



Northeast Site Solutions  
Denise Sabo  
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August 15, 2021

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Exempt Modification Application  
107 Buck Road, Hebron CT 06248  
Latitude: 41.654450  
Longitude: -72.410864  
Site#: 876387\_Crown\_Dish

Dear Ms. Bachman:

Based on the 2020 merger between T-Mobile and Sprint, and as part of the agreement, the DOJ required T-Mobile to divest some sites to Dish in order to create an additional wireless provider. This site is part of the agreement.

Dish Wireless LLC is requesting to file an exempt modification for an existing tower located at 107 Buck Road, Hebron CT 06248. Dish Wireless LLC proposes to install three (3) antennas at the 107-foot level of the existing 119.5-foot tower. The property is owned by Mapleleaf Farm Land Trust LLC and the tower is owned by Crown Castle. This modification includes hardware that is 5G capable.

**Dish Wireless LLC Planned Modifications:**

Remove:  
Antenna mount  
(12) DB844H90 Antenna

Remove and Replace: NONE

Install New:  
Commscope MC-K6MHDX-9-96 Mount  
(3) LMA MX08FRO665-20 Antenna  
(3) TA08025-B604 RRU  
(3) TA08025-B605 RRU  
(1) Raycap  
(1) 1-1/2" Hybrid

Existing to Remain:  
NONE



Ground Work: (within existing compound)

New H-Frame  
Equipment Cabinet  
Power/Telco Cabinet  
Ice Bridge  
7'x5' Steel Platform

The facility was approved by the Town of Hebron Planning and Zoning on February 10, 2000. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-SOj-73, a copy of this letter is being sent to Daniel Larson, First Selectman, Elected Official and Michael O'Leary, Town Planner Officer for the Town of Hebron, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, DISH Wireless LLC respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

*Denise Sabo*

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**NSS** **NORTHEAST**  
SITE SOLUTIONS  
*Turnkey Wireless Development*

Attachments cc:

Daniel Larson, First Selectman ([dlarson@hebronct.com](mailto:dlarson@hebronct.com))  
Town of Hebron  
15 Gilead Street Hebron, CT 06248  
860-228-5971, ext. 122

Michael O'Leary, Town Planner ([moleary@hebronct.com](mailto:moleary@hebronct.com))  
Town of Hebron  
15 Gilead Street Hebron, CT 06248  
860-228-5971, ext. 137

Mapleleaf Farm Land Trust LLC ([renedellis@aol.com](mailto:renedellis@aol.com))  
768 Gilead Street Hebron, CT 06248

Crown Castle, Tower Owner

# Exhibit A

## **Original Facility Approval**



# TOWN OF HEBRON

15 Gilead Street, Hebron, CT 06248

TEL (860) 228-5971 FAX (860) 228-5980

Planning/Zoning

Building

Health

Conservation

February 10, 2000

CERTIFIED MAIL

Spring PCS  
9 Barnes Industrial Road  
Wallingford, CT 06492

**RE: Petition 99-11, Application by Sprint PCS for Telecommunications Facility  
on Buck Road, R-1 District**

Dear Sprint PCS:

Please be advised that at the February 8, 2000 meeting of the Planning and Zoning Commission, the Commission took the following action on the above-referenced application:

Approved with the following conditions:

1. The overall height of the tower shall not exceed 100 (one hundred) feet.
2. The tower shall be modified to be of such design and treated with an architectural material so that it is camouflaged to resemble a woody tree with a single trunk and branches on its upper part, in a manner acceptable to the Commission, unless waived by the Commission.
3. The tower shall be permitted to accommodate a single PCS provider, as shown on the plans, plus a GPS antenna. Any other antenna, including a potential co-locator shall require a Special Permit Application to the Commission.
4. The chain link fence surrounding the leased area shall be a green colored vinyl clad mesh material.
5. Evergreen plantings, a minimum of 6 (six) feet in height, shall be planted in double staggered rows along the south, east, and north sides of the fenced area, shown on a plan acceptable to the Commission.
6. This facility shall comply, at all times, with the standards promulgated by the FCC for non-ionizing electromagnetic emissions, as amended. After the facility is operational, the applicant shall submit, within 90 (ninety) days of beginning operations from this site, and annually thereafter, existing and maximum future projected measurements of non-ionizing electromagnetic emissions as well as the Federal standard established for such emissions.
7. Any change from the battery powered emergency generator system, as proposed, shall require application to, and approval from the Commission.
8. The property owner and owner(s) of the facility shall execute a statement, to be recorded in the land records of the Town of Hebron, agreeing to the requirements of Subsection 8.23.10.
9. The plans shall incorporate the items contained in the report of the Town Engineer.
10. As specified by the applicant, no lighting shall be mounted on the tower, and any lights within the leased area shall be shielded from glare off the property.
11. A Disposal Plan is needed as to how to dismantle the tower, either due to Section 8.23.10, or due to a decision to discontinue use of the tower by Sprint.

## CERTIFIED MAIL

2-10-00

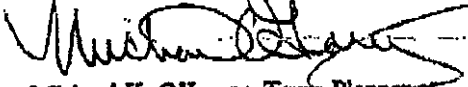
Sprint PCS

RE: Petition 99-11, Application by Sprint PCS for Telecommunications Facility (cont.)

Please have the plans revised to include the above conditions and forward one set of mylars and four blue-line sets of plans for signature by the Commission. Also, a Special Permit Certification must be filed in the Town Clerk's Office before the approval is effective. We will prepare the Certificate for you. A filing fee will be needed before filing with the Town Clerk.

If you have any questions, please call me.

Very truly yours,



Michael K. O'Leary, Town Planner  
for the Planning and Zoning Commission

MKO/1

cc: Petition File #99-11  
Thomas J. Regan, Esq., Brown, Rudnick, Freed, & Gesmer, PC  
Edward A. and Renee J. Ellis

TOWN OF HEBRON, CONNECTICUT  
PLANNING AND ZONING COMMISSION

IN RE: 99-11

APPLICATION OF SPRINT PCS  
FOR SPECIAL PERMIT TO CONSTRUCT  
A TELECOMMUNICATIONS TOWER  
ON A 131 ACRE PARCEL OF LAND ON  
BUCK ROAD IN THE TOWN OF HEBRON,  
CONNECTICUT.

FINDINGS OF FACT

At its regular meeting on February 8, 2000, pursuant to statutory notice, the Town of Hebron Planning and Zoning Commission considered the above-captioned application and acted upon same. At that time the Commission adopted the following findings in support of their action:

1. Sprint Spectrum, LP, d/b/a Sprint PCS (hereinafter "Sprint" or "Applicant"), is a telecommunications company created to provide wireless communication services known as Personal Communications Service ("PCS"). Sprint is duly authorized to construct, operate and manage a wireless personal communication system using the FCC radio license of its sister company, Wireless Co. LP. Under that agreement, Sprint is authorized to make this application on behalf of Wireless Co. LP.
2. Sprint is, specifically, a provider of PCS service. PCS is digital a digital technology. Although similar to analog cellular service, digital service works on a higher frequency and at a lower power than analog service. While this gives PCS a higher quality, the geographic area covered by a digital facility is smaller than that covered by an analog facility. The result is that a digital network requires more antennae.
3. A PCS network is a grid made up of a continuous series of overlapping cells. A cell is the geographic area serviced by any single antenna facility. The size of any given cell is determined by topography and vegetation. PCS antennae must be located above the height of surrounding trees or structures to be effective. When a PCS user moves from one cell to another the call is automatically transferred to the next cell without interruption. In order for this to work there must be some overlap of cells.
4. Sprint is not provider of analog service. As such, if a Sprint user reaches gap in digital service, the call will not automatically switch to analog service. Once a gap is reached the Sprint user's PCS call will be dropped, regardless of the availability of analog coverage in the area.
5. Sprint maintains that it is charged with the responsibility of providing wireless telephone service throughout Connecticut including the area in and around the Town of Hebron. Sprint further maintains that it has a mandate to provide "seamless" service coverage throughout Connecticut.

6. The cell which Sprint seeks to cover comprises a significant portion of central/eastern Hebron, along with parts of the westerly portion of Marlborough. Within the cell is that portion of Rt. 66 running east from the Rt. 85 intersection, and that portion of Rt. 85 running north of the intersection with Rt. 66

7. Sprint maintains that there is a gap in PCS coverage along Routes 66 and 85, and in the immediate surrounding areas of Hebron

8. With its application Sprint provided a computer-generated map showing gaps in coverage within Hebron and the surrounding area and bearing the description "Holes visible on portions of Rt. 66 & 85." The representation was based on computer modeling and reflected what coverage would be based on surrounding sites, but without the planned Buck Road facility.

9. As to the coverage gaps within the Town of Hebron, the computer-generated map showed a gap in coverage along Rt. 66 from just west of the Marlborough town line to just east of the intersection with Jennifer Drive. The claimed gap extends south of Rt. 66 to the western half of Hope Valley Road, and north of the highway into Gilead. The map also showed gaps along Rt. 85, one near the intersection with Prentice Hill Road, and two others between Martin Road and the intersection with East Street.

10. Virtually the entire gap identified by Sprint falls within residential zoned districts, R-1 north of Rt. 66 and primarily R-2 south of Rt. 66.

11. Virtually all the coverage gaps identified by Sprint within the Town of Hebron encompass substantial portions of the Town's designated inland wetlands and watercourses

12. The Applicant has complied with basic site plan content requirements of Section 8.23.6 in that either with its application or in the course of the hearings it submitted the following documentation:

- (1) A plan showing where/how proposed antenna would be affixed to the tower.
- (2) Details of proposed antenna including size and color.
- (3) Elevations and details of proposed shielding.
- (4) Elevations of proposed equipment boxes/buildings and details of landscaping/lighting.
- (5) Description of tower co-location capacity, number and type of antennas, positions for co-locators and collapsing design.
- (6) Statement that performance standards in Regulation 5.6.3 shall be complied with and site will not interfere with public safety communications.
- (7) An analysis of fall zone prepared by licensed engineer
- (8) Proof of FFC license.
- (9) Maps depicting (a) planned town coverage; (b) future planned sites/towers in Hebron; (c) service area of proposed site; (d) search radius of proposed site (e) all existing, approved and planned towers and structures over 40' in planned area.
- (10) Simulation of site to ascertain visual impacts.
- (11) Certified letters to similar providers seeking co-location opportunities.



13. The Buck Road site selected by Sprint is situated on the westerly one-third of the gap identified by Sprint in its application.

14. The neighborhood consists of predominantly open and forested, presently vacant, residentially zoned land, with residential development currently averaging two acres or more per household. The area is situated in an R-1 zone. The topography consists of rolling hills ranging from 350 feet to 685 feet above mean sea level. There are 28 property owners located within 200 feet of the Ellis property on which the proposed tower would be built. The areas residences are single-family homes.

15. The Ellis property on which the proposed tower would be located is a 131-acre parcel consisting of mostly wooded land, with some open space dedicated to farming/pasturing.

16. Within the property, the site selected for the tower would be 683 feet from Buck Road. The proposed location would put the tower roughly 450 feet from the three-lot Buck Road Subdivision and roughly 750 feet from the only existing residence pictured on Applicant's plans.

17. The facility proposed by Sprint for the Ellis property would consist of an access drive off of Buck Road, a 100-foot square equipment compound, and a 150-foot-tall "monopole" tower with antennae mounted upon it.

18. The monopole would be constructed of galvanized steel. It would have an antenna platform located at the top. The platform would consist of three sectors forming a horizontally situated triangle. On each of the three sectors there would be mounted up to three panel antennae, for a total of up to nine antennae per platform. Each individual antenna would be five feet high, six inches wide, and two inches thick. The antenna panels would be off-white in color. With additional potential co-locators, successive arrays of antennae/platform would be added at 10-foot increments along the pole.

19. Section 8.23.7 of Hebron's zoning regulations dictates minimum lot area and setback requirements for proposed telecommunications facilities. These are intended to achieve a minimum level of desired safety in the event of a structural failure and to achieve a sense of land use compatibility between diverse uses. Specifically, the regulations provide that a tower shall be located on a lot of two acres or more. The proposed facility on Buck Road complies with this requirement.

20. Section 8.23.7 of the regulations also dictates that all towers shall be setback from property lines the greater of 100 feet or the distance equal to one and one-half (1 1/2) times the tower height. This requirement includes all equipment/buildings related to the tower. Based on our review of the site plans we conclude that the proposed tower complies with the requirements of Section 8.23.7.3.

21. In addition, the Town's regulations require compliance with a number of general requirements contained within Section 8.23.8. With regard to those requirements we find the following:

- (1) The tower is not within 500' of any facilities identified in Section 8.

- (2) The proposed tower is not closer than three (3) times the tower height to any residence
- (3) The proposed tower, although over 75 feet, is not within 1000' of historic district.
- (4) The Applicant has produced evidence that the tower as planned would not require lighting in order to comply with FCC regulations.
- (5) The tower as planned would be galvanized and would weather to neutral gray.
- (6) The proposed tower is not located in town open space.
- (7) The proposed tower will be a monopole and will be designed to collapse upon itself.
- (8) Although the Applicant did not present any specific plan for camouflage of the proposed tower it did indicate a willingness to provide such camouflage if requested by the Commission.
- (9) The proposed tower at 150 feet will accommodate two additional users.
- (10) The site will be served by driveway and will have sufficient parking.
- (11) Not applicable.
- (12-13) The proposed facility will not include a dish antenna.
- (14) The site as designed will not interfere with public safety communications.
- (15) The site is not in Flood Hazard Plan.
- (16) Applicant has produced evidence that the design of the facility is such that it will comply with FCC standards for non-ionizing electromagnetic emissions
- (17) As designed all utilities leading to the tower will be underground. The compound will be surrounded by a 6-foot-high fence with locked gate and will be landscaped.
- (18) As proposed the facility will not include a generator and that no fuel will be stored.
- (19) Applicant has stated that Sprint personnel will visit the site at least monthly for maintenance and Sprint will be responsible for upkeep of the site.

22. The Commission is satisfied that there are no existing or approved towers, structures or buildings which would provide potential co-location opportunities.

23. Applicant has produced evidence to support the fact that once in operation the proposed tower facility would meet the following standards:

- a) The use will be carried on in such a manner and with such precautions against fire and explosion hazards as to produce no serious exposure hazard to adjacent property, and the storage of all flammable or explosive materials shall be in a manner approved by the Fire Marshall of the town of Hebron.
- b) The use will emit no offensive odors perceptible from any property line of the lot on which the operation is located, and shall emit no obnoxious, toxic or corrosive fumes or gases.
- c) The use will not exhaust, or waste into the air, dust created by any industrial operation in excess of one cubic centimeter of settled matter per cubic meter of air, or produce heat or glare perceptible from any property line of the lot on which the operation is located for a period exceeding three continuous minutes.
- d) Industrial and exterior lighting will not produce glare on public highways or neighboring property, or conflict with any traffic signals.

e) Smoke or other air contaminant will not be discharged into the atmosphere from any single source of emission for a period or periods aggregating more than three minutes in any one hour, which is as dark or darker in shade than as designated on No. 2 on the Ringelman Chart, as published by the United States Bureau of Mines, or which has of such opacity as to obscure an observers' view to a degree equal to or greater than does smoke designated as No. 2 on the Ringelman Chart.

f) The use will be operated in conformance with the following performance standards governing noise, and no sound pressure level shall exceed the decibel levels in the designated octave bands shown in Section 5.6.3 of the Hebron Zoning Regulations, with sound measurements being made in accordance with that section.

24. The site chosen for the proposed tower is in a residential zone, specifically, an R-1 district. Given that the proposed tower is over 75 feet tall the proposed site for this telecommunications facility is clearly the least favored location as defined by the town's zoning regulations.

~~25. However, the gap in coverage that Sprint seeks to fill falls entirely within residential districts of this town.~~

26. Based on the evidence presented and our own review of the topography and vegetation in the area, we are satisfied that in order to provide any reasonable degree of coverage along the Rt. 66 corridor the Sprint must locate its antenna facility within a residential area.

27. In the abstract, the Ellis parcel on Buck Road, given its size, its present use, the fact that it is about ¼ wooded and is largely vacant, and given its proximity to Rt. 66 we find that the 131-acre parcel in question is a reasonable location for a telecommunications facility, given the restrictions placed upon us by the Federal Telecommunications Act of 1996.

28. The average tree height in the area of the proposed site is approximately 75 feet.

29. As for the specific location of the proposed tower and compound within the 131-acre parcel, the neighbors have expressed great concern about the location of the tower in such proximity to their residences.

30. The proposed site is on a large parcel of land (131 acres) that could contain the site further from established residences. The proposed tower is approximately 750' to the closest residence. The Commission asked the applicant if the tower could be moved into the open field (and perhaps camouflaged) further from the established residences. The applicant responded that the tower could be moved slightly in one direction or the other but essentially had to stay very close to the proposed site or coverage would be lost on Rt. 66.

31. Evidence as to the applicant's statement that moving the site into the open field would not work was not provided by the applicant. A 100' propagation map was asked of the applicant for the site in the open field. The applicant responded with the need to fill the cell with a 150' tower and further studies are not necessary.

32. Indeed, the chosen site is much closer to both the public road and to the neighbors than would be necessary simply based on the size of the parcel. In assessing the appropriateness of this specific location there are several factors to consider under our Regulations.

33. We find that given the setbacks and distances from surrounding residences, even at 150-feet the proposed tower, as located, would not pose a risk to the health and safety of the local residents in the event of a structural failure. Moreover, given that the Applicant will not be storing hazardous materials at the site, we find that the equipment in the compound would not present a hazard to neighbors.

34. While the Commission recognizes and understands the concerns of the neighbors about the possible effects of radio frequency radiation, this Commission cannot consider such concerns so long as the facility, as planned, is in compliance with FCC guidelines. We find that the applicant has submitted sufficient documentation to satisfy us that the proposed facility will be well within FCC guidelines.

35. During the public hearing the applicant submitted data from other towns to support their contention that there would be no negative impact on the value of surrounding property in this case. Members of the public opposed to the tower also submitted material suggesting that towers do tend to decrease property values. No evidence was submitted by anyone, however, regarding the value of the properties surrounding this particular site and no direct opinion evidence was submitted as to any potential impact of a tower at this site on neighboring property values.

36. While there are questions about the methodology of the studies provided by the applicant, and questions about the applicability of those studies to this neighborhood in Hebron, the commission concludes for the purpose of this application that there is no credible evidence that the placement of a PROPERLY CAMOUFLAGED telecommunications tower at this site on Buck road would seriously harm the surrounding property values.

37. The commission finds that the proposed tower facility would have an impact on the "appearance and beauty" of the community.

38. However, any tower significantly higher than the tree height would be visible from the surrounding neighborhood.

39. In order to achieve coverage on Rt. 66 it will be necessary to place a tower in such a position that it will rise above the tree height.

40. Based on the evidence presented in the hearings we find that, assuming proper camouflage of a nature acceptable to the Commission, the location of a telecommunications tower of some height at the proposed location would be appropriate, in light of the restrictions place upon us by Federal Telecommunications Act.

41. Hebron's zoning regulations provide "The maximum height of a tower proposed under this regulation shall be 150 feet including the antenna and all other appurtenances and shall not exceed the minimum height necessary to carry out the function of the facility

42. Sprint's radio frequency engineer, Alessandro Ponce, stated that Sprint's main concern was covering Rt. 66 and Rt. 85. He said that most of the cellular traffic comes from people driving on the roads and that Route 66 and Route 85 provide a lot of traffic. In short, Sprint's main objective in placing a tower at the Buck Road site is to "cover the main thoroughfares through Town."

43. Sprint does not believe that the cell will be filled at a lower height than 150 feet. To illustrate this point, Mr. Ponce presented at the October 12, 1999 hearing a propagation study showing what the coverage would be if the Buck Road tower were limited to 120-feet. This study was prepared by Sprint not in response to any request by the Commission but because it was aware of subsequent changes in the town's zoning regulations capping tower height at 120 feet. Those revisions in the regulations, however, are inapplicable to this application.

44. At the October 12, 1999 hearing a Commission member specifically questioned whether the amount of coverage shown at 150 feet and the amount shown at 120 feet was significantly different, questioning the value of the higher tower. Sprint's response to this was that it had only generated the 120-foot study because "we know the Town's preference for a tower at that height." The Applicant's spokesman went on to say:

"... to be honest with you, it probably hurts more than helps showing you that because when you look at a blob of green and a blob of blue, I agree with you. It doesn't look significantly different, but I guess from our perspective, the important point for you to hear is that the tower at 120 feet, in our opinion, doesn't fulfill the coverage need."

45. At the November 9, 1999 hearing Sprint provided each Commission member a packet of propagation studies for the Buck Road site, each reflecting the coverage achieved by a different height tower. The packet was supposed to have included a map again showing the limitations of a 120-foot tower at the proposed site, but for some reason this 120-foot propagation study was not included in the packet of propagation studies provided to the individual commissioners at that hearing. A copy was provided to the Commission staff and the Commission members had an opportunity to review this in detail at a subsequent meeting.

46. The 120-foot study submitted on November 9, 1999 had been prepared on November 4, 1999. This study actually showed worse coverage than had been reflected by the 120-foot study presented at the first hearing, i.e. the one conducted sua sponte by Sprint on October 12, 1999. Specifically, the November 4, 1999 study demonstrated a larger gap in coverage along Rt. 66 west of the Marlborough town line, and it also showed a *new* gap on Rt. 66 in the area of Stone House Lane.

47. On careful comparison of the two studies it is clear that the location of the hypothetical 120-foot tower on the second study was at a different longitude and latitude that had been reflected on the first study.

48. With its application Sprint submitted a propagation study map dated July 19, 1999 purporting to show the coverage that would be achieved by the proposed 150 foot tower (560-02) that map being further identified as "Holes covered on portions of Rt. 66 & 85."

49. That July 19, 1999 propagation study showed that a 150-foot tower would achieve a substantial increase in coverage in the sparsely populated areas north and south of Rt. 66. It also showed that such a tower would eliminate the significant gap along Rt. 66 between the Marlborough town line and Jennifer Drive. However, the study showed that the proposed tower would not close the gap on Rt. 66 west of the town center. Further, the study also showed that the gaps on Rt. 85, while modestly reduced by the 150-foot Buck Road tower, would not be eliminated.

50. Even Sprint's own expert admitted that the 150-foot tower as proposed would still leave gaps along Route 66. Any gap, no matter how small, will cause the traveling caller to drop his call.

51. At the time of the October 12, 1999 hearing a Commission member raised questions about the fact that the 150 foot tower would not be able to achieve the seamless coverage that Sprint was putting forth as justification for the tower. At that time the available propagation study for 150 feet was the one prepared on July 19, 1999 and included in the application materials.

52. The propagation study prepared on November 4, 1999, and entered into the record at the December 7, 1999 hearing, showed greater coverage with a 150-foot tower than had been reflected in the July 1999 study submitted with the application. Specifically, the November version eliminated the gap on Rt. 66 west of the town line completely, eliminated the northernmost gap on Rt. 85 (near Prentice Road), and eliminated a small gap on Rt. 85 near Hills Farm.

53. To help evaluate the technical data the Commission retained the services of a consultant, CompComm, a telecommunications-engineering firm from New Jersey. John W. Sieber, PE, an engineer with CompComm, reviewed the materials provided by the applicant prior to the first public hearing. Among other things, CompComm's initial evaluation highlighted the need to request propagation studies from Sprint showing potential coverage at heights less than 150 feet, including 125 feet, 100 feet and 80 feet.

54. After reviewing the additional submissions of Sprint, Mr. Sieber opined that when existing coverage is factored in the proposed 150-tower "covers very little new area" than would be covered by a 120-foot tower. CompComm found no significant difference in coverage within Hebron with a 120-foot tower than with a 150-foot tower.

55. Based on our own review of the propagation studies, the Commission is convinced that a tower of 150 feet at the proposed site would provide no greater coverage on Rt. 66 than would a tower of 120 feet at that same location. The only effect that the placement of a 120-foot tower at the site rather than a 150-foot tower would have on Rt. 85 would be to slightly increase the size of one of the gaps that would exist even with the 150-foot tower.

56. The applicant stated that three candidate sites were evaluated for this tower application. The applicant stated that the other sites were north and south of the selected site on Buck Road. Applicant stated that it chose the Ellis site because it was a large parcel. Applicant did not provide propagation maps for the two sites not selected.

57. On their own initiative, the applicant did not provide the Commission with any alternatives to the proposed site at Buck Road. Only one propagation map with a lower height on the proposed site was provided.

58. From the very first hearing the commission made it clear that it wanted to explore the possibility of obtaining coverage in town through the use of smaller, more numerous towers. On several occasions, including the October 12, 1999 and November 9, 1999 hearings, the Commission asked that Applicant provide propagation maps for two specifically-named alternative sites (Lions' Park and Main Street Firehouse), as well as other potential sites which in combination might provide similar coverage with multiple, shorter towers.

59. Throughout the course of the hearings sprint demonstrated an unwillingness to consider alternative sites involving varying heights of towers at two or more locations on the same site.

60. The applicant ultimately provided the commission with a few maps, namely existing coverage with other proposed towers; coverage from the proposed site with 150', 120' and 100' towers; coverage from the Main St. Firehouse (150') and Lions' Park (150'). When the Commission finally received maps of combined multiple sites, the applicant used only the two alternative sites specifically referenced by the Commission (Lions Park and fire station) and simply used 80' at all three sites.

61. The Commission did not receive propagation maps as requested for multiple sites with varying combinations of heights to determine if alternatives were feasible, nor were any other alternative combination of sites provided by the applicant. In other words, propagation maps requested to determine the applicant's compliance with Section 8.23.8.20 of the regulations were not provided.

62. In response to a request for alternative site propagation studies made at the November 9, 1999, sprint stated that "at some point when you start requiring us to put multiple towers on a site, it becomes economically prohibitive for us to fill the cell." No cost data was ever submitted as evidence to back up this claim of "economic prohibitiveness".

63. When pressed on the issue of the economic factors Sprint responded, "I think at this point, our position is we're prepared to put one tower in this cell."

64. Sprint's representative also stated: "(W)e have submitted to you what we feel we're capable of putting in this area to fill this cell. If the Commission feels that we've not proven the necessity of the tower, then they have the ability to deny the application and we have the ability to pursue whatever remedies are available to us."

65. Accurate propagation maps are critical to determine compliance with the regulations.

66. The map of coverage dated November 4, 1999 produced by applicant to show the extent of coverage from the proposed site with only a 100-foot tower, actually shows results that are virtually identical as those produced by applicant on the same date but designed to reflect coverage from the site with a 120-foot tower. Comparing the 100-foot study and the 120-foot study, it is clear that coverage in the vicinity of Rt. 66 and Rt. 85 is virtually unchanged and coverage in the outlying areas is also quite similar.

67. On 11/9/99 the applicant's representative stated that a 150-foot tower would provide 27.2 sq. mi. of coverage, a 120-foot tower would provide only 9 sq. mi. coverage, and a 100-foot tower would provide a meager 3.5 sq. miles of coverage. Based on our review of the propagation studies we find that this assertion is simply not credible.

68. CompComm analyzed a number of alternative antenna arrangements. CompComm identified two locations, which in combination would allow Sprint to provide the requisite coverage on both Rt. 66 and Rt. 85 with lower towers than that proposed for the Buck Road site.

69. CompComm, in its report dated 12/3/99, stated that coverage similar to what Sprint seeks at 150 feet can likely be achieved with multiple, lower towers and the studies provided by Sprint do not demonstrate the necessity of a 150' tower. The report states, "*The propagation studies submitted by Sprint do not demonstrate the need for the taller structure.*"

70. The CompComm report went on to also make note of the questionable assertion about the amount of decreased coverage that would result for a shorter tower. Specifically, CompComm stated, "*These studies show a major decrease in coverage area when the antenna height is decreased by only 30 feet - from 150' to 120', which is still well above the tree line and most of the surrounding terrain. This difference should not cause a coverage difference this extreme.*"

71. The CompComm report went on to state, "*The studies show that coverage on Route 66 and Route 85 in Hebron are similar with the proposed antenna at 150 feet and 120 feet... When the antenna is lowered to 100 feet, the signal along Route 66 is similar and the signal along Route 85 decreases further. From the simulations, CompComm recommends a maximum height of 120 feet at this location to reduce visual impact.*"

72. CompComm undertook an independent analysis of alternative sites in town. Based on their review, CompComm stated, "*Our conclusion is that coverage of the areas of concern could likely be achieved through a combination of smaller towers on certain alternative sites.*" "*The best single site alternative is Site V on the map.*" (a site southeast of the proposed site, south of Route 66 and west of Route 85). *Another approach would be to allow two sites to provide the same coverage. The best combination of sites in this case is Site III and Site VII. These would provide the required coverage to both Route 66 and Route 85 with lower towers than the single site solution demonstrated in the application.*"

73. Putting aside momentarily the question of coverage on Rt. 66 and Rt. 85, most of the additional coverage gained by building a 150-foot tower over a 120-foot tower would be in largely uninhabited, sparsely populated and heavily wooded portions of town, most of which fall within wetlands.



74. Sprint conducted a Visual Resource Evaluation study within a two-mile radius of the site. The evaluation was conducted three separate times, September 24, October 2, and October 30, 1999. Between the first and last study deciduous trees had lost some but not all foliage cover. Because not all foliage had dropped by October 30, 1999 visual impact may be greater than estimated, or in places not anticipated, since Sprint could not predictively "remove" leaves in its predictive model."

75. Likewise, Visual Resource Evaluation may be slightly skewed since conflicting testimony was given as to the intensity of the wind. The wind may have lowered the balloon so it did not fly at 150 feet. Therefore, visual simulations may be lower than actual 150 feet.

76. Based on the evidence presented at the hearings, and the statements and testimony of the applicant's representatives, along with a detailed review of the propagation studies and the supporting opinions of the expert retained by the Commission, we find:

a. That the proposed facility is not within a historic district and the provisions of Section 8.23.9.1 are inapplicable.

~~b. That, while the site chosen by the Applicant is not an inappropriate site for some type of telecommunications tower facility, the Applicant has failed to show that it has made diligent efforts to minimize the proximity of the facility to, and its visibility from, residential properties.~~

c. That the proposed location is not a preference 1 through 2 location, but that the applicant has adequately described the efforts and measure taken to pursue those preferences and why a higher preference location was not technologically, legally or economically feasible.

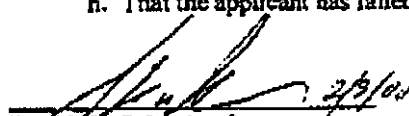
d. That the applicant has failed to demonstrate to the Commission's satisfaction, the necessity of the height of the proposed telecommunications tower.

e. That the proposed tower of 150 feet exceeds the minimum height necessary to carry out the function of the facility.

f. That the function of the facility, and the coverage goals stated by the applicant, could be carried out and satisfied at the proposed location with a 100 foot tower, and that 100 feet is the minimum antenna height needed to carry out the function of the facility.

g. That the nature of the area and neighborhood is such that any tower at the proposed site, if higher than the tree canopy, could be camouflaged and that camouflage is reasonable and necessary to protect the well being and property values of the neighborhood.

h. That the applicant has failed to provide an abandonment plan.

  
David W. Schoolcraft  
Chairman, Hebron Planning and  
Zoning Commission

# Exhibit B

## Property Card

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2016.



Information on the Property Records for the Municipality of Hebron was last updated on 4/12/2021.

### Parcel Information

Location:	107 BUCK RD	Property Use:	Vacant Land	Primary Use:	Commercial Vacant Land
Unique ID:	4018	Map Block Lot:	42-3X.A	Acres:	1.04
490 Acres:	0.00	Zone:	R-1	Volume / Page:	0568/0605
Developers Map / Lot:		Census:	5261		

### Value Information

	Appraised Value	Assessed Value
Land	165,000	115,500
Buildings	0	0
Detached Outbuildings	0	0
Total	165,000	115,500

## Owner's Information

### Owner's Data

MAPLELEAF FARM LAND TRUST LLC  
(CT33XC560)  
C/O GLOBAL SIGNAL ACQ II  
PMB 331 4017 WASHINGTON RD  
MCMURRAY PA 15317

## Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Cell Tower	2000	0.00	0.00	1

## Owner History - Sales

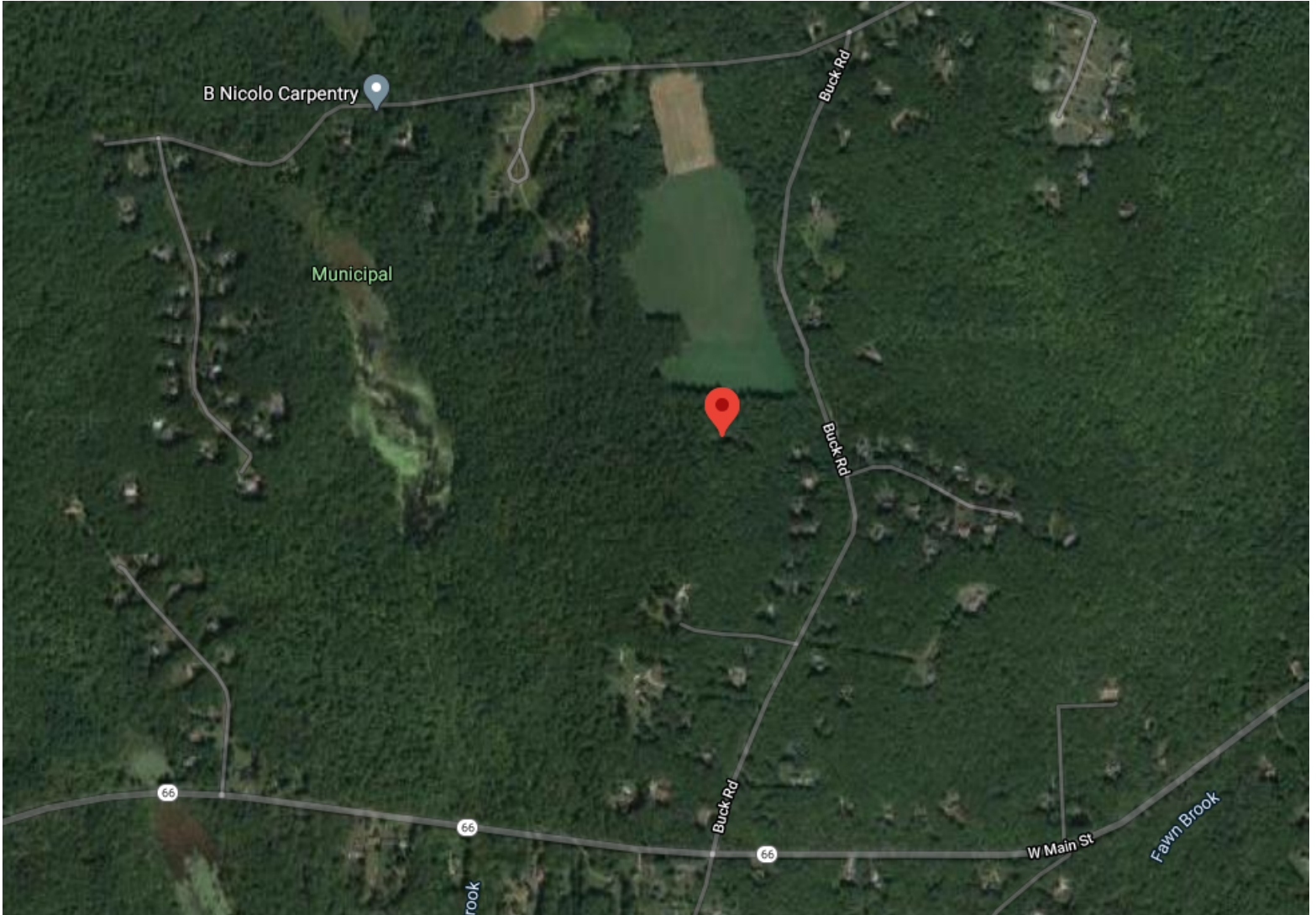
Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
MAPLELEAF FARM LAND TRUST LLC	0568	0605	05/18/2020		No	\$0
ELLIS EDWARD A & RENEE	0435	0526	04/29/2008		No	\$0
ELLIS EDWARD A&RENEE(CT33XC560	0134	0493	09/29/1988		No	\$0

## Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
27235	Comm Renovations	09/18/2018		Closed	SPRINT TO REPLACE 6 ANTENNAS W/ 9 REMOTE RADIO HEADS
14-188B	Other	01/27/2014		Closed	
2012-21150	Mechanical	01/16/2013		Closed	
2011-20817	Mechanical	12/13/2011		Closed	CHANGE 12 ANTENNAS
11528B	Outbuilding/Yard Item	06/28/2004		Closed	

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
11780	Mechanical	08/07/2002		Closed	

Information Published With Permission From The Assessor



# Exhibit C

## **Construction Drawings**



DISH Wireless L.L.C. SITE ID:  
**BOBDL00099A**

DISH Wireless L.L.C. SITE ADDRESS:  
**107 BUCK RD.  
HEBRON, CT 06248**

SCOPE OF WORK	
THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:	
<b>TOWER SCOPE OF WORK:</b>	
<ul style="list-style-type: none"> <li>• REMOVE OLD NEXTEL EQUIPMENT AT 107'-0" AGL</li> <li>• INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)</li> <li>• INSTALL (1) PROPOSED TOWER PLATFORM MOUNT</li> <li>• INSTALL PROPOSED JUMPERS</li> <li>• INSTALL (6) PROPOSED RRU's (2 PER SECTOR)</li> <li>• INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)</li> <li>• INSTALL (1) PROPOSED HYBRID CABLE</li> </ul>	
<b>GROUND SCOPE OF WORK:</b>	
<ul style="list-style-type: none"> <li>• INSTALL (1) PROPOSED METAL PLATFORM</li> <li>• INSTALL (1) PROPOSED ICE BRIDGE</li> <li>• INSTALL (1) PROPOSED PPC CABINET</li> <li>• INSTALL (1) PROPOSED EQUIPMENT CABINET</li> <li>• INSTALL (1) PROPOSED POWER CONDUIT</li> <li>• INSTALL (1) PROPOSED TELCO CONDUIT</li> <li>• INSTALL (1) PROPOSED TELCO-FIBER BOX</li> <li>• INSTALL (1) PROPOSED GPS UNIT</li> <li>• INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)</li> </ul>	

SITE INFORMATION	PROJECT DIRECTORY
PROPERTY OWNER: ELLIS EDWARD A & RENEE, (CT33XC560) ADDRESS: PMB 331 4017 WASHINGTON RD MCMURRAY, PA 15317	APPLICANT: DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER TYPE: MONOPOLE	TOWER OWNER: CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486-9377
TOWER CO SITE ID: 876387	SITE DESIGNER: B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587-4630
TOWER APP NUMBER: 556601	SITE ACQUISITION: NICHOLAS CURRY (704) 405-6600
COUNTY: TOLLAND	CONSTRUCTION MANAGER: JAVIER SOTO JAVIER.SOTO@DISH.COM
LATITUDE (NAD 83): 41° 39' 16.02" N 41.654450 N	RF ENGINEER: BOSSENER CHARLES BOSSENER.CHARLES@DISH.COM
LONGITUDE (NAD 83): 72° 24' 39.11" W 72.410864 W	
ZONING JURISDICTION: CONNECTICUT SITING COUNCIL	
ZONING DISTRICT: R-1	
PARCEL NUMBER: 09013067-42-3X.A	
OCCUPANCY GROUP: U	
CONSTRUCTION TYPE: II-B	
POWER COMPANY: EVERSOURCE	
TELEPHONE COMPANY: T.B.D	



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



1717 S. BOULDER  
SUITE 300  
TULSA, OK 74119  
PH: (918) 587-4630  
www.btgrp.com



**B&T ENGINEERING, INC.**  
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Expires 2/10/22

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DRAWN BY: JJR	CHECKED BY: MDW	APPROVED BY: MDW
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RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

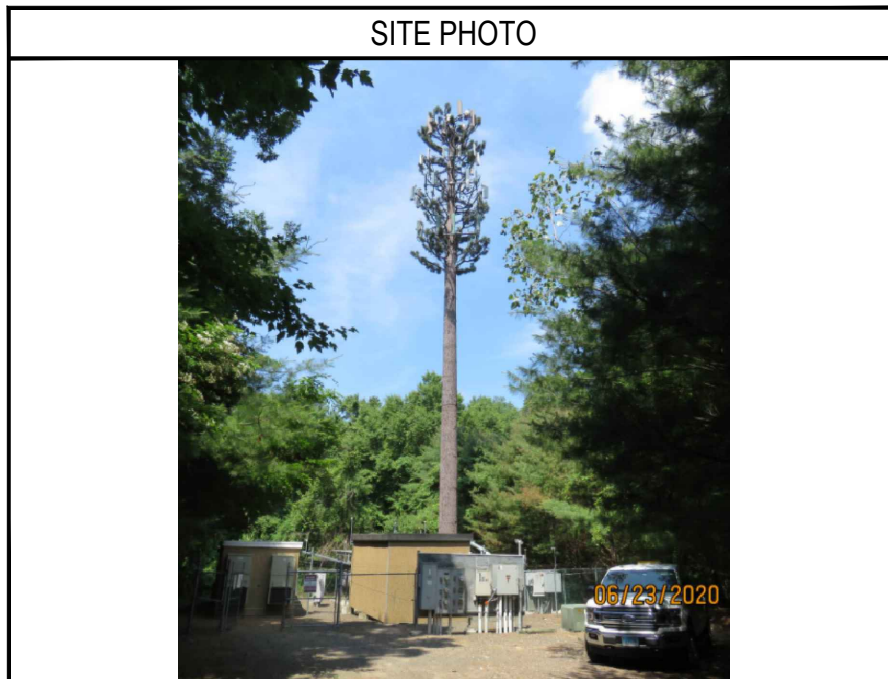
SUBMITTALS		
REV	DATE	DESCRIPTION
A	5/27/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C.  
PROJECT INFORMATION  
**BOBDL00099A**  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
TITLE SHEET

SHEET NUMBER  
**T-1**



**UNDERGROUND SERVICE ALERT CBYD 811**  
UTILITY NOTIFICATION CENTER OF CONNECTICUT  
(800) 922-4455  
WWW.CBYD.COM  
CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

**GENERAL NOTES**

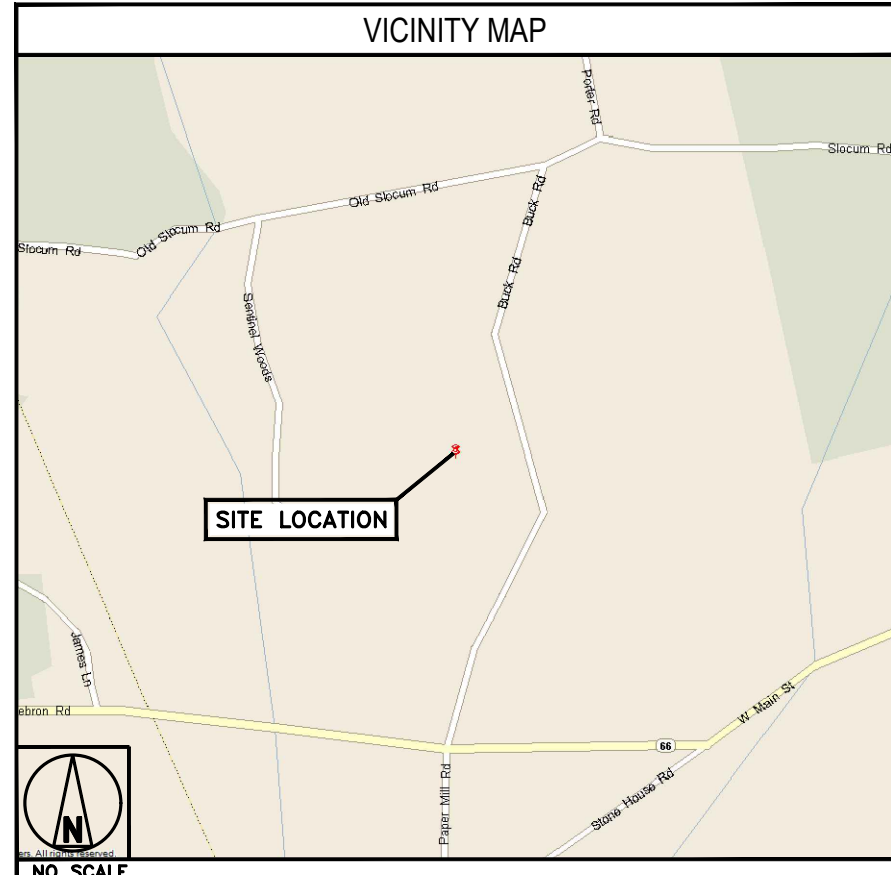
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE, NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

**DIRECTIONS**

**DIRECTIONS FROM DISH Wireless L.L.C. DISTRICT OFFICE:**  
TAKE ROUTE 2 EAST TO EXIT 13. TAKE ROUTE 66 NORTHEAST AND TURN LEFT ON BUCK ROAD. ACCESS GATE ON LEFT 1/2 MI. \*NOTE\* SAI PLOWS SITE.



**CONNECTICUT CODE COMPLIANCE**

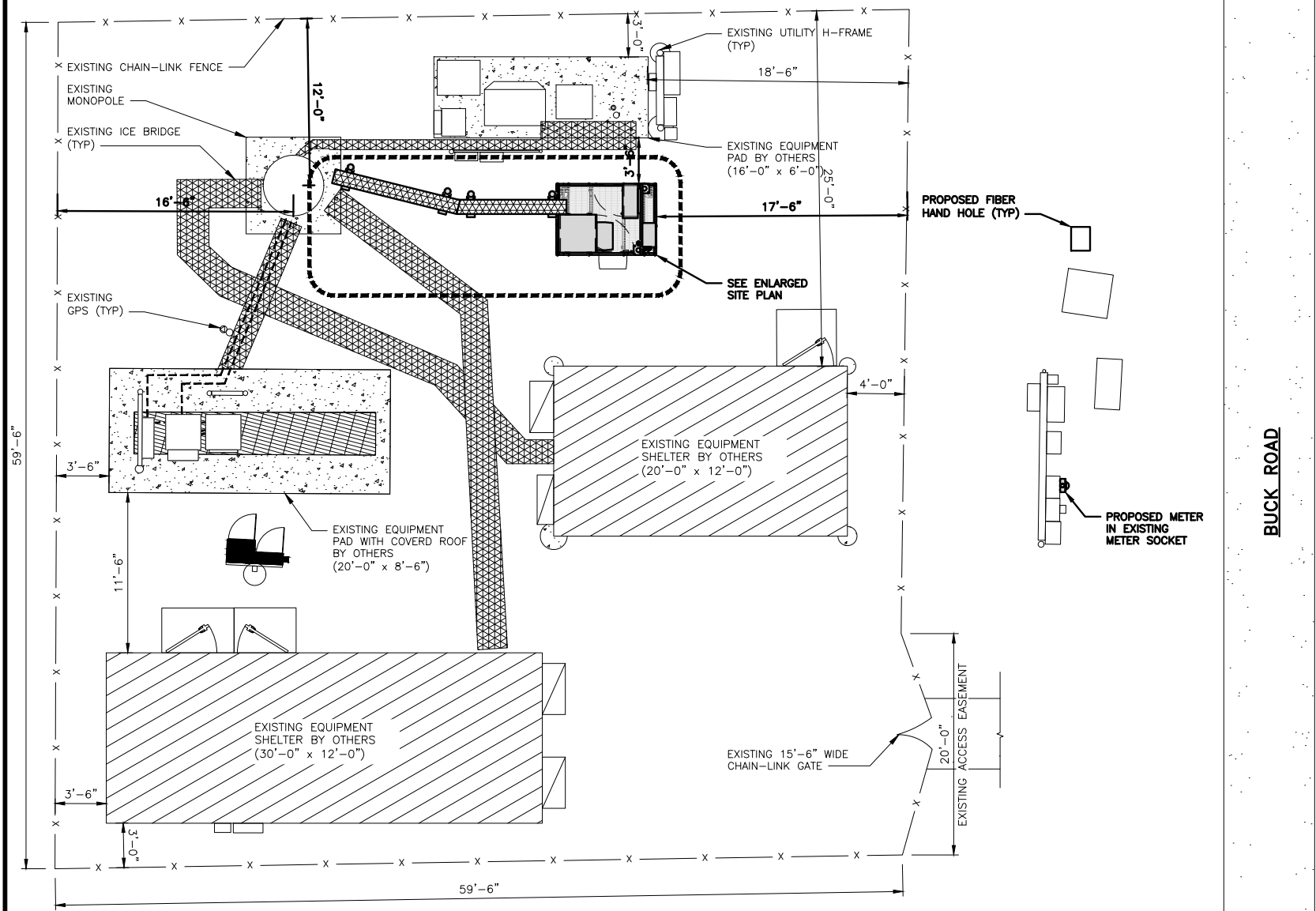
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

**SHEET INDEX**

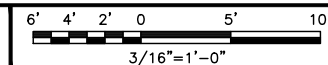
SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE
G-1	GROUNDING PLANS AND NOTES
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
RF-2	RF PLUMBING DIAGRAM
GN-1	LEGEND AND ABBREVIATIONS
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES

1  
A-2



**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.

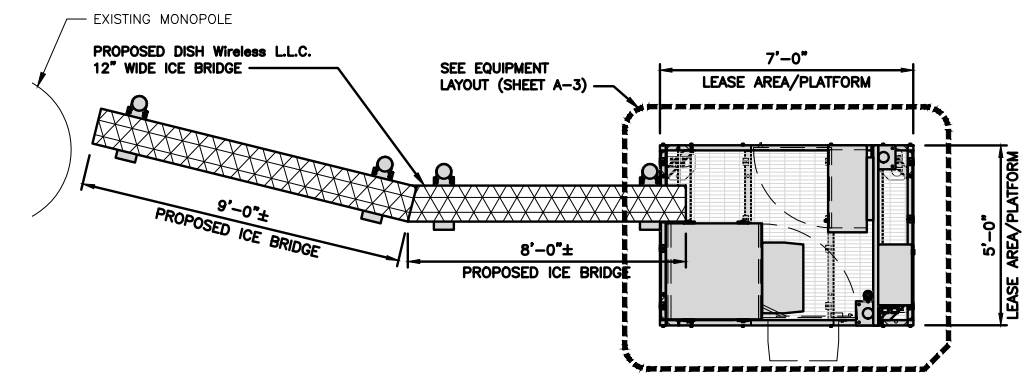


**OVERALL SITE PLAN**

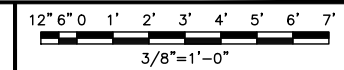
BUCK ROAD

**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



**ENLARGED SITE PLAN**



2



**OVERALL SITE PLAN**

NO SCALE

3



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



1717 S. BOULDER  
SUITE 300  
TULSA, OK 74119  
PH: (918) 587-4630  
www.btgrp.com



**B&T ENGINEERING, INC.**  
PEC.0001564  
Expires 2/10/22

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DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MDW	MDW

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	5/27/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C.  
PROJECT INFORMATION

BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

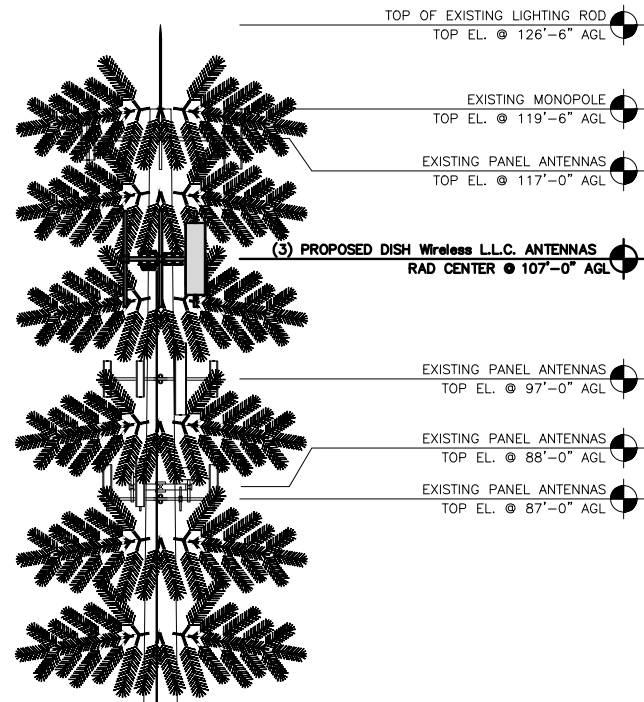
SHEET TITLE  
**OVERALL AND ENLARGED SITE PLAN**

SHEET NUMBER  
**A-1**



**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



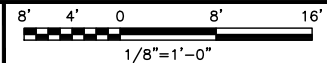
PROPOSED DISH Wireless L.L.C. ICE BRIDGE

PROPOSED DISH Wireless L.L.C. EQUIPMENT ON PROPOSED STEEL PLATFORM

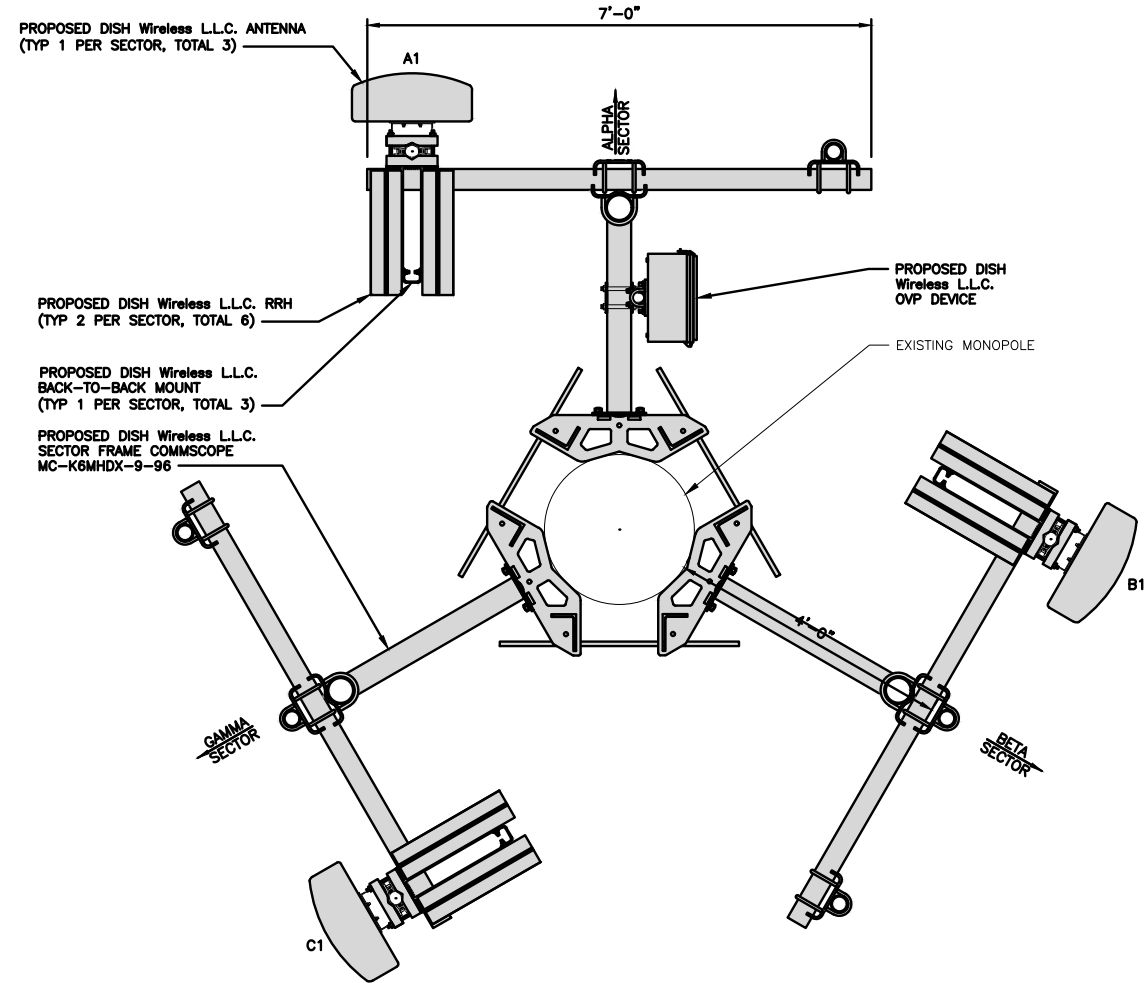
PROPOSED DISH Wireless L.L.C. GPS UNIT

EXISTING MONOPOLE  
BOTTOM EL. @ 6" AGL

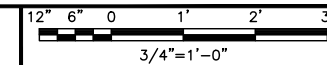
**PROPOSED NORTH ELEVATION**



1



**ANTENNA LAYOUT**



2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	
ALPHA	A1	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	72.0" x 20.0"	0°	107'-0"	(1) HIGH-CAPACITY HYBRID CABLE (150' LONG)
BETA	B1	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	72.0" x 20.0"	120°	107'-0"	
GAMMA	C1	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	72.0" x 20.0"	240°	107'-0"	

SECTOR	POSITION	RRH		NOTES
		MANUFACTURER - MODEL NUMBER	TECHNOLOGY	
ALPHA	A1	FUJITSU-TA08025-B604	5G	1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS. 2. ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES.
	A1	FUJITSU-TA08025-B605	5G	
BETA	B1	FUJITSU-TA08025-B604	5G	
	B1	FUJITSU-TA08025-B605	5G	
GAMMA	C1	FUJITSU-TA08025-B604	5G	
	C1	FUJITSU-TA08025-B605	5G	

**ANTENNA SCHEDULE**

NO SCALE

3



5701 SOUTH SANTA FE DRIVE  
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DRAWN BY: CHECKED BY: APPROVED BY:  
JJR MDW MDW

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
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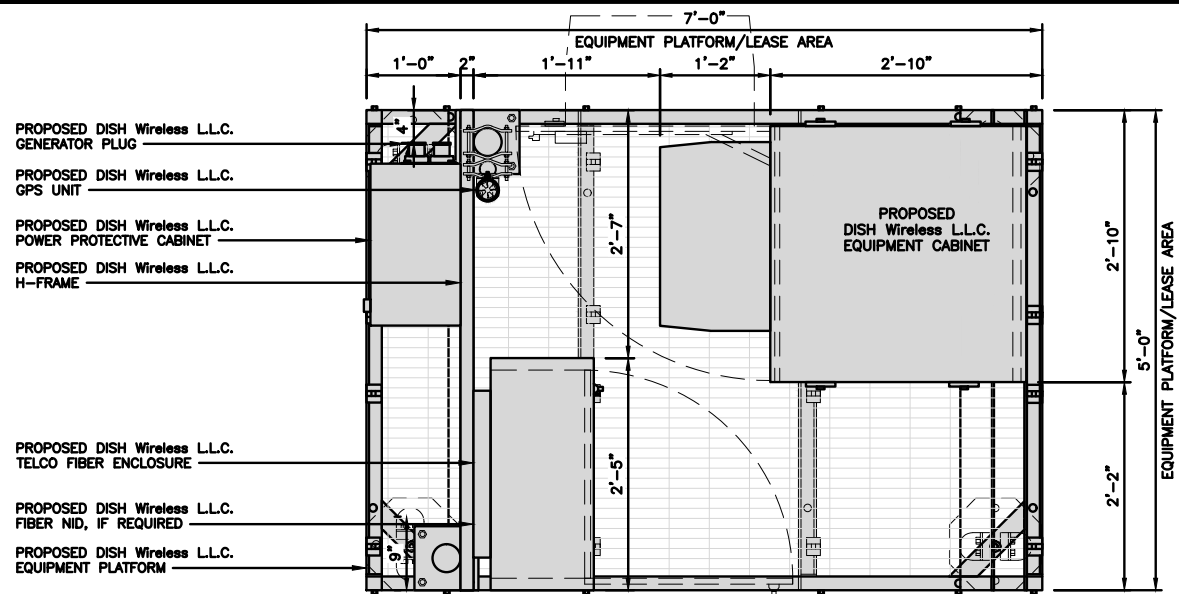
A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C. PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

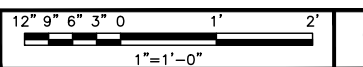
SHEET TITLE  
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

**A-2**



PLATFORM EQUIPMENT PLAN

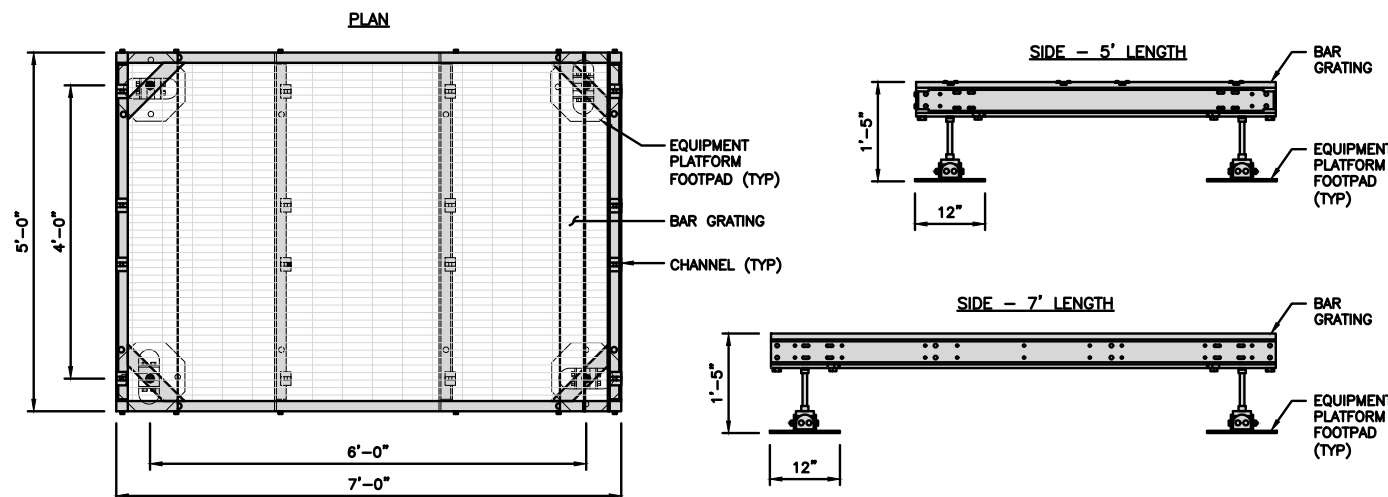


1

COMMSCOPE MTC4045LP  
5X7 PLATFORM

DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

NOTE:  
GC TO PROVIDE EXTENDED  
THREAD FOR PLATFORM IF  
REQUIRED HEIGHT EXCEEDS 17"

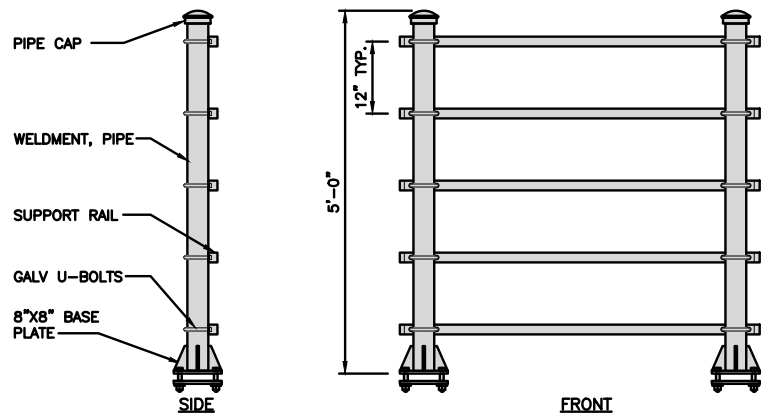


PLATFORM DETAIL

NO SCALE 2

KENWOOD T1701KT5-5S  
H-FRAME

UNISTRUT/SUPPORT RAIL	5
WEIGHT/ VOLUME	173.6 LBS



H-FRAME DETAIL

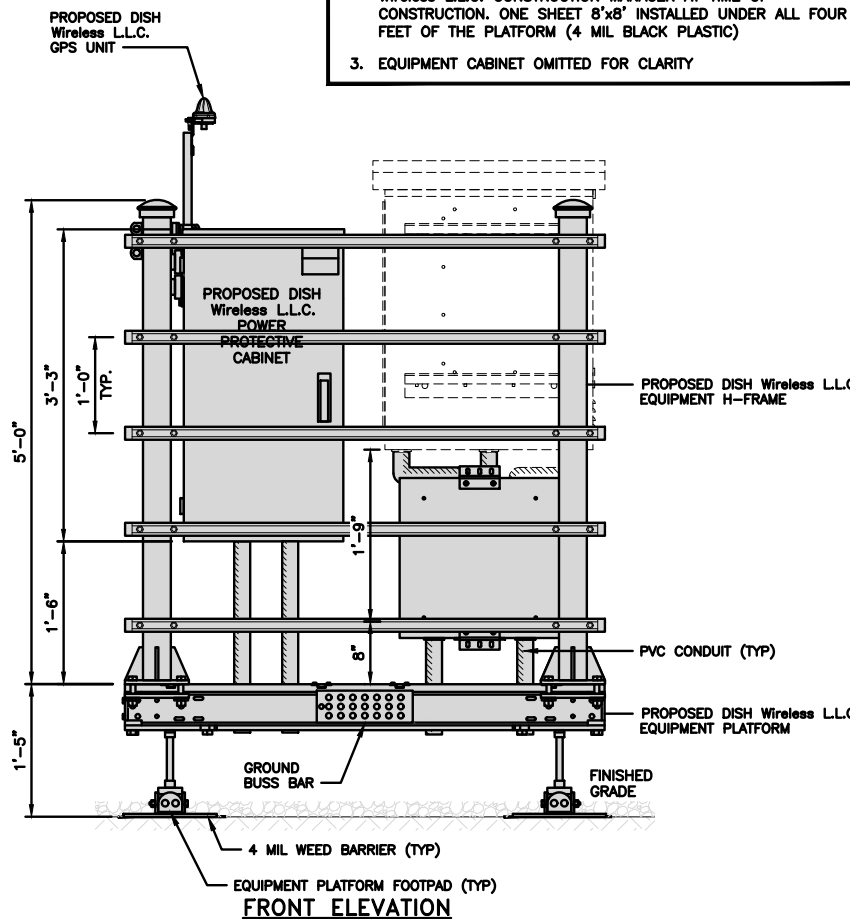
NO SCALE 3

NOT USED

NO SCALE 4

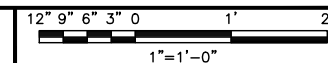
NOTES

1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH Wireless L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)
3. EQUIPMENT CABINET OMITTED FOR CLARITY



FRONT ELEVATION

BACK ELEVATION



5



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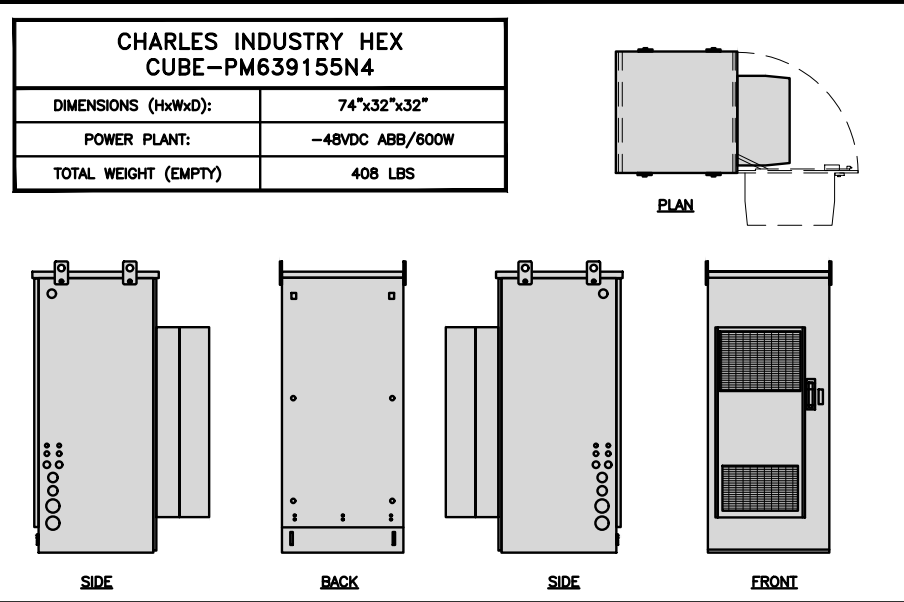
A&E PROJECT NUMBER  
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DISH Wireless L.L.C.  
PROJECT INFORMATION

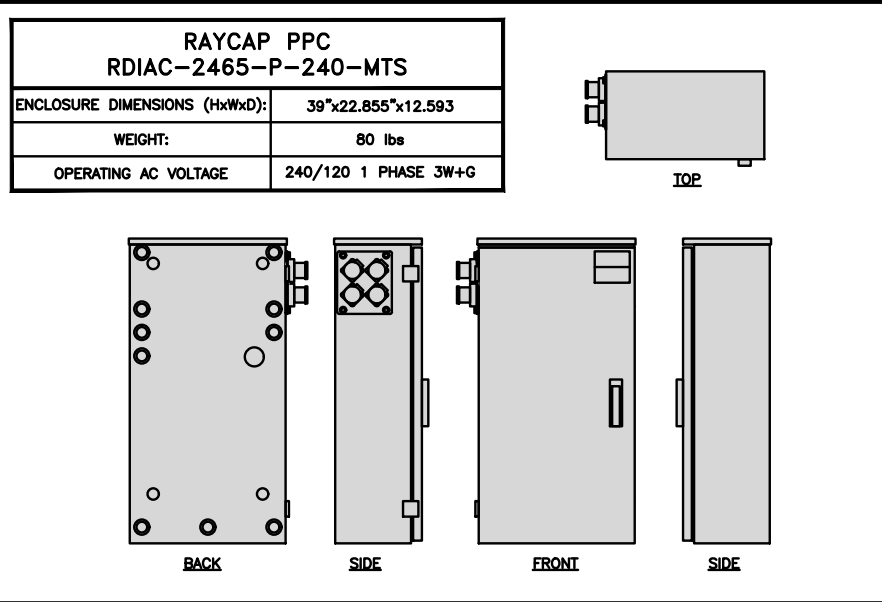
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
EQUIPMENT PLATFORM AND  
H-FRAME DETAILS

SHEET NUMBER  
**A-3**



**CABINET DETAIL** NO SCALE 1



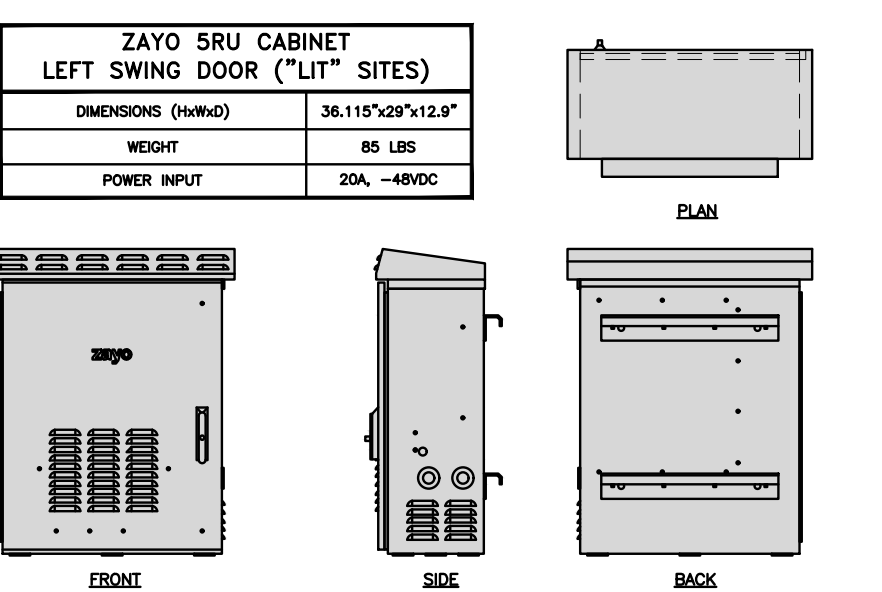
**POWER PROTECTION CABINET (PPC) DETAIL** NO SCALE 2



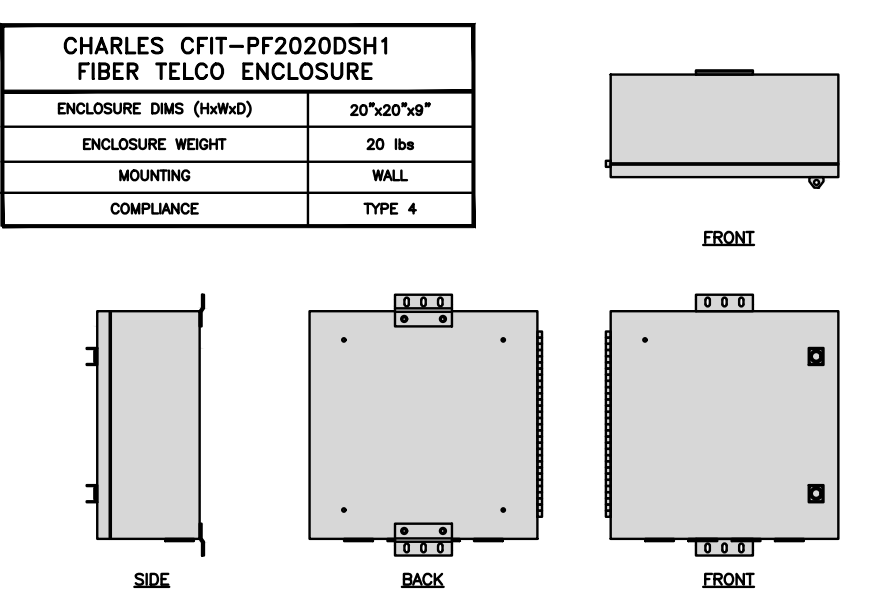
**NOT USED** NO SCALE 3



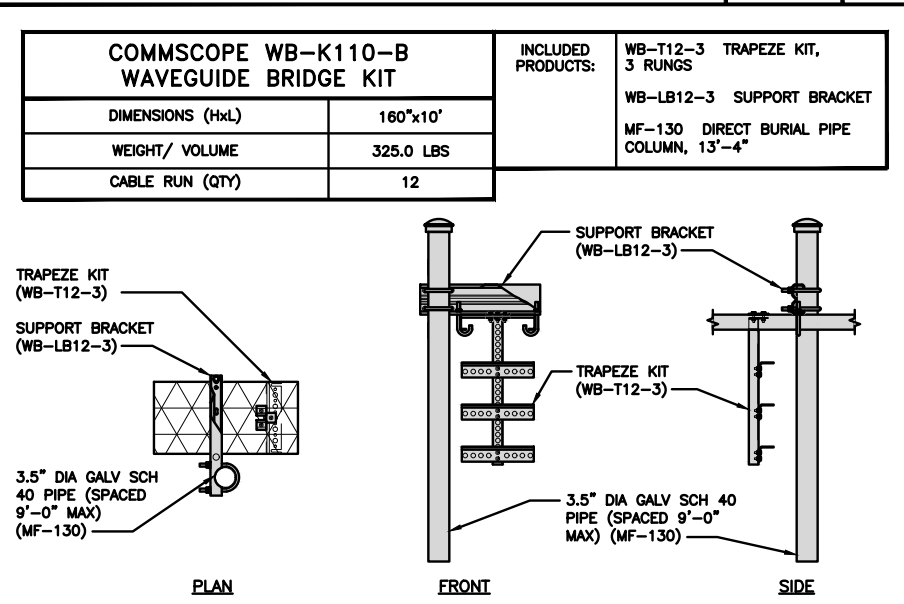
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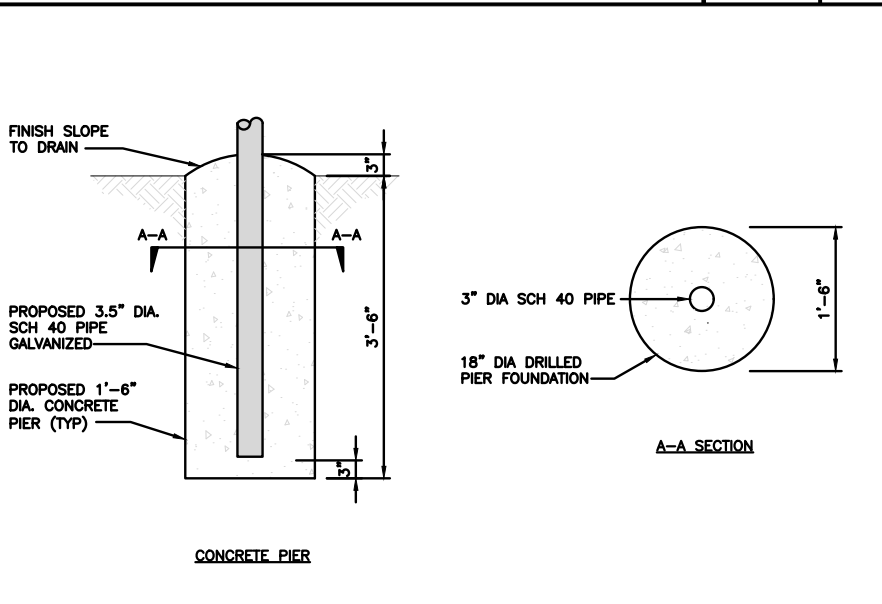
**NETWORK INTERFACE UNIT DETAIL** NO SCALE 5



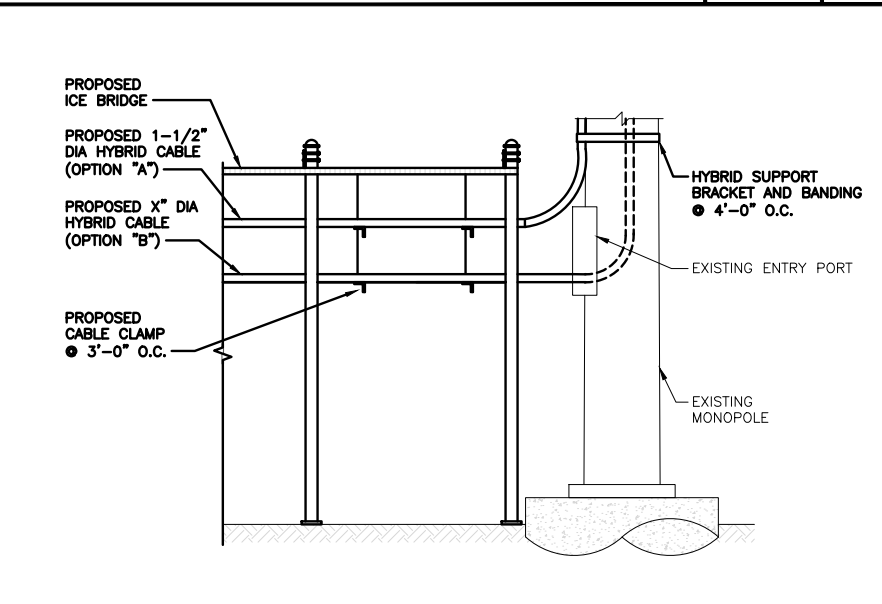
**FIBER TELCO ENCLOSURE DETAIL** NO SCALE 6



**ICE BRIDGE DETAIL** NO SCALE 7



**TYPICAL ICE BRIDGE CONCRETE PIER DETAIL** NO SCALE 8



**HYBRID CABLE RUN** NO SCALE 9

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JJR	MDW	MDW
RFDS REV #:		

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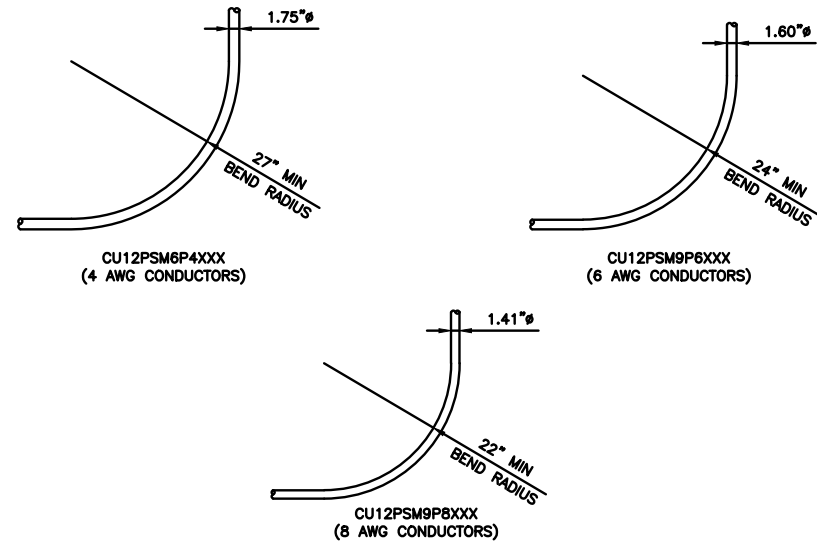
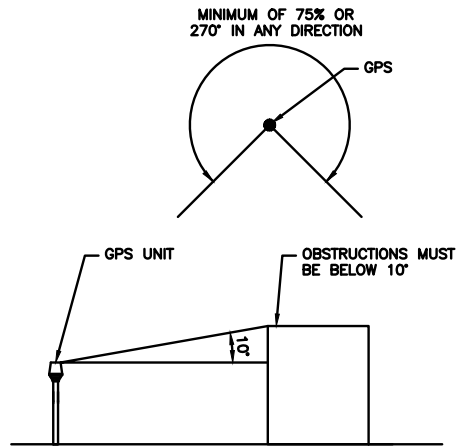
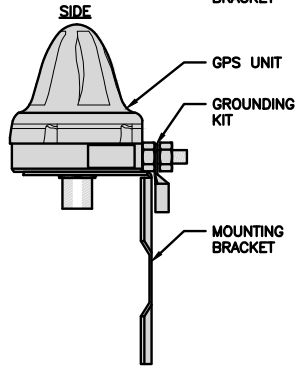
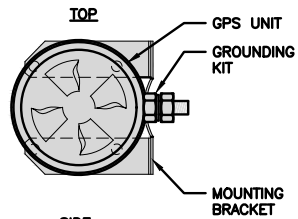
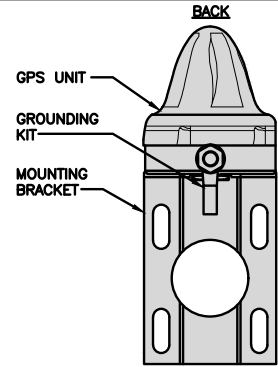
DISH Wireless L.L.C.  
PROJECT INFORMATION

**BOBDL0099A**  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
**EQUIPMENT DETAILS**

SHEET NUMBER  
**A-4**

ROSENBERGER GPSGLONASS-36-N-S	
DIMENSION (DIA x H)	69mm x 98.5mm
WEIGHT (WITH ACCESSORIES)	515.74g
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1559 MHz ~ 1610.5MHz



GPS ANTENNA DETAIL

NO SCALE 1

GPS MINIMUM SKY VIEW REQUIREMENTS

NO SCALE 2

CABLES UNLIMITED HYBRID CABLE  
MINIMUM BEND RADIUS

NO SCALE 3

NOT USED

NO SCALE 4

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8

NOT USED

NO SCALE 9



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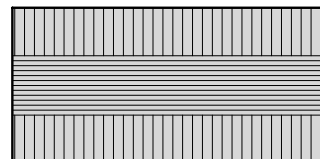
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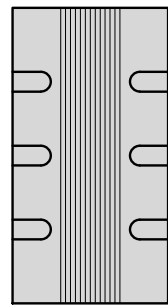
SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER  
**A-5**

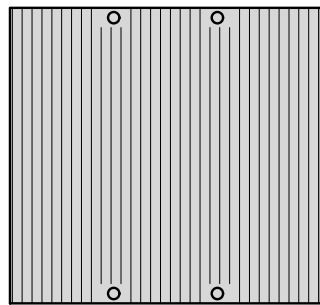
<b>FUJITSU TA08025-B604 RRH</b>	
DIMENSIONS (HxWxD) (KG/IN)	380x400x200/14.9"x15.7"x7.8"
WEIGHT(KG,LB)/ VOLUME	29kg,63.9lb/ 30L
POWER SUPPLY	DC-58~-36V



PLAN



SIDE



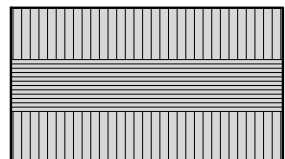
FRONT

REMOTE RADIO HEAD DETAIL

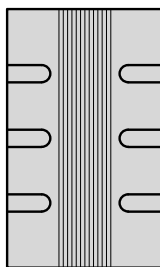
NO SCALE

1

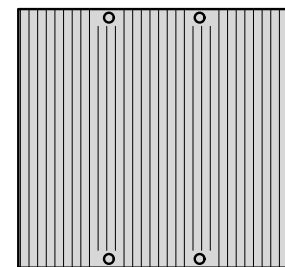
<b>FUJITSU TA08025-B605 RRH</b>	
DIMENSIONS (HxWxD) (KG/IN)	380x400x230/14.9"x15.7"x9.0"
WEIGHT(KG,LB)/ VOLUME	34kg,74.9lb/ 35L
POWER SUPPLY	DC-58~-36V



PLAN



SIDE



FRONT

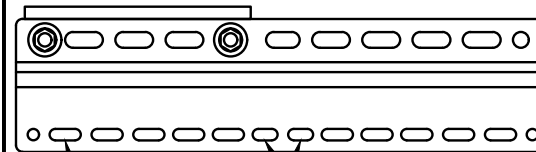
REMOTE RADIO HEAD DETAIL

NO SCALE

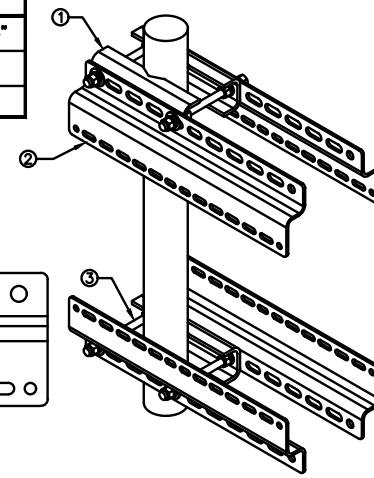
2

<b>SABRE INDUSTRIES RRU BRACKET MOUNT C10123155</b>	
DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

ITEM#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



11MM x 30MM SLOTS  
40MM ON CENTER  
11MM x 24MM SLOTS



REMOTE RADIO MOUNT DETAIL

NO SCALE

3

<b>JMA WIRELESS MX08FRO665-21 ANTENNA</b>	
DIMENSIONS (HxWxD)	72.8"x20.0"x8.0"
TOTAL WEIGHT	64.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE



PLAN



BACK



SIDE



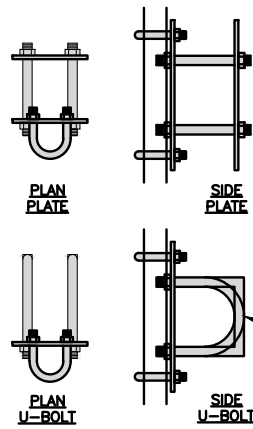
FRONT

ANTENNA DETAIL

NO SCALE

4

<b>COMMSCOPE XP-2040 CROSSOVER PLATE</b>	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11.023 LBS

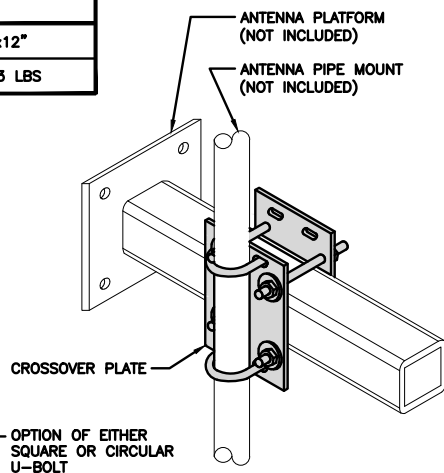


PLAN PLATE

SIDE PLATE

PLAN U-BOLT

SIDE U-BOLT



ANTENNA PLATFORM (NOT INCLUDED)  
ANTENNA PIPE MOUNT (NOT INCLUDED)

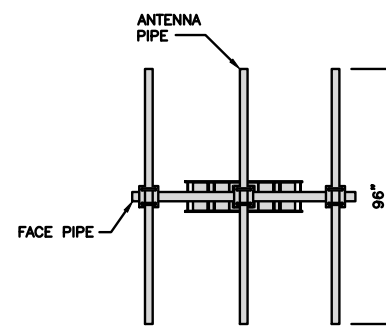
CROSSOVER PLATE  
OPTION OF EITHER SQUARE OR CIRCULAR U-BOLT

RRH/OVP MOUNT DETAIL

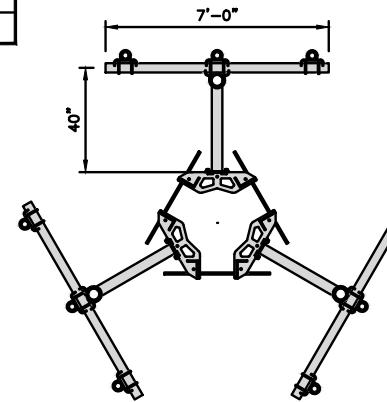
NO SCALE

8

<b>COMMSCOPE MC-K6MHDX-9-96</b>	
FACE WIDTH	7'-0"
WEIGHT	1203.31 lbs
NOTE: 15" TO 50" O.D.	



ANTENNA PIPE  
FACE PIPE



T-ARM MOUNT DETAIL

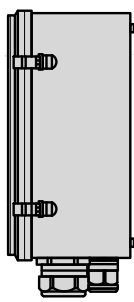
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9

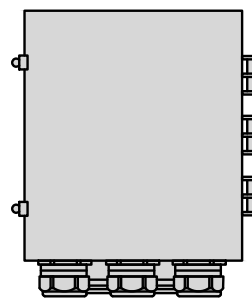
<b>RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)</b>	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



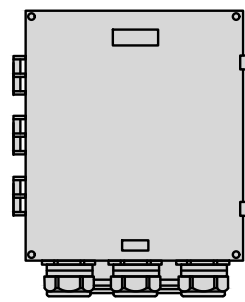
PLAN



SIDE



BACK



FRONT

SURGE SUPPRESSION DETAIL (OVP)

NO SCALE

7

**dish**  
wireless.

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PROJECT INFORMATION

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107 BUCK RD.  
HEBRON, CT 06248

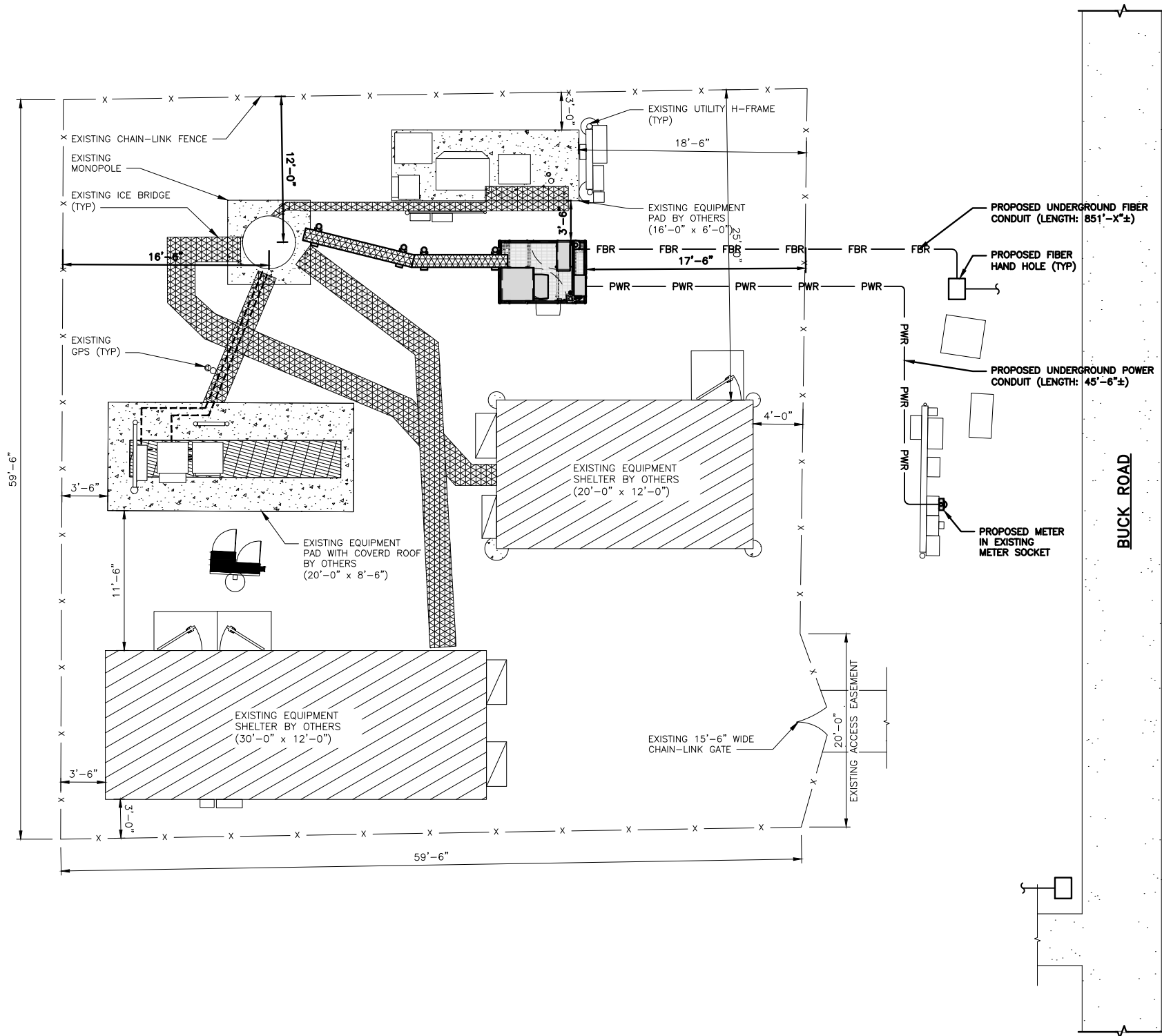
SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER

**A-6**

**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND -48V CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY -48V.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. ALL TRENCHES IN COMPOUND TO BE HAND DUG



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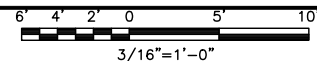
DISH Wireless L.L.C.  
PROJECT INFORMATION

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107 BUCK RD.  
HEBRON, CT 06248

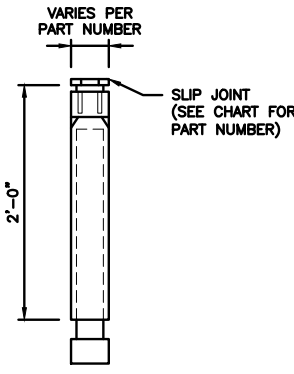
SHEET TITLE  
ELECTRICAL/FIBER ROUTE  
PLAN AND NOTES

SHEET NUMBER

**E-1**



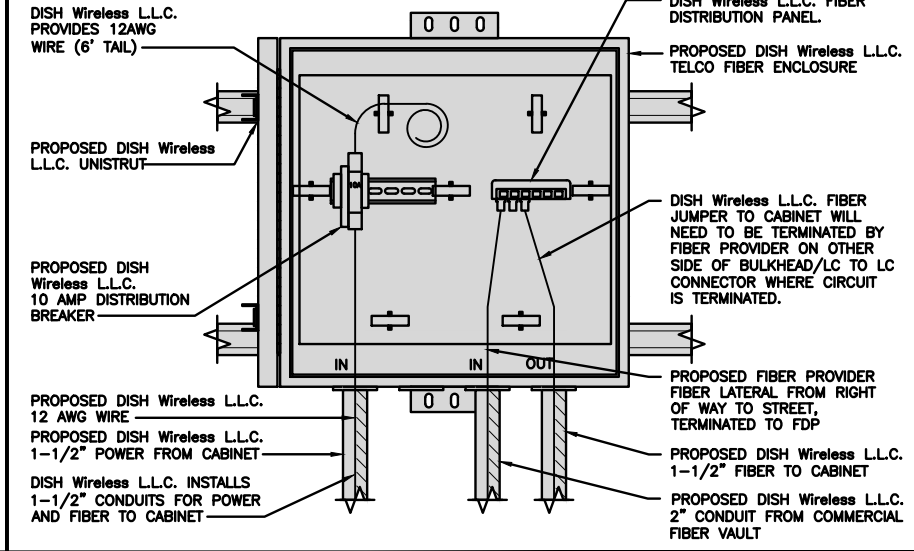
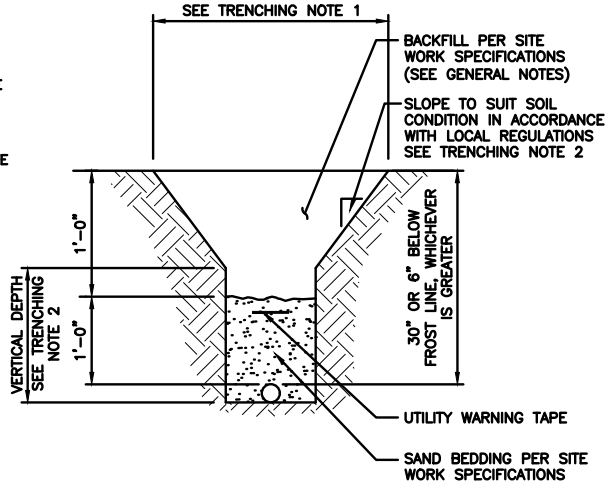
CARLON EXPANSION FITTINGS				
COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"



NOTE: CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

**TRENCHING NOTES**

- CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
- TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
- ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT NATIONAL ELECTRIC CODE (NEC) OR AS REQUIRED BY THE LOCAL JURISDICTION, WHICHEVER IS THE MOST STRINGENT.



EXPANSION JOINT DETAIL

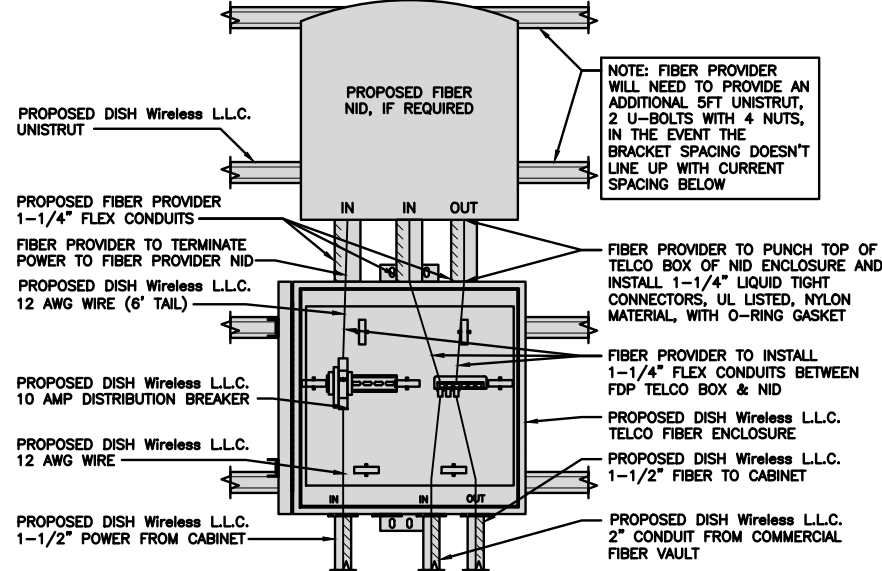
NO SCALE 1

TYPICAL UNDERGROUND TRENCH DETAIL

NO SCALE 2

DARK TELCO BOX – INTERIOR WIRING LAYOUT

NO SCALE 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL)

NO SCALE 4

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8

NOT USED

NO SCALE 9



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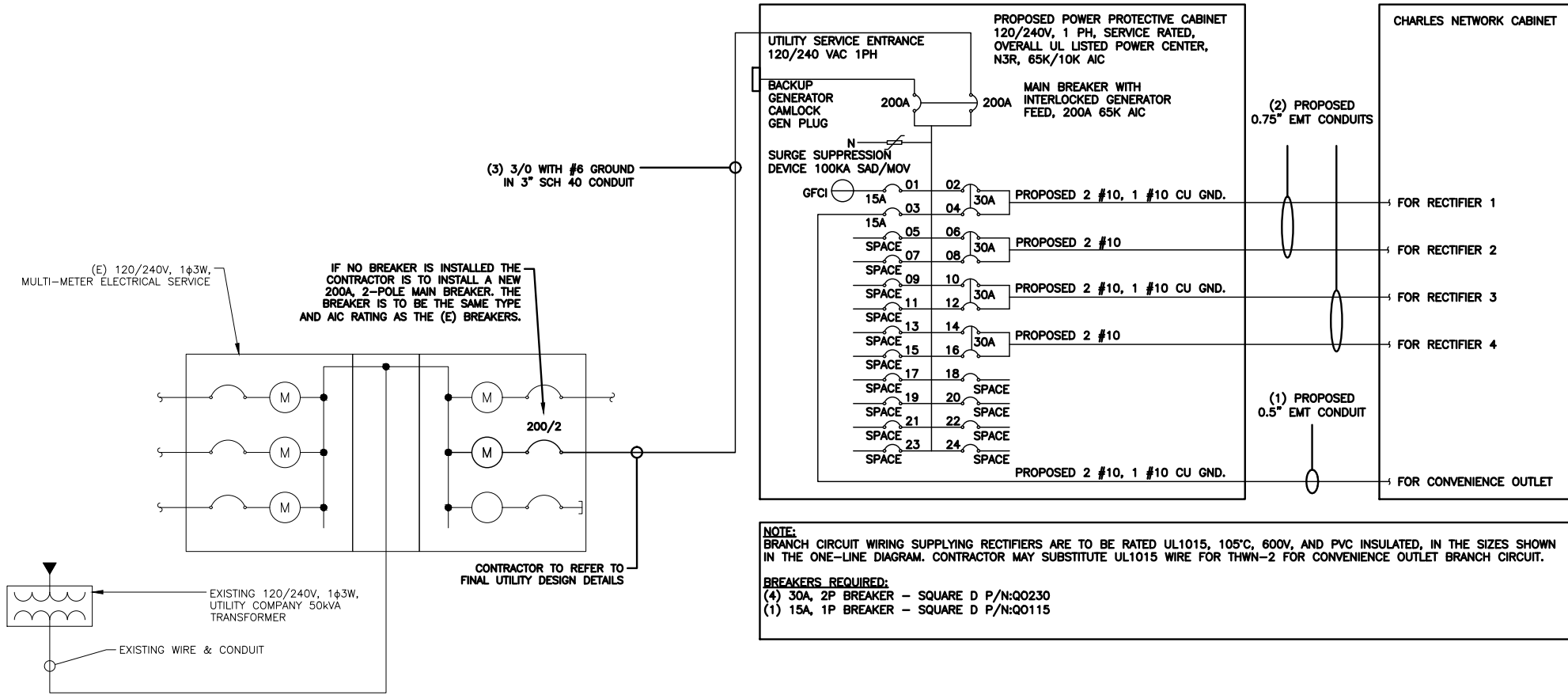
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DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
ELECTRICAL  
DETAILS

SHEET NUMBER

**E-2**



**NOTES**

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2014/17 NEC TABLE 310.15(B)(3)(g) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

#12 FOR 15A-20A/1P BREAKER: 0.8 x 30A = 24.0A  
 #10 FOR 25A-30A/2P BREAKER: 0.8 x 40A = 32.0A  
 #8 FOR 35A-40A/2P BREAKER: 0.8 x 55A = 44.0A  
 #6 FOR 45A-60A/2P BREAKER: 0.8 x 75A = 60.0A

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.  
 0.5" CONDUIT - 0.122 SQ. IN AREA  
 0.75" CONDUIT - 0.213 SQ. IN AREA  
 2.0" CONDUIT - 1.316 SQ. IN AREA  
 3.0" CONDUIT - 2.907 SQ. IN AREA

CABINET CONVENIENCE OUTLET CONDUCTORS (1 CONDUIT): USING THWN-2, CU.  
 #10 - 0.0211 SQ. IN X 2 = 0.0422 SQ. IN  
 #10 - 0.0211 SQ. IN X 1 = 0.0211 SQ. IN <GROUND  
 TOTAL = 0.0633 SQ. IN

0.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

RECTIFIER CONDUCTORS (2 CONDUITS): USING UL1015, CU.  
 #10 - 0.0266 SQ. IN X 4 = 0.1064 SQ. IN  
 #10 - 0.0082 SQ. IN X 1 = 0.0082 SQ. IN <BARE GROUND  
 TOTAL = 0.1146 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (5) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, CU.  
 3/0 - 0.2679 SQ. IN X 3 = 0.8037 SQ. IN  
 #6 - 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND  
 TOTAL = 0.8544 SQ. IN

3.0" SCH 40 PVC CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (4) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

**NOTE:**  
 BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL1015, 105°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM. CONTRACTOR MAY SUBSTITUTE UL1015 WIRE FOR THWN-2 FOR CONVENIENCE OUTLET BRANCH CIRCUIT.

**BREAKERS REQUIRED:**  
 (4) 30A, 2P BREAKER - SQUARE D P/N:Q0230  
 (1) 15A, 1P BREAKER - SQUARE D P/N:Q0115

**PROPOSED CHARLES PANEL SCHEDULE**

LOAD SERVED	VOLT AMPS (WATTS)		TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS)		LOAD SERVED
	L1	L2						L1	L2	
PPC GFCI OUTLET	180	180	15A	1	A	2	30A	2880	2880	ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4	30A	2880	2880	ABB/GE INFINITY RECTIFIER 2
-SPACE-				5	A	6	30A	2880	2880	ABB/GE INFINITY RECTIFIER 3
-SPACE-				7	B	8	30A	2880	2880	ABB/GE INFINITY RECTIFIER 4
-SPACE-				9	A	10				-SPACE-
-SPACE-				11	B	12				-SPACE-
-SPACE-				13	A	14				-SPACE-
-SPACE-				15	B	16				-SPACE-
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS		180	180					11520	11520	
200A MCB, 1φ, 24 SPACE, 120/240V				L1	L2					
MB RATING: 65,000 AIC				11700	11700					
				98	98					
				98						
				123						

PANEL SCHEDULE

NO SCALE 2

NOT USED

NO SCALE 3



5701 SOUTH SANTA FE DRIVE  
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JJR MDW MDW

RFDS REV #: ---

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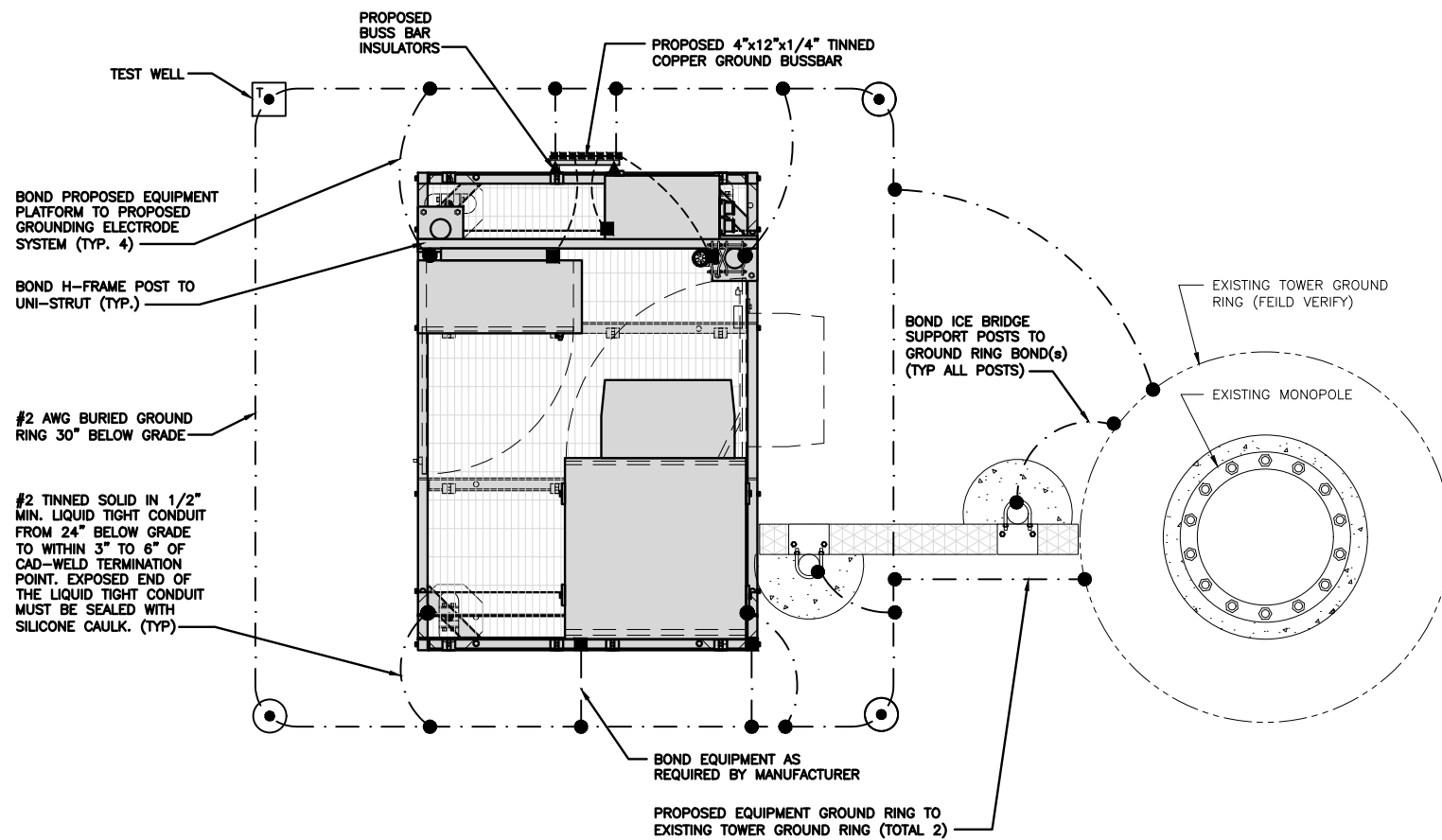
A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

SHEET NUMBER  
**E-3**



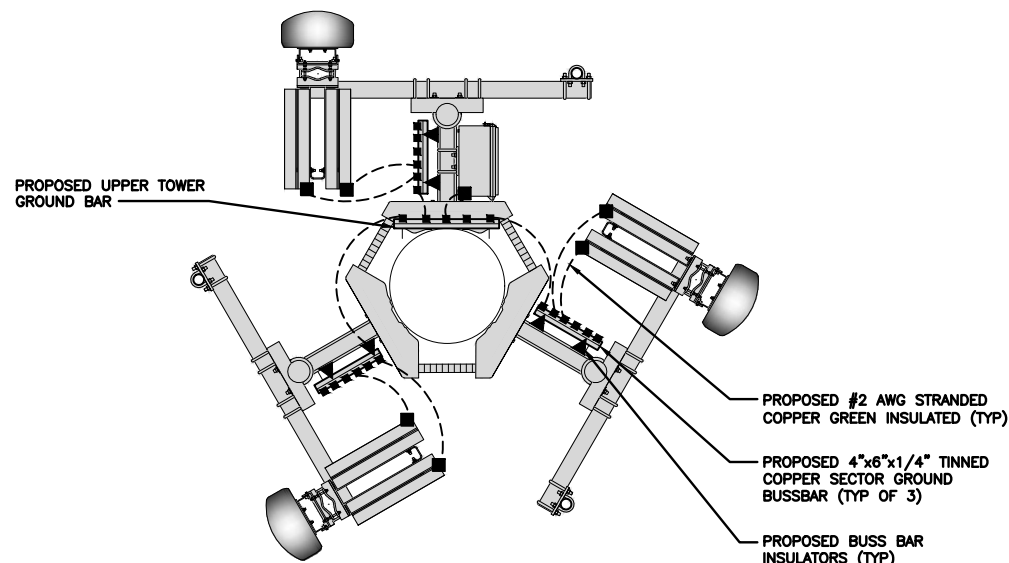


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE 1

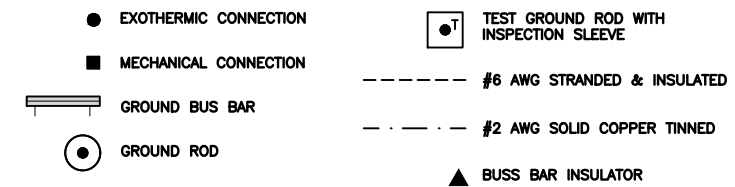
NOTES

1. ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE ONLY



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE 2



GROUNDING LEGEND

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless L.L.C. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

- (A) **EXTERIOR GROUND RING:** #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.
- (B) **TOWER GROUND RING:** THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.
- (C) **INTERIOR GROUND RING:** #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.
- (D) **BOND TO INTERIOR GROUND RING:** #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING.
- (E) **GROUND ROD:** UL LISTED COPPER CLAD STEEL MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.
- (F) **CELL REFERENCE GROUND BAR:** POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.
- (G) **HATCH PLATE GROUND BAR:** BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.
- (H) **EXTERIOR CABLE ENTRY PORT GROUND BARS:** LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.
- (I) **TELCO GROUND BAR:** BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- (J) **FRAME BONDING:** THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.
- (K) **INTERIOR UNIT BONDS:** METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.
- (L) **FENCE AND GATE GROUNDING:** METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.
- (M) **EXTERIOR UNIT BONDS:** METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. USING #2 TINNED SOLID COPPER WIRE
- (N) **ICE BRIDGE SUPPORTS:** EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.
- (O) **DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR**
- (P) **TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR. REFER TO DISH Wireless L.L.C. GROUNDING NOTES.**

GROUNDING KEY NOTES

NO SCALE 3



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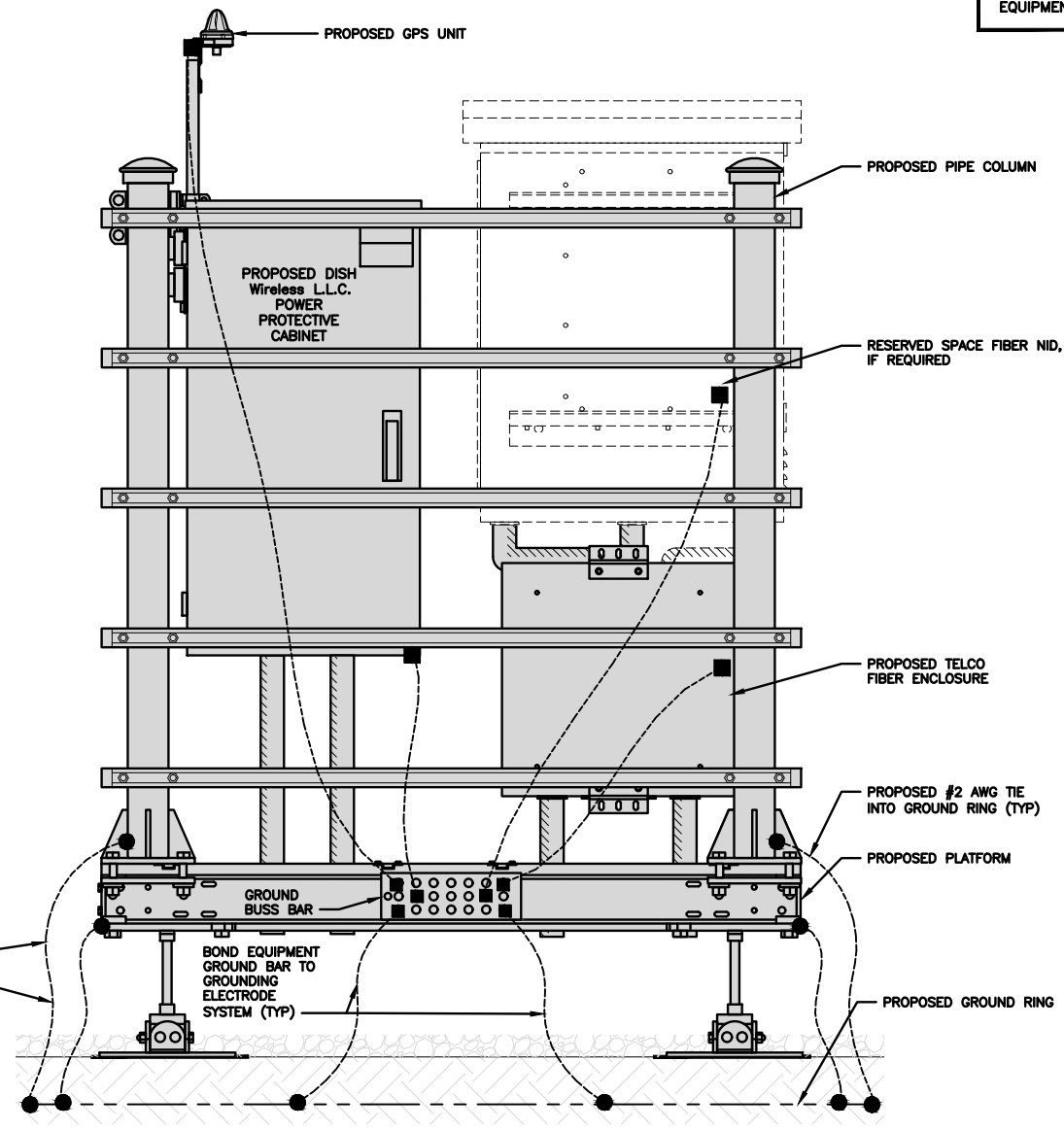
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

SHEET NUMBER

G-1

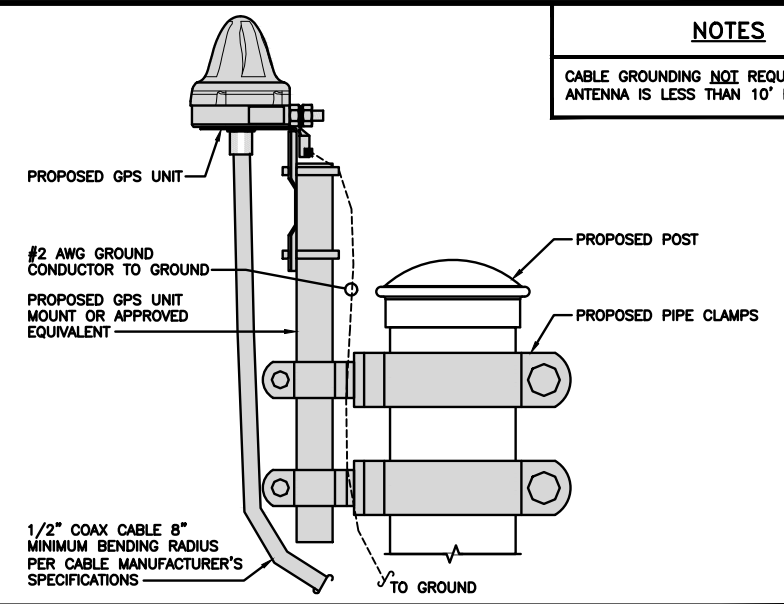
**NOTES**  
EQUIPMENT CABINET OMITTED FOR CLARITY



**H-FRAME GROUNDING DETAIL**

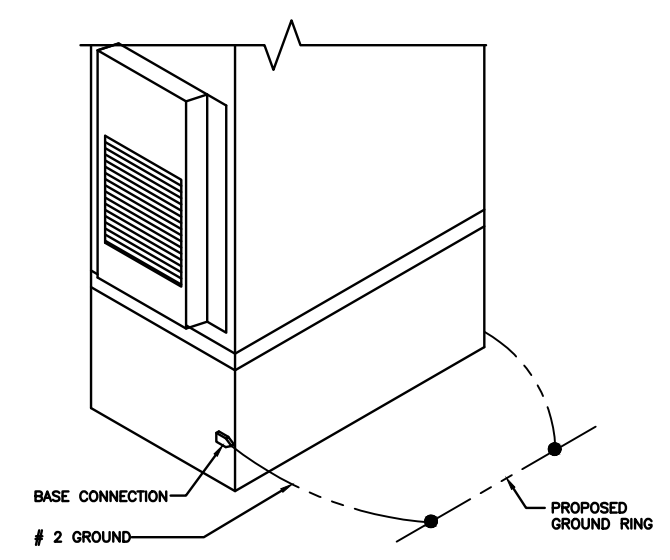
NO SCALE 1

**NOTES**  
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



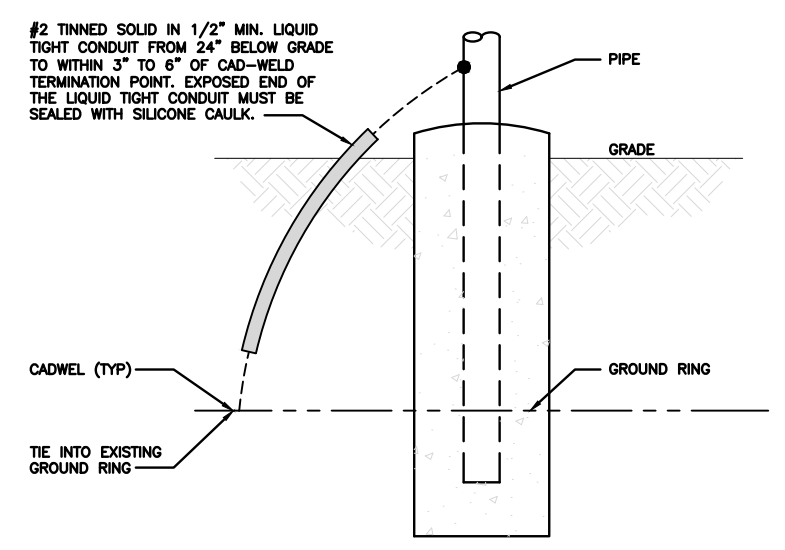
**TYPICAL GPS UNIT GROUNDING**

NO SCALE 2



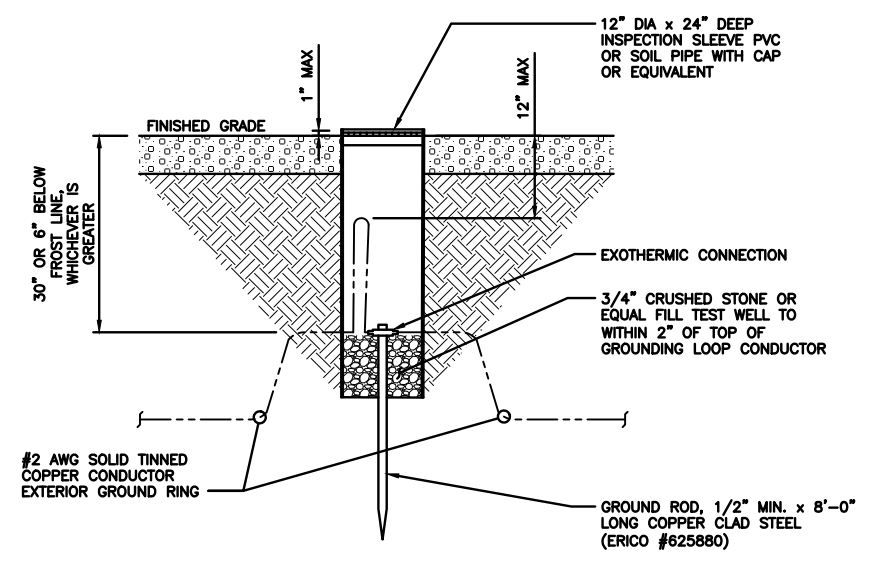
**OUTDOOR CABINET GROUNDING**

NO SCALE 3



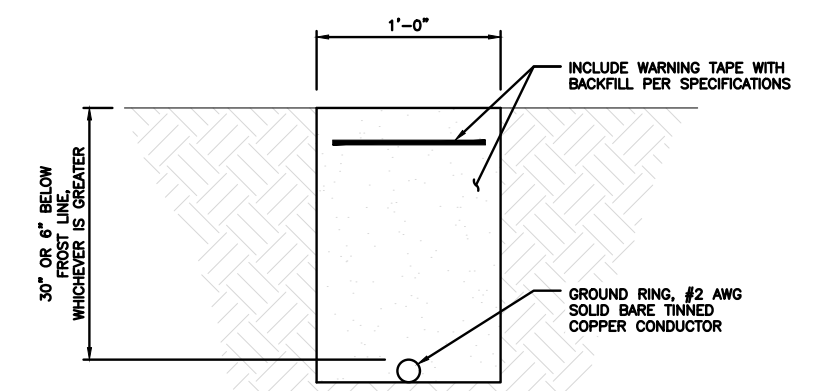
**TRANSITIONING GROUND DETAIL**

NO SCALE 4



**TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE**

NO SCALE 5



**TYPICAL GROUND RING TRENCH**

NO SCALE 6



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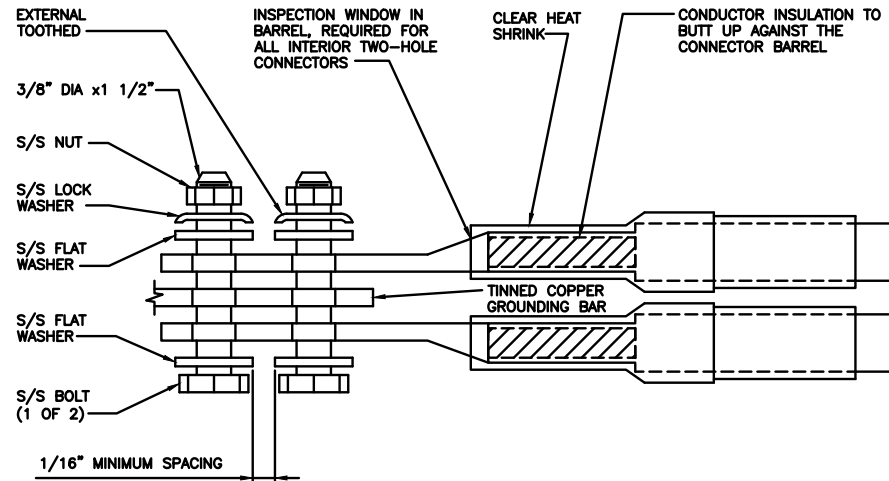
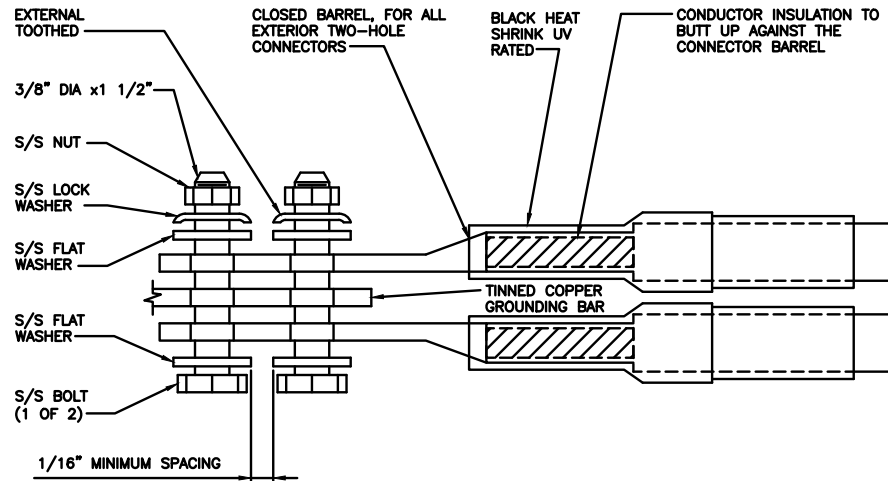
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DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
**G-2**

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
8. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



TYPICAL GROUNDING NOTES

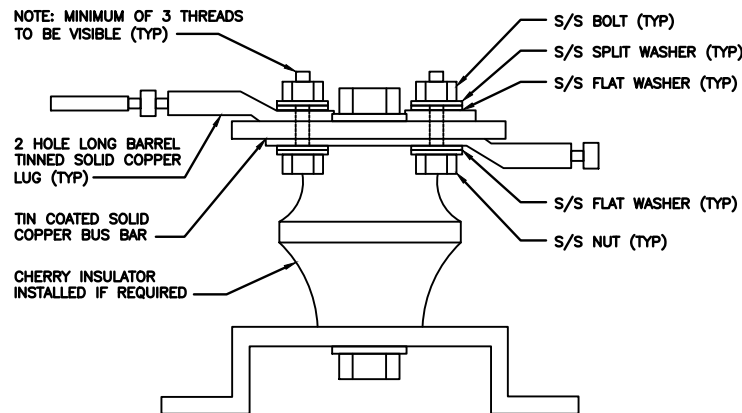
NO SCALE 1

TYPICAL EXTERIOR TWO HOLE LUG

NO SCALE 2

TYPICAL INTERIOR TWO HOLE LUG

NO SCALE 3



LUG DETAIL

NO SCALE 4

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8

NOT USED

NO SCALE 9

**dish**  
wireless.

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LITTLETON, CO 80120

**B+T GRP**  
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107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
**G-3**

**RF JUMPER COLOR CODING**

3/4" TAPE WIDTHS WITH 3/4" SPACING

LOW-BAND RRH -  
(600MHz N71 BASEBAND) +  
(850MHz N26 BAND) +  
(700MHz N29 BAND) - OPTIONAL PER MARKET

ADD FREQUENCY COLOR TO SECTOR BAND  
(CBRS WILL USE YELLOW BANDS)

ALPHA RRH				BETA RRH				GAMMA RRH			
PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT
RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
ORANGE	ORANGE	RED	RED	ORANGE	ORANGE	BLUE	BLUE	ORANGE	ORANGE	GREEN	GREEN
	WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

MID-BAND RRH -  
(AWS BANDS N66+N70)

ADD FREQUENCY COLOR TO SECTOR BAND  
(CBRS WILL USE YELLOW BANDS)

RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
PURPLE	PURPLE	RED	RED	PURPLE	PURPLE	BLUE	BLUE	PURPLE	PURPLE	GREEN	GREEN
	WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

**HYBRID/DISCREET CABLES**

INCLUDE SECTOR BANDS BEING SUPPORTED  
ALONG WITH FREQUENCY BANDS

EXAMPLE 1 - HYBRID, OR DISCREET, SUPPORTS  
ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

EXAMPLE 2 - HYBRID, OR DISCREET, SUPPORTS  
CBRS ONLY, ALL SECTORS

EXAMPLE 1	EXAMPLE 2	EXAMPLE 3
RED	RED	RED
BLUE	BLUE	
GREEN	GREEN	ORANGE
ORANGE	YELLOW	PURPLE
PURPLE		

**FIBER JUMPERS TO RRHs**

LOW-BAND RRH FIBER CABLES HAVE SECTOR  
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**POWER CABLES TO RRHs**

LOW-BAND RRH POWER CABLES HAVE SECTOR  
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**RET MOTORS AT ANTENNAS**

ANTENNA 1 LOW BAND/"IN"	ANTENNA 1 HIGH BAND/"IN"	ANTENNA 1 LOW BAND/"IN"	ANTENNA 1 HIGH BAND/"IN"	ANTENNA 1 LOW BAND/"IN"	ANTENNA 1 HIGH BAND/"IN"
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**MICROWAVE RADIO LINKS**

LINKS WILL HAVE A 1.5-2 INCH WHITE WRAP WITH  
THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.  
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH  
ADDITIONAL MW RADIO.

MICROWAVE CABLES WILL REQUIRE P-TOUCH  
LABELS INSIDE THE CABINET TO IDENTIFY THE  
LOCAL AND REMOTE SITE ID'S

FORWARD AZIMUTH OF 0-120 DEGREES		FORWARD AZIMUTH OF 120-240 DEGREES		FORWARD AZIMUTH OF 240-360 DEGREES	
PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
RED	RED	BLUE	BLUE	GREEN	GREEN
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED		BLUE		GREEN
	WHITE		WHITE		WHITE

**RF CABLE COLOR CODES**

NO SCALE

1

LOW BANDS (N71+N26)  
OPTIONAL - (N29)



AWS  
(N66+N70+H-BLOCK)



CBRS TECH  
(3 GHz)



NEGATIVE SLANT PORT  
ON ANT/RRH



ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR



COLOR IDENTIFIER

NO SCALE

2

NOT USED

NO SCALE

3

NOT USED

NO SCALE

4



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PROJECT INFORMATION

BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
RF  
CABLE COLOR CODES

SHEET NUMBER  
**RF-1**



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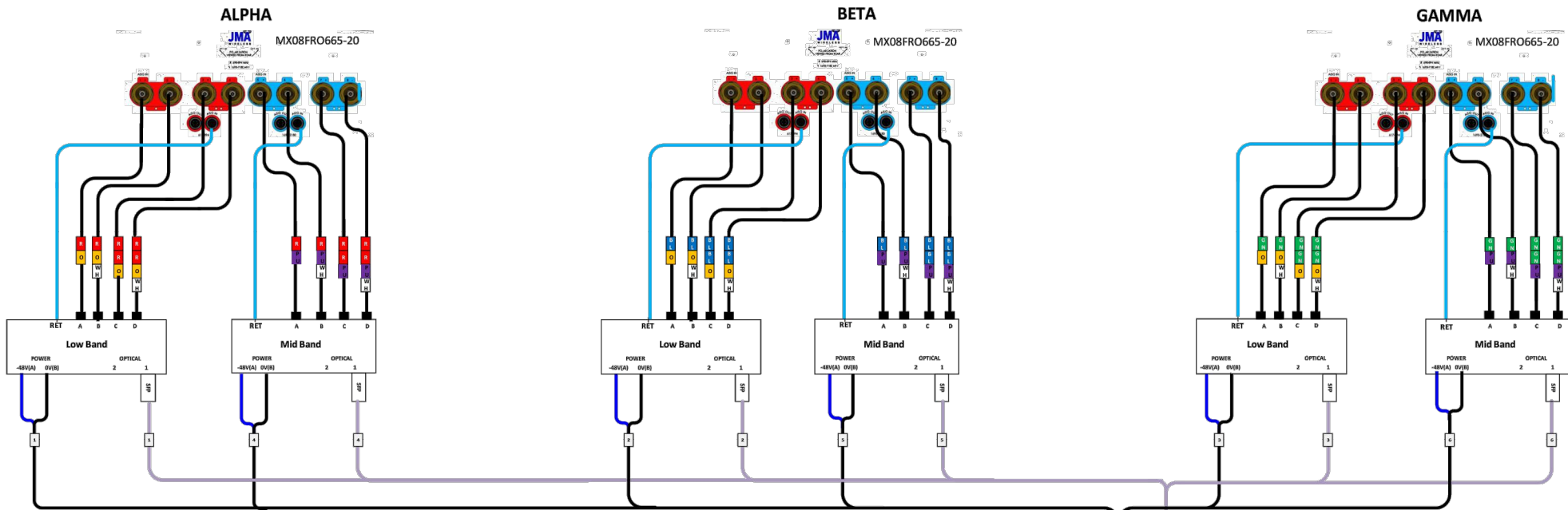
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SHEET TITLE  
RF  
PLUMBING DIAGRAM

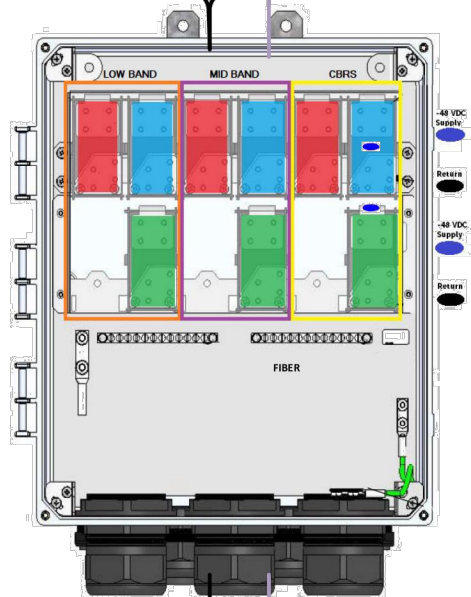
SHEET NUMBER

**RF-2**



Fiber Patch Panel

Bottom Row	Pair 1	Pair 2	Pair 3	Pair 10	Open	Open
Middle Row	Pair 4	Pair 5	Pair 6	Pair 11	Open	Open
Top Row	Pair 7	Pair 8	Pair 9	Pair 12	Open	Open



CSR NCS540

Port	Interface	Description
0	Gi0/0/0/0	SiteBoss
1	Gi0/0/0/1	CBRS - Alpha
2	Gi0/0/0/2	CBRS - Beta
3	Gi0/0/0/3	CBRS - Gamma
4	Te0/0/0/4	Fujitsu Low-Band RU - Alpha
5	Te0/0/0/5	Fujitsu Mid-Band RU - Alpha
6	Te0/0/0/6	Fujitsu Low-Band RU - Beta
7	Te0/0/0/7	Fujitsu Mid-Band RU - Beta
8	Te0/0/0/8	Fujitsu Low-Band RU - Gamma
9	Te0/0/0/9	Fujitsu Mid-Band RU - Gamma
10	Te0/0/0/10	Fixed Wifi
11	Te0/0/0/11	Fixed Wifi
12	Te0/0/0/12	Fixed Wifi
13	Te0/0/0/13	Fixed Wifi
14	Te0/0/0/14	CBRS1
15	Te0/0/0/15	CBRS2
16	Te0/0/0/16	CBRS3
17	Gi0/0/0/17	SM1 - BMC
18	Gi0/0/0/18	SM2 - BMC
19	Te0/0/0/19	SM1 - Data 1
20	Te0/0/0/20	SM1 - Data 2
21	Te0/0/0/21	SM2 - Data 1
22	Te0/0/0/22	SM2 - Data 2
23	Te0/0/0/23	Reserved Uplink (EDC, LDC)
24	Te0/0/0/24	Blank/Future
25	Te0/0/0/25	Blank/Future
26	Te0/0/0/26	Fiber NIU
27	Te0/0/0/27	Fiber NIU
28	Te0/0/0/28	Blank/Future
29	Te0/0/0/29	Blank/Future

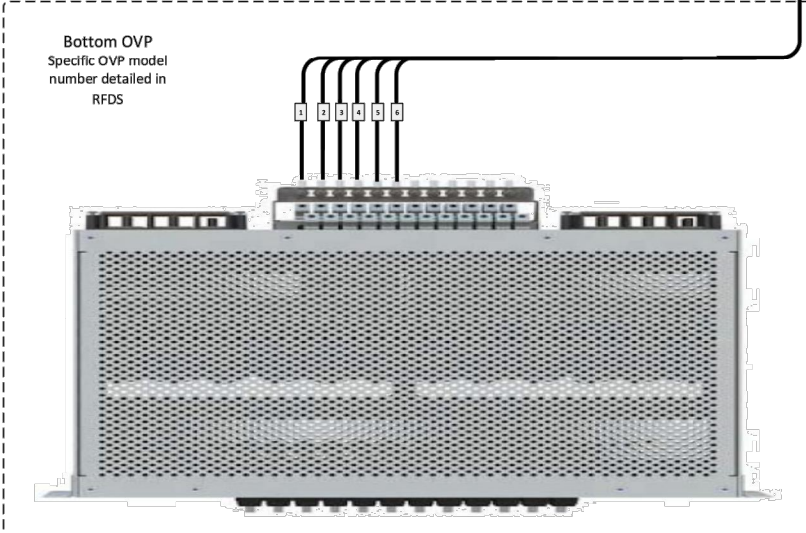
top

bottom

### Bottom OVP Layout

Circuit 1	Alpha Low Band
Circuit 2	Beta Low Band
Circuit 3	Gamma Low Band
Circuit 4	Alpha Mid Band
Circuit 5	Beta Mid Band
Circuit 6	Gamma Mid Band
Circuit 7	Alpha CBRS
Circuit 8	Beta CBRS
Circuit 9	Gamma CBRS
Circuit 10	Open
Circuit 11	Open
Circuit 12	Open

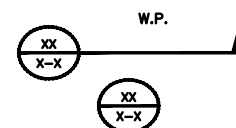
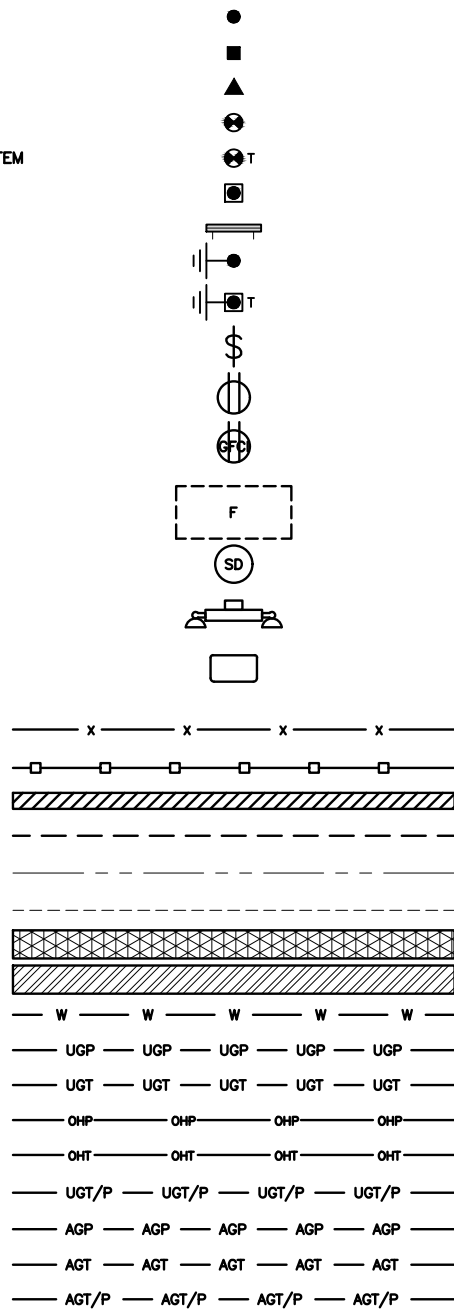
Bottom OVP  
Specific OVP model  
number detailed in  
RFDS



5G plumbing diagram JMA MX08FRO665-20  
2-2-2(LB+MB)

REV	DATE	BY	CHKD	APPD
3	5-Jan-2021	Quan Liu		

EXOTHERMIC CONNECTION  
 MECHANICAL CONNECTION  
 BUSS BAR INSULATOR  
 CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 EXOTHERMIC WITH INSPECTION SLEEVE  
 GROUNDING BAR  
 GROUND ROD  
 TEST GROUND ROD WITH INSPECTION SLEEVE  
 SINGLE POLE SWITCH  
 DUPLEX RECEPTACLE  
 DUPLEX GFCI RECEPTACLE  
 FLUORESCENT LIGHTING FIXTURE  
 (2) TWO LAMPS 48-T8  
 SMOKE DETECTION (DC)  
 EMERGENCY LIGHTING (DC)  
 SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW  
 LED-1-25A400/51K-SR4-120-PE-DBTDXD



SECTION REFERENCE  
 DETAIL REFERENCE

**LEGEND**

AB	ANCHOR BOLT	IN	INCH	INT	INTERIOR
ABV	ABOVE	LB(S)	POUND(S)	LF	LINEAR FEET
AC	ALTERNATING CURRENT	LTE	LONG TERM EVOLUTION	MAS	MASONRY
ADDL	ADDITIONAL	MAX	MAXIMUM	MB	MACHINE BOLT
AFF	ABOVE FINISHED FLOOR	MECH	MECHANICAL	MFR	MANUFACTURER
AFG	ABOVE FINISHED GRADE	MGB	MASTER GROUND BAR	MIN	MINIMUM
AGL	ABOVE GROUND LEVEL	MISC	MISCELLANEOUS	MTL	METAL
AIC	AMPERAGE INTERRUPTION CAPACITY	MTS	MANUAL TRANSFER SWITCH	MW	MICROWAVE
ALUM	ALUMINUM	NEC	NATIONAL ELECTRIC CODE	NM	NEWTON METERS
ALT	ALTERNATE	NO.	NUMBER	#	NUMBER
ANT	ANTENNA	NTS	NOT TO SCALE	OC	ON-CENTER
APPROX	APPROXIMATE	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	OPNG	OPENING
ARCH	ARCHITECTURAL	P/C	PRECAST CONCRETE	PCS	PERSONAL COMMUNICATION SERVICES
ATS	AUTOMATIC TRANSFER SWITCH	PCU	PRIMARY CONTROL UNIT	PP	PRIMARY RADIO CABINET
AWG	AMERICAN WIRE GAUGE	PSF	POUNDS PER SQUARE FOOT	PP	POLARIZING PRESERVING
BATT	BATTERY	PSI	POUNDS PER SQUARE INCH	PT	PRESSURE TREATED
BLDG	BUILDING	PWR	POWER CABINET	QTY	QUANTITY
BLK	BLOCK	RAD	RADIUS	RECT	RECTIFIER
BLKG	BLOCKING	REF	REFERENCE	REINF	REINFORCEMENT
BM	BEAM	REQ'D	REQUIRED	RET	REMOTE ELECTRIC TILT
BTC	BARE TINNED COPPER CONDUCTOR	RF	RADIO FREQUENCY	RMC	RIGID METALLIC CONDUIT
BOF	BOTTOM OF FOOTING	RRH	REMOTE RADIO HEAD	RRU	REMOTE RADIO UNIT
CAB	CABINET	RWY	RACEWAY	SCH	SCHEDULE
CANT	CANTILEVERED	SHT	SHEET	SIAD	SMART INTEGRATED ACCESS DEVICE
CHG	CHARGING	SIM	SIMILAR	SPEC	SPECIFICATION
CLG	CEILING	SQ	SQUARE	SS	STAINLESS STEEL
CLR	CLEAR	STD	STANDARD	STL	STEEL
COL	COLUMN	TEMP	TEMPORARY	THK	THICKNESS
COMM	COMMON	TMA	TOWER MOUNTED AMPLIFIER	TN	TOE NAIL
CONC	CONCRETE	TOA	TOP OF ANTENNA	TOC	TOP OF CURB
CONSTR	CONSTRUCTION	TOF	TOP OF FOUNDATION	TOP	TOP OF PLATE (PARAPET)
DBL	DOUBLE	TOS	TOP OF STEEL	TOW	TOP OF WALL
DC	DIRECT CURRENT	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION	TYP	TYPICAL
DEPT	DEPARTMENT	UG	UNDERGROUND	UL	UNDERWRITERS LABORATORY
DF	DOUGLAS FIR	UNO	UNLESS NOTED OTHERWISE	UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
DIA	DIAMETER	UPS	UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)	VIF	VERIFIED IN FIELD
DIAG	DIAGONAL	W	WIDE	W	WITH
DIM	DIMENSION	WD	WOOD	WP	WEATHERPROOF
DWG	DRAWING	WT	WEIGHT		
DWL	DOWEL				
EA	EACH				
EC	ELECTRICAL CONDUCTOR				
EL	ELEVATION				
ELEC	ELECTRICAL				
EMT	ELECTRICAL METALLIC TUBING				
ENG	ENGINEER				
EQ	EQUAL				
EXP	EXPANSION				
EXT	EXTERIOR				
EW	EACH WAY				
FAB	FABRICATION				
FF	FINISH FLOOR				
FG	FINISH GRADE				
FIF	FACILITY INTERFACE FRAME				
FIN	FINISH(ED)				
FLR	FLOOR				
FDN	FOUNDATION				
FOC	FACE OF CONCRETE				
FOM	FACE OF MASONRY				
FOS	FACE OF STUD				
FOW	FACE OF WALL				
FS	FINISH SURFACE				
FT	FOOT				
FTG	FOOTING				
GA	GAUGE				
GEN	GENERATOR				
GFCI	GROUND FAULT CIRCUIT INTERRUPTER				
GLB	GLUE LAMINATED BEAM				
GLV	GALVANIZED				
GPS	GLOBAL POSITIONING SYSTEM				
GND	GROUND				
GSM	GLOBAL SYSTEM FOR MOBILE				
HDG	HOT DIPPED GALVANIZED				
HDR	HEADER				
HGR	HANGER				
HVAC	HEAT/VENTILATION/AIR CONDITIONING				
HT	HEIGHT				
IGR	INTERIOR GROUND RING				

**ABBREVIATIONS**



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**B&T ENGINEERING, INC.**  
 PEC.0001564  
 Expires 2/10/22

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 OF A LICENSED PROFESSIONAL ENGINEER,  
 TO ALTER THIS DOCUMENT.

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MDW	MDW

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	5/27/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
 147458.003.01

DISH Wireless L.L.C.  
 PROJECT INFORMATION  
 BOBDL00099A  
 107 BUCK RD.  
 HEBRON, CT 06248

SHEET TITLE  
 LEGEND AND ABBREVIATIONS

SHEET NUMBER  
**GN-1**

**SITE ACTIVITY REQUIREMENTS:**

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.
2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:  
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. 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/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION  
CARRIER: DISH Wireless L.L.C.  
TOWER OWNER: TOWER OWNER
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.



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PEC.0001564  
Expires 2/10/22

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DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MDW	MDW

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	5/27/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-2**

**CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
  - #4 BARS AND SMALLER 40 ksi
  - #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
  - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
  - CONCRETE EXPOSED TO EARTH OR WEATHER:
    - #6 BARS AND LARGER 2"
    - #5 BARS AND SMALLER 1-1/2"
  - CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
    - SLAB AND WALLS 3/4"
    - BEAMS AND COLUMNS 1-1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

**ELECTRICAL INSTALLATION NOTES:**

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. TIE WRAPS ARE NOT ALLOWED.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.



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**B&T ENGINEERING, INC.**  
PEC.0001564  
Expires 2/10/22

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MDW	MDW

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	5/27/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
147458.003.01

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-3**



**GROUNDING NOTES:**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.



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DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MDW	MDW

RFDS REV #: ---

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A&E PROJECT NUMBER  
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DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBDL00099A  
107 BUCK RD.  
HEBRON, CT 06248

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-4**

# Exhibit D

## **Structural Analysis Report**

Date: **May 04, 2021**



Crown Castle  
2000 Corporate Drive  
Canonsburg, PA  
(724) 416-2000

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **DISH Network Co-Locate**  
**Site Number:** BOBDL00099A  
**Site Name:** CT-CCI-T-876387

**Crown Castle Designation:** **BU Number:** 876387  
**Site Name:** SOUTH HEBRON / NED ELLIS PROP.  
**JDE Job Number:** 650082  
**Work Order Number:** 1962696  
**Order Number:** 556601 Rev. 0

**Engineering Firm Designation:** **Crown Castle Project Number:** 1962696

**Site Data:** **107 Buck Rd., HEBRON, TOLLAND County, CT**  
**Latitude 41° 39' 16.02", Longitude -72° 24' 39.11"**  
**119.5 Foot - Monopole Tower**

Crown Castle is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

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

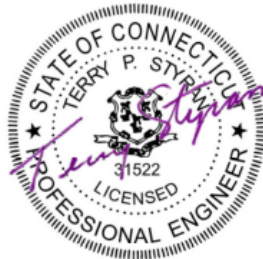
LC7: Proposed Equipment Configuration **Sufficient Capacity – 99.9%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Nicholas A. Palladino

Respectfully submitted by:

Terry P. Styran, P.E.  
Senior Project Engineer



Terry P Styran  
2021.05.06  
17:51:37 -04'00'

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

- Table 1 - Proposed Equipment Configuration
- Table 2 - Non-Carrier Equipment To Be Removed
- Table 3 - Other Considered Equipment

### 3) ANALYSIS PROCEDURE

- Table 4 - Documents Provided
- 3.1) Analysis Method
- 3.2) Assumptions

### 4) ANALYSIS RESULTS

- Table 5 - Section Capacity (Summary)
- Table 6 - Tower Component Stresses vs. Capacity - LC7
- 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 119.5 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. The tower was modified per reinforcement drawings prepared by GPD Associates, in December of 2008. Reinforcement consists of addition of base plate stiffeners.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	130 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-K6MHDX-9-96 (3)		

**Table 2 - Non-Carrier Equipment To Be Removed**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	12	decibel	DB844H90 w/ Mount Pipe	-	-
		1	tower mounts	T-Arm Mount [TA 602-3]		

**Table 3 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
117.0	117.0	3	ericsson	AIR6449 B41_T-MOBILE	4	1-5/8
		3	ericsson	RADIO 4415 B66A		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	rfs celwave	APX16DWV-16DWV-S-E-A20		
		3	rfs celwave	APXVAALL24_43-U-NA20_TMO		
		3	tower mounts	10.5' V-Frame Assembly [VFA10-SD-S]		
		1	tower mounts	Collar Mount [MSFAA]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	-	-	-	12	7/8
97.0	97.0	3	antel	BXA-70063-6CF-2 w/ Mount Pipe	12	1-5/8
		6	antel	LPA-80080-4CF-EDIN-0 w/ Mount Pipe		
		6	rfs celwave	FD9R6004/2C-3L		
		3	swedcom	SPXW 8515 T4 w/ Mount Pipe		
		1	tower mounts	T-Arm Mount [TA 602-3]		
88.0	90.0	3	ericsson	TME-RRUS-11	-	-
		1	raycap	TME-DC6-48-60-18-8F		
	88.0	1	tower mounts	Pipe Mount [PM 602-3]		
87.0	89.0	6	powerwave technologies	7770.00 w/ Mount Pipe	1 2 12 1	3/8 7/16 7/8 Conduit
		6	powerwave technologies	LGP21401		
		6	powerwave technologies	LGP21901		
	88.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe		
	87.0	1	tower mounts	T-Arm Mount [TA 602-3]		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2157932	CCISITES
4-POST-MODIFICATION INSPECTION	2431180	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1630217	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1613574	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2374441	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.0.9.0), 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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

#### 3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

#### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	119.5 - 69.67	Pole	TP33.02x19x0.3125	1	-20.94	1821.77	73.6	Pass
L2	69.67 - 42.25	Pole	TP39.99x31.0839x0.375	2	-28.18	2652.06	86.0	Pass
L3	42.25 - 0	Pole	TP51x37.7131x0.4375	3	-44.87	4107.42	86.5	Pass
							Summary	
						Pole (L3)	86.5	Pass
						Rating =	86.5	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	88.7	Pass
1	Base Plate	0	86.1	Pass
1	Base Foundation (Structure)	0	99.9	Pass
1	Base Foundation (Soil Interaction)	0	69.8	Pass

<b>Structure Rating (max from all components) =</b>	<b>99.9%</b>
---	--------------

Notes:

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

#### 4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. In order for the results of this analysis to be considered valid, the loading modification, as follows, must be completed.

Loading Changes:

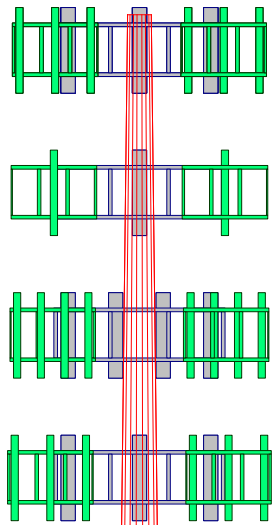
- a) Removal of the abandoned antennas and mounts at the 107 ft level

No structural modifications are required at this time provided that the above-listed changes are completed.

**APPENDIX A**  
**TNXTOWER OUTPUT**



119.5 ft



**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 86.5%

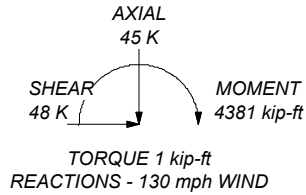
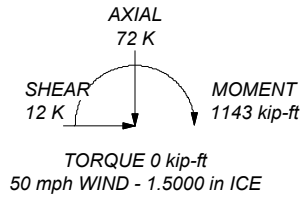
Section	1	2	3	
Length (ft)	49.83	32.08	47.75	
Number of Sides	18	18	18	
Thickness (in)	0.3125	0.3750	0.4375	
Socket Length (ft)	4.66	5.50		
Top Dia (in)	19.0000	31.0839	37.7131	
Bot Dia (in)	33.0200	39.9900	51.0000	
Grade		A572-65		
Weight (K)	4.3	4.6	9.9	18.8

69.7 ft

42.3 ft

0.0 ft

ALL REACTIONS  
ARE FACTORED



**Crown Castle**  
2000 Corporate Drive  
Canonsburg, PA  
The Pathway to Possible Phone: (724) 416-2000  
FAX:

Job:	<b>876387</b>		
Project:			
Client:	Crown Castle	Drawn by:	NPalladino
Code:	TIA-222-H	Date:	05/04/21
Path:			App'd:
			Scale:
			NTS
			Dwg No.
			E-1

## Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Tolland County, Connecticut.
- Tower base elevation above sea level: 545.00 ft.
- Basic wind speed of 130 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Maximum demand-capacity ratio is: 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
--	---	---

## 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	119.50-69.67	49.83	4.66	18	19.0000	33.0200	0.3125	1.2500	A572-65 (65 ksi)
L2	69.67-42.25	32.08	5.50	18	31.0839	39.9900	0.3750	1.5000	A572-65 (65 ksi)
L3	42.25-0.00	47.75		18	37.7131	51.0000	0.4375	1.7500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	19.2449	18.5357	817.8017	6.6341	9.6520	84.7287	1636.6795	9.2696	2.7940	8.941
	33.4812	32.4418	4384.6653	11.6112	16.7742	261.3940	8775.1000	16.2240	5.2615	16.837
L2	32.8192	36.5512	4354.7927	10.9017	15.7906	275.7837	8715.3156	18.2791	4.8108	12.829
	40.5491	47.1518	9348.7731	14.0633	20.3149	460.1925	18709.847 6	23.5804	6.3782	17.009
L3	39.7814	51.7618	9086.4782	13.2328	19.1582	474.2856	18184.912 6	25.8858	5.8675	13.411
	51.7193	70.2124	22678.172 1	17.9497	25.9080	875.3347	45386.184 7	35.1128	8.2060	18.757

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 119.50- 69.67				1	1	1			
L2 69.67- 42.25				1	1	1			
L3 42.25-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter r in	Weight plf
***** CU12PSM9P6XXX(1- 1/2)	C	No	Surface Ar (CaAa)	107.00 - 0.00	1	1	0.000 0.000	1.6000		2.35

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf	
***** *** HB158-21U6S24- xxM_TMO(1-5/8)	C	No	No	Inside Pole	117.00 - 8.00	4	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	2.50 2.50 2.50 2.50
***** LDF5-50A(7/8)	A	No	No	Inside Pole	107.00 - 8.00	12	No Ice 1/2" Ice	0.00 0.00	0.33 0.33

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
*****									
LDF7-50A(1-5/8)	B	No	No	Inside Pole	97.00 - 3.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
*****									
LDF5-50A(7/8)	A	No	No	Inside Pole	87.00 - 8.00	12	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
FB-L98B-002-75000(3/8)	A	No	No	Inside Pole	87.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	A	No	No	Inside Pole	87.00 - 8.00	2	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
							2" Ice	0.00	0.14
2" Rigid Conduit	A	No	No	Inside Pole	87.00 - 8.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
							2" Ice	0.00	2.80

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	119.50-69.67	A	0.000	0.000	0.000	0.000	0.27
		B	0.000	0.000	0.000	0.000	0.27
		C	0.000	0.000	5.973	0.000	0.56
L2	69.67-42.25	A	0.000	0.000	0.000	0.000	0.30
		B	0.000	0.000	0.000	0.000	0.27
		C	0.000	0.000	4.387	0.000	0.34
L3	42.25-0.00	A	0.000	0.000	0.000	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	6.760	0.000	0.44

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	119.50-69.67	A	1.414	0.000	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	0.000	0.27
		C		0.000	0.000	16.528	0.000	0.76
L2	69.67-42.25	A	1.343	0.000	0.000	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.27
		C		0.000	0.000	12.140	0.000	0.48
L3	42.25-0.00	A	1.219	0.000	0.000	0.000	0.000	0.38
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	18.108	0.000	0.65

### Feed Line Center of Pressure

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
L1	119.50-69.67	0.0000	1.0212	0.0000	1.4983
L2	69.67-42.25	0.0000	1.2639	0.0000	1.9097
L3	42.25-0.00	0.0000	1.2700	0.0000	1.9081

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	16	CU12PSM9P6XXX(1-1/2)	69.67 - 107.00	1.0000	1.0000
L2	16	CU12PSM9P6XXX(1-1/2)	42.25 - 69.67	1.0000	1.0000
L3	16	CU12PSM9P6XXX(1-1/2)	0.00 - 42.25	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
***** ***									
AIR6449 B41_T-MOBILE	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 5.27 1/2" 5.70 Ice 6.14 1" Ice 7.06 2" Ice 7.06	2.03 2.36 2.70 3.43 3.43	0.11 0.15 0.20 0.30	
AIR6449 B41_T-MOBILE	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 5.27 1/2" 5.70 Ice 6.14 1" Ice 7.06 2" Ice 7.06	2.03 2.36 2.70 3.43 3.43	0.11 0.15 0.20 0.30	
AIR6449 B41_T-MOBILE	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 5.27 1/2" 5.70 Ice 6.14 1" Ice 7.06 2" Ice 7.06	2.03 2.36 2.70 3.43 3.43	0.11 0.15 0.20 0.30	
APXVAALL24_43-U-NA20_TMO	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 14.67 1/2" 15.43 Ice 16.21 1" Ice 17.81 2" Ice 17.81	5.32 5.99 6.68 8.08 8.08	0.15 0.26 0.38 0.65	
APXVAALL24_43-U-NA20_TMO	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 14.67 1/2" 15.43 Ice 16.21 1" Ice 17.81 2" Ice 17.81	5.32 5.99 6.68 8.08 8.08	0.15 0.26 0.38 0.65	
APXVAALL24_43-U-	C	From Leg	4.00	0.0000	117.00	No Ice 14.67	5.32	0.15	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
NA20_TMO			0.00 0.00			1/2" Ice 1" Ice 2" Ice	15.43 6.26 6.85 7.46 8.72	5.99 1.50 2.00 2.52 3.62	0.26 0.38 0.65
APX16DWV-16DWV-S-E-A20	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
APX16DWV-16DWV-S-E-A20	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
APX16DWV-16DWV-S-E-A20	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
(2) RADIO 4424 B25_TMO	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.05 2.23 2.42 2.81	1.61 1.77 1.94 2.30	0.09 0.11 0.13 0.19
RADIO 4424 B25_TMO	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.05 2.23 2.42 2.81	1.61 1.77 1.94 2.30	0.09 0.11 0.13 0.19
RADIO 4415 B66A	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
(2) RADIO 4415 B66A	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
(4) 8'x2" Antenna Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(4) 8'x2" Antenna Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(4) 8'x2" Antenna Mount	C	From Leg	4.00	0.0000	117.00	No Ice	1.90	1.90	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CA <sub>AA</sub> Front ft <sup>2</sup>	CA <sub>AA</sub> Side ft <sup>2</sup>	Weight K
Pipe			0.00 0.00			1/2" 2.73 Ice 3.40 1" Ice 4.40 2" Ice 4.40	2.73 3.40 4.40 4.40	0.04 0.06 0.12
Collar Mount [MSFAA]	A	None		0.0000	117.00	No Ice 3.17 1/2" 3.79 Ice 4.42 1" Ice 5.76 2" Ice 5.76	3.17 3.79 4.42 5.76 5.76	0.20 0.23 0.28 0.40
10.5' V-Frame Assembly [VFA10-SD-S]	A	From Leg	0.50 0.00 0.00	0.0000	117.00	No Ice 9.80 1/2" 14.90 Ice 19.60 1" Ice 29.00 2" Ice 29.00	6.40 10.00 13.50 20.50 20.50	0.42 0.50 0.63 0.89
10.5' V-Frame Assembly [VFA10-SD-S]	B	From Leg	0.50 0.00 0.00	0.0000	117.00	No Ice 9.80 1/2" 14.90 Ice 19.60 1" Ice 29.00 2" Ice 29.00	6.40 10.00 13.50 20.50 20.50	0.42 0.50 0.63 0.89
10.5' V-Frame Assembly [VFA10-SD-S]	C	From Leg	0.50 0.00 0.00	0.0000	117.00	No Ice 9.80 1/2" 14.90 Ice 19.60 1" Ice 29.00 2" Ice 29.00	6.40 10.00 13.50 20.50 20.50	0.42 0.50 0.63 0.89
***** *****								
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 2.86 1/2" 3.22 Ice 3.59 1" Ice 4.34 2" Ice 4.34	6.57 7.19 7.84 9.17 9.17	0.03 0.08 0.13 0.25
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 2.86 1/2" 3.22 Ice 3.59 1" Ice 4.34 2" Ice 4.34	6.57 7.19 7.84 9.17 9.17	0.03 0.08 0.13 0.25
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 2.86 1/2" 3.22 Ice 3.59 1" Ice 4.34 2" Ice 4.34	6.57 7.19 7.84 9.17 9.17	0.03 0.08 0.13 0.25
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 7.34 1/2" 8.08 Ice 8.83 1" Ice 10.38 2" Ice 10.38	5.51 6.22 6.94 8.44 8.44	0.06 0.11 0.18 0.35
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 7.34 1/2" 8.08 Ice 8.83 1" Ice 10.38 2" Ice 10.38	5.51 6.22 6.94 8.44 8.44	0.06 0.11 0.18 0.35
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 7.34 1/2" 8.08 Ice 8.83 1" Ice 10.38 2" Ice 10.38	5.51 6.22 6.94 8.44 8.44	0.06 0.11 0.18 0.35
SPXW 8515 T4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 2.91 1/2" 3.35 Ice 3.80 1" Ice 4.76 2" Ice 4.76	3.29 3.74 4.20 5.18 5.18	0.03 0.06 0.10 0.20
SPXW 8515 T4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	97.00	No Ice 2.91 1/2" 3.35 Ice 3.80 1" Ice 4.76	3.29 3.74 4.20 5.18	0.03 0.06 0.10 0.20

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
SPXW 8515 T4 w/ Mount Pipe	C	From Leg	4.00	0.00	0.00	0.0000	97.00	2" Ice			
								No Ice	2.91	3.29	0.03
								1/2"	3.35	3.74	0.06
								Ice	3.80	4.20	0.10
								1" Ice	4.76	5.18	0.20
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.00	0.00	0.0000	97.00	2" Ice			
								No Ice	0.31	0.08	0.00
								1/2"	0.39	0.12	0.01
								Ice	0.47	0.17	0.01
								1" Ice	0.65	0.29	0.02
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.00	0.00	0.0000	97.00	2" Ice			
								No Ice	0.31	0.08	0.00
								1/2"	0.39	0.12	0.01
								Ice	0.47	0.17	0.01
								1" Ice	0.65	0.29	0.02
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.00	0.00	0.0000	97.00	2" Ice			
								No Ice	0.31	0.08	0.00
								1/2"	0.39	0.12	0.01
								Ice	0.47	0.17	0.01
								1" Ice	0.65	0.29	0.02
T-Arm Mount [TA 602-3]	C	None			0.0000	97.00	2" Ice				
							No Ice	13.40	13.40	0.77	
							1/2"	16.44	16.44	1.00	
							Ice	19.70	19.70	1.29	
							1" Ice	25.86	25.86	2.05	
*****											
TME-RRUS-11	A	From Leg	1.00	0.00	2.00	0.0000	88.00	2" Ice			
								No Ice	2.96	1.67	0.06
								1/2"	3.23	1.98	0.08
								Ice	3.50	2.30	0.12
								1" Ice	4.09	3.02	0.19
TME-RRUS-11	B	From Leg	1.00	0.00	2.00	0.0000	88.00	2" Ice			
								No Ice	2.96	1.67	0.06
								1/2"	3.23	1.98	0.08
								Ice	3.50	2.30	0.12
								1" Ice	4.09	3.02	0.19
TME-RRUS-11	C	From Leg	1.00	0.00	2.00	0.0000	88.00	2" Ice			
								No Ice	2.96	1.67	0.06
								1/2"	3.23	1.98	0.08
								Ice	3.50	2.30	0.12
								1" Ice	4.09	3.02	0.19
TME-DC6-48-60-18-8F	A	From Leg	1.00	0.00	2.00	0.0000	88.00	2" Ice			
								No Ice	1.21	1.21	0.03
								1/2"	1.89	1.89	0.05
								Ice	2.11	2.11	0.08
								1" Ice	2.57	2.57	0.14
Pipe Mount [PM 602-3]	C	From Leg	1.00	0.00	0.00	0.0000	88.00	2" Ice			
								No Ice	6.67	6.67	0.28
								1/2"	7.70	7.70	0.34
								Ice	8.74	8.74	0.42
								1" Ice	10.90	10.90	0.63
*****											
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	2.00	0.0000	87.00	2" Ice			
								No Ice	5.75	4.25	0.06
								1/2"	6.18	5.01	0.10
								Ice	6.61	5.71	0.16
								1" Ice	7.49	7.16	0.29
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.00	2.00	0.0000	87.00	2" Ice			
								No Ice	5.75	4.25	0.06
								1/2"	6.18	5.01	0.10
								Ice	6.61	5.71	0.16
								1" Ice	7.49	7.16	0.29
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.00		0.0000	87.00	2" Ice			
								No Ice	5.75	4.25	0.06
								1/2"	6.18	5.01	0.10



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			2.00			Ice 6.61	5.71	0.16
						1" Ice 7.49	7.16	0.29
						2" Ice		
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	87.00	No Ice 4.63 1/2" 5.06 Ice 5.51 1" Ice 6.43	3.27 3.69 4.12 5.00	0.07 0.13 0.20 0.38
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	87.00	No Ice 4.63 1/2" 5.06 Ice 5.51 1" Ice 6.43	3.27 3.69 4.12 5.00	0.07 0.13 0.20 0.38
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	87.00	No Ice 4.63 1/2" 5.06 Ice 5.51 1" Ice 6.43	3.27 3.69 4.12 5.00	0.07 0.13 0.20 0.38
(2) LGP21401	A	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 1.10 1/2" 1.24 Ice 1.38 1" Ice 1.69 2" Ice	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21901	A	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 0.23 1/2" 0.29 Ice 0.36 1" Ice 0.53 2" Ice	0.16 0.21 0.28 0.42	0.01 0.01 0.01 0.02
(2) LGP21901	B	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 0.23 1/2" 0.29 Ice 0.36 1" Ice 0.53 2" Ice	0.16 0.21 0.28 0.42	0.01 0.01 0.01 0.02
(2) LGP21901	C	From Leg	4.00 0.00 2.00	0.0000	87.00	No Ice 0.23 1/2" 0.29 Ice 0.36 1" Ice 0.53 2" Ice	0.16 0.21 0.28 0.42	0.01 0.01 0.01 0.02
T-Arm Mount [TA 602-3]	A	None		0.0000	87.00	No Ice 13.40 1/2" 16.44 Ice 19.70 1" Ice 25.86 2" Ice	13.40 16.44 19.70 25.86	0.77 1.00 1.29 2.05
*****								
EEl Branches (Large)	C	None		0.0000	114.00	No Ice 90.00 1/2" 120.00 Ice 144.00 1" Ice 172.80 2" Ice	90.00 120.00 144.00 172.80	1.50 1.90 2.47 3.21
EEl Branches (Large)	C	None		0.0000	104.00	No Ice 90.00 1/2" 120.00 Ice 144.00 1" Ice 172.80 2" Ice	90.00 120.00 144.00 172.80	1.50 1.90 2.47 3.21
EEl Branches (Large)	C	None		0.0000	94.00	No Ice 90.00	90.00	1.50

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
EEI Branches (Large)	C	None		0.0000	84.00	1/2" Ice	120.00	120.00	1.90
						1" Ice	144.00	144.00	2.47
						2" Ice	172.80	172.80	3.21
						No Ice	90.00	90.00	1.50
						1/2" Ice	120.00	120.00	1.90
						1" Ice	144.00	144.00	2.47
EEI Branches (Small)	C	None		0.0000	77.00	1/2" Ice	120.00	120.00	1.90
						1" Ice	144.00	144.00	2.47
						2" Ice	172.80	172.80	3.21
						No Ice	90.00	90.00	1.50
						1/2" Ice	120.00	120.00	1.90
						1" Ice	144.00	144.00	2.47
*****						2" Ice	172.80	172.80	3.21
*						No Ice	45.00	45.00	0.75
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	60.00	60.00	0.85
						1" Ice	72.00	72.00	0.95
						2" Ice	96.00	96.00	1.15
						No Ice	45.00	45.00	0.75
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	8.01	4.23	0.11
						1" Ice	8.52	4.69	0.19
						2" Ice	9.04	5.16	0.29
						No Ice	10.11	6.12	0.52
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	8.01	4.23	0.11
						1" Ice	8.52	4.69	0.19
						2" Ice	9.04	5.16	0.29
						No Ice	10.11	6.12	0.52
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	0.98	0.06
						1" Ice	2.14	1.11	0.08
						2" Ice	2.32	1.25	0.10
						No Ice	2.71	1.55	0.15
TA08025-B604	B	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	0.98	0.06
						1" Ice	2.14	1.11	0.08
						2" Ice	2.32	1.25	0.10
						No Ice	2.71	1.55	0.15
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	0.98	0.06
						1" Ice	2.14	1.11	0.08
						2" Ice	2.32	1.25	0.10
						No Ice	2.71	1.55	0.15
TA08025-B605	A	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	1.13	0.08
						1" Ice	2.14	1.27	0.09
						2" Ice	2.32	1.41	0.11
						No Ice	2.71	1.72	0.16
TA08025-B605	B	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	1.13	0.08
						1" Ice	2.14	1.27	0.09
						2" Ice	2.32	1.41	0.11
						No Ice	2.71	1.72	0.16
TA08025-B605	C	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	0.00	1.13	0.08
						1" Ice	2.14	1.27	0.09
						2" Ice	2.32	1.41	0.11
						No Ice	2.71	1.72	0.16
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	107.00	1/2" Ice	2.31	1.29	0.02
						1" Ice	2.50	1.45	0.04
						2" Ice	2.70	1.61	0.06
						No Ice	3.12	1.96	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
Commscope MC-K6MHDX-9-96 (3)	C	None		0.0000	107.00	2" Ice			
						No Ice	15.30	15.30	1.19
						1/2"	20.48	20.48	1.71
						Ice	25.66	25.66	2.22
						1" Ice	36.02	36.02	3.25
(2) 8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	107.00	2" Ice			
						No Ice	1.90	1.90	0.03
						1/2"	2.73	2.73	0.04
						Ice	3.40	3.40	0.06
						1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	107.00	2" Ice			
						No Ice	1.90	1.90	0.03
						1/2"	2.73	2.73	0.04
						Ice	3.40	3.40	0.06
						1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	107.00	2" Ice			
						No Ice	1.90	1.90	0.03
						1/2"	2.73	2.73	0.04
						Ice	3.40	3.40	0.06
						1" Ice	4.40	4.40	0.12
						2" Ice			

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 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

Comb. No.	Description
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	119.5 - 69.67	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	26	-45.13	0.78	0.21
			Max. Mx	20	-20.94	1056.13	-0.41
			Max. My	2	-20.94	-0.05	1055.67
			Max. Vy	20	-41.51	1056.13	-0.41
			Max. Vx	14	41.52	0.88	-1055.53
			Max. Torque	17			-0.57
L2	69.67 - 42.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.19	0.78	-0.10
			Max. Mx	20	-28.19	2190.84	-0.80
			Max. My	14	-28.19	1.19	-2190.57
			Max. Vy	20	-43.83	2190.84	-0.80
			Max. Vx	14	43.84	1.19	-2190.57
			Max. Torque	17			-0.57
L3	42.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.69	0.78	-0.80
			Max. Mx	20	-44.87	4379.22	-1.57
			Max. My	14	-44.87	1.71	-4379.58
			Max. Vy	20	-47.59	4379.22	-1.57
			Max. Vx	14	47.60	1.71	-4379.58
			Max. Torque	17			-0.57

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	71.69	12.02	-0.00
	Max. H <sub>x</sub>	20	44.92	47.55	-0.01
	Max. H <sub>z</sub>	2	44.92	-0.01	47.55
	Max. M <sub>x</sub>	2	4378.98	-0.01	47.55
	Max. M <sub>z</sub>	8	4378.33	-47.55	0.01
	Max. Torsion	5	0.57	-23.78	41.19
	Min. Vert	19	33.69	41.18	-23.79
	Min. H <sub>x</sub>	8	44.92	-47.55	0.01
	Min. H <sub>z</sub>	14	44.92	0.01	-47.55
	Min. M <sub>x</sub>	14	-4379.58	0.01	-47.55
	Min. M <sub>z</sub>	20	-4379.22	47.55	-0.01

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Torsion	17	-0.57	23.78	-41.19

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overtuning Moment, M <sub>x</sub> kip-ft	Overtuning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	37.43	0.00	0.00	0.25	0.36	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	44.92	0.01	-47.55	-4378.98	-0.82	-0.48
0.9 Dead+1.0 Wind 0 deg - No Ice	33.69	0.01	-47.55	-4340.47	-0.92	-0.49
1.2 Dead+1.0 Wind 30 deg - No Ice	44.92	23.78	-41.19	-3792.90	-2190.04	-0.57
0.9 Dead+1.0 Wind 30 deg - No Ice	33.69	23.78	-41.19	-3759.55	-2170.85	-0.57
1.2 Dead+1.0 Wind 60 deg - No Ice	44.92	41.18	-23.79	-2190.43	-3792.32	-0.50
0.9 Dead+1.0 Wind 60 deg - No Ice	33.69	41.18	-23.79	-2171.20	-3759.01	-0.50
1.2 Dead+1.0 Wind 90 deg - No Ice	44.92	47.55	-0.01	-0.96	-4378.33	-0.30
0.9 Dead+1.0 Wind 90 deg - No Ice	33.69	47.55	-0.01	-1.02	-4339.86	-0.29
1.2 Dead+1.0 Wind 120 deg - No Ice	44.92	41.17	23.77	2188.86	-3791.06	-0.02
0.9 Dead+1.0 Wind 120 deg - No Ice	33.69	41.17	23.77	2169.50	-3757.77	-0.01
1.2 Dead+1.0 Wind 150 deg - No Ice	44.92	23.76	41.18	3792.25	-2187.85	0.27
0.9 Dead+1.0 Wind 150 deg - No Ice	33.69	23.76	41.18	3758.76	-2168.69	0.28
1.2 Dead+1.0 Wind 180 deg - No Ice	44.92	-0.01	47.55	4379.58	1.71	0.48
0.9 Dead+1.0 Wind 180 deg - No Ice	33.69	-0.01	47.55	4340.93	1.58	0.49
1.2 Dead+1.0 Wind 210 deg - No Ice	44.92	-23.78	41.19	3793.51	2190.93	0.57
0.9 Dead+1.0 Wind 210 deg - No Ice	33.69	-23.78	41.19	3760.01	2171.50	0.57
1.2 Dead+1.0 Wind 240 deg - No Ice	44.92	-41.18	23.79	2191.04	3793.21	0.50
0.9 Dead+1.0 Wind 240 deg - No Ice	33.69	-41.18	23.79	2171.66	3759.67	0.50
1.2 Dead+1.0 Wind 270 deg - No Ice	44.92	-47.55	0.01	1.57	4379.22	0.30
0.9 Dead+1.0 Wind 270 deg - No Ice	33.69	-47.55	0.01	1.48	4340.52	0.29
1.2 Dead+1.0 Wind 300 deg - No Ice	44.92	-41.17	-23.77	-2188.25	3791.96	0.02
0.9 Dead+1.0 Wind 300 deg - No Ice	33.69	-41.17	-23.77	-2169.04	3758.43	0.01
1.2 Dead+1.0 Wind 330 deg - No Ice	44.92	-23.76	-41.18	-3791.65	2188.75	-0.27
0.9 Dead+1.0 Wind 330 deg - No Ice	33.69	-23.76	-41.18	-3758.31	2169.35	-0.28
1.2 Dead+1.0 Ice+1.0 Temp	71.69	0.00	0.00	0.80	0.78	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	71.69	0.00	-12.02	-1141.21	0.66	-0.11
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	71.69	6.01	-10.41	-988.32	-570.29	-0.12
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	71.69	10.41	-6.01	-570.39	-988.20	-0.11
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	71.69	12.02	-0.00	0.59	-1141.08	-0.06

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	71.69	10.41	6.01	571.63	-987.98	-0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	71.69	6.01	10.41	989.72	-569.91	0.06
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	71.69	-0.00	12.02	1142.83	1.09	0.11
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	71.69	-6.01	10.41	989.94	572.04	0.12
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	71.69	-10.41	6.01	572.01	989.95	0.11
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	71.69	-12.02	0.00	1.03	1142.83	0.06
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	71.69	-10.41	-6.01	-570.01	989.73	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	71.69	-6.01	-10.41	-988.10	571.66	-0.06
Dead+Wind 0 deg - Service	37.43	0.00	-9.54	-874.94	0.12	-0.10
Dead+Wind 30 deg - Service	37.43	4.77	-8.26	-757.81	-437.39	-0.12
Dead+Wind 60 deg - Service	37.43	8.26	-4.77	-437.56	-757.60	-0.10
Dead+Wind 90 deg - Service	37.43	9.54	-0.00	-0.00	-874.71	-0.06
Dead+Wind 120 deg - Service	37.43	8.26	4.77	437.63	-757.35	-0.01
Dead+Wind 150 deg - Service	37.43	4.77	8.26	758.06	-436.95	0.05
Dead+Wind 180 deg - Service	37.43	-0.00	9.54	875.44	0.62	0.10
Dead+Wind 210 deg - Service	37.43	-4.77	8.26	758.31	438.13	0.12
Dead+Wind 240 deg - Service	37.43	-8.26	4.77	438.06	758.34	0.10
Dead+Wind 270 deg - Service	37.43	-9.54	0.00	0.50	875.46	0.06
Dead+Wind 300 deg - Service	37.43	-8.26	-4.77	-437.12	758.09	0.01
Dead+Wind 330 deg - Service	37.43	-4.77	-8.26	-757.56	437.70	-0.05

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-37.43	0.00	0.00	37.43	0.00	0.000%
2	0.01	-44.92	-47.55	-0.01	44.92	47.55	0.000%
3	0.01	-33.69	-47.55	-0.01	33.69	47.55	0.000%
4	23.78	-44.92	-41.19	-23.78	44.92	41.19	0.000%
5	23.78	-33.69	-41.19	-23.78	33.69	41.19	0.000%
6	41.18	-44.92	-23.79	-41.18	44.92	23.79	0.000%
7	41.18	-33.69	-23.79	-41.18	33.69	23.79	0.000%
8	47.55	-44.92	-0.01	-47.55	44.92	0.01	0.000%
9	47.55	-33.69	-0.01	-47.55	33.69	0.01	0.000%
10	41.17	-44.92	23.77	-41.17	44.92	-23.77	0.000%
11	41.17	-33.69	23.77	-41.17	33.69	-23.77	0.000%
12	23.76	-44.92	41.18	-23.76	44.92	-41.18	0.000%
13	23.76	-33.69	41.18	-23.76	33.69	-41.18	0.000%
14	-0.01	-44.92	47.55	0.01	44.92	-47.55	0.000%
15	-0.01	-33.69	47.55	0.01	33.69	-47.55	0.000%
16	-23.78	-44.92	41.19	23.78	44.92	-41.19	0.000%
17	-23.78	-33.69	41.19	23.78	33.69	-41.19	0.000%
18	-41.18	-44.92	23.79	41.18	44.92	-23.79	0.000%
19	-41.18	-33.69	23.79	41.18	33.69	-23.79	0.000%
20	-47.55	-44.92	0.01	47.55	44.92	-0.01	0.000%
21	-47.55	-33.69	0.01	47.55	33.69	-0.01	0.000%
22	-41.17	-44.92	-23.77	41.17	44.92	23.77	0.000%
23	-41.17	-33.69	-23.77	41.17	33.69	23.77	0.000%
24	-23.76	-44.92	-41.18	23.76	44.92	41.18	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
25	-23.76	-33.69	-41.18	23.76	33.69	41.18	0.000%
26	0.00	-71.69	0.00	0.00	71.69	0.00	0.000%
27	0.00	-71.69	-12.02	-0.00	71.69	12.02	0.000%
28	6.01	-71.69	-10.41	-6.01	71.69	10.41	0.000%
29	10.41	-71.69	-6.01	-10.41	71.69	6.01	0.000%
30	12.02	-71.69	-0.00	-12.02	71.69	0.00	0.000%
31	10.41	-71.69	6.01	-10.41	71.69	-6.01	0.000%
32	6.01	-71.69	10.41	-6.01	71.69	-10.41	0.000%
33	-0.00	-71.69	12.02	0.00	71.69	-12.02	0.000%
34	-6.01	-71.69	10.41	6.01	71.69	-10.41	0.000%
35	-10.41	-71.69	6.01	10.41	71.69	-6.01	0.000%
36	-12.02	-71.69	0.00	12.02	71.69	-0.00	0.000%
37	-10.41	-71.69	-6.01	10.41	71.69	6.01	0.000%
38	-6.01	-71.69	-10.41	6.01	71.69	10.41	0.000%
39	0.00	-37.43	-9.54	-0.00	37.43	9.54	0.000%
40	4.77	-37.43	-8.26	-4.77	37.43	8.26	0.000%
41	8.26	-37.43	-4.77	-8.26	37.43	4.77	0.000%
42	9.54	-37.43	-0.00	-9.54	37.43	0.00	0.000%
43	8.26	-37.43	4.77	-8.26	37.43	-4.77	0.000%
44	4.77	-37.43	8.26	-4.77	37.43	-8.26	0.000%
45	-0.00	-37.43	9.54	0.00	37.43	-9.54	0.000%
46	-4.77	-37.43	8.26	4.77	37.43	-8.26	0.000%
47	-8.26	-37.43	4.77	8.26	37.43	-4.77	0.000%
48	-9.54	-37.43	0.00	9.54	37.43	-0.00	0.000%
49	-8.26	-37.43	-4.77	8.26	37.43	4.77	0.000%
50	-4.77	-37.43	-8.26	4.77	37.43	8.26	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00031900
3	Yes	4	0.00000001	0.00014923
4	Yes	5	0.00000001	0.00086510
5	Yes	5	0.00000001	0.00033892
6	Yes	5	0.00000001	0.00087510
7	Yes	5	0.00000001	0.00034338
8	Yes	4	0.00000001	0.00029888
9	Yes	4	0.00000001	0.00013259
10	Yes	5	0.00000001	0.00086911
11	Yes	5	0.00000001	0.00034090
12	Yes	5	0.00000001	0.00086700
13	Yes	5	0.00000001	0.00033991
14	Yes	4	0.00000001	0.00033981
15	Yes	4	0.00000001	0.00016407
16	Yes	5	0.00000001	0.00087598
17	Yes	5	0.00000001	0.00034370
18	Yes	5	0.00000001	0.00086605
19	Yes	5	0.00000001	0.00033926
20	Yes	4	0.00000001	0.00028406
21	Yes	4	0.00000001	0.00012128
22	Yes	5	0.00000001	0.00087003
23	Yes	5	0.00000001	0.00034118
24	Yes	5	0.00000001	0.00087208
25	Yes	5	0.00000001	0.00034215
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00035662
28	Yes	5	0.00000001	0.00046566
29	Yes	5	0.00000001	0.00046665
30	Yes	5	0.00000001	0.00035609
31	Yes	5	0.00000001	0.00046592
32	Yes	5	0.00000001	0.00046559
33	Yes	5	0.00000001	0.00035653
34	Yes	5	0.00000001	0.00046808

35	Yes	5	0.00000001	0.00046708
36	Yes	5	0.00000001	0.00035704
37	Yes	5	0.00000001	0.00046716
38	Yes	5	0.00000001	0.00046749
39	Yes	4	0.00000001	0.00006612
40	Yes	4	0.00000001	0.00033947
41	Yes	4	0.00000001	0.00035119
42	Yes	4	0.00000001	0.00006548
43	Yes	4	0.00000001	0.00034441
44	Yes	4	0.00000001	0.00034213
45	Yes	4	0.00000001	0.00006619
46	Yes	4	0.00000001	0.00035287
47	Yes	4	0.00000001	0.00034106
48	Yes	4	0.00000001	0.00006552
49	Yes	4	0.00000001	0.00034618
50	Yes	4	0.00000001	0.00034851

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.5 - 69.67	18.079	47	1.2867	0.0008
L2	74.33 - 42.25	7.041	47	0.9208	0.0003
L3	47.75 - 0	2.840	47	0.5583	0.0001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	AIR6449 B41_T-MOBILE	47	17.412	1.2711	0.0008	36481
114.00	EEl Branches (Large)	47	16.614	1.2523	0.0007	33164
107.00	MX08FRO665-21 w/ Mount Pipe	47	14.766	1.2071	0.0006	14592
104.00	EEl Branches (Large)	47	13.986	1.1868	0.0006	11768
97.00	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	47	12.203	1.1362	0.0005	8106
94.00	EEl Branches (Large)	47	11.459	1.1129	0.0005	7152
88.00	TME-RRUS-11	47	10.020	1.0622	0.0004	5790
87.00	(2) 7770.00 w/ Mount Pipe	47	9.787	1.0532	0.0004	5611
84.00	EEl Branches (Large)	47	9.101	1.0249	0.0004	5137
77.00	EEl Branches (Small)	47	7.585	0.9517	0.0003	4297

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.5 - 69.67	90.382	20	6.4409	0.0039
L2	74.33 - 42.25	35.214	20	4.6094	0.0015
L3	47.75 - 0	14.205	16	2.7946	0.0006

### Critical Deflections and Radius of Curvature - Design Wind



Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	AIR6449 B41_T-MOBILE	20	87.051	6.3633	0.0038	7449
114.00	EEI Branches (Large)	20	83.060	6.2696	0.0035	6772
107.00	MX08FRO665-21 w/ Mount Pipe	20	73.827	6.0442	0.0031	2978
104.00	EEI Branches (Large)	20	69.925	5.9429	0.0029	2401
97.00	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	20	61.014	5.6902	0.0025	1652
94.00	EEI Branches (Large)	20	57.299	5.5731	0.0023	1457
88.00	TME-RRUS-11	20	50.104	5.3186	0.0019	1178
87.00	(2) 7770.00 w/ Mount Pipe	20	48.939	5.2732	0.0019	1141
84.00	EEI Branches (Large)	20	45.510	5.1315	0.0018	1044
77.00	EEI Branches (Small)	20	37.931	4.7644	0.0016	871

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	119.5 - 69.67 (1)	TP33.02x19x0.3125	49.83	0.00	0.0	31.141 3	-20.94	1821.77	0.011
L2	69.67 - 42.25 (2)	TP39.99x31.0839x0.375	32.08	0.00	0.0	45.334 3	-28.18	2652.06	0.011
L3	42.25 - 0 (3)	TP51x37.7131x0.4375	47.75	0.00	0.0	70.212 3	-44.87	4107.42	0.011

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	119.5 - 69.67 (1)	TP33.02x19x0.3125	1056.42	1470.41	0.718	0.00	1470.41	0.000
L2	69.67 - 42.25 (2)	TP39.99x31.0839x0.375	2191.49	2589.82	0.846	0.00	2589.82	0.000
L3	42.25 - 0 (3)	TP51x37.7131x0.4375	4380.73	5140.70	0.852	0.00	5140.70	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	119.5 - 69.67 (1)	TP33.02x19x0.3125	41.52	546.53	0.076	0.50	1502.70	0.000
L2	69.67 - 42.25 (2)	TP39.99x31.0839x0.375	43.85	795.62	0.055	0.50	2653.83	0.000
L3	42.25 - 0 (3)	TP51x37.7131x0.4375	47.61	1232.23	0.039	0.57	5456.31	0.000

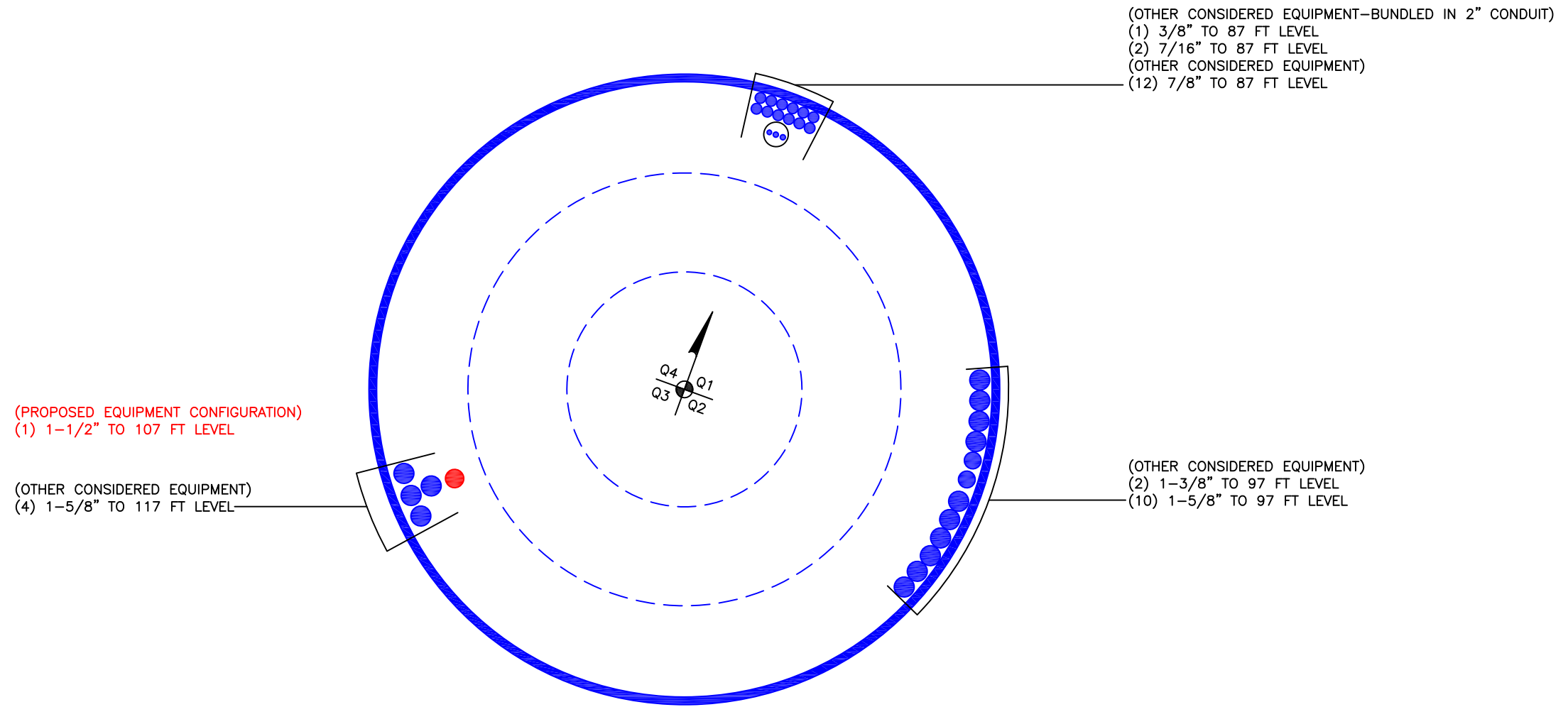
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_u$	$M_{ux}$	$M_{uy}$	$V_u$	$T_u$			
L1	119.5 - 69.67 (1)	0.011	0.718	0.000	0.076	0.000	0.736	1.000	4.8.2
L2	69.67 - 42.25 (2)	0.011	0.846	0.000	0.055	0.000	0.860	1.000	4.8.2
L3	42.25 - 0 (3)	0.011	0.852	0.000	0.039	0.000	0.865	1.000	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	119.5 - 69.67	Pole	TP33.02x19x0.3125	1	-20.94	1821.77	73.6	Pass
L2	69.67 - 42.25	Pole	TP39.99x31.0839x0.375	2	-28.18	2652.06	86.0	Pass
L3	42.25 - 0	Pole	TP51x37.7131x0.4375	3	-44.87	4107.42	86.5	Pass
Summary								
Pole (L3)							86.5	Pass
<b>RATING =</b>							<b>86.5</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

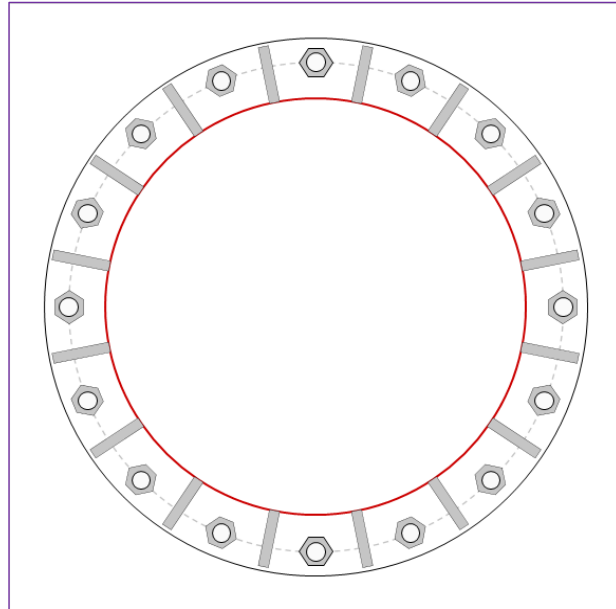
# Monopole Base Plate Connection



Site Info	
BU #	876387
Site Name	H HEBRON / NED ELLIS
Order #	556601 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.875

Applied Loads	
Moment (kip-ft)	4380.74
Axial Force (kips)	44.87
Shear Force (kips)	47.61



Connection Properties	Analysis Results
-----------------------	------------------

**Anchor Rod Data**  
 (16) 2-1/4"  $\phi$  bolts (A615-75 N;  $F_y=75$  ksi,  $F_u=100$  ksi) on 60" BC

**Base Plate Data**  
 66" OD x 2" Plate (A871 Gr. 60;  $F_y=60$  ksi,  $F_u=75$  ksi)

**Stiffener Data**  
 (16) 21"H x 7"W x 1.25"T, Notch: 1"  
 plate:  $F_y= 50$  ksi ; weld:  $F_y= 70$  ksi  
 horiz. weld: 0.5625" groove, 45° dbl bevel, 0.3125" fillet  
 vert. weld: 0.3125" fillet

**Pole Data**  
 51" x 0.4375" 18-sided pole (A572-65;  $F_y=65$  ksi,  $F_u=80$  ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>	
$Pu\_t = 216.11$	$\phi Pn\_t = 243.75$		<b>Stress Rating</b>
$Vu = 2.98$	$\phi Vn = 149.1$		<b>88.7%</b>
$Mu = n/a$	$\phi Mn = n/a$		<b>Pass</b>

Base Plate Summary		
Max Stress (ksi):	38.16	(Roark's Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	<b>70.7%</b>	<b>Pass</b>

Stiffener Summary		
Horizontal Weld:	<b>86.1%</b>	<b>Pass</b>
Vertical Weld:	<b>64.1%</b>	<b>Pass</b>
Plate Flexure+Shear:	<b>11.9%</b>	<b>Pass</b>
Plate Tension+Shear:	<b>50.4%</b>	<b>Pass</b>
Plate Compression:	<b>50.5%</b>	<b>Pass</b>

Pole Summary		
Punching Shear:	<b>12.5%</b>	<b>Pass</b>

# Pier and Pad Foundation



BU #: 876387  
 Site Name: SOUTH HEBRON  
 App. Number: 556601 Rev. 0

TIA-222 Revision: H  
 Tower Type: Monopole

Top & Bot. Pad Rein. Different?:   
 Block Foundation?:   
 Rectangular Pad?:

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	44.92	kips
Base Shear, $V_{u\_comp}$ :	47.56	kips
Moment, $M_u$ :	4380.74	ft-kips
Tower Height, $H$ :	119.5	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Lateral (Sliding) (kips)</i>	128.07	47.56	37.1%	Pass
<i>Bearing Pressure (ksf)</i>	18.00	3.41	18.9%	Pass
<i>Overturning (kip*ft)</i>	6704.91	4678.98	69.8%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	4529.28	4523.42	99.9%	Pass
<i>Pier Compression (kip)</i>	26891.28	67.74	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	6039.74	2131.52	35.3%	Pass
<i>Pad Shear - 1-way (kips)</i>	1004.09	279.87	27.9%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.046	24.2%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	5153.35	2714.05	52.7%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	6.5	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	8	
Pier Rebar Quantity, $mc$ :	38	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	4	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

Soil Rating: 69.8%  
 Structural Rating: 99.9%

Pad Properties		
Depth, $D$ :	5	ft
Pad Width, $W_1$ :	28	ft
Pad Thickness, $T$ :	3	ft
Pad Rebar Size (Top dir. 2), $Sp_{top2}$ :	8	
Pad Rebar Quantity (Top dir. 2), $mp_{top2}$ :	30	
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	8	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	56	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60	ksi
Concrete Compressive Strength, $F'c$ :	4	ksi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	100	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	24.000	ksf
Cohesion, $C_u$ :		ksf
Friction Angle, $\phi$ :		degrees
SPT Blow Count, $N_{blows}$ :	49	
Base Friction, $\mu$ :	0.3	
Neglected Depth, $N$ :	3.25	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	8	ft

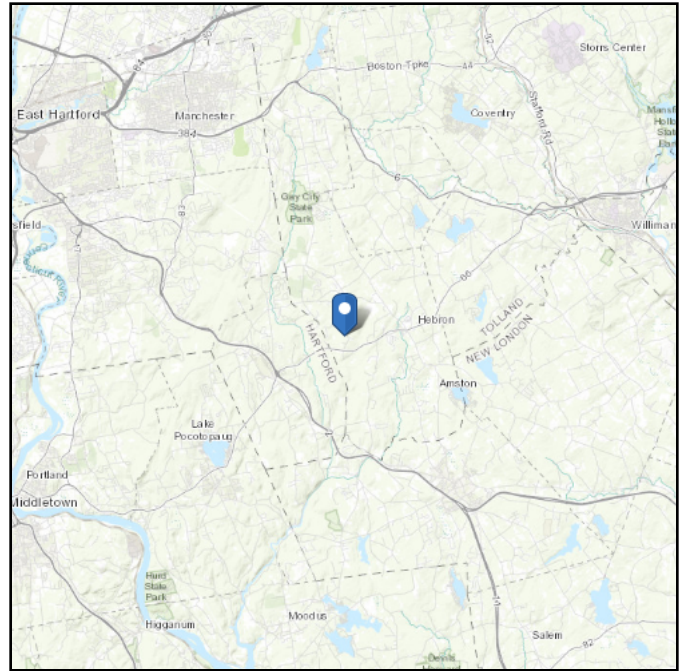
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# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 544.53 ft (NAVD 88)  
**Latitude:** 41.65445  
**Longitude:** -72.410864



## Wind

### Results:

Wind Speed:	130	Vmph
10-year MRI	78	Vmph
25-year MRI	87	Vmph
50-year MRI	95	Vmph
100-year MRI	103	Vmph

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.



## Ice

---

**Results:**

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Wed Feb 10 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.



BU: 876387  
 WO: 1962696  
 Order: 556601

Structure: A  
 Rev: 0

**Location**

	Decimal Degrees	Deg	Min	Sec
Lat:	41.654450	+	41	39
Long:	-72.410864	-	72	24

**Code and Site Parameters**

Seismic Design Code:	ASCE 7-10	
Site Soil:	D	Stiff Soil (Default)
Risk Category:	II	
<u>USGS Seismic Reference</u>		
S <sub>s</sub> :	0.1770	g
S <sub>1</sub> :	0.0630	g
T <sub>L</sub> :	6	s

**Seismic Design Category Determination**

Importance Factor, I <sub>e</sub> :	1
Acceleration-based site coefficient, F <sub>a</sub> :	1.6000
Velocity-based site coefficient, F <sub>v</sub> :	2.4000
Design spectral response acceleration short period, S <sub>DS</sub> :	0.1888 g
Design spectral response acceleration 1 s period, S <sub>D1</sub> :	0.1008 g
Seismic Design Category Based on S <sub>DS</sub> :	B
Seismic Design Category Based on S <sub>D1</sub> :	B
Seismic Design Category Based on S <sub>1</sub> :	N/A
Controlling Seismic Design Category:	B

# Exhibit E

## **Mount Analysis**

Date: **August 2, 2021**

Darcy Tarr  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
704-405-6589



Trylon  
1825 W. Walnut Hill Lane,  
Suite 302  
Irving, TX 75038  
214-930-1730

**Subject:** Mount Replacement Analysis Report

**Carrier Designation:** Dish Network Equipment Change Out  
**Carrier Site Number:** BOBDL00099A  
**Carrier Site Name:** CT-CCI-T-876387

**Crown Castle Designation:** Crown Castle BU Number: 876387  
Crown Castle Site Name: SOUTH HEBRON / NED ELLIS PROP.  
Crown Castle JDE Job Number: 650082  
Crown Castle Order Number: 556601 Rev. 0

**Engineering Firm Designation:** Trylon Report Designation: 189062

**Site Data:** 107 Buck Road, Hebron, Tolland County, CT, 06248  
Latitude 41°39'16.02" Longitude -72°24'39.11"

**Structure Information:** Tower Height & Type: 119.5 ft Monopine  
Mount Elevation: 107.0 ft  
Mount Type: 7.0 ft T-Arms

Dear Darcy Tarr,

Trylon is pleased to submit this "**Mount Replacement Analysis Report**" to determine the structural integrity of Dish Network's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

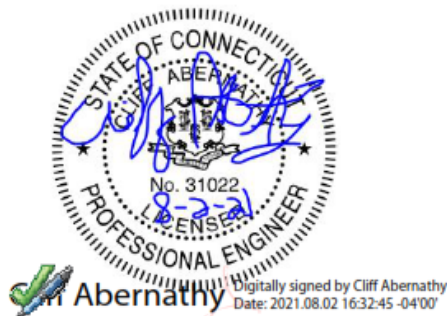
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

**T-Arms** **Sufficient\***  
**\*Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Steve Mustaro, P.E.

Respectfully Submitted by:  
Cliff Abernathy, P.E.



## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

### 3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity

4.1) Recommendations

### 5) APPENDIX A

Wire Frame and Rendered Models

### 6) APPENDIX B

Software Input Calculations

### 7) APPENDIX C

Software Analysis Output

### 8) APPENDIX D

Additional Calculations

### 9) APPENDIX E

Supplemental Drawings

## 1) INTRODUCTION

This is a proposed three sector 7.0 ft T-Arms, designed by Commscope

## 2) ANALYSIS CRITERIA

<b>Building Code:</b>	2015 IBC / 2018 CTSCB
<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Ultimate Wind Speed:</b>	130 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor at Base:</b>	1.0
<b>Topographic Factor at Mount:</b>	1.0
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Seismic <math>S_s</math>:</b>	0.177
<b>Seismic <math>S_1</math>:</b>	0.063
<b>Live Loading Wind Speed:</b>	30 mph
<b>Man Live Load at Mid/End-Points:</b>	250 lb
<b>Man Live Load at Mount Pipes:</b>	500 lb

**Table 1 - Proposed Equipment Configuration**

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
107.0	107.0	3	JMA WIRELESS	MX08FRO665-21	7.0 ft T-Arms [Commscope MC-K6MHDX-9-96]
		3	FUJITSU	TA08025-B604	
		3	FUJITSU	TA08025-B605	
		1	RAYCAP	RDIDC-9181-PF-48	

## 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Crown Application	Dish Network Application	556601 Rev. 0	CCI Sites
Mount Manufacturer Drawings	Commscope	MC-K6MHDX-9-96	Trylon

### 3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed, using Microsoft Excel, by Trylon was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B).

### 3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
- 5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
- 6) Steel grades have been assumed as follows, unless noted otherwise:
 

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Tylon should be notified to determine the effect on the structural integrity of the antenna mounting system.

### 4) ANALYSIS RESULTS

**Table 3 - Mount Component Stresses vs. Capacity (T-Arms, Worst Case Sector)**

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP2	107.0	40.7	Pass
	Horizontal(s)	H1		40.8	Pass
	Standoff(s)	M1		31.6	Pass
	Mount Connection(s)	-		27.3	Pass

<b>Structure Rating (max from all components) =</b>	<b>40.8%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H, Section 15.5

#### 4.1) Recommendations

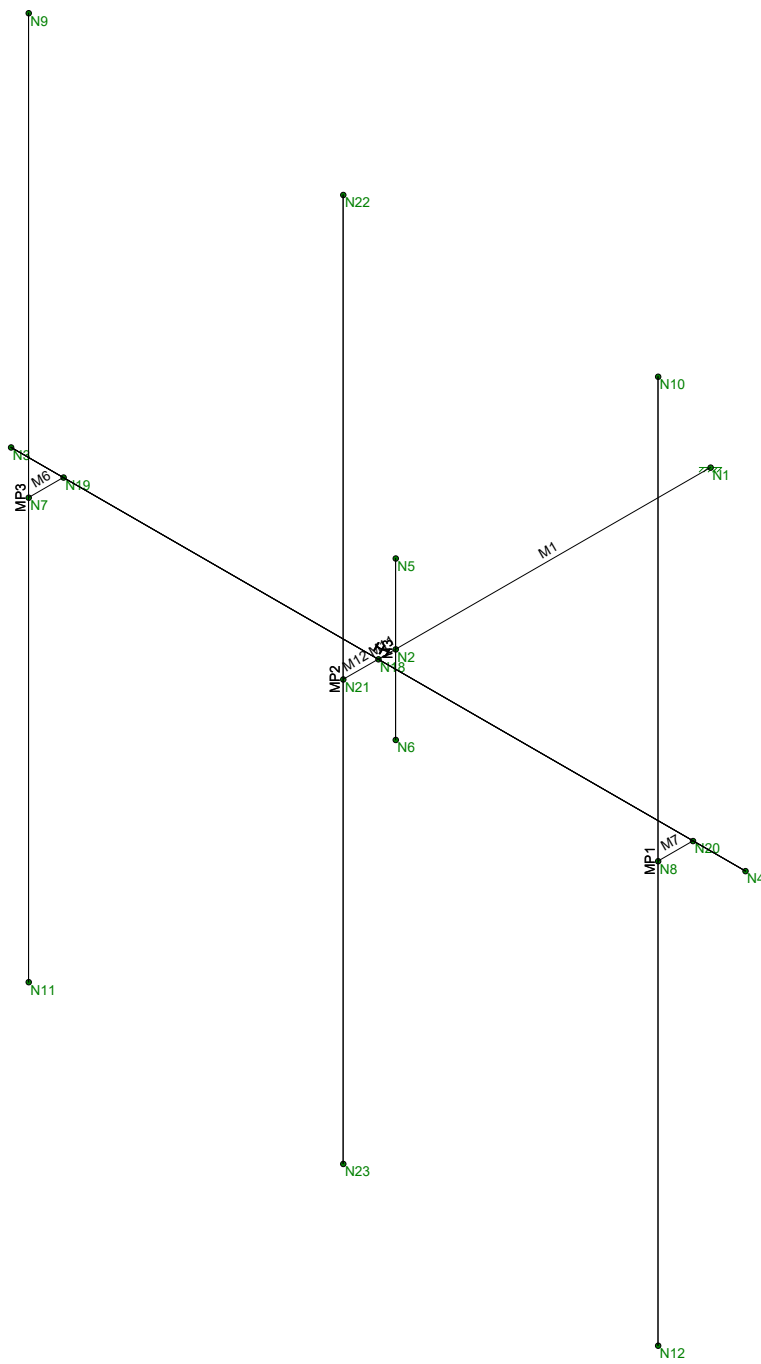
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope MC-K6MHDX-9-96.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

**APPENDIX A**  
**WIRE FRAME AND RENDERED MODELS**

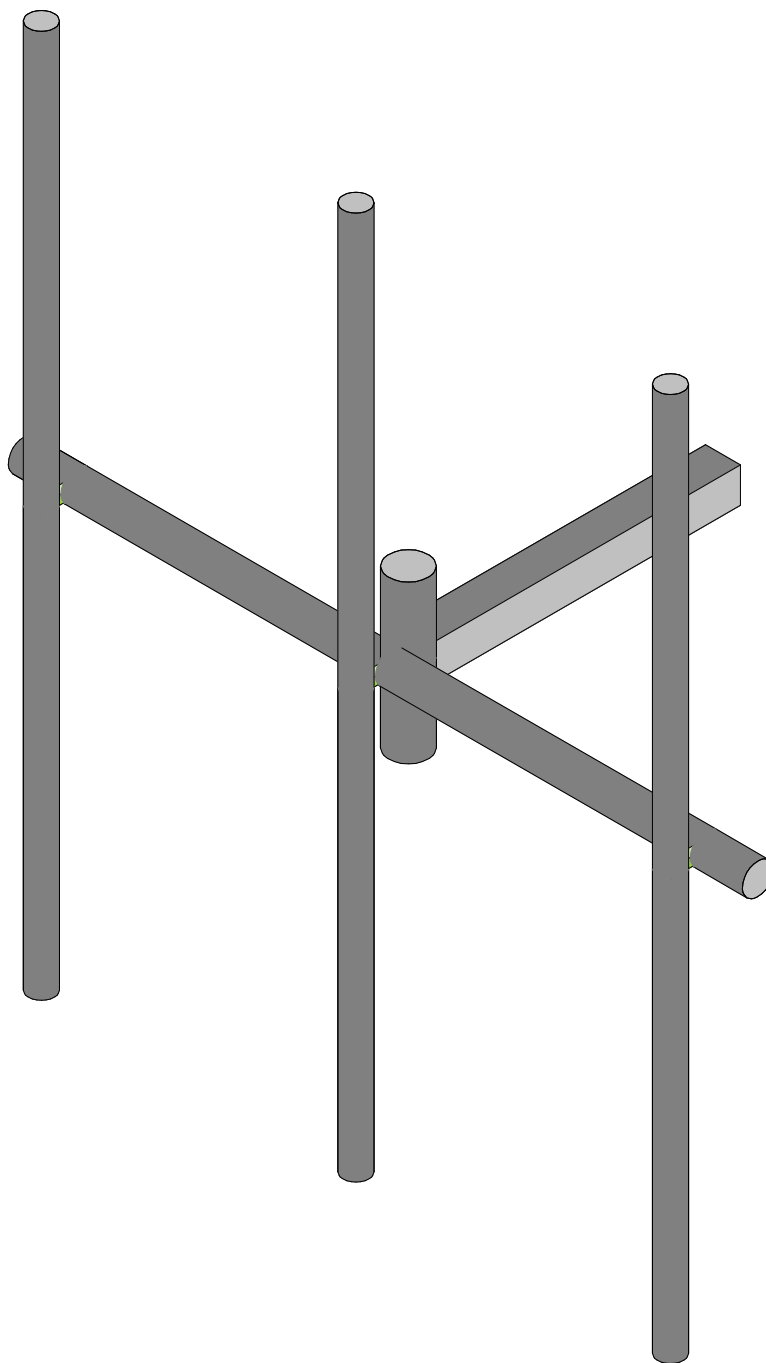




Trylon
SMM
189062

876387

Wireframe
Aug 2, 2021 at 1:44 PM
876387_loaded.r3d



Trylon

SMM

189062

876387

Render

Aug 2, 2021 at 1:45 PM

876387\_loaded.r3d

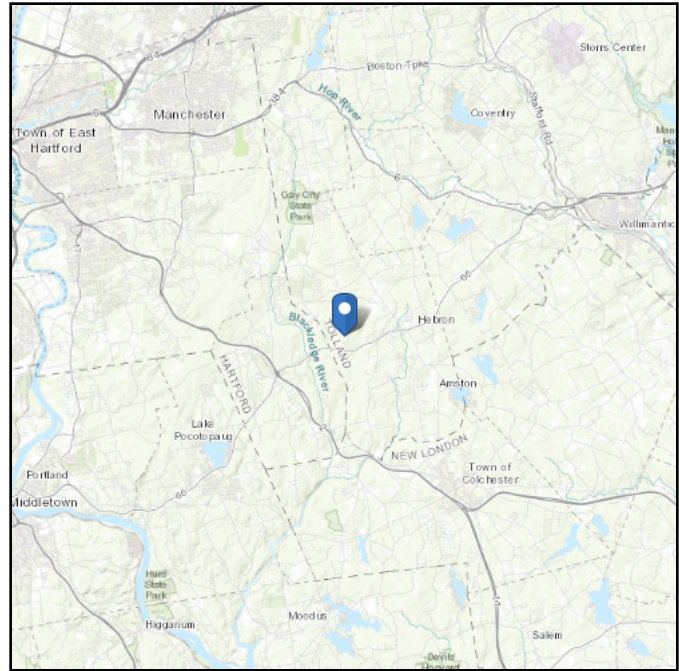
**APPENDIX B**  
**SOFTWARE INPUT CALCULATIONS**

# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 544.53 ft (NAVD 88)  
**Latitude:** 41.65445  
**Longitude:** -72.410864



## Ice

### Results:

Ice Thickness: 0.75 in.  
Concurrent Temperature: 15 F  
Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Mon Aug 02 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

# CONNECTICUT DESIGN CRITERIA - STATE

Revision: R-400 7/30/2021

CT is NOT a Home Rule State; Tab added only for Design Criteria

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS												
Municipality	Ground Snow Load	Wind Design Parameters										
		MCE Spectral Accelerations (%g)		Ultimate Design Wind Speeds, $V_{ult}$ (mph)			Nominal Design Wind Speeds, $V_{asd}$ (mph)			Wind-Borne Debris Regions <sup>1</sup>		Hurricane-Prone Regions
		$S_s$	$S_1$	Risk Cat. I	Risk Cat. II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & III except Occup I-2	Risk Cat III Occup I-2 & Risk Cat. IV	
Hebron	30	0.177	0.063	120	130	140	93	101	108			Yes

1. Wind-Borne Debris Regions:

Type A: Full Municipality.

Type B: Areas south of Interstate 95.

*Exception:* Areas that are more than one mile from the coastal mean high-water line as certified by a registered design professional may be classified as being outside a wind-borne debris region.

Type C: Areas south of Metro North/Amtrak Railroad to the west of the Quinnipiac River and areas south of Interstate 95 to the east of the Quinnipiac River.

*Exception:* Areas that are more than one mile from the coastal mean high-water line as certified by a registered design professional may be classified as being outside a wind-borne debris region.



# Trylon

1825 W. Walnut Hill Lane Suite 120  
Irving, TX 75038

## TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	189062
Carrier Site ID:	BU# 876387
Carrier Site Name:	H HEBRON / NED ELLIS F

CODES AND STANDARDS	
Building Code:	2015 IBC
Local Building Code:	2018 CTSCB
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	T-Arm	--
Mount Elevation:	107.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	119.5	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	C	--
Site Class:	D - Default	--
Ground Elevation:	544.53	ft.

TOPOGRAPHIC DATA		
Topographic Category:	1.00	--
Topographic Feature:	N/A	--
Crest Point Elevation:	0.00	ft.
Base Point Elevation:	0.00	ft.
Crest to Mid-Height (L/2):	0.00	ft.
Distance from Crest (x):	0.00	ft.
Base Topo Factor ( $K_{zt}$ ):	1.00	--
Mount Topo Factor ( $K_{zt}$ ):	1.00	--

WIND PARAMETERS		
Design Wind Speed:	130	mph
Wind Escalation Factor ( $K_s$ ):	1.00	--
Velocity Coefficient ( $K_z$ ):	1.28	--
Directionality Factor ( $K_d$ ):	0.95	--
Gust Effect Factor ( $G_h$ ):	1.00	--
Shielding Factor ( $K_a$ ):	0.90	--
Velocity Pressure ( $q_z$ ):	51.73	psf

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness ( $t_i$ ):	1.50	in
Importance Factor ( $I_i$ ):	1.00	--
Ice Velocity Pressure ( $q_{zi}$ ):	51.73	psf
Mount Ice Thickness ( $t_{iz}$ ):	1.69	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	93.12	psf
Round Member Pressure:	55.87	psf
Ice Wind Pressure:	7.24	psf

SEISMIC PARAMETERS		
Importance Factor ( $I_e$ ):	1.00	--
Short Period Accel. ( $S_s$ ):	0.18	g
1 Second Accel. ( $S_1$ ):	0.06	g
Short Period Des. ( $S_{DS}$ ):	0.19	g
1 Second Des. ( $S_{D1}$ ):	0.10	g
Short Period Coeff. ( $F_a$ ):	1.60	--
1 Second Coeff. ( $F_v$ ):	2.40	--
Response Coefficient ( $C_s$ ):	0.09	--
Amplification Factor ( $A_S$ ):	1.20	--

## LOAD COMBINATIONS [LRFD]

#	Description
1	1.4DL
2	1.2DL + 1WL 0 AZI
3	1.2DL + 1WL 30 AZI
4	1.2DL + 1WL 45 AZI
5	1.2DL + 1WL 60 AZI
6	1.2DL + 1WL 90 AZI
7	1.2DL + 1WL 120 AZI
8	1.2DL + 1WL 135 AZI
9	1.2DL + 1WL 150 AZI
10	1.2DL + 1WL 180 AZI
11	1.2DL + 1WL 210 AZI
12	1.2DL + 1WL 225 AZI
13	1.2DL + 1WL 240 AZI
14	1.2DL + 1WL 270 AZI
15	1.2DL + 1WL 300 AZI
16	1.2DL + 1WL 315 AZI
17	1.2DL + 1WL 330 AZI
18	0.9DL + 1WL 0 AZI
19	0.9DL + 1WL 30 AZI
20	0.9DL + 1WL 45 AZI
21	0.9DL + 1WL 60 AZI
22	0.9DL + 1WL 90 AZI
23	0.9DL + 1WL 120 AZI
24	0.9DL + 1WL 135 AZI
25	0.9DL + 1WL 150 AZI
26	0.9DL + 1WL 180 AZI
27	0.9DL + 1WL 210 AZI
28	0.9DL + 1WL 225 AZI
29	0.9DL + 1WL 240 AZI
30	0.9DL + 1WL 270 AZI
31	0.9DL + 1WL 300 AZI
32	0.9DL + 1WL 315 AZI
33	0.9DL + 1WL 330 AZI
34	1.2DL + 1DLi + 1WLi 0 AZI
35	1.2DL + 1DLi + 1WLi 30 AZI
36	1.2DL + 1DLi + 1WLi 45 AZI
37	1.2DL + 1DLi + 1WLi 60 AZI
38	1.2DL + 1DLi + 1WLi 90 AZI
39	1.2DL + 1DLi + 1WLi 120 AZI
40	1.2DL + 1DLi + 1WLi 135 AZI
41	1.2DL + 1DLi + 1WLi 150 AZI

#	Description
42	1.2DL + 1DLi + 1WLi 180 AZI
43	1.2DL + 1DLi + 1WLi 210 AZI
44	1.2DL + 1DLi + 1WLi 225 AZI
45	1.2DL + 1DLi + 1WLi 240 AZI
46	1.2DL + 1DLi + 1WLi 270 AZI
47	1.2DL + 1DLi + 1WLi 300 AZI
48	1.2DL + 1DLi + 1WLi 315 AZI
49	1.2DL + 1DLi + 1WLi 330 AZI
50	(1.2+0.2Sds) + 1.0E 0 AZI
51	(1.2+0.2Sds) + 1.0E 30 AZI
52	(1.2+0.2Sds) + 1.0E 45 AZI
53	(1.2+0.2Sds) + 1.0E 60 AZI
54	(1.2+0.2Sds) + 1.0E 90 AZI
55	(1.2+0.2Sds) + 1.0E 120 AZI
56	(1.2+0.2Sds) + 1.0E 135 AZI
57	(1.2+0.2Sds) + 1.0E 150 AZI
58	(1.2+0.2Sds) + 1.0E 180 AZI
59	(1.2+0.2Sds) + 1.0E 210 AZI
60	(1.2+0.2Sds) + 1.0E 225 AZI
61	(1.2+0.2Sds) + 1.0E 240 AZI
62	(1.2+0.2Sds) + 1.0E 270 AZI
63	(1.2+0.2Sds) + 1.0E 300 AZI
64	(1.2+0.2Sds) + 1.0E 315 AZI
65	(1.2+0.2Sds) + 1.0E 330 AZI
66	(0.9-0.2Sds) + 1.0E 0 AZI
67	(0.9-0.2Sds) + 1.0E 30 AZI
68	(0.9-0.2Sds) + 1.0E 45 AZI
69	(0.9-0.2Sds) + 1.0E 60 AZI
70	(0.9-0.2Sds) + 1.0E 90 AZI
71	(0.9-0.2Sds) + 1.0E 120 AZI
72	(0.9-0.2Sds) + 1.0E 135 AZI
73	(0.9-0.2Sds) + 1.0E 150 AZI
74	(0.9-0.2Sds) + 1.0E 180 AZI
75	(0.9-0.2Sds) + 1.0E 210 AZI
76	(0.9-0.2Sds) + 1.0E 225 AZI
77	(0.9-0.2Sds) + 1.0E 240 AZI
78	(0.9-0.2Sds) + 1.0E 270 AZI
79	(0.9-0.2Sds) + 1.0E 300 AZI
80	(0.9-0.2Sds) + 1.0E 315 AZI
81	(0.9-0.2Sds) + 1.0E 330 AZI
82-88	1.2D + 1.5 Lv1



#	Description
89	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP1
90	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP1
91	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP1
92	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP1
93	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP1
94	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP1
95	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP1
96	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP1
97	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP1
98	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP1
99	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP1
100	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP1
101	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP1
102	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP1
103	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP1
104	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP1
105	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP2
106	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP2
107	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP2
108	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP2
109	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP2
110	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP2
111	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP2
112	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP2
113	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP2
114	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP2
115	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP2
116	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP2
117	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP2
118	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP2
119	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP2
120	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP2

#	Description
121	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP3
122	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP3
123	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP3
124	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP3
125	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP3
126	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP3
127	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP3
128	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP3
129	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP3
130	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP3
131	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP3
132	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP3
133	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP3
134	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP3
135	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP3
136	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP3
137	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP4
138	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP4
139	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP4
140	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP4
141	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP4
142	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP4
143	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP4
144	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP4
145	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP4
146	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP4
147	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP4
148	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP4
149	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP4
150	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP4
151	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP4
152	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP4

\*This page shows an example of maintenance loads for (4) pipes, the number of mount pipe LCs may vary per site

**EQUIPMENT LOADING**

<i>Appurtenance Name/Location</i>	<i>Qty.</i>	<i>Elevation [ft]</i>	<i>--</i>	<i>EPA<sub>N</sub> (ft2)</i>	<i>EPA<sub>T</sub> (ft2)</i>	<i>Weight (lbs)</i>
MX08FRO665-21	1	107	No Ice	12.49	5.87	82.50
MP2, 0	--	--	w/ Ice	13.68	6.96	276.11
TA08025-B604	1	107	No Ice	1.96	0.98	63.90
MP2, 0	--	--	w/ Ice	2.38	1.30	67.68
TA08025-B605	1	107	No Ice	1.96	1.13	75.00
MP2, 0	--	--	w/ Ice	2.38	1.46	72.12
RDIDC-9181-PF-48	1	107	No Ice	2.01	1.17	21.85
MP2, 0	--	--	w/ Ice	2.43	1.52	71.07
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
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			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			







**APPENDIX C**  
**SOFTWARE ANALYSIS OUTPUT**







**7c`X: cfa YX`GhY`GYWJcb`GYlg**

	Šää\	Ú@^	V`^	Ô•ã}^!c	Tæ\æ	Ô•ã}^!^	Q`Gá	Q`Álá	Q:Álá	R`Álá
F	ÓØFCE	ÍØWFEGY	Ó`æ	p[]^	ÖíHÁJUÓ:HH	V` ææ	ÉíF	Éíí	IÉF	ÉÉíH

**>c]bh6ci bXUfmi7cbX]hcbg**

	RãÄ~{	ÝÄÉá	ÝÄÉá	ZÄÉá	ÝÁÚ] dZ ÉDää	ÝÁÚ] dZ ÉDää	ZÁÚ] dZ ÉDää
F	pF	Ü^æ&ä }	Ü^æ&ä }	Ü^æ&ä }	Ü^æ&ä }	Ü^æ&ä }	Ü^æ&ä }

**6 Ug]W@ UX'7 UgYg**

	ÓŠÔÔ•&ä }	Ôæ*{i^	ÝÁÓ!ææ	ÝÁÓ!ææ	ZÁÓ!ææ	Rãc	Ú[ãc	Öädã`cá	ÖÉ^æQ`^ÉÉ	Ú`!æ^Q`ÉÉ
F	Ü^ÁY`ã@	ÖŠ		É			í			
G	Üd`&c`!^ÁY`ãáZ	YŠZ						í		
H	Üd`&c`!^ÁY`ãáY	YŠY						í		
I	Yã`ãÁŠ`ãáÉÓZQ	YŠZ					í			
Í	Yã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
Ī	Yã`ãÁŠ`ãáÍÓZQ	p[]^					FÉ			
İ	Yã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
Ĭ	Yã`ãÁŠ`ãáÉÓZQ	YŠY					í			
J	Yã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
FÉ	Yã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
FF	Yã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
FG	Ö^ÁY`ã@	UŠF					í	í		
FH	Ö^ÁÚc`&c`!^ÁY`ãáZ	UŠG						í		
FI	Ö^ÁÚc`&c`!^ÁY`ãáY	UŠH						í		
FÍ	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	UŠG					í			
FĪ	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
Fİ	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
FĬ	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
FJ	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	USH					í			
GE	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
GF	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
GG	Ö^ÁY`ã`ãÁŠ`ãáÉÓZQ	p[]^					FÉ			
GH	Ü^ã{ }æS`ãáZ	ÖSZ		ÉFFH			í			
G	Ü^ã{ }æS`ãáY	ÖSY	ÉFFH				í			
G	Šã^ÁŠ`ãáFÁŠcD	p[]^					F			
G	Šã^ÁŠ`ãáGÁŠcD	p[]^					F			
G	Šã^ÁŠ`ãáHÁŠcD	p[]^					F			
G	Tæc` }æ&^ÁŠ`ãáFÁŠÉ	p[]^					F			
GJ	Tæc` }æ&^ÁŠ`ãáGÁŠÉ	p[]^					F			
HE	Tæc` }æ&^ÁŠ`ãáHÁŠÉ	p[]^					F			

**@ UX'7ca V]bU]cbg**

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F	FÉ ÖŠ	Ý^ Ý	ÖŠ FÉ															
G	FÉÖŠÉFY ŠÁÉÓZQ	Ý^ Ý	ÖŠ FÉG	G	F	H		I	F									
H	FÉÖŠÉFY ŠÁÉÓZQ	Ý^ Ý	ÖŠ FÉG	G	Éíí	H	Éí	í	F									
I	FÉÖŠÉFY ŠÁÉÓZQ	Ý^ Ý	ÖŠ FÉG	G	Éíí	H	Éíí	í	F									
Í	FÉÖŠÉFY ŠÁÉÓZQ	Ý^ Ý	ÖŠ FÉG	G	Éí	H	Éíí	í	F									







**APPENDIX D**  
**ADDITIONAL CALCUATIONS**

**BOLT TOOL 1.5.2**

Project Data	
Job Code:	189062
Carrier Site ID:	BU# 876387
Carrier Site Name:	H HEBRON / NED ELLIS F

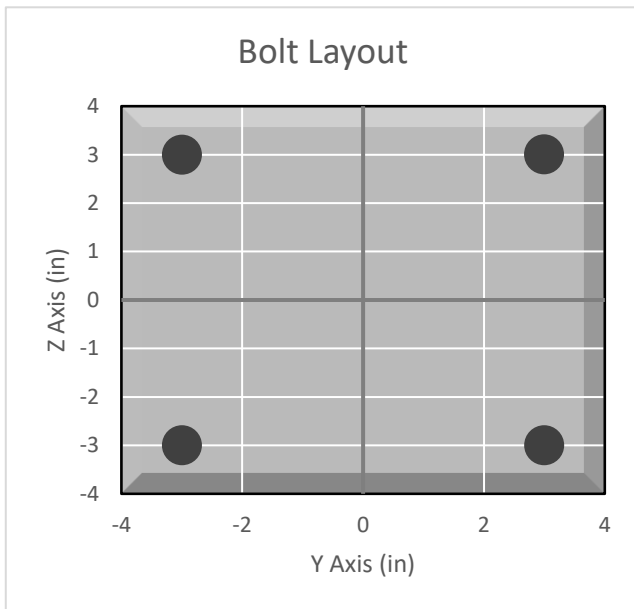
Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	TIA-222-H

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in

Connection Description
Mount Standoff to Collar

Bolt Check*		
Tensile Capacity ( $\phi T_n$ ):	20340.1	lbs
Shear Capacity ( $\phi V_n$ ):	13805.8	lbs
Tension Force ( $T_u$ ):	5394.1	lbs
Shear Force ( $V_u$ ):	329.3	lbs
Tension Usage:	25.3%	--
Shear Usage:	2.3%	--
Interaction:	25.3%	Pass
Controlling Member:	M1	--
Controlling LC:	39	--

\*Rating per TIA-222-H Section 15.5

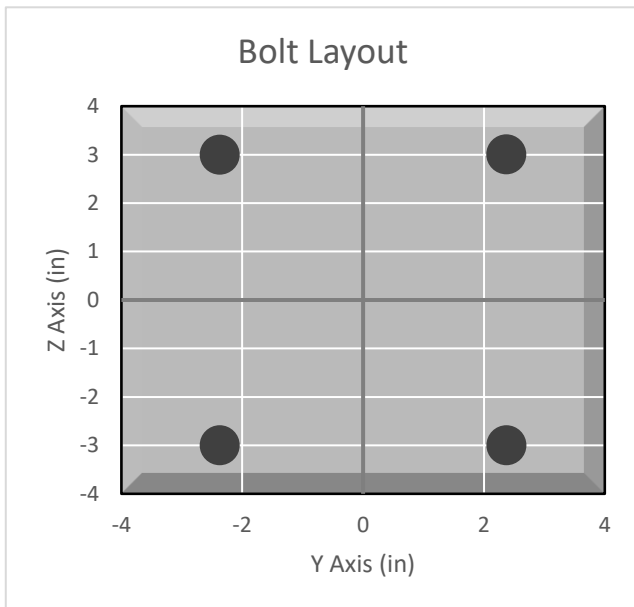


**BOLT TOOL 1.5.2**

Project Data	
Job Code:	189062
Carrier Site ID:	BU# 876387
Carrier Site Name:	H HEBRON / NED ELLIS F

Code	
Design Standard:	TIA-222-H
Slip Check:	Yes
Pretension Standard:	TIA-222-H

Bolt Properties		
Connection Type:	U-Bolt	
Diameter:	0.625	in
Grade:	A307	--
Yield Strength (Fy):	36	ksi
Ultimate Strength (Fu):	60	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	4	in



Connection Description
Mount Horizontal to Standoff

Bolt Check*		
Tensile Capacity ( $\phi T_n$ ):	10170.1	lbs
Shear Capacity ( $\phi V_n$ ):	6902.9	lbs
Tension Force ( $T_u$ ):	564.7	lbs
Shear Force ( $V_u$ ):	1981.8	lbs
Tension Usage:	5.3%	--
Shear Usage:	27.3%	--
Interaction:	27.3%	Pass
Controlling Member:	M11	--
Controlling LC:	99	--

\*Rating per TIA-222-H Section 15.5

Slip Check*		
Sliding Capacity ( $\phi R_{ns}$ ):	14435.5	lbs
Torsion Capacity ( $\phi R_{nr}$ ):	2405.9	lb-ft
Sliding Force ( $V_{us}$ ):	507.4	lbs
Torsional Force ( $T_{ur}$ ):	369.7	lb-ft
Sliding Usage:	3.3%	--
Torsion Usage:	14.9%	--
Interaction:	15.3%	Pass
Controlling Member:	M11	--
Controlling LC:	7	--

\*Rating per TIA-222-H Section 15.5

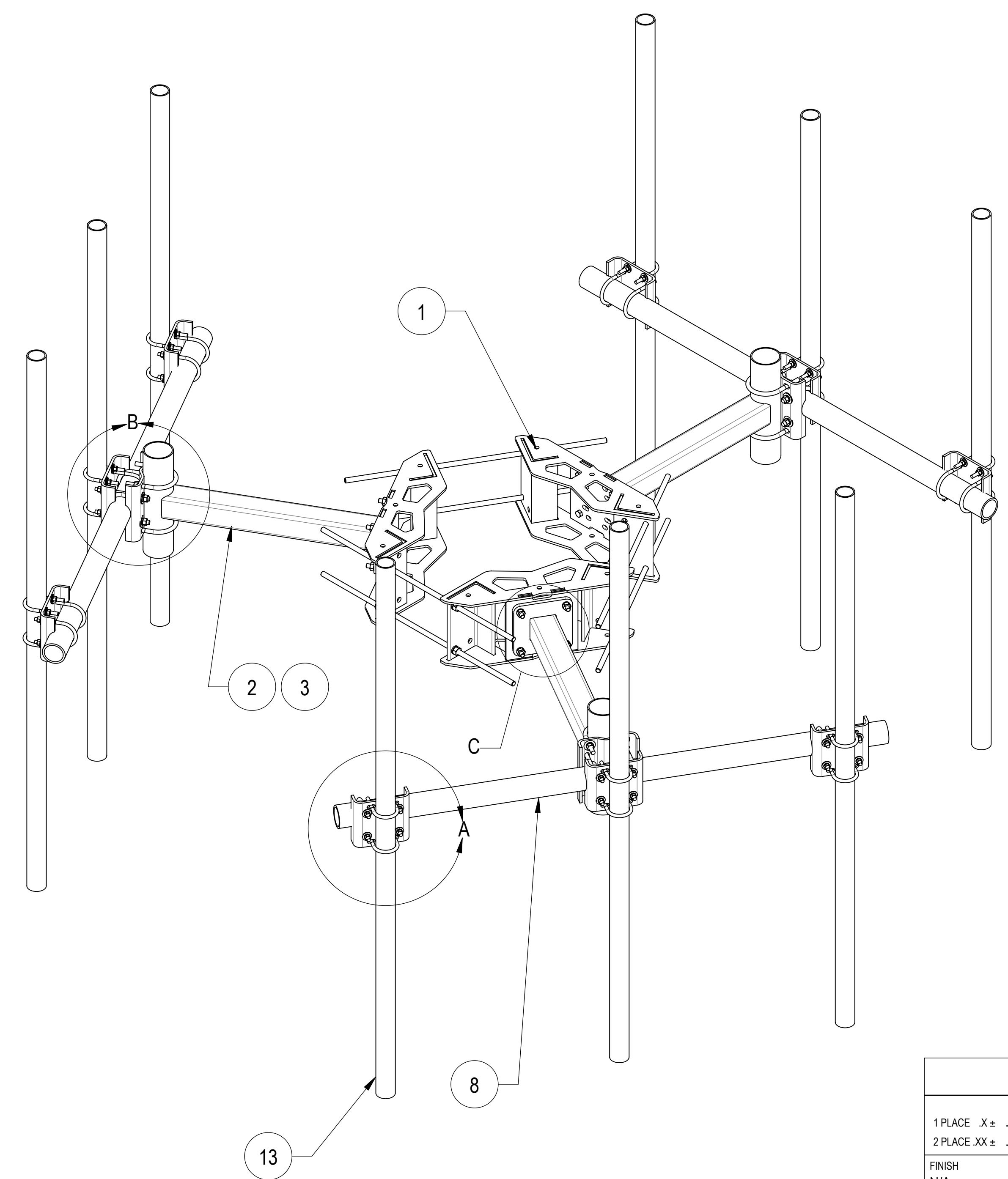
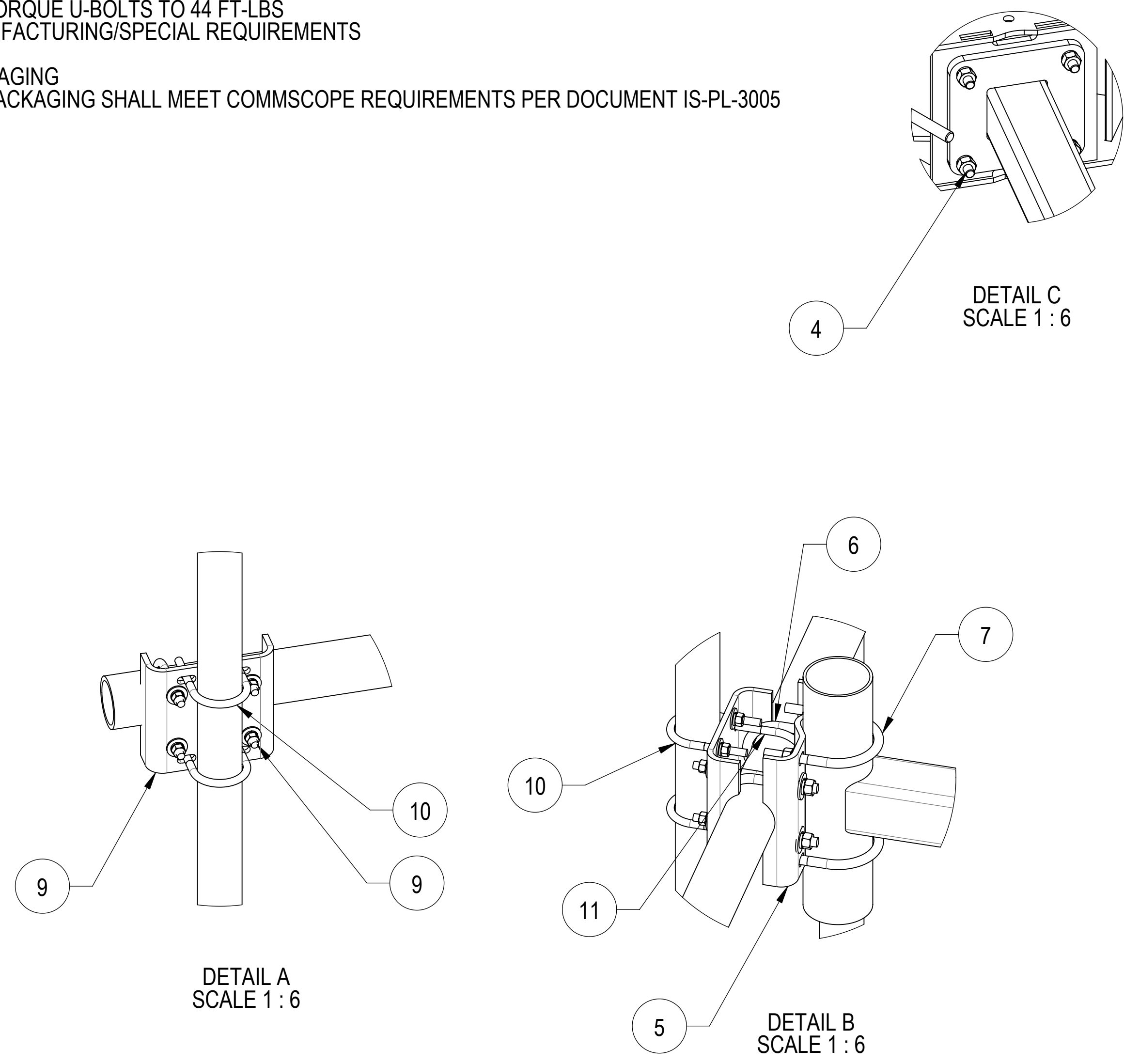
**APPENDIX E**  
**SUPPLEMENTAL DRAWINGS**



**NOTES:**

- 1.0 GENERAL NOTES
  - 1.1 ALL METRIC DIMENSIONS ARE IN BRACKETS.
- 2.0 DESIGN NOTES
  - 2.1 FOR PATENT INFORMATION: [HTTPS://WWW.CS-PAT.COM](https://www.cs-pat.com)
  - 2.2 USE STANDARD TORQUE VALUES FOR 5/8" BOLTS
  - 2.3 TORQUE U-BOLTS TO 44 FT-LBS
- 3.0 MANUFACTURING/SPECIAL REQUIREMENTS
- 4.0 TEST
- 5.0 PACKAGING
  - 5.1 PACKAGING SHALL MEET COMMSCOPE REQUIREMENTS PER DOCUMENT IS-PL-3005

REVISIONS				
REV.	IPS	DESCRIPTION	BY	DATE
A	10539PC	NEW RELEASED.	XZ1054	3/11/2021



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1
2	MT197.01	36" SINGLE SUPPORT ARM	3
3	MT197H	HARDWARE KIT (NEXT ITEM)	3
4	GB-0524A	5/8" X 2-1/2" GALV BOLT KIT (A325)	12
5	MT216.13	CENTER BRACKET	3
6	GUB-53560	5/8" X 3-5/8" X 6" GALV U-BOLT	6
7	GUB-5456	5/8" X 4-5/8" X 6 1/2" GALV U-BOLT	6
8	MTC333912	84" X 3-1/2" OD PIPE	3
9	MT219H3501	3.5"OD Clamp Bracket	9
10	GUB-4352	1/2" X 3" X 5-1/4" GALV U-BOLT	18
11	GUB-4356	1/2" X 3-5/8" X 6" GALV U-BOLT	18
13	MT54696	Ø 2.875" O.D. X 96 PIPE	9

DENSITY	0.28	lbs/in <sup>3</sup>
MASS	1203.02	lbs
VOLUME	4265.23	in <sup>3</sup>
SURFACE AREA	35860.22	in <sup>2</sup>

**COMMSCOPE, INC. OF NORTH CAROLINA**

SAP MATERIAL MASTER  
**MC-K6MHDX-9-96**

FINISH: N/A      MATERIAL: A36, A53

NAME	DATE	TITLE
CE XZ1054	03/08/2021	T-ARM, MCK6, 3, 4" x 84" , 9, 2-7/8"x96
RW ROGHANSON	03/16/2021	
AD BCAMPBELLCOON	03/19/2021	
RE ECN 10539PC		

SCALE: 1:32      DOCUMENT NO.: MC-K6MHDX-9-96

SIZE	Auth Group	INSL	MODEL	REVISION	VERSION	STATUS	REVISION	VERSION	STATUS	REVISION
D				AD	00	A	00	AD	A	

SHEET 1 OF 2

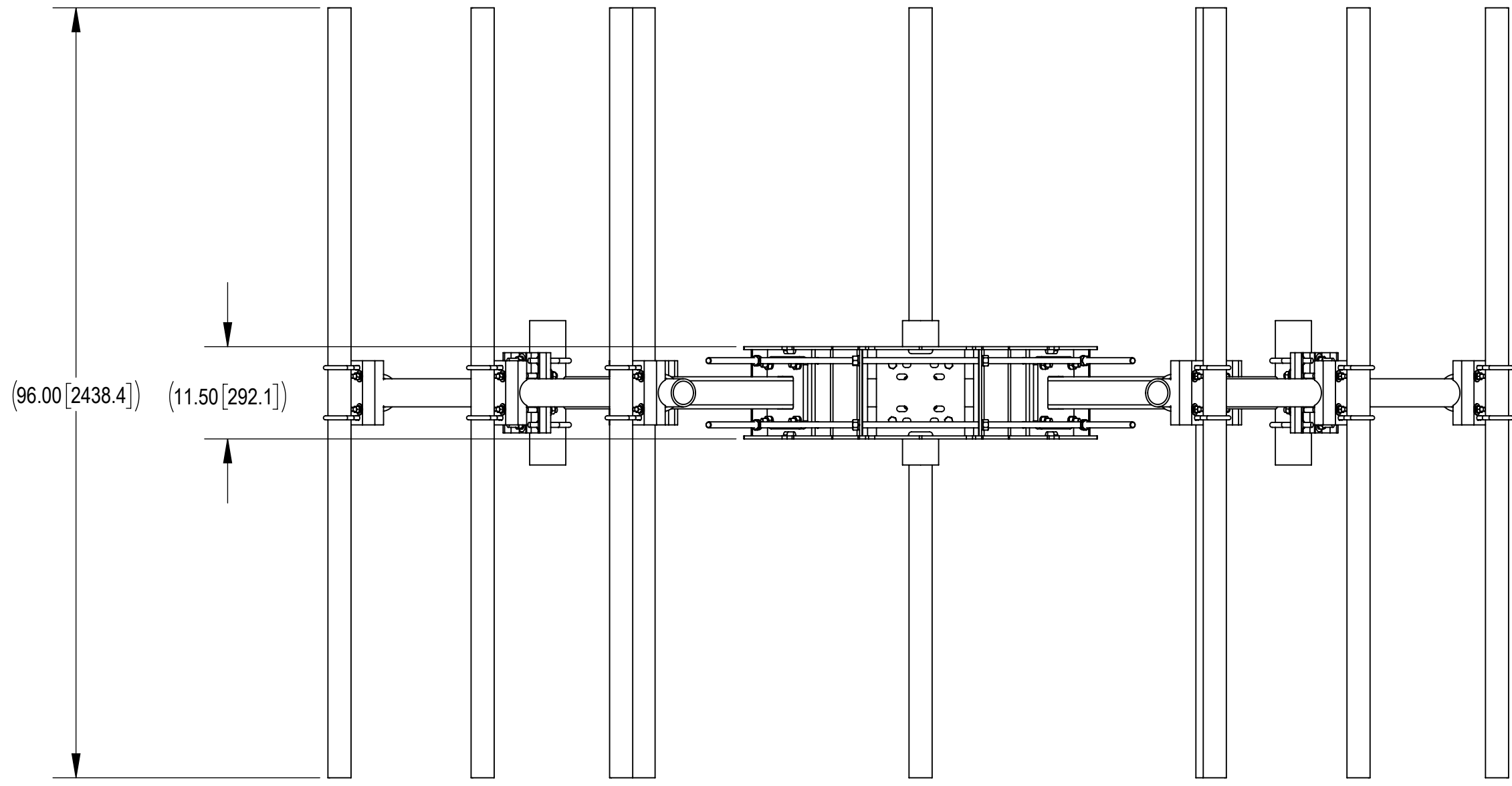
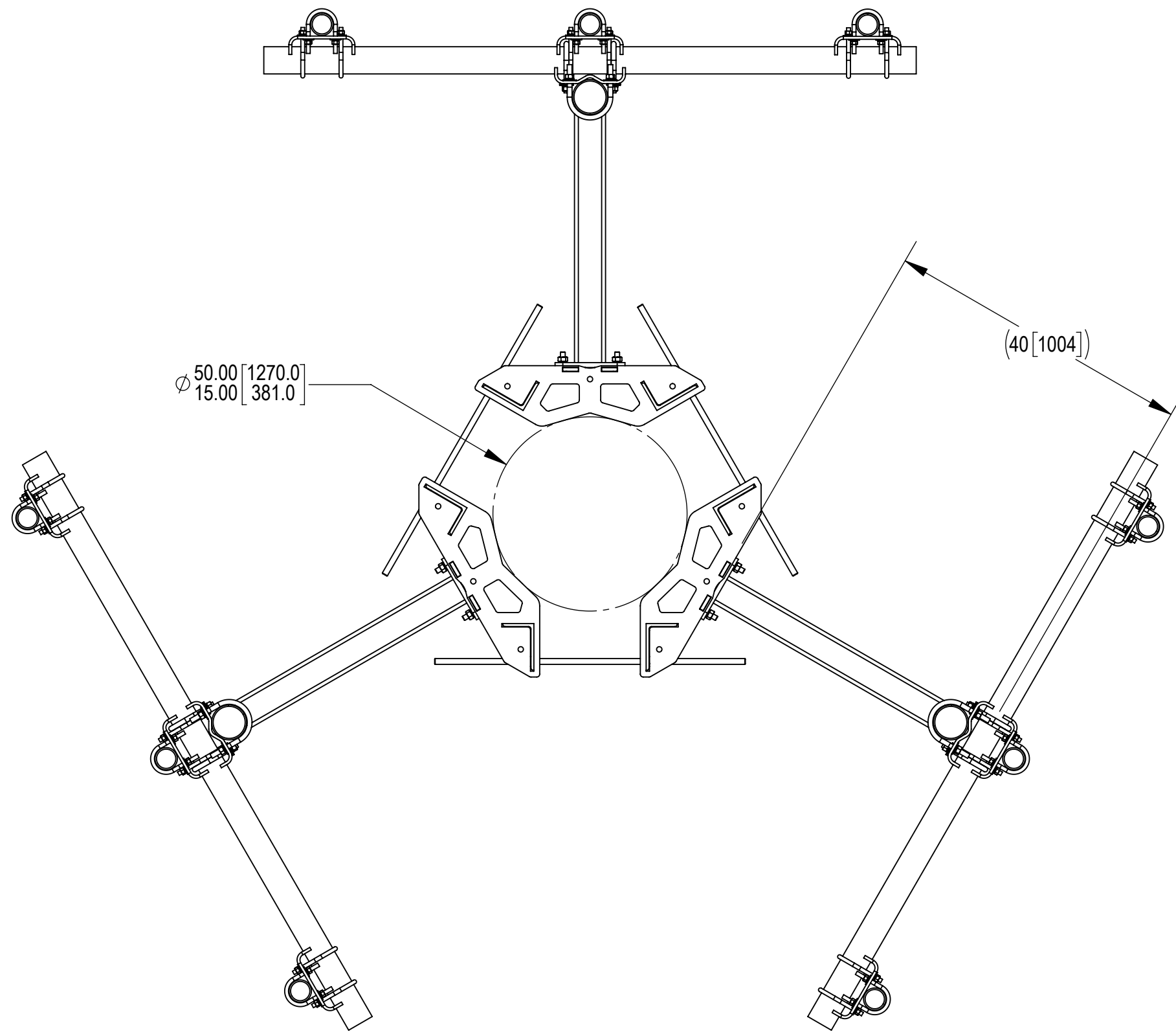
4

3

2

1

NOTES:



COMMSCOPE, INC. OF NORTH CAROLINA				
TITLE T-ARM, MCK6, 3, 4" x 84" , 9, 2-7/8"x96				
SIZE <b>C</b>	SCALE <b>1:32</b>	DOCUMENT NO. <b>MC-K6MHDX-9-96</b>		
		DRAWING		SHEET
		VERSION	STATUS	REVISION
		00	AD	A
				2 OF 2

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4

3

2

1

D

D

C

C

B

B

A

A

# Exhibit F

## **Power Density/RF Emissions Report**

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT  
EVALUATION OF HUMAN EXPOSURE POTENTIAL  
TO NON-IONIZING EMISSIONS

Dish Wireless Existing Facility

Site ID: 876387

BOBDL00099A  
107 Buck Road  
Hebron, Connecticut 06248

**June 24, 2021**

**EBI Project Number: 6221003216**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>37.22%</b>

June 24, 2021

Dish Wireless

Emissions Analysis for Site: 876387 - BOBDL00099A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **107 Buck Road in Hebron, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$ , respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 107 Buck Road in Hebron, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 4 5G channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 4 5G channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 4) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 5) The antennas used in this modeling are the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector A, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector B, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 6) The antenna mounting height centerline of the proposed antennas is 107 feet above ground level (AGL).
- 7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 8) All calculations were done with respect to uncontrolled / general population threshold limits.

## Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21
Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz
Gain:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd
Height (AGL):	107 feet	Height (AGL):	107 feet	Height (AGL):	107 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts
ERP (W):	36,123.20	ERP (W):	36,123.20	ERP (W):	36,123.20
Antenna AI MPE %:	<b>16.26%</b>	Antenna BI MPE %:	<b>16.26%</b>	Antenna CI MPE %:	<b>16.26%</b>



Site Composite MPE %	
Carrier	MPE %
Dish Wireless (Max at Sector A):	16.26%
Verizon	4.1%
AT&T	4.9%
T-Mobile	10.47%
Nextel	1.49%
<b>Site Total MPE % :</b>	<b>37.22%</b>

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	16.26%
Dish Wireless Sector B Total:	16.26%
Dish Wireless Sector C Total:	16.26%
<b>Site Total MPE % :</b>	
	<b>37.22%</b>

Dish Wireless Maximum MPE Power Values (Sector A)							
Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Dish Wireless 600 MHz 5G	4	1667.71	107.0	23.51	600 MHz 5G	400	5.88%
Dish Wireless 1900 MHz 5G	4	7363.09	107.0	103.80	1900 MHz 5G	1000	10.38%
						<b>Total:</b>	<b>16.26%</b>

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the Dish Wireless facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:


Dish Wireless Sector	Power Density Value (%)
Sector A:	16.26%
Sector B:	16.26%
Sector C:	16.26%
Dish Wireless Maximum MPE % (Sector A):	16.26%
Site Total:	37.22%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **37.22%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

# Exhibit G

## **Recipient Mailings**



**UNITED STATES  
POSTAL SERVICE®**

**Click-N-Ship®**

**P**

usps.com 9405 5036 9930 0483 1041 88 0059 0000 0031 4586  
**US POSTAGE**  
 Flat Rate Env  
 08/24/2021

**U.S. POSTAGE PAID**  
Click-N-Ship®

Mailed from 01566

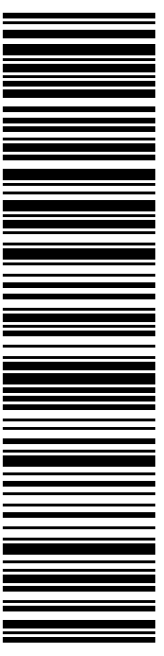
**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 08/27/21  
 Re#: DS-876387  
**0006**

**R013**

SHIP TO: RICH ZAJAC  
 CROWN CASTLE  
 4545 E RIVER RD  
 STE 320  
 W HENRIETTA NY 14586-9024

**USPS TRACKING #**



**9405 5036 9930 0483 1041 88**

Electronic Rate Approved #038555749



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### Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
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### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0483 1041 88**

Trans. #: 541585178	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 08/24/2021	Total: <b>\$7.95</b>
Ship Date: 08/24/2021	
Expected Delivery Date: 08/27/2021	

**From:** DEBORAH CHASE  
 NORTHEAST SITE SOLUTIONS  
 420 MAIN ST  
 STE 1  
 STURBRIDGE MA 01566-1359

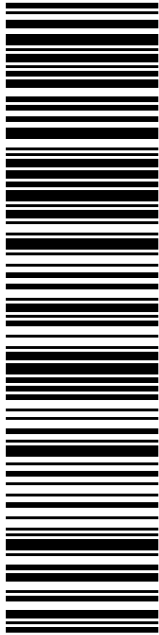
Re#: DS-876387

**To:** RICH ZAJAC  
 CROWN CASTLE  
 4545 E RIVER RD  
 STE 320  
 W HENRIETTA NY 14586-9024

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at usps.com



**USPS TRACKING #**

**9405 5036 9930 0483 1041 95**

Electronic Rate Approved #038555749

**SHIP**

TO: DANIEL LARSON  
FIRST SELECTMAN  
15 GILEAD ST  
HEBRON CT 06248-1501

**P**

**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 08/27/21  
Re#: DS-876387  
**0006**

**R001**

**Click-N-Ship®**

usps.com 9405 5036 9930 0483 1041 95 0059 0000 0010 6248  
**US POSTAGE \$7.95**  
Flat Rate Envoy

**U.S. POSTAGE PAID**  
Click-N-Ship®

Mailed from 01566



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5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0483 1041 95**

Trans. #: 541585178	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 08/24/2021	Total: <b>\$7.95</b>
Ship Date: 08/24/2021	
Expected Delivery Date: 08/27/2021	

**From:** DEBORAH CHASE  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359


Re#: DS-876387

**To:** DANIEL LARSON  
FIRST SELECTMAN  
15 GILEAD ST  
HEBRON CT 06248-1501

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**UNITED STATES  
POSTAL SERVICE®**

**Click-N-Ship®**

**P**

usps.com 9405 5036 9930 0483 1042 01 0059 0000 0010 6248  
**US POSTAGE**  
 Flat Rate Env  
**U.S. POSTAGE PAID**  
Click-N-Ship®

08/24/2021 Mailed from 01566

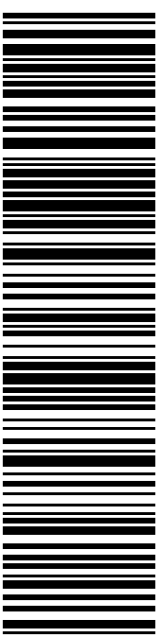
**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 08/27/21  
 Re#: DS-876387  
**0006**

**R001**

SHIP TO: MICHAEL O'LEARY  
 TOWN PLANNER  
 15 GILEAD ST  
 HEBRON CT 06248-1501

**USPS TRACKING #**



**9405 5036 9930 0483 1042 01**

Electronic Rate Approved #038555749



Cut on dotted line.

### Instructions

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2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0483 1042 01**

Trans. #: 541585178	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 08/24/2021	Total: <b>\$7.95</b>
Ship Date: 08/24/2021	
Expected Delivery Date: 08/27/2021	

**From:** DEBORAH CHASE  
 NORTHEAST SITE SOLUTIONS  
 420 MAIN ST  
 STE 1  
 STURBRIDGE MA 01566-1359


Re#: DS-876387

**To:** MICHAEL O'LEARY  
 TOWN PLANNER  
 15 GILEAD ST  
 HEBRON CT 06248-1501

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at usps.com



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POSTAL SERVICE®**

**Click-N-Ship®**

**P**

usps.com 9405 5036 9930 0483 1042 18 0059 0000 0010 6248  
**US POSTAGE**  
 Flat Rate Env  
 08/24/2021

**U.S. POSTAGE PAID**  
 Click-N-Ship®

Mailed from 01566

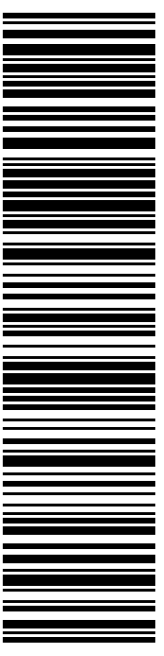
**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 08/27/21  
 Re#: DS-876387  
**0006**

**R004**

SHIP TO:  
 MAPLELEAF FARM LAND TRUST LLC  
 768 GILEAD ST  
 HEBRON CT 06248-1317

**USPS TRACKING #**



**9405 5036 9930 0483 1042 18**

Electronic Rate Approved #038555749



Cut on dotted line.

### Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0483 1042 18**

Trans. #: 541585178	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 08/24/2021	Total: <b>\$7.95</b>
Ship Date: 08/24/2021	
Expected Delivery Date: 08/27/2021	

**From:** DEBORAH CHASE      Re#: DS-876387  
 NORTHEAST SITE SOLUTIONS  
 420 MAIN ST  
 STE 1  
 STURBRIDGE MA 01566-1359

**To:** MAPLELEAF FARM LAND TRUST LLC  
 768 GILEAD ST  
 HEBRON CT 06248-1317

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at usps.com

CR 876387



FISKDALE  
458 MAIN ST  
FISKDALE, MA 01518-9998  
(800)275-8777

08/24/2021

12:21 PM

Product	Qty	Unit Price	Price
Prepaid Mail	1		\$0.00
Hebron, CT 06248			
Weight: 1 lb 4.50 oz			
Acceptance Date:			
Tue 08/24/2021			
Tracking #:			
9405 5036 9930 0483 1041 95			
Prepaid Mail	1		\$0.00
West Henrietta, NY 14586			
Weight: 0 lb 2.00 oz			
Acceptance Date:			
Tue 08/24/2021			
Tracking #:			
9405 5036 9930 0483 1041 88			
Prepaid Mail	1		\$0.00
Hebron, CT 06248			
Weight: 1 lb 4.50 oz			
Acceptance Date:			
Tue 08/24/2021			
Tracking #:			
9405 5036 9930 0483 1042 18			
Prepaid Mail	1		\$0.00
Hebron, CT 06248			
Weight: 1 lb 4.50 oz			
Acceptance Date:			
Tue 08/24/2021			
Tracking #:			
9405 5036 9930 0483 1042 01			
Grand Total:			\$0.00