY VARY FROM THE LOCATIONS INDICATED. IN PARTICULAR, THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH UTILITIES, PIPELINES AND/OR SUBSURFACE STRUCTURES IN THE AREA, MAY BE SHOWN OR NOT BE SHOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROCEED WITH GREAT CARE IN EXECUTION OF ANY WORK. CALL 1-888-DIG-SAFE 48 HOURS BEFORE YOU DIG, DRILL OR BLAST. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND UTILITIES.
4. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE ENGINEER OR DESIGNATED ENGINEER'S REPRESENTATIVE.
5. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THIS JOB SITE DURING THE PERFORMANCE OF THIS CONTRACT.
6. THE CONTRACTOR SHALL RESTORE ALL PUBLIC OR PRIVATE PROPERTY DAMAGED OR REMOVED TO AT LEAST AS GOOD OF CONDITION AS BEFORE DISTURBED AS DETERMINED BY THE OWNER OR OWNERS REPRESENTATIVE.
7. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS AND SHALL BE RESPONSIBLE FOR OBTAINING AND MAINTAINING ALL REQUIRED PERMITS, INSPECTIONS, CERTIFICATES, ETC.
8. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE MONUMENTATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE OWNER OR OWNER'S REPRESENTATIVE, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE UNDER THE SUPERVISION OF A LICENSED LAND SURVEYOR
9. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH OSHA REGULATIONS.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK.
11. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE AWAY FROM THE BUILDING AND THE TOWER COORDINATED WITH THE OWNER OR OWNER'S REPRESENTATIVE AND THE UTILITY OWNER. NOTIFY THE OWNER OR OWNER'S REPRESENTATIVE AND THE UTILITY OWNER BEFORE EACH AND EVERY CONNECTION TO EXISTING SYSTEMS IS MADE.
12. MAINTAIN FLOW FOR ALL EXISTING UTILITIES.
13. ALL SITE FILL SHALL MEET SELECTED FILL STANDARDS AS DEFINED BY THE ENGINEER ON THE DRAWINGS.
14. CONTRACTOR TO GRADE ALL AREAS ON THE SITE TO PROVIDE POSITIVE DRAINAGE.
15. THESE DRAWINGS DO NOT INCLUDE PROVISIONS FOR CONSTRUCTION SAFETY AND THE CONTRACTOR SHALL COMPLY WITH ALL OSHA CONSTRUCTION SAFETY REGULATIONS.
16. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE OWNER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE APPROVAL BY THE ENGINEER OR ENGINEER'S DESIGNATE.

ANTENNA MOUNTING AND INSTALLATION DESIGN NOTES:

1. ANTENNA ASSEMBLY, CONNECTIONS, DESIGN LOADS, MOUNTING, BRACKETS, POLES AND ALL COMPONENTS THERE OF, AND ATTACHMENT THERE TO, IS THE RESPONSIBILITY OF THE ANTENNA MANUFACTURER. ANTENNA MANUFACTURER SHALL PROVIDE THE ENGINEER THE PROPER DESIGN SPECIFICATIONS FOR INCLUSION INTO CONSTRUCTION DRAWINGS.
2. BRACKETS SHALL BE DESIGNED TO SUPPORT CURRENT AND FUTURE PANEL ANTENNAS AND COAXIAL CABLES AS SHOWN.
3. ANTENNA MOUNTING PLATFORM SUPPLIES, CONTRACTOR TO VERIFY ATTACHMENT REQUIREMENTS PRIOR TO CONSTRUCTION.

EXCAVATION AND FOUNDATION NOTES:

1. FOUNDATION EXCAVATION SHALL BE HAND-TRIMMED TO REMOVE LOOSE MATERIALS.
2. EXTERIOR FOUNDATION BACKFILL SHALL BE SELECTED GRANULAR FILL.
3. DO NOT PLACE FOOTINGS IN WATER OR ON FROZEN GROUND.
4. SOIL BEARING SURFACES, PREVIOUSLY ACCEPTED BY GEOTECHNICAL ENGINEER, WHICH ARE ALLOWED TO BECOME SATURATED, FROZEN OR DISTURBED SHALL BE REWORKED TO SATISFACTION OF GEOTECHNICAL ENGINEER OR THEIR APPROVED DESIGNATE.
5. DO NOT ALLOW GROUND BENEATH FOOTINGS TO FREEZE.
6. FOOTING EXCAVATIONS SHALL BE CUT NEAT.
7. ALL STRUCTURAL BACKFILL AND SUBBASE UNDER SLABS-ON-GRADE AND FOOTINGS SHALL BE "SW" OR BETTER PER ASTM D-2487 COMPACTED TO A MINIMUM 85% STANDARD PROCTOR DENSITY PER ASTM D-698.

STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
2. STEEL ANGLES BASE PLATES, BEARING PLATES AND MISC. FABRICATION SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF ASTM-A36 WITH A MINIUM YIELD STRESS OF 36 KSI. ALL STEEL TUBES AND PIPES SHALL BE A500 STEEL MINIMUM.
3. ALL EXTERIOR STRUCTURAL STEEL SHALL BE, WHEN DELIVERED, HOT-DIP GALVANIZED ACCORDING TO ASTM A123. TOUCH-UP FIELD WELDS AND MARRED AREAS W/2 COATS OF GALVANIZED PAINT.
4. DO NOT PLACE HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON STRUCTURAL DRAWINGS.
5. CONNECTIONS:
A. WELDS (SHIELDED METAL ARC) - ELECTRODES SHALL BE E70XX MINIMUM AND BE IN ACCORDANCE WITH AWS D1.1 UNLESS NOTED OTHERWISE.
B. MINIMUM CAPACITY OF CONNECTIONS: FOR CONNECTIONS NOT DETAILED, PROVIDE CONNECTION CAPACITY OF AT LEAST THAT REQUIRED BY PART 2 OF THE AISC MANUAL (9TH EDITION) IN THE SECTION "ALLOWABLE LOADS ON BEAMS", FOR THE GIVEN MEMBER AND STEEL SPECIFICATIONS. CONCENTRATED LOADS NEAR SUPPORTS MUST BE ADDED
6. CONNECTION DESIGNS BY FABRICATOR WILL BE SUBJECT TO REVIEW AND APPROVAL.
7. BOLTED CONNECTIONS SHALL USE BEARING TYPE GALVANIZED ASTM A325 OLTS (3/4" DIA.) AND SHALL HAVE A MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
8. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. GALVANIZED ASTM A307 BOLTS UNLESS NOTED OTHERWISE.

verizonwireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3500 TEL

ADVANCED ENGINEERING GROUP, P.C.

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A/E _____

AEC PROJECT NO: NA
DRAWN BY: DD
CHECKED BY: SA

SUBMITTALS

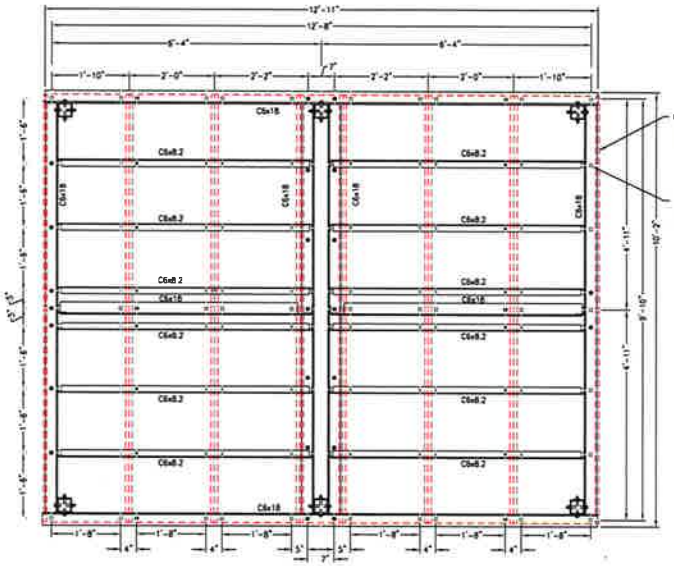
14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

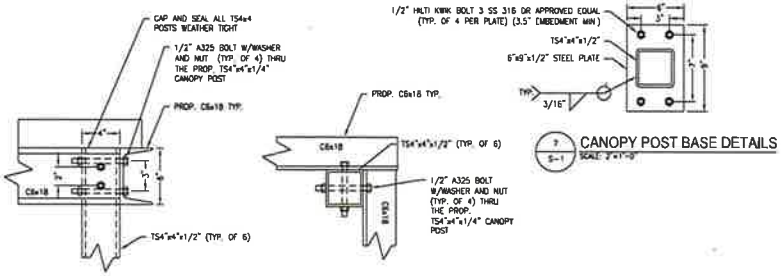
100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
ANTENNA PLAN, DETAILS & NOTES

SHEET NUMBER
A-3

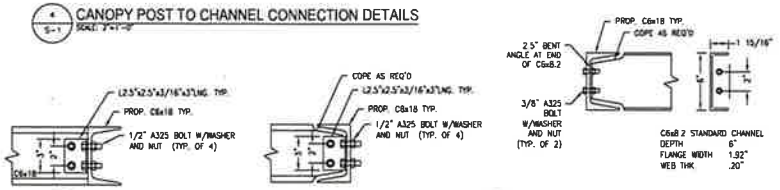


1 S-1 ICE CANOPY GRIP STRUT FRAMING PLAN
SCALE: 3/4"=1'-0"



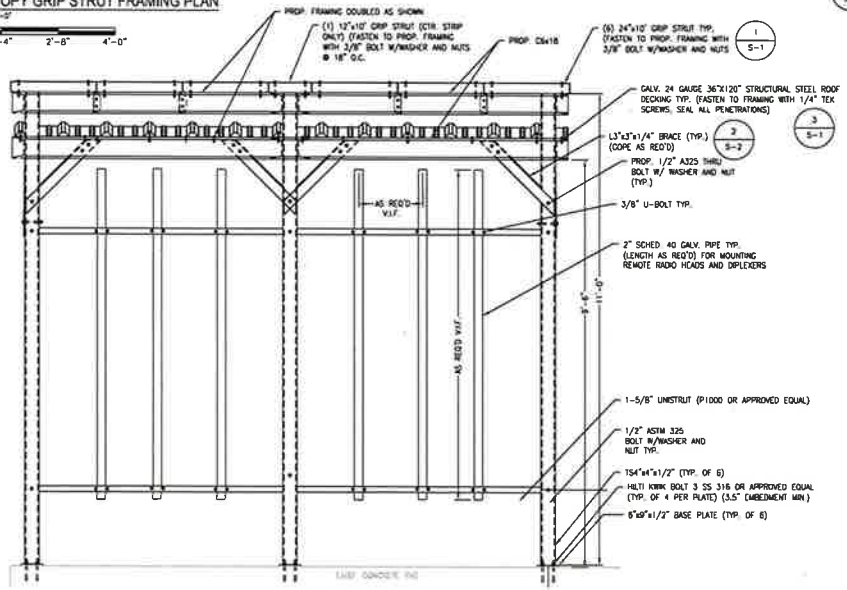
3 S-1 CANOPY POST BASE DETAILS
SCALE: 3"=1'-0"

4 S-1 CANOPY POST TO CHANNEL CONNECTION DETAILS
SCALE: 3"=1'-0"

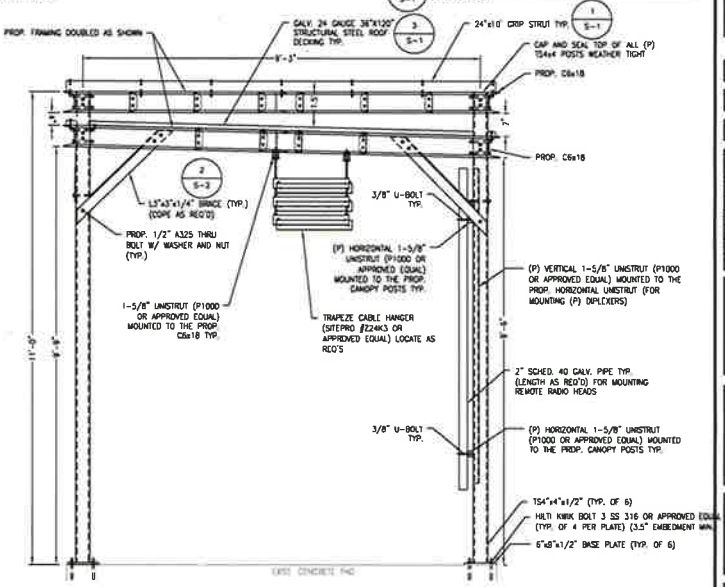


5 S-1 C6x18 TO C6x18 CONNECTION DETAILS
SCALE: 3"=1'-0"

6 S-1 C6x18 TO C6x8.2 CONNECTION DETAILS
SCALE: 3"=1'-0"



2 S-1 ICE CANOPY RRU FRAMING ELEVATION
SCALE: 3/4"=1'-0"



3 S-1 ICE CANOPY FRAMING ELEVATION
SCALE: 3/4"=1'-0"

verizonwireless
400 FERBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

EEG ADVANCED ENGINEERING GROUP, P.C.

APPROVALS

LANDLORD
LEASING
R.F.
ZONING
CONSTRUCTION
A/E

AEC PROJECT NO.	NA
DRAWN BY:	DD
CHECKED BY:	SA

SUBMITTALS

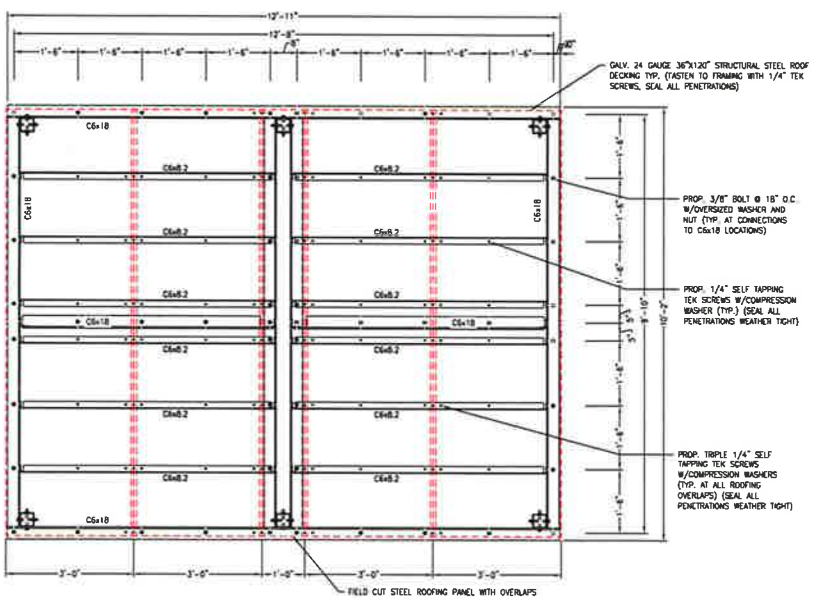
14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

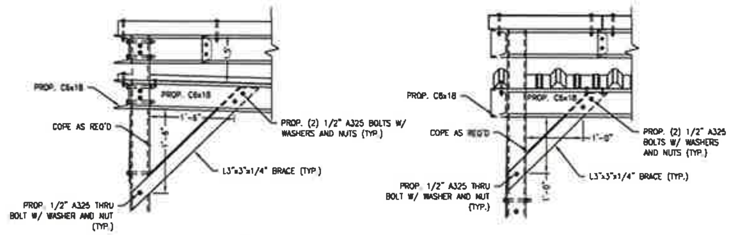
100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
CANOPY PLANS & DETAILS

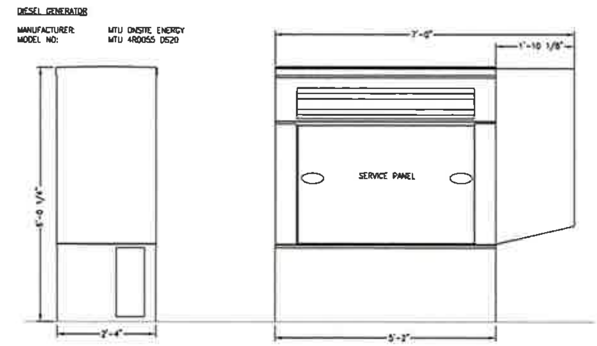
SHEET NUMBER
S-1



1 / S-2 ICE CANOPY STRUCTURAL STEEL ROOF FRAMING PLAN
SCALE: 3/4"=1'-0"



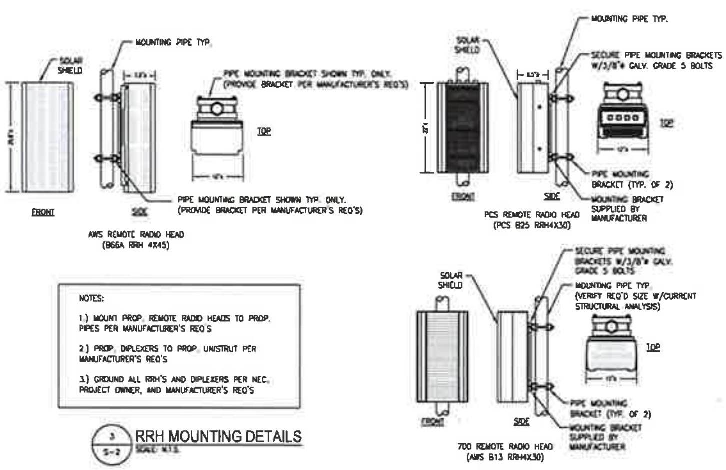
2 / S-2 BRACE DETAILS
SCALE: 1"=1'



GENERATOR NOTES:

1. CONTRACTOR TO VERIFY REQ'D MAKE AND MODEL WITH CM AND PROJECT OWNER
2. VERIFY REQ'D FUEL TANK SIZE WITH CM AND PROJECT OWNER
3. MOUNT GENERATOR TO CONCRETE SLAB PER MANUFACTURER'S REQ'S
4. GROUND PROP. GENERATOR PER MANUFACTURER'S REQ'S

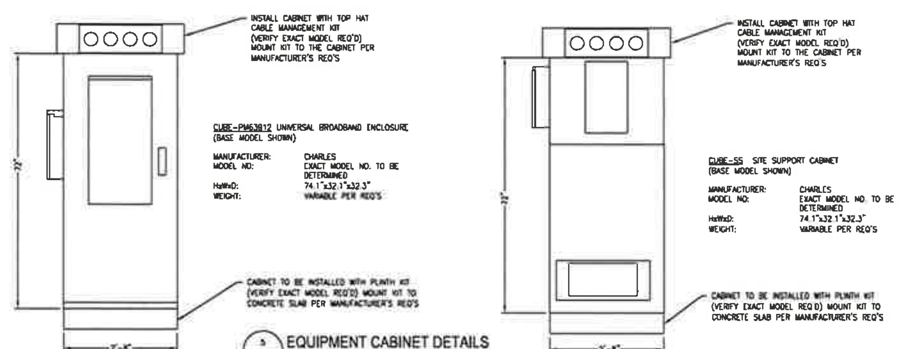
4 / S-2 GENERATOR DETAILS
SCALE: 3/4"=1'



NOTES:

1.) MOUNT PROP. REMOTE RADIO HEADS TO PROP. PIPES PER MANUFACTURER'S REQ'S
2.) PROP. DIPLEXERS TO PROP. UNISTRUT PER MANUFACTURER'S REQ'S
3.) GROUND ALL RRH'S AND DIPLEXERS PER NEC, PROJECT OWNER, AND MANUFACTURER'S REQ'S

3 / S-2 RRH MOUNTING DETAILS
SCALE: N.T.S.



5 / S-2 EQUIPMENT CABINET DETAILS
SCALE: 1"=1'

verizon wireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development Services - Telecommunications

APPROVALS

LANDLORD ______
LEASING ______
R.F. ______
ZONING ______
CONSTRUCTION ______
A/E ______

AEG PROJECT NO: NA
DRAWN BY: DD
CHECKED BY: SA

SUBMITTALS

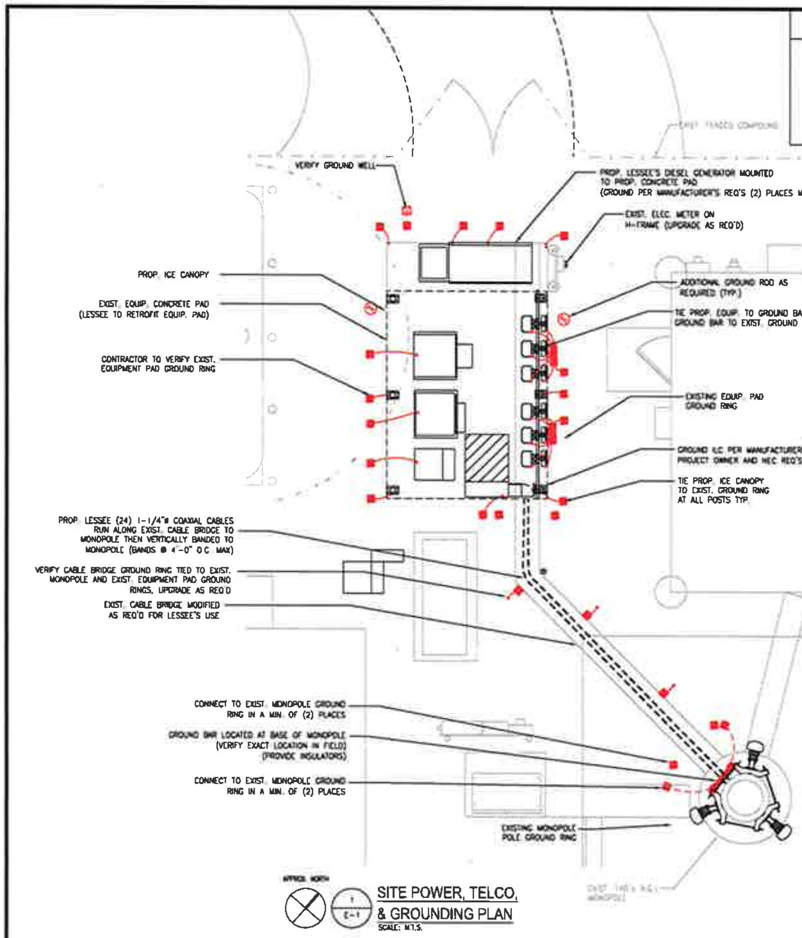
14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
CANOPY PLANS & DETAILS

SHEET NUMBER
S-2



1
E-1
SITE POWER, TELCO, & GROUNDING PLAN
SCALE: N.T.S.

GROUNDING LEGEND

■	EXOTHERMIC TYPE CONNECTION
●	COMPRESSION TYPE CONNECTION
- - - -	#2 SOLID TINNED COPPER WIRE UNLESS OTHERWISE NOTED
⊗	5/8" x 10'-0" COPPER CLAD GROUND ROD
⊠	GROUND WELL

ELECTRICAL NOTES

1. UTILITY SERVICES SHOWN ARE PROPOSED. THE ELECTRIC CONTRACTOR SHALL COORDINATE EXACT TELEPHONE AND ELECTRIC SERVICE CONNECTION POINTS, PULL BOXES, ROUTING AND ASSOCIATED REQUIREMENTS WITH LOCAL UTILITY COMPANIES.
2. VISIT SITE AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED. REPORT ADVERSE CONDITIONS IN WRITING TO LICENSEE. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS INCLUDING PREPARATORY WORK DONE BY OTHERS.
3. ALL EXISTING UNDERGROUND LINES ON SITE SHALL BE LOCATED PRIOR TO CONSTRUCTION.
4. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACK CHARGES, AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION.
5. PERFORM WORK AS REQUIRED BY BOCA AND PER LOCAL LAWS.
6. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND FIELD CONSTRUCTION MANAGER.
7. ALL EXTERIOR WALL PENETRATIONS SHALL BE SILICONE SEALED.
8. MATERIAL AND EQUIPMENT SHALL BE UL, NEMA, ANSI, IEEE, ADA & CBM APPROVED FOR INTENDED SERVICE. INSTALLATION SHALL MEET REQUIREMENTS OF NATIONAL AND STATE ELECTRICAL CODE.
9. ALL ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THEN THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C..
10. ALL NEW WIRING SHALL BE TYPE THWN RATED 75°C, 600 VOLT, WET OR DRY LOCATIONS. MINIMUM BRANCH CIRCUIT WIRING SHALL BE #12 AWG SOLID COPPER.
11. ALL METALLIC CONDUITS SHALL BE PROVIDED WITH BONDING BUSHINGS.
12. ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE TURNED OVER TO THE LICENSEE PROJECT MANAGER AT JOB COMPLETION.
13. PROVIDE THE OWNER WITH ONE SET OF COMPLETE ELECTRICAL "AS BUILT" DRAWINGS AT THE COMPLETION OF THE JOB.
14. GUARANTEE WORK IN WRITING FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS OR INSTALLATION AT NO COST TO OWNER. CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO COST TO OWNER.
15. CONTRACTOR SHALL CONTACT "DIG SAFE" (1-888-DIG-SAFE) PRIOR TO COMMENCEMENT OF WORK.

GROUNDING NOTES

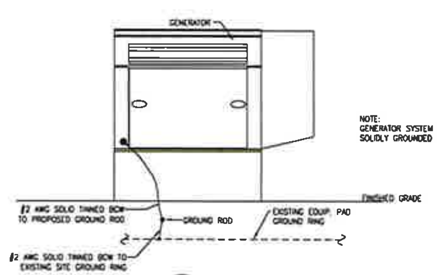
1. ALL GROUND WIRE SHALL BE BARE COPPER #2 AWG UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE INSTALLATION OF GROUND RODS AND GROUND RING WITH FOUNDATION AND UNDERGROUND CONDUIT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MIGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS SHALL EACH HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE (TYPICAL FOR FOUR MOUNTING PIPES PER SECTOR)
6. ANTENNA GROUND KITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
7. COORDINATE NEW LICENSEE GROUND SYSTEM WITH EXISTING SITE GROUND SYSTEM.
8. EACH SECTION OF CABLE TRAY, ICE BRIDGE AND ICE SHIELD SHALL BE CONNECTED IN A FASHION TO PROVIDE A CONTINUOUS GROUND.
9. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANELS, AND FRAMES OF EQUIPMENT, AND WHERE EXPOSED FOR GROUNDING CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE WITH STAINLESS STEEL SELF-TAPPING SCREWS.
10. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
11. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH LICENSEE PROJECT MANAGER.
12. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
13. INSTALL GROUND BUSHINGS ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANELBOARD.
14. GROUND ANTENNA BASES, FRAMES, CABLE RACKS AND OTHER METALLIC COMPONENTS WITH #2 GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
15. GROUND COAXIAL SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.
16. REINFORCEMENT IN EQUIPMENT SLAB TO BE WELDED AND REINFORCEMENT TO BE BONDED TO GROUNDING RING.
17. CONCRETE-ENCASED ELECTRODES GREATER THAN 20 S.F. OF SURFACE AREA & 1/2" OR GREATER REINFORCING STEEL MUST BE BONDED TO THE GROUNDING RING PER NEC 250.50.

GROUNDING NOTE:

CONTRACTOR TO VERIFY/TEST/USE EXISTING GROUNDING RING/SYSTEM AND UPGRADE AS REQUIRED TO MEET LESSEE'S RESISTIVITY REQUIREMENTS

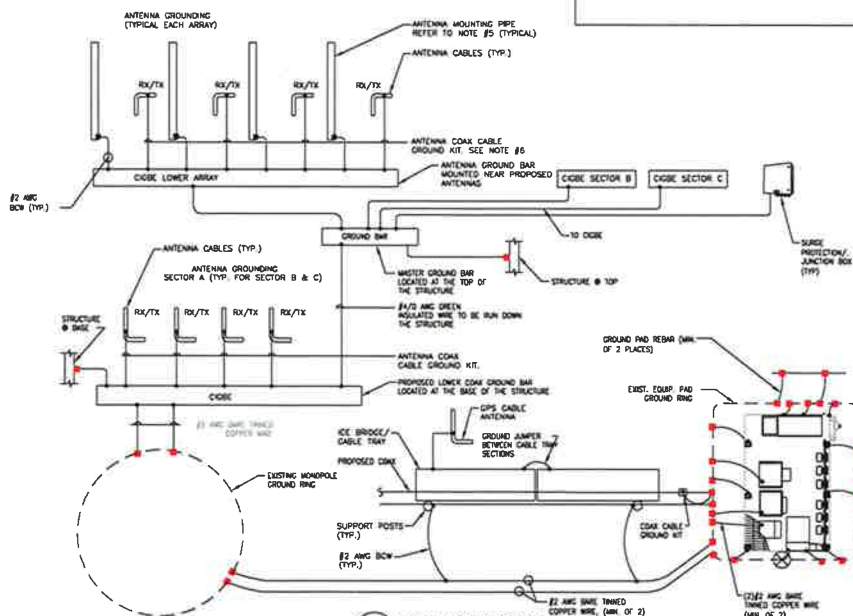
UTILITY NOTES:

1. EXISTING UTILITY CONDUITS TO EQUIPMENT PAD TO BE UTILIZED BY LESSEE SUBJECT TO CONDITION AND SIZE
2. EXISTING ELECTRIC METER ON H-FRAME TO BE UPGRADED AS REQUIRED



NOTE:
GENERATOR SYSTEM SHALL BE SOLIDLY GROUNDED PER NEC 250.20.

2
E-1
GENERATOR GROUNDING
SCALE: N.T.S.



3
E-1
GROUNDING RISER DIAGRAM
SCALE: N.T.S.

verizon wireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development Surveying - Telecommunications

APPROVALS

LANDLORD	
LEASING	
R.F.	
ZONING	
CONSTRUCTION	
A/E	

AEG PROJECT NO:	NA
DRAWN BY:	DD
CHECKED BY:	SA

SUBMITTALS

14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

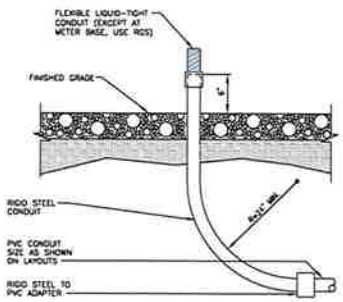
100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE

ELECTRICAL AND GROUNDING PLAN, NOTES & DETAILS

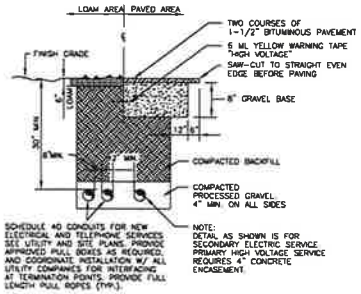
SHEET NUMBER

E-1



NOTE:
CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF CONDUIT STUB-UP.

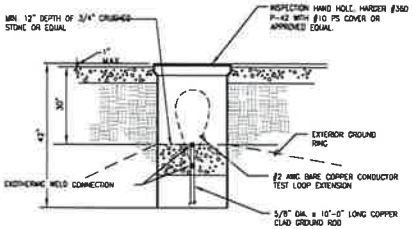
1 / E-2 CONDUIT STUB-UP
SCALE: N.T.S.



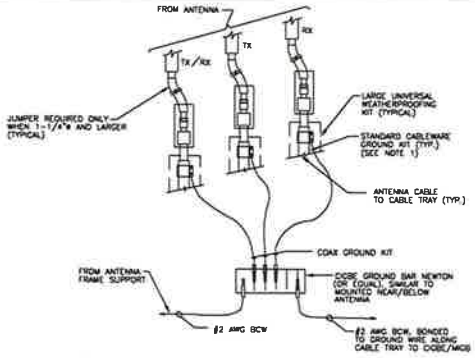
SCHEDULE 40 CONDUITS FOR NEW ELECTRICAL AND TELEPHONE SERVICES SEE UTILITY AND SITE PLANS. PROVIDE APPROVED PULL BOXES AS REQUIRED, AND COORDINATE INSTALLATION W/ ALL UTILITY COMPANIES FOR INTERFACING AT TERMINATION POINTS. PROVIDE FULL LENGTH PULL ROPES (TYP.).

NOTE:
DETAIL AS SHOWN IS FOR SECONDARY ELECTRIC SERVICE. PRIMARY HIGH VOLTAGE SERVICE REQUIRES 4" CONCRETE ENCASEMENT.

3 / E-2 TYP. DIRECT JOINT SERVICE BURIED CONDUIT DETAIL
SCALE: N.T.S.



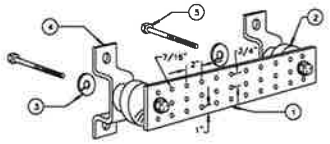
3 / E-2 GROUND WELL DETAIL
SCALE: N.T.S.



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

STANDARD DETAIL CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

4 / E-2
SCALE: N.T.S.



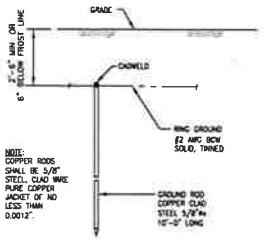
LEGEND

1- GALV. STEEL GROUND BAR. 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 30B1-4 OR EQUAL
3- 5/8" LOCKWASHERS OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" H.H.C.S. BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18-8 STAINLESS STEEL.

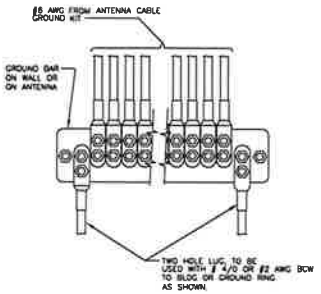
GROUNDING - STANDARD DETAIL IGROUND BAR

5 / E-2
SCALE: N.T.S.



NOTE:
COPPER RODS SHALL BE 5/8" STEEL CLAD WIRE PURE COPPER JACKET OF NO LESS THAN 0.0012".

6 / E-2 TYP. GROUND ROD DETAIL
SCALE: N.T.S.



NOTE:
1. CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS.

GROUNDING - STANDARD DETAIL INSTALLATION OF GROUND WIRES TO GROUND BAR

7 / E-2
SCALE: N.T.S.

verizonwireless
400 FRIBERG PARKWAY
WESTBOROUGH, MA 01581
(508) 330-3300 TEL

EGADVANCED ENGINEERING GROUP, P.C.
Civil Engineering • Site Development Surveying • Telecommunications

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A/E _____

AEC PROJECT NO: NA
DRAWN BY: DD
CHECKED BY: SA

SUBMITTALS

14	04/06/17	CONSTRUCTION REVISIONS
13	03/30/17	CONSTRUCTION REVISIONS
12	03/17/17	CONSTRUCTION REVISIONS
11	03/13/17	CONSTRUCTION REVISIONS
10	11/11/15	CONSTRUCTION REVISIONS
9	11/02/15	CONSTRUCTION REVISIONS
8	10/30/15	REVISIONS

WESTWOOD 6
CROWN # -842905

100 LOWDER BROOK DRIVE
WESTWOOD, MA 02090

SHEET TITLE
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER
E-2