April 11, 2023

Melanie Bachman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Tower Share Application
71 Pleasant View Road, Derby, CT 06418
Latitude: 41.315000
Longitude: -73.064444
Site #: CT13616-A_BOHVN00049A_SBA_DISH

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 71 Pleasant View Road, Derby, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas at the 97-foot level of the existing 120-foot monopole tower, one (1) Fiber cable will also be installed. Dish Wireless LLC equipment cabinets will be placed within a 7' x 5' lease area within the fenced compound. Included are plans by B+T, dated May 12, 2022, Exhibit 8. Also included is a structural analysis prepared by TES, dated December 20, 2022 confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit 7. The facility was approved by the Connecticut Siting Council, Docket No. 307 on April 27, 2006. Please see attached Exhibit 5.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mayor Richard Dziekan, and Kevin White, Acting Zoning Enforcement Officer for the City of Derby, and property owner (Our Lady, Queen of the Apostles Parish Church). No notice is required for SBA, as SBA is the tower owner making this submission.

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the existing tower is 120-feet and the Dish Wireless LLC antennas will be located at a center line height of 97-feet.

2. The proposed modifications will not result in the increase of the site boundary as depicted on the attached site plan.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed local and state criteria. The incremental effect of the proposed changes will be negligent.

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 13.04% as evidenced by Exhibit 6.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, Dish Wireless LLC respectfully indicates that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing monopole has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included as Exhibit 7.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this support tower in Manchester. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation..

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 97-foot level of the existing 120-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit 6, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. Dish Wireless LLC will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the Letter of Authorization has been provided by the owner to assist Dish Wireless LLC with this tower sharing application.

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading.

Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing guyed tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Derby.

Sincerely,

Elizabeth Jamieson
Site Development Specialist II
SBA Communications Corporation
134 Flanders Road, Suite 125
Westborough, MA 01581
860.605.7808 + **T**
EJamieson@sbasite.com

Attachments:

cc:
Mayor Richard Dziekan
Derby City Hall
1 Elizabeth Street, 2nd Floor
Derby, CT 06418

Kevin White, Zoning Enforcement Officer
Derby City Hall
1 Elizabeth Street
Derby, CT 06418

Our Land of the Apostles Church – Property Owner
212 Elizabeth Street
Derby, CT 06418

EXHIBIT LIST

Exhibit 1	Copy of Check	X
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	Docket No. 307 4/27/2006
Exhibit 6	EME Report	Fox Hill Telecom – 04/07/2023
Exhibit 7	Structural Analysis	TES - 12/20/2022
Exhibit 8	Construction Drawings	B+T Group - 02/27/2023
Exhibit 9	Mod Drawings	TES- 12/20/2022

EXHIBIT 1

Copy of Check for filing fee.

EXHIBIT 2

FedEx Labels

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

April 12, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 395737826408

Delivery Information:			
Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	M.EDWARDS	**Delivery Location:**	
Service type:	FedEx Standard Overnight		
Special Handling:	Deliver Weekday		
		Delivery date:	Apr 12, 2023 13:26

Shipping Information:			
Tracking number:	395737826408	**Ship Date:**	Apr 11, 2023
		Weight:	

Recipient:	**Shipper:**

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Thank you for choosing FedEx

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

April 12, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 395736552363

Delivery Information:			
Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	M.MARC	**Delivery Location:**	
Service type:	FedEx Standard Overnight		
Special Handling:	Deliver Weekday		
		Delivery date:	Apr 12, 2023 10:36

Shipping Information:			
Tracking number:	395736552363	**Ship Date:**	Apr 11, 2023
		Weight:	

Recipient:	**Shipper:**

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Thank you for choosing FedEx

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

April 12, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 395736774032

Delivery Information:			
Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	M.MARC	**Delivery Location:**	
Service type:	FedEx Standard Overnight		
Special Handling:	Deliver Weekday		
		Delivery date:	Apr 12, 2023 10:36

Shipping Information:			
Tracking number:	395736774032	**Ship Date:**	Apr 11, 2023
		Weight:	

Recipient:	**Shipper:**

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Thank you for choosing FedEx

EXHIBIT 3

Property Card

City of Derby
Property Listing Report

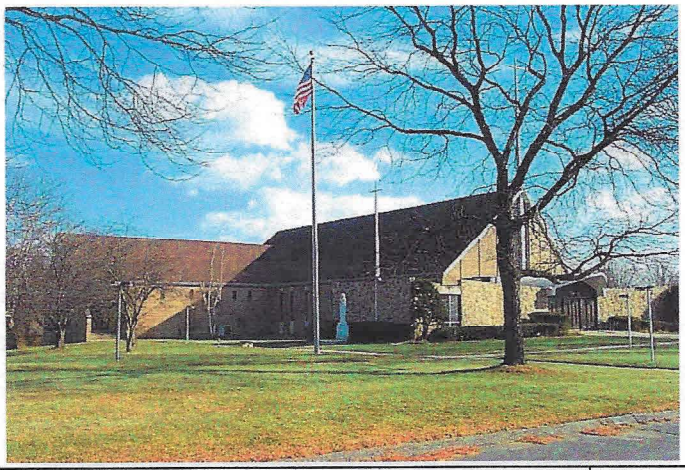
Parcel ID 5-6 101&113

Account 004789

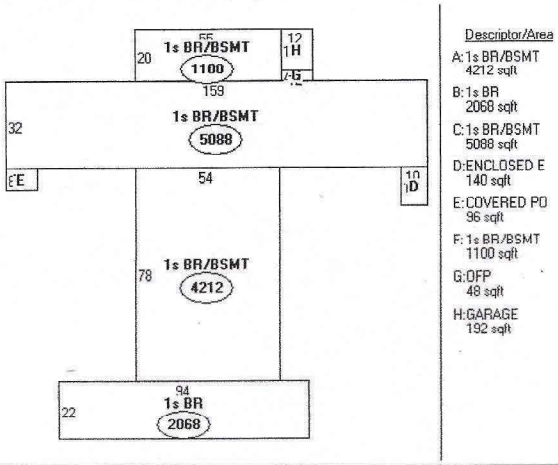
Property Information

Owner	OUR LADY, QUEEN OF THE APOSTLES PARISH C
Address	71 PLEASANT VIEW RD
Mailing Address	212 ELIZABETH ST DERBY CT 06418-0000
Land Use	
Land Class	E E

Neighborhood	103
Zoning	P
Acreage	15.88
Utilities	ALL PUBLIC ALL PUBLIC
Lot Description	ROLLING
Census Tract	1201



Sketch



Construction Details

Year Built	1970
Stories	
Building Style	
Building Condition	GOOD
Total Rooms	
Bedrooms	
Bathrooms	
Roof Style	
Primary Ext. Wall	
Heating Type	
Heating System	
Heating Fuel	
First Floor Area	
Total Living Area	

Parcel Valuations

(Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	2645450	
Land	923500	
Total	3568950	2498260

Sales History:

Sale Date	20180924
Sale Price	0
Book/ Page	784 132

Report Created On 5/20/2022

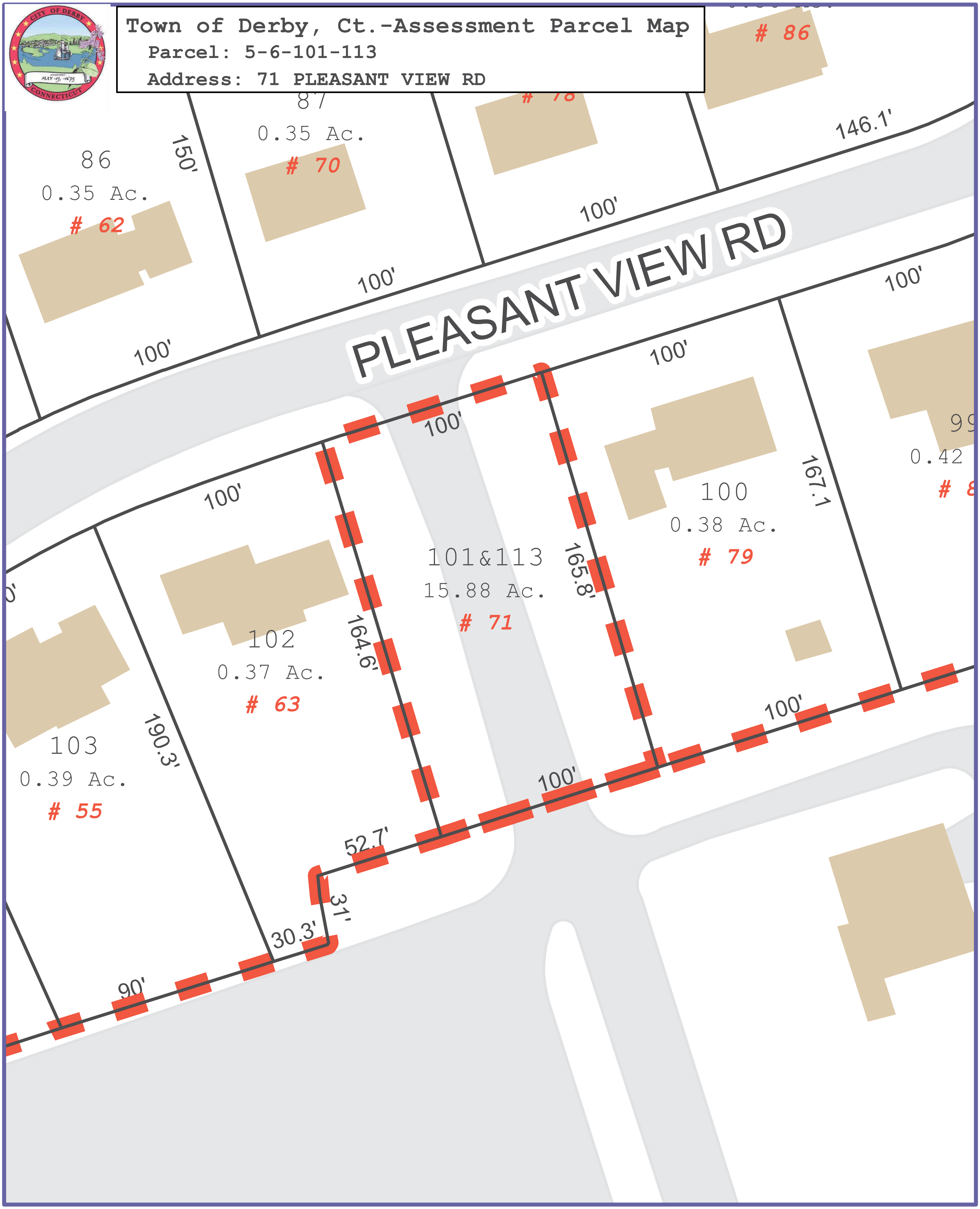
EXHIBIT 4

Property Map

Town of Derby, Ct.-Assessment Parcel Map

Parcel: 5-6-101-113

Address: 71 PLEASANT VIEW RD



Map Produced: August 2021

0 25 50 75 100 Feet

Disclaimer:
This map is for informational purposes only. All information is subject to verification by any user. The Town of Derby and its mapping contractors assume no legal responsibility for the information contained herein.

EXHIBIT 5

Zoning Documents

DOCKET NO. 307 – National Grid Communications, Inc. d/b/a Gridcom application for a Certificate of Environmental Compatibility and Pubic Need for the construction, operation, and maintenance of a telecommunications facility located at one of two sites at 71 Pleasant View Road, Derby, Connecticut.	}	Connecticut Siting Council April 27, 2006

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to National Grid Communications, Inc. d/b/a Gridcom, hereinafter referred to as the Certificate Holder, for a telecommunications facility at Site A, 71 Pleasant View Road, Derby, Connecticut. The Council denies certification of Site B, 71 Pleasant View Road, Derby, Connecticut.

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

1. The tower shall be constructed no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Omnipoint Holdings, Inc. (T-Mobile) and other entities, both public and private, but such tower shall not exceed a height of 120 feet above ground level. The height at the top of the antennas shall not exceed 120 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the City of Derby for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:

    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound not to exceed 40-feet by 40-feet, radio equipment, access road, utility line, and landscaping; and
    b) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Prior to submission of the D&M Plan to the Council, the Certificate Holder shall discuss a tower design at this site with the City of Derby. The Town and Certificate Holder shall agree upon a tower design, but any differences would be resolved by the Council.

4. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

5. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

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

7. The Certificate Holder shall provide reasonable space on the tower for no compensation for any City of Derby public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

8. If the facility authorized herein is not fully constructed and providing wireless services within twelve months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.

9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

10. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.

11. Any request for extension of the time periods referred to in Conditions 8, 9, & 10 shall be filed with the Council not later than sixty days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list. Any proposed modifications to this Decision and Order shall likewise be so served.

12. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

Pursuant to General Statutes § 16-50p, the Council hereby directs that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Connecticut Post, The New Haven Register and Valley Gazette.

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

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
National Grid Communications, Inc. d/b/a Gridcom	David Vivian Site Development Manager Gridcom 733 Chapin Street, Suite 200F Ludlow, MA 01056 Lucia Chiocchio, Esq. Cuddy & Feder LLP 90 Maple Avenue White Plains, NY 10601-5196
Intervenor	**Its Representative**
Omnipoint Communications, Inc.	Kenneth Ira Spigle, Esq. Attorney at Law 687 Highland Avenue, Suite 1 Needham, MA 02494
Party	**Its Representative**
City of Derby	Joseph T. Coppola, Esq. Karanian & Catalano 2 Corporate Drive, Suite 201 Trumbull, CT 06611 Anthony Staffieri, Mayor City Hall 1 Elizabeth Street Derby, CT 06418
Intervenor	**Its Representative**
Pleasant View Hilltop Committee	Nancy Marren 195 Sentinel Hill Road Derby, CT 06418

EXHIBIT 6

EME Report

Fox Hill Telecom

Radio Frequency Emissions Analysis Report

Site ID: BOHVN00049A

SBA - Pleasantview Road
71 Pleasantview Road
Derby, CT 06418

April 7, 2023

Fox Hill Telecom Project Number: 230296

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**13.04 %**

Fox Hill Telecom

April 7, 2023

Dish Wireless
5701 South Santa Fe Drive
Littleton, CO 80120

Emissions Analysis for Site: **BOHVN00049A – SBA - Pleasantview Road**

Fox Hill Telecom, Inc ("Fox Hill") was directed to analyze the proposed radio installation for Dish Wireless, LLC (Dish) facility located at **71 Pleasantview Road, Derby, CT**, for the purpose of determining whether the emissions from the Proposed Dish radio and 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600 MHz band is approximately 400 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS / AWS-4) bands is 1000 $\mu W/cm^2$. 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 performed for the proposed upgrades to the Dish Wireless antenna facility located at **71 Pleasantview Road, Derby, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65 for far field modeling calculations.

In OET-65, plane wave power densities in the Far Field of an antenna are calculated by considering antenna gain and reflective waves that would contribute to exposure.

Since the radiation pattern of an antenna has developed in the **Far Field** region the power gain in specific directions needs to be considered in exposure predictions to yield an Effective Radiated Power (ERP) in each specific direction from the antenna. Also, since the vertical radiation pattern of the antenna is considered, the exposure calculations would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels. To determine a worst-case scenario at each point along the calculation radials, each point was calculated using the antenna gain value at each angle of incident and compared against the result using an isotropic radiator at the antenna height with the greater of the two used to yield the more pessimistic far field value for each point along the calculation radial.

Additionally, to model a truly "worst case" prediction of exposure levels at or near a surface, such as at ground-level or on a rooftop, reflection off the surface of antenna radiation power can be assumed, resulting in a potential 1.6 times increase in power density in calculating far field power density values.

With these factors Considered, the worst case **Far Field prediction model** utilized in this analysis is determined by the following equation:

Equation 9 per FCC OET65 for Far Field Modeling

$$S = \frac{33.4\ ERP}{R^2}$$

S = Power Density (in μw/cm^2)
ERP = Effective Radiated Power from antenna (watts)
R = Distance from the antenna (meters)

Predicted far field power density values for all carriers identified in this report were calculated 6 feet above the ground level and are displayed as a percentage of the applicable FCC standards. All emissions values for other carriers were calculated using the same Far Field model outlined above, using industry standard radio configurations and frequency band selection based upon available licenses in this geographic area for emissions contribution estimates.

For each Dish sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
5G	n71 (600 MHz)	4	61.5
5G	n70 (AWS-4 / 1995-2020)	4	40
5G	n66 (AWS-4 / 2180-2200)	4	40

Table 1: Channel Data Table

The following **Dish** antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz (n71) frequency band and the 2100 MHz (AWS 4) frequency bands at 1995-2020 MHz (n70) and 2180-2200 MHz (n66). This is based on feedback from Dish regarding anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Commscope FFVV-65B-R3	97
B	1	Commscope FFVV-65B-R3	97
C	1	Commscope FFVV-65B-R3	97

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.

RESULTS

Per the calculations completed for the proposed **Dish** configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Commscope FFVV-65B-R3	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	4.09
						Sector A Composite MPE%	**4.09**
Antenna B1	Commscope FFVV-65B-R3	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	4.09
						Sector B Composite MPE%	**4.09**
Antenna C1	Commscope FFVV-65B-R3	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	4.09
						Sector C Composite MPE%	**4.09**

Table 3: Dish Emissions Levels

The Following table (*Table 4*) shows all additional carriers on site and their emissions contribution estimates, along with the newly calculated **Dish** far field emissions contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site emissions values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each **Dish** Sector as well as the composite emissions value for the site.

Site Composite MPE%	
Carrier	**MPE%**
Dish – Max Per Sector Value	**4.09 %**
T-Mobile	2.41 %
Verizon Wireless	3.96 %
Sprint	2.58 %
Site Total MPE %:	**13.04 %**

Table 4: All Carrier MPE Contributions

Dish Sector A Total:	4.09 %
Dish Sector B Total:	4.09 %
Dish Sector C Total:	4.09 %
Site Total:	13.04 %

Table 5: Site MPE Summary

Table 6 below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated **Dish** sector(s). For this site, all three sectors have the same configuration yielding the same results for all three sectors.

Dish _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Dish n71 (600 MHz) 5G	4	1,008.96	97	10.84	n71 (600 MHz)	400	2.71%
Dish n70 (AWS-4 / 1995-2020) 5G	4	1,574.20	97	6.90	n70 (AWS-4 / 1995-2020)	1000	0.69%
Dish n66 (AWS-4 / 2180-2200) 5G	4	1,686.79	97	6.90	n66 (AWS-4 / 2180-2200)	1000	0.69%
						Total:	**4.09 %**

Table 6: Dish Maximum Sector MPE Power Values

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 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 Sector	Power Density Value (%)
Sector A:	4.09 %
Sector B:	4.09 %
Sector C:	4.09 %
Dish Maximum Total (per sector):	4.09 %
Site Total:	13.04 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite emissions value for this site, assuming all carriers present, is **13.04 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon the far field calculations performed for all carriers identified in this report.

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.

Scott Heffernan
Principal RF Engineer
Fox Hill Telecom, Inc
Worcester, MA 01609
(978)660-3998

EXHIBIT 7

Structural Analysis

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Post-Mod Structural Analysis Report

Existing 119 ft PennSummit Monopole
Customer Name: SBA Communications Corp
Customer Site Number: CT13616-A
Customer Site Name: St. Judes
Carrier Name: Verizon (App#: 215201, V1)
Carrier Site ID / Name: BOHVN00049A / St. Judes
Site Location: 71 Pleasantview Road
Derby, Connecticut
New Haven County
Latitude: 41.315042
Longitude: -73.064314

Analysis Result:

Max Structural Usage: 52.9% [Pass]
Max Foundation Usage: 17.0% [Pass]
Pre-Mod Installation: Approved

Report Prepared By: Tawfeeq Alajaj

Introduction

The purpose of this report is to summarize the analysis results on the 119 ft PennSummit Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any existing modification listed under Sources of Information was assumed completed and was included in this analysis.

The proposed modification by **TES** listed under Sources of Information was considered completed and was included in this analysis.

Sources of Information

Tower Drawings	Original structural design report prepared by PennSummit Tubular, LLC & Paul J. Ford and Company. Dated 08-17-2006. Design No 26805. Job No 29206-0266. / Original antenna concealment cylinder fabrication drawings prepared by Stealth Concealment Solutions, Inc. Dated 03-17-2003. Job No. FOUR-4C-100-40. Previous structural report prepared by Tower Engineering Solutions. Dated 01-21-2016. TES Project No 20131.
Foundation Drawing	Original foundation design prepared by PennSummit Tubular, LLC & Paul J. Ford and Company. Dated 08-17-2006. Design No 26805. Job No 29206-0266.
Geotechnical Report	Geotechnical report prepared by JGI Eastern, Inc. Dated 07-31-2006. Project No 06496G.
Mount Analysis	N/A
Existing Modification	N/A
Proposed Modification	TES Job # 136551

Analysis Criteria

The comprehensive analysis was performed in accordance with the requirements and stipulations of the TIA-222-H**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	125.0 mph (3-Sec. Gust) (Ultimate wind speed)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 1" radial ice concurrent
Service Load Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-H / 2021 IBC / 2022 Connecticut State Building Code
Exposure Category:	B
Risk Category:	II
Topographic Category:	1
Crest Height:	674 ft
Seismic Parameters:	S_S = 0.202, S_1 = 0.054

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	114.0	3	RFS V18-209014 - Panel	Inside 36" concealment canister from 109' to 119'	(6) 1 5/8"	T-Mobile
2		3	RFS Twin PCS TMAs			
3		3	RFS Twin AWS TMAs			
4	113.0	1	Flag (12'x18')	Direct	-	-
4	108.0	3	RFS - APXVBLL09B43-C-I20 - Panel	Inside 36" concealment canister from 99' to 109'	(12) 1 5/8"	Verizon
5	103.5	3	Samsung - MT6407-77A - Panel			
6	103.0	3	CommScope TMAT1921B78-21A			
6	97.0	3	FFVV-65B-R3 - Panel	Inside 36" concealment canister from 79' to 99'	(1) 1.60" Hybrid	Dish Wireless
7		1	Raycap RDIDC-9181-PF-48			
8	87.0	3	Commscope DHHTT65B-3XR - Panel	Inside 36" concealment canister from 79' to 99'	(12) 7/8"; (2) 1/2"; (3) 3/8" RET Line; (3) 5/8" DC; (3) 1/4" Fiber	Sprint Nextel
9		2	Andrew FPA5250D06-N			
10		6	RFS KIT-FD9R6004/1C-DL Diplexrs			
11		3	Redconnex AN-80i			
12	84.0	3	Argus LLPX310R - Panel	Inside 36" concealment canister from 79' to 99'	(2) 1/2"; (3) 5/8"; (3) 1/4"	Clearwire
13		1	Andrew FPA5250D06-N			
14		3	Redconnex AN-80i BTSs			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
6	97.0	3	FFVV-65B-R3 - Panel	Inside 36" concealment canister from 79' to 99'	(1) 1.60" Hybrid	Dish Wireless
7		1	Raycap RDIDC-9181-PF-48			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate	Spoked Connection
Max. Usage:	**49.1%**	**20.3%**	**22.0%**	**52.9%**
Pass/Fail	**Pass**	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)
Original Design Reactions	1550.0	23.0
Analysis Reactions	613.3	9.3
Factored Reactions*	2092.5	31.1
% of Design Reactions	29.3%	30.1%

* Per section 15.6.2 of the TIA-222-H standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by TIA-222 for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.9607 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the structure and its foundation will be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222-H Standard after the following proposed modification is successfully completed.

- Proposed modification design drawing by **TES** Job # 136551

Pre-Mod Installation Determination

We have also checked this tower to determine if the proposed Verizon equipment loading can be installed prior to the completion of the required modifications. We ran a reduced wind loading case as required by TIA-322 considering a construction period of no more than 6 months.

The tower and foundations passed, so the Carrier can proceed and install their proposed loading prior to the mods completion. Please be aware that this approval is being provided and is based on the method outlined in TIA-322. This approval is not a blanket approval and there is still a risk that the tower will experience a wind event that cannot be predicted by TIA-322 or our Engineers. In the event of an unforeseen wind event, Tower Engineering Solutions will not be liable nor responsible for damage to the tower or the Carriers equipment. Additionally, the tower cannot go beyond the 6 month construction period without the modifications being completed. If the modifications cannot be completed within 6 months from the completed installation of the Carrier's proposed equipment, TES must be notified immediately for further review.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

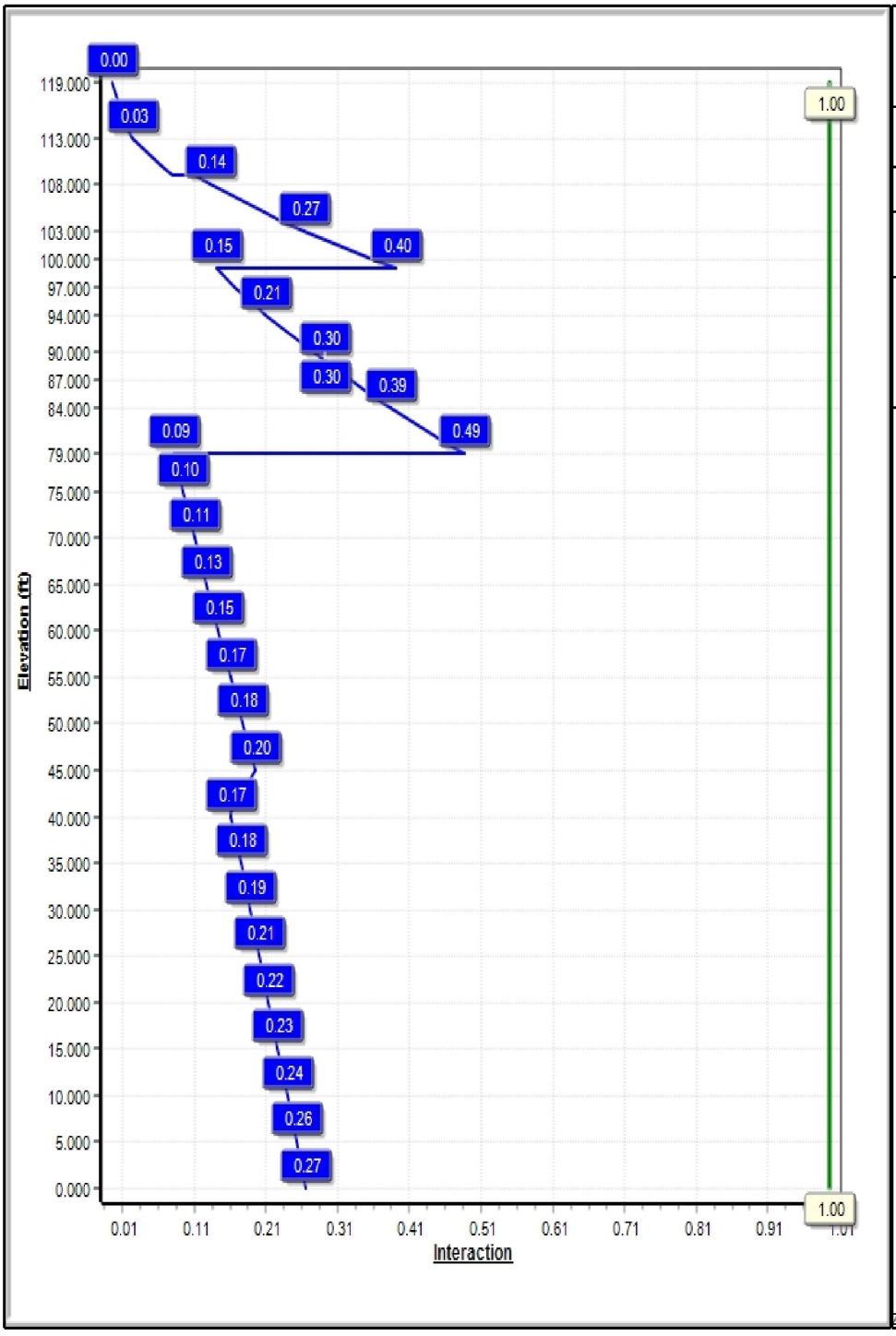
Usage Diagram - Max Ratio 49.07% at 79.0ft

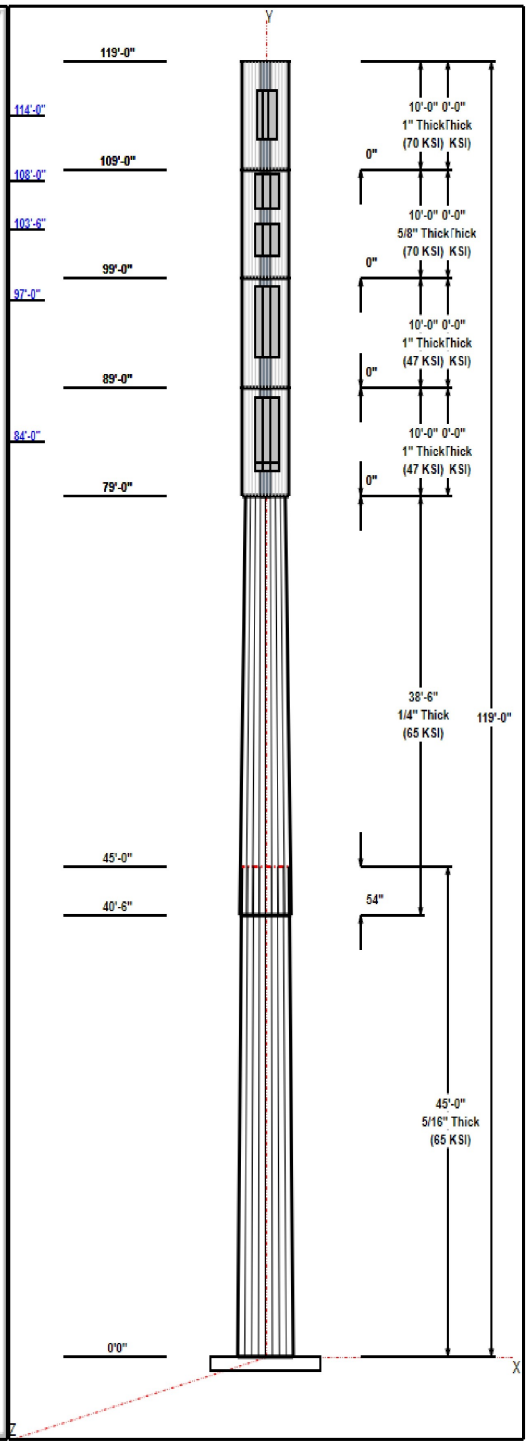
Structure:	CT13616-A-SBA	**Code:**	EIA/TIA-222-H	12/20/2022
Site Name:	St. Judes	**Exposure:**	B	
Height:	119.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

Tower Engineering Solutions

Dead Load Factor:	1.20	**Iterations:**	29
Wind Load Factor:	1.00		

Load Case : 1.2D + 1.0W 125 mph Wind





Structure: CT13616-A-SBA

Type: Custom
Site Name: St. Judes
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.15000

12/20/2022

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	45.00	34.60	41.35	0.313		0.15000	65
2	38.50	30.00	35.77	0.250	Slip	0.15000	65
3	10.00	8.00	8.00	1.000	Butt	0.00000	47
4	10.00	8.00	8.00	1.000	Butt	0.00000	47
5	10.00	5.00	5.00	0.625	Butt	0.00000	70
6	10.00	5.00	5.00	1.000	Butt	0.00000	70

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
114.00	114.00	1	27" Canister at 114.0'	---
114.00	114.00	3	V18-209014	T-Mobile
114.00	114.00	3	RFS Twin PCS TMAs	T-Mobile
114.00	114.00	3	RFS Twin AWS TMAs	T-Mobile
113.00	113.00	1	Flag (12'x18')	---
108.00	107.00	3	APXVBLL09B43-C-I20	Verizon
104.00	104.00	1	28" Canister at 104.0'	---
103.50	102.50	3	MT6407-77A	Verizon
103.00	103.00	3	Commscope	Verizon
97.00	95.00	3	FFVV-65B-R3	Dish Wireless
97.00	97.00	1	Raycap	Dish Wireless
94.00	94.00	1	29" Canister at 94.0'	---
87.00	85.00	3	Commscope	Sprint Nextel
87.00	87.00	2	Andrew FPA5250D06-N	Sprint Nextel
87.00	87.00	6	RFS	Sprint Nextel
87.00	87.00	3	Redconnex AN-80i	Sprint Nextel
84.00	84.00	1	30" Canister at 84.0'	---
84.00	82.00	3	Argus LLPX310R	Clearwire
84.00	82.00	1	Andrew FPA5250D06-N	Clearwire
84.00	84.00	3	Redconnex AN-80i BTSs	Clearwire

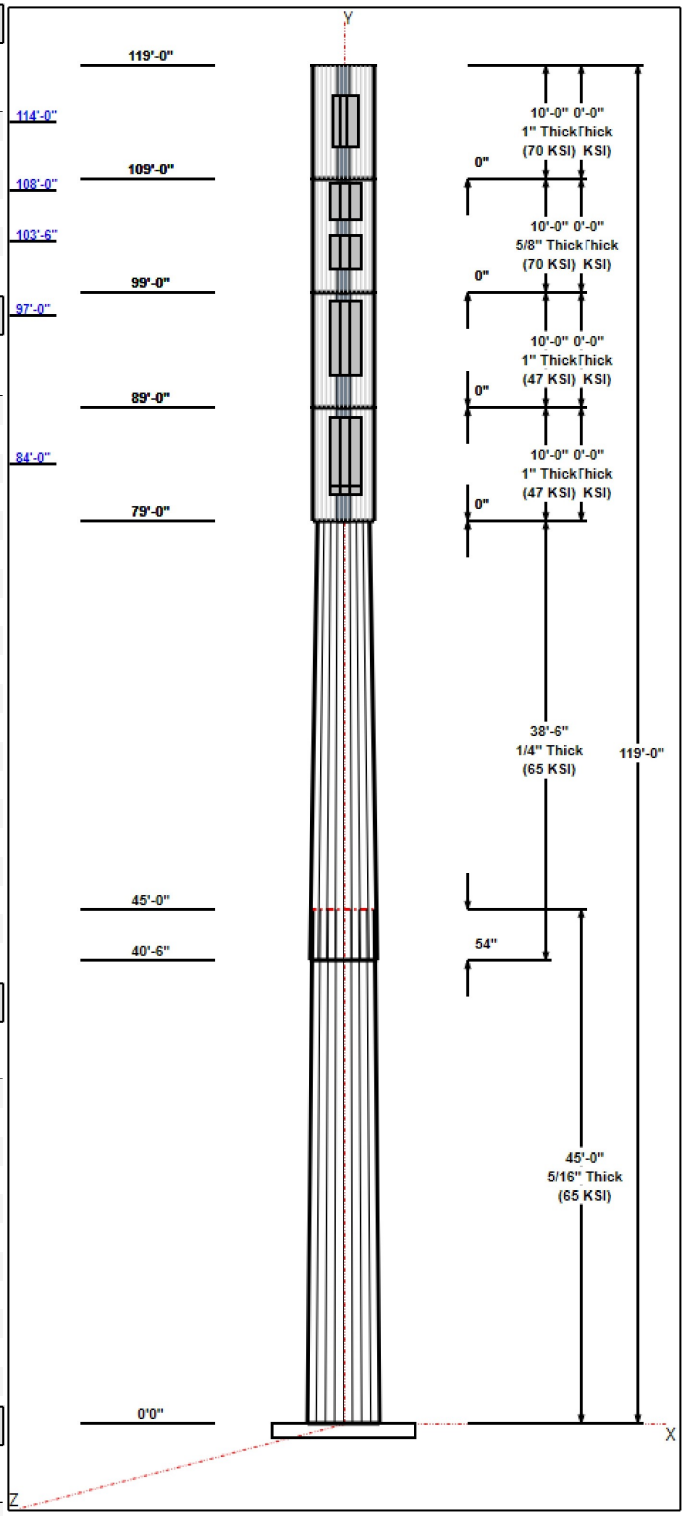
Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
3.00	114.00	Inside	1 5/8" Coax	T-Mobile
3.00	107.00	Inside	1 5/8" Coax	Verizon
3.00	97.00	Inside	1.60" Hybrid	Dish Wireless
3.00	87.00	Inside	1/2" Coax	Sprint Nextel
3.00	87.00	Inside	1/4" Fiber	Sprint Nextel
3.00	87.00	Inside	3/8" RET Line	Sprint Nextel
3.00	87.00	Inside	5/8" DC	Sprint Nextel
3.00	87.00	Inside	7/8" Coax	Sprint Nextel
3.00	84.00	Inside	1/2" Coax	Clearwire
3.00	84.00	Inside	1/4" Coax	Clearwire
3.00	84.00	Inside	5/8" Coax	Clearwire

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate



Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	46.0	50.0	Clipped

Reactions

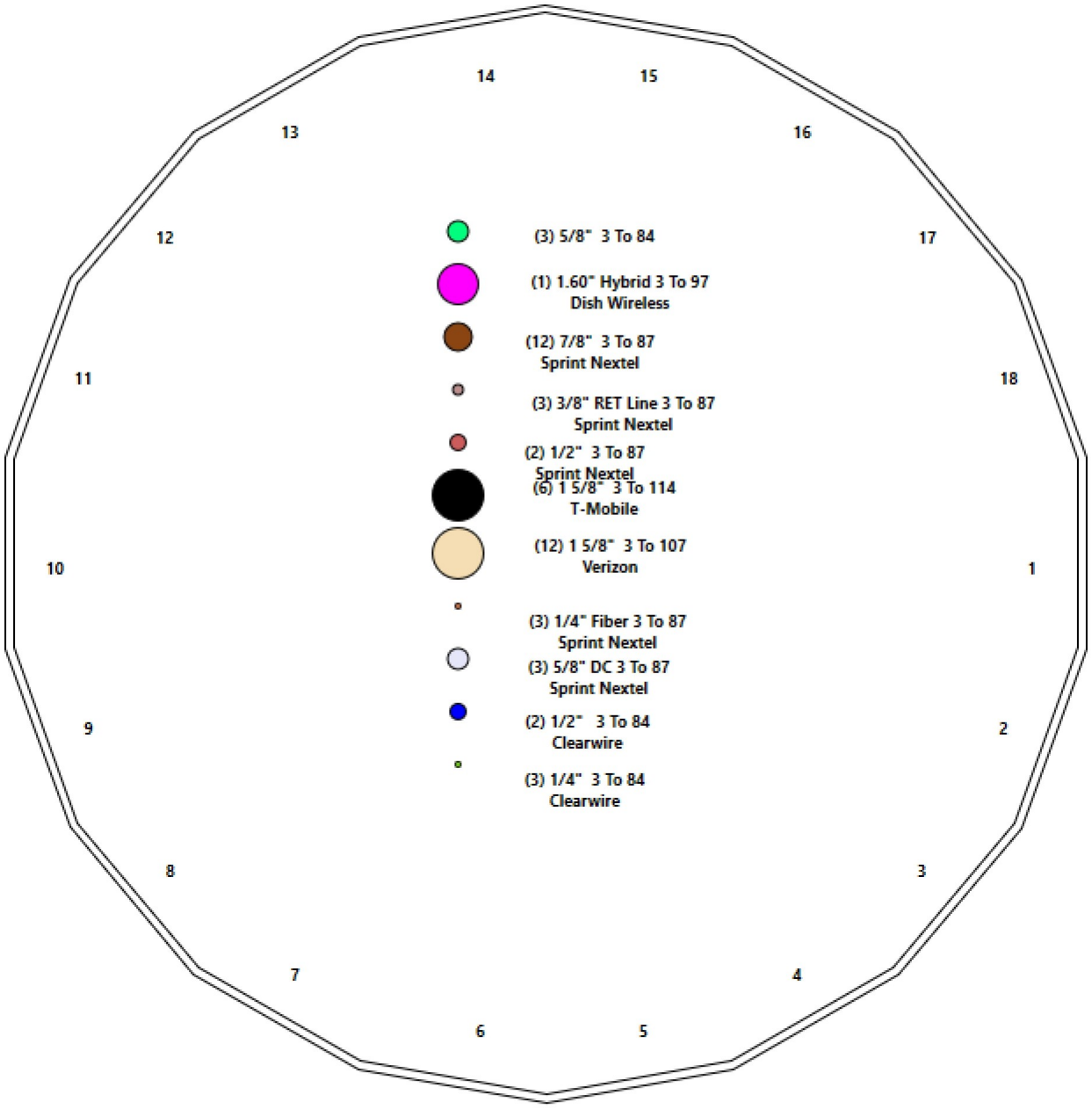
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.0W 125 mph Wind	613.3	9.3	19.6
0.9D + 1.0W 125 mph Wind	609.4	9.3	14.7
1.2D + 1.0Di + 1.0Wi 50 mph Wind	260.4	3.4	28.4
1.2D + 1.0Ev + 1.0Eh	32.0	0.4	20.3
0.9D + 1.0Ev + 1.0Eh	32.0	0.4	15.4
1.0D + 1.0W 60 mph Wind	119.6	1.8	16.4

Structure: CT13616-A-SBA - Coax Line Placement

Type: Monopole
Site Name: St. Judes
Height: 119.00 (ft)

12/20/2022

Tower Engineering Solutions



Shaft Properties

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	45.000	0.3125	65		0.00	5,720
2	18	38.500	0.2500	65	Slip	54.00	3,393
3	R	10.000	1.0000	47	Flange	0.00	748
4	R	10.000	1.0000	47	Flange	0.00	748
5	R	10.000	0.6250	70	Flange	0.00	292
6	R	10.000	1.0000	70	Flange	0.00	428
					Total Shaft Weight:		**11,329**

	Bottom						Top							
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**	**Canister Diam (in)**
1	41.35	0.00	40.70	8660.38	21.92	132.32	34.60	45.00	34.01	5051.28	18.11	110.7	0.150000	0.00
2	35.77	40.50	28.19	4494.55	23.82	143.10	30.00	79.00	23.61	2639.64	19.75	120.0	0.150000	0.00
3	8.00	79.00	21.99	134.80	0.00	8.00	8.00	89.00	21.99	134.80	0.00	8.00	0.000000	36.00
4	8.00	89.00	21.99	134.80	0.00	8.00	8.00	99.00	21.99	134.80	0.00	8.00	0.000000	36.00
5	5.00	99.00	8.59	20.57	0.00	8.00	5.00	109.00	8.59	20.57	0.00	8.00	0.000000	36.00
6	5.00	109.0	12.57	25.15	0.00	5.00	5.00	119.00	12.57	25.15	0.00	5.00	0.000000	36.00

Load Summary

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	114.00	27" Canister at 114.0'	1	150.00	0.00	1.00	755.02	0.000	1.00	0.00	0.00
2	114.00	V18-209014	3	18.70	0.00	0.00	70.02	4.165	0.00	0.00	0.00
3	114.00	RFS Twin PCS TMAs	3	11.00	0.00	0.00	17.87	0.000	0.00	0.00	0.00
4	114.00	RFS Twin AWS TMAs	3	17.60	0.00	0.00	28.77	0.000	0.00	0.00	0.00
5	113.00	Flag (12'x18')	1	100.00	7.92	1.00	104.52	8.278	1.00	0.00	0.00
6	108.00	APXVBLL09B43-C-I20	3	35.70	0.00	0.00	115.06	5.045	0.00	0.00	-1.00
7	104.00	28" Canister at 104.0'	1	150.00	0.00	1.00	749.56	0.000	1.00	0.00	0.00
8	103.50	MT6407-77A	3	79.40	0.00	0.00	150.04	5.247	0.00	0.00	-1.00
9	103.00	Commscope TMAT1921B78-21A	3	17.60	0.00	0.00	28.83	0.000	0.00	0.00	0.00
10	97.00	FFVV-65B-R3	3	125.70	0.00	0.00	430.56	20.445	0.00	0.00	-2.00
11	97.00	Raycap RDIDC-9181-PF-48	1	21.90	0.00	0.00	55.88	0.000	0.00	0.00	0.00
12	94.00	29" Canister at 94.0'	1	150.00	0.00	1.00	743.53	0.000	1.00	0.00	0.00
13	87.00	Commscope DHHTT65B-3XR	3	45.40	0.00	1.00	171.63	0.000	1.00	0.00	-2.00
14	87.00	Andrew FPA5250D06-N	2	2.00	0.00	1.00	19.34	0.000	1.00	0.00	0.00
15	87.00	RFS KIT-FD9R6004/1C-DL Diplexrs	6	6.40	0.00	1.00	13.08	0.000	1.00	0.00	0.00
16	87.00	Redconnex AN-80i	3	4.50	0.00	1.00	58.14	0.000	1.00	0.00	0.00
17	84.00	30" Canister at 84.0'	1	150.00	0.00	1.00	736.89	0.000	1.00	0.00	0.00
18	84.00	Argus LLPX310R	3	28.60	0.00	1.00	85.41	0.000	1.00	0.00	-2.00
19	84.00	Andrew FPA5250D06-N	1	14.00	0.00	1.00	25.45	0.581	1.00	0.00	-2.00
20	84.00	Redconnex AN-80i BTSs	3	4.50	0.00	1.00	14.86	0.000	1.00	0.00	0.00
		Totals:	**48**	**1,944.40**			**6,801.65**				

Linear Appurtenances

Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Exposed Width**	**Exposed**
3.00	114.00	(6) 1 5/8" Coax	0.00	Inside
3.00	107.00	(12) 1 5/8" Coax	0.00	Inside
3.00	97.00	(1) 1.60" Hybrid	0.00	Inside
3.00	87.00	(2) 1/2" Coax	0.00	Inside
3.00	87.00	(3) 1/4" Fiber	0.00	Inside
3.00	87.00	(3) 3/8" RET Line	0.00	Inside
3.00	87.00	(3) 5/8" DC	0.00	Inside
3.00	87.00	(12) 7/8" Coax	0.00	Inside
3.00	84.00	(2) 1/2" Coax	0.00	Inside
3.00	84.00	(3) 1/4" Coax	0.00	Inside
3.00	84.00	(3) 5/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3125	41.350	40.703	8660.4	21.92	132.32	75.6	412.5	0.0
5.00		0.3125	40.600	39.959	8194.2	21.50	129.92	76.1	397.5	686.2
10.00		0.3125	39.850	39.215	7745.0	21.07	127.52	76.6	382.8	673.5
15.00		0.3125	39.100	38.471	7312.6	20.65	125.12	77.1	368.4	660.9
20.00		0.3125	38.350	37.727	6896.5	20.23	122.72	77.6	354.2	648.2
25.00		0.3125	37.600	36.983	6496.6	19.81	120.32	78.1	340.3	635.6
30.00		0.3125	36.850	36.239	6112.4	19.38	117.92	78.6	326.7	622.9
35.00		0.3125	36.100	35.495	5743.7	18.96	115.52	79.1	313.4	610.2
40.00		0.3125	35.350	34.752	5390.1	18.54	113.12	79.6	300.3	597.6
40.50	Bot - Section 2	0.3125	35.275	34.677	5355.5	18.49	112.88	79.6	299.0	59.1
45.00	Top - Section 1	0.2500	35.100	27.652	4243.2	23.35	140.40	0.0	0.0	953.4
50.00		0.2500	34.350	27.057	3975.1	22.82	137.40	74.6	227.9	465.4
55.00		0.2500	33.600	26.462	3718.5	22.29	134.40	75.2	218.0	455.3
60.00		0.2500	32.850	25.867	3473.3	21.76	131.40	75.8	208.2	445.2
65.00		0.2500	32.100	25.272	3239.0	21.23	128.40	76.4	198.7	435.0
70.00		0.2500	31.350	24.677	3015.5	20.70	125.40	77.1	189.5	424.9
75.00		0.2500	30.600	24.082	2802.6	20.17	122.40	77.7	180.4	414.8
79.00	Top - Section 2	0.2500	30.000	23.606	2639.6	19.75	120.00	78.2	173.3	324.5
79.00	Bot - Section 3	1.0000	8.000	21.991	134.8	4.94	30.00	47.0	33.7	
80.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	74.8
84.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	299.3
85.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	74.8
87.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
89.00	Top - Section 3	1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
89.00	Bot - Section 4	1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	
90.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	74.8
94.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	299.3
95.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	74.8
97.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
99.00	Top - Section 4	1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
99.00	Bot - Section 5	0.6250	5.000	8.590	20.6	0.00	12.80	70.0	8.2	
100.00		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	29.2
103.00		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	87.7
103.50		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	14.6
104.00		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	14.6
105.00		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	29.2
108.00		0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	87.7
109.00	Top - Section 5	0.6250	5.000	8.590	20.6	0.00	8.00	70.0	8.2	29.2
109.00	Bot - Section 6	1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	
110.00		1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	42.8
113.00		1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	128.3
114.00		1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	42.8
115.00		1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	42.8
119.00		1.0000	5.000	12.566	25.2	0.00	5.00	70.0	10.1	171.0
										11329.2

Wind Loading - Shaft

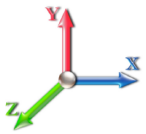
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 125 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	27.633	30.40	363.52	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	27.633	30.40	356.93	0.730	0.000	5.00	17.336	12.66	384.7	0.0	823.4
10.00		1.00	0.70	27.633	30.40	350.34	0.730	0.000	5.00	17.019	12.42	377.6	0.0	808.2
15.00		1.00	0.70	27.633	30.40	343.74	0.730	0.000	5.00	16.702	12.19	370.6	0.0	793.0
20.00		1.00	0.70	27.633	30.40	337.15	0.730	0.000	5.00	16.384	11.96	363.6	0.0	777.9
25.00		1.00	0.70	27.633	30.40	330.56	0.730	0.000	5.00	16.067	11.73	356.5	0.0	762.7
30.00		1.00	0.70	27.656	30.42	324.10	0.730	0.000	5.00	15.750	11.50	349.8	0.0	747.5
35.00		1.00	0.73	28.901	31.79	324.57	0.730	0.000	5.00	15.432	11.27	358.1	0.0	732.3
40.00		1.00	0.76	30.025	33.03	323.95	0.730	0.000	5.00	15.115	11.03	364.4	0.0	717.1
40.50	Bot - Section 2	1.00	0.76	30.132	33.14	323.84	0.730	0.000	0.50	1.494	1.09	36.1	0.0	70.9
45.00	Top - Section 1	1.00	0.79	31.053	34.16	322.46	0.730	0.000	4.50	13.494	9.85	336.5	0.0	1144.1
50.00		1.00	0.81	32.002	35.20	324.98	0.730	0.000	5.00	14.692	10.73	377.5	0.0	558.5
55.00		1.00	0.83	32.885	36.17	322.24	0.730	0.000	5.00	14.375	10.49	379.6	0.0	546.3
60.00		1.00	0.85	33.713	37.08	318.99	0.730	0.000	5.00	14.057	10.26	380.6	0.0	534.2
65.00		1.00	0.87	34.493	37.94	315.29	0.730	0.000	5.00	13.740	10.03	380.6	0.0	522.0
70.00		1.00	0.89	35.231	38.75	311.20	0.730	0.000	5.00	13.423	9.80	379.7	0.0	509.9
75.00		1.00	0.91	35.932	39.53	306.77	0.730	0.000	5.00	13.105	9.57	378.1	0.0	497.7
79.00	Top - Section 2	1.00	0.92	36.470	40.12	302.99	0.730	0.000	4.00	10.256	7.49	300.3	0.0	389.4
80.00		1.00	0.93	36.601	40.26	358.71	0.600	0.000	1.00	3.000	1.80	72.5	0.0	101.3
84.00	Appurtenance(s)	1.00	0.94	37.115	40.83	361.22	0.600	0.000	4.00	12.000	7.20	293.9	0.0	405.3
85.00		1.00	0.94	37.240	40.96	361.83	0.600	0.000	1.00	3.000	1.80	73.7	0.0	101.3
87.00	Appurtenance(s)	1.00	0.95	37.489	41.24	363.04	0.600	0.000	2.00	6.000	3.60	148.5	0.0	202.6
89.00	Top - Section 3	1.00	0.96	37.733	41.51	364.22	0.600	0.000	2.00	6.000	3.60	149.4	0.0	202.6
90.00		1.00	0.96	37.854	41.64	364.80	0.600	0.000	1.00	3.000	1.80	75.0	0.0	101.3
94.00	Appurtenance(s)	1.00	0.97	38.327	42.16	367.07	0.600	0.000	4.00	12.000	7.20	303.5	0.0	405.3
95.00		1.00	0.97	38.443	42.29	367.63	0.600	0.000	1.00	3.000	1.80	76.1	0.0	101.3
97.00	Appurtenance(s)	1.00	0.98	38.672	42.54	368.72	0.600	0.000	2.00	6.000	3.60	153.1	0.0	202.6
99.00	Top - Section 4	1.00	0.99	38.899	42.79	369.80	0.600	0.000	2.00	6.000	3.60	154.0	0.0	202.6
100.00		1.00	0.99	39.010	42.91	370.33	0.600	0.000	1.00	3.000	1.80	77.2	0.0	46.6
103.00	Appurtenance(s)	1.00	1.00	39.341	43.28	371.90	0.600	0.000	3.00	9.000	5.40	233.7	0.0	139.8
103.50	Appurtenance(s)	1.00	1.00	39.396	43.34	372.16	0.600	0.000	0.50	1.500	0.90	39.0	0.0	23.3
104.00	Appurtenance(s)	1.00	1.00	39.450	43.40	372.41	0.600	0.000	0.50	1.500	0.90	39.1	0.0	23.3
105.00		1.00	1.00	39.558	43.51	372.92	0.600	0.000	1.00	3.000	1.80	78.3	0.0	46.6
108.00	Appurtenance(s)	1.00	1.01	39.878	43.87	374.43	0.600	0.000	3.00	9.000	5.40	236.9	0.0	139.8
109.00	Top - Section 5	1.00	1.01	39.983	43.98	374.92	0.600	0.000	1.00	3.000	1.80	79.2	0.0	46.6
110.00		1.00	1.02	40.087	44.10	375.41	0.600	0.000	1.00	3.000	1.80	79.4	0.0	62.8
113.00	Appurtenance(s)	1.00	1.02	40.397	44.44	376.86	0.600	0.000	3.00	9.000	5.40	240.0	0.0	188.5
114.00	Appurtenance(s)	1.00	1.03	40.499	44.55	377.33	0.600	0.000	1.00	3.000	1.80	80.2	0.0	62.8
115.00		1.00	1.03	40.600	44.66	377.80	0.600	0.000	1.00	3.000	1.80	80.4	0.0	62.8
119.00		1.00	1.04	40.998	45.10	379.65	0.600	0.000	4.00	12.000	7.20	324.7	0.0	251.3
								Totals:	**119.00**			**8,962.2**		**14,055.9**

Discrete Appurtenance Forces

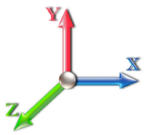
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 125 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	114.00	RFS Twin PCS TMAs	3	40.499	44.548	0.00	1.00	0.00	39.60	0.000	0.000	0.00	0.00	0.00
2	114.00	V18-209014	3	40.499	44.548	0.00	1.00	0.00	67.32	0.000	0.000	0.00	0.00	0.00
3	114.00	27" Canister at 114.0'	1	40.499	44.548	1.00	1.00	0.00	180.00	0.000	0.000	0.00	0.00	0.00
4	114.00	RFS Twin AWS TMAs	3	40.499	44.548	0.00	1.00	0.00	63.36	0.000	0.000	0.00	0.00	0.00
5	113.00	Flag (12'x18')	1	40.397	44.436	1.00	1.00	7.92	120.00	0.000	0.000	351.94	0.00	0.00
6	108.00	APXVBLL09B43-C-I20	3	39.772	43.749	0.00	1.00	0.00	128.52	0.000	-1.000	0.00	0.00	0.00
7	104.00	28" Canister at 104.0'	1	39.450	43.395	1.00	1.00	0.00	180.00	0.000	0.000	0.00	0.00	0.00
8	103.50	MT6407-77A	3	39.287	43.215	0.00	1.00	0.00	285.84	0.000	-1.000	0.00	0.00	0.00
9	103.00	Commscope	3	39.341	43.275	0.00	1.00	0.00	63.36	0.000	0.000	0.00	0.00	0.00
10	97.00	Raycap	1	38.672	42.540	0.00	1.00	0.00	26.28	0.000	0.000	0.00	0.00	0.00
11	97.00	FFVV-65B-R3	3	38.443	42.287	0.00	1.00	0.00	452.52	0.000	-2.000	0.00	0.00	0.00
12	94.00	29" Canister at 94.0'	1	38.327	42.160	1.00	1.00	0.00	180.00	0.000	0.000	0.00	0.00	0.00
13	87.00	Redconnex AN-80i	3	37.489	41.238	1.00	1.00	0.00	16.20	0.000	0.000	0.00	0.00	0.00
14	87.00	RFS	6	37.489	41.238	1.00	1.00	0.00	46.08	0.000	0.000	0.00	0.00	0.00
15	87.00	Andrew FPA5250D06-N	2	37.489	41.238	1.00	1.00	0.00	4.80	0.000	0.000	0.00	0.00	0.00
16	87.00	Commscope	3	37.240	40.964	1.00	1.00	0.00	163.44	0.000	-2.000	0.00	0.00	0.00
17	84.00	Redconnex AN-80i BTSs	3	37.115	40.826	1.00	1.00	0.00	16.20	0.000	0.000	0.00	0.00	0.00
18	84.00	Andrew FPA5250D06-N	1	36.860	40.546	1.00	1.00	0.00	16.80	0.000	-2.000	0.00	0.00	0.00
19	84.00	Argus LLPX310R	3	36.860	40.546	1.00	1.00	0.00	102.96	0.000	-2.000	0.00	0.00	0.00
20	84.00	30" Canister at 84.0'	1	37.115	40.826	1.00	1.00	0.00	180.00	0.000	0.000	0.00	0.00	0.00
							Totals:		**2,333.28**			**351.94**		

Total Applied Force Summary

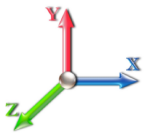
Structure:	CT13616-A-SBA		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 125 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		384.67	888.60	0.00	0.00
10.00		377.63	971.19	0.00	0.00
15.00		370.59	956.00	0.00	0.00
20.00		363.55	940.82	0.00	0.00
25.00		356.51	925.63	0.00	0.00
30.00		349.76	910.44	0.00	0.00
35.00		358.15	895.25	0.00	0.00
40.00		364.43	880.06	0.00	0.00
40.50		36.15	87.17	0.00	0.00
45.00		336.48	1290.74	0.00	0.00
50.00		377.54	721.46	0.00	0.00
55.00		379.59	709.31	0.00	0.00
60.00		380.55	697.16	0.00	0.00
65.00		380.57	685.01	0.00	0.00
70.00		379.73	672.86	0.00	0.00
75.00		378.14	660.71	0.00	0.00
79.00		300.34	519.82	0.00	0.00
80.00		72.47	133.91	0.00	0.00
84.00	(8) attachments	293.95	851.60	0.00	0.00
85.00		73.74	132.82	0.00	0.00
87.00	(14) attachments	148.46	496.17	0.00	0.00
89.00		149.42	247.92	0.00	0.00
90.00		74.95	123.96	0.00	0.00
94.00	(1) attachments	303.55	675.84	0.00	0.00
95.00		76.12	123.96	0.00	0.00
97.00	(4) attachments	153.14	726.72	0.00	0.00
99.00		154.04	247.56	0.00	0.00
100.00		77.24	69.06	0.00	0.00
103.00	(3) attachments	233.69	270.54	0.00	0.00
103.50	(3) attachments	39.00	320.37	0.00	0.00
104.00	(1) attachments	39.06	214.53	0.00	0.00
105.00		78.32	69.06	0.00	0.00
108.00	(3) attachments	236.87	320.73	0.00	0.00
109.00		79.17	54.09	0.00	0.00
110.00		79.37	70.32	0.00	0.00
113.00	(1) attachments	591.89	330.96	0.00	0.00
114.00	(10) attachments	80.19	420.60	0.00	0.00
115.00		80.39	62.83	0.00	0.00
119.00		324.71	251.33	0.00	0.00
	Totals:	**9,314.11**	**19,627.11**	**0.00**	**0.00**

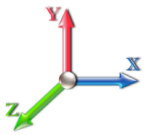
Calculated Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Load Case: 1.2D + 1.0W 125 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-19.62	-9.33	0.00	-613.28	0.00	613.28	2770.05	714.33	2432.17	2339.53	0.00	0.000	0.000	0.269
5.00	-18.72	-8.98	0.00	-566.63	0.00	566.63	2737.33	701.28	2344.09	2269.31	0.05	-0.097	0.000	0.257
10.00	-17.73	-8.63	0.00	-521.74	0.00	521.74	2703.94	688.22	2257.62	2199.58	0.20	-0.191	0.000	0.244
15.00	-16.76	-8.28	0.00	-478.62	0.00	478.62	2669.88	675.17	2172.78	2130.35	0.46	-0.283	0.000	0.231
20.00	-15.81	-7.93	0.00	-437.23	0.00	437.23	2635.15	662.11	2089.57	2061.66	0.80	-0.372	0.000	0.218
25.00	-14.88	-7.59	0.00	-397.57	0.00	397.57	2599.76	649.06	2007.98	1993.54	1.24	-0.458	0.000	0.205
30.00	-13.96	-7.25	0.00	-359.61	0.00	359.61	2563.70	636.00	1928.02	1926.02	1.76	-0.541	0.000	0.192
35.00	-13.06	-6.90	0.00	-323.34	0.00	323.34	2526.98	622.95	1849.68	1859.13	2.37	-0.621	0.000	0.179
40.00	-12.18	-6.54	0.00	-288.83	0.00	288.83	2489.59	609.89	1772.96	1792.91	3.06	-0.697	0.000	0.166
40.50	-12.09	-6.51	0.00	-285.56	0.00	285.56	2485.81	608.58	1765.38	1786.32	3.14	-0.704	0.000	0.165
45.00	-10.80	-6.17	0.00	-256.27	0.00	256.27	1840.21	485.30	1403.23	1320.44	3.83	-0.769	0.000	0.200
50.00	-10.07	-5.79	0.00	-225.43	0.00	225.43	1815.76	474.86	1343.48	1274.66	4.67	-0.837	0.000	0.183
55.00	-9.36	-5.41	0.00	-196.46	0.00	196.46	1790.64	464.41	1285.03	1229.18	5.59	-0.912	0.000	0.165
60.00	-8.67	-5.03	0.00	-169.39	0.00	169.39	1764.86	453.97	1227.89	1184.03	6.58	-0.982	0.000	0.148
65.00	-7.98	-4.65	0.00	-144.23	0.00	144.23	1738.40	443.52	1172.04	1139.25	7.65	-1.046	0.000	0.131
70.00	-7.31	-4.26	0.00	-120.98	0.00	120.98	1711.29	433.08	1117.49	1094.86	8.78	-1.105	0.000	0.115
75.00	-6.66	-3.88	0.00	-99.67	0.00	99.67	1683.50	422.64	1064.24	1050.90	9.96	-1.157	0.000	0.099
79.00	-6.14	-3.57	0.00	-84.16	0.00	84.16	1660.79	414.28	1022.58	1016.07	10.95	-1.194	0.000	0.087
79.00	-6.14	-3.57	0.00	-84.16	0.00	84.16	930.23	279.07	18866.3	173.90	10.95	-1.194	0.000	0.491
80.00	-5.99	-3.53	0.00	-80.59	0.00	80.59	930.23	279.07	18866.3	173.90	11.20	-1.203	0.000	0.470
84.00	-5.12	-3.24	0.00	-66.48	0.00	66.48	930.23	279.07	18866.3	173.90	12.48	-1.824	0.000	0.388
85.00	-4.98	-3.18	0.00	-63.24	0.00	63.24	930.23	279.07	18866.3	173.90	12.87	-1.961	0.000	0.369
87.00	-4.48	-3.04	0.00	-56.87	0.00	56.87	930.23	279.07	18866.3	173.90	13.75	-2.214	0.000	0.332
89.00	-4.23	-2.89	0.00	-50.80	0.00	50.80	930.23	279.07	18866.3	173.90	14.72	-2.441	0.000	0.297
89.00	-4.23	-2.89	0.00	-50.80	0.00	50.80	930.23	279.07	18866.3	173.90	14.72	-2.441	0.000	0.297
90.00	-4.10	-2.83	0.00	-47.91	0.00	47.91	930.23	279.07	18866.3	173.90	15.25	-2.546	0.000	0.280
94.00	-3.43	-2.50	0.00	-36.61	0.00	36.61	930.23	279.07	18866.3	173.90	17.53	-2.902	0.000	0.214
95.00	-3.30	-2.43	0.00	-34.11	0.00	34.11	930.23	279.07	18866.3	173.90	18.15	-2.977	0.000	0.200
97.00	-2.58	-2.24	0.00	-29.25	0.00	29.25	930.23	279.07	18866.3	173.90	19.42	-3.111	0.000	0.171
99.00	-2.34	-2.08	0.00	-24.77	0.00	24.77	930.23	279.07	18866.3	173.90	20.75	-3.225	0.000	0.145
99.00	-2.34	-2.08	0.00	-24.77	0.00	24.77	541.19	162.36	3641.39	63.23	20.75	-3.225	0.000	0.396
100.00	-2.26	-2.01	0.00	-22.70	0.00	22.70	541.19	162.36	3641.39	63.23	21.43	-3.275	0.000	0.363
103.00	-1.99	-1.78	0.00	-16.66	0.00	16.66	541.19	162.36	3641.39	63.23	23.76	-4.091	0.000	0.267
103.50	-1.67	-1.72	0.00	-15.77	0.00	15.77	541.19	162.36	3641.39	63.23	24.19	-4.204	0.000	0.253
104.00	-1.46	-1.67	0.00	-14.91	0.00	14.91	541.19	162.36	3641.39	63.23	24.64	-4.310	0.000	0.239
105.00	-1.38	-1.59	0.00	-13.25	0.00	13.25	541.19	162.36	3641.39	63.23	25.56	-4.504	0.000	0.212
108.00	-1.08	-1.33	0.00	-8.47	0.00	8.47	541.19	162.36	3641.39	63.23	28.54	-4.955	0.000	0.136
109.00	-1.03	-1.25	0.00	-7.13	0.00	7.13	541.19	162.36	3641.39	63.23	29.59	-5.063	0.000	0.115
109.00	-1.03	-1.25	0.00	-7.13	0.00	7.13	791.68	237.50	8195.40	85.75	29.59	-5.063	0.000	0.085
110.00	-0.96	-1.17	0.00	-5.88	0.00	5.88	791.68	237.50	8195.40	85.75	30.66	-5.153	0.000	0.070
113.00	-0.69	-0.55	0.00	-2.37	0.00	2.37	791.68	237.50	8195.40	85.75	33.94	-5.293	0.000	0.029
114.00	-0.28	-0.43	0.00	-1.82	0.00	1.82	791.68	237.50	8195.40	85.75	35.05	-5.316	0.000	0.022
115.00	-0.22	-0.35	0.00	-1.39	0.00	1.39	791.68	237.50	8195.40	85.75	36.16	-5.335	0.000	0.016
119.00	0.00	-0.32	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75	40.64	-5.366	0.000	0.000

Wind Loading - Shaft

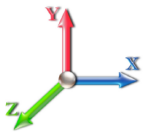
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 125 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	27.633	30.40	363.52	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	27.633	30.40	356.93	0.730	0.000	5.00	17.336	12.66	384.7	0.0	617.6
10.00		1.00	0.70	27.633	30.40	350.34	0.730	0.000	5.00	17.019	12.42	377.6	0.0	606.2
15.00		1.00	0.70	27.633	30.40	343.74	0.730	0.000	5.00	16.702	12.19	370.6	0.0	594.8
20.00		1.00	0.70	27.633	30.40	337.15	0.730	0.000	5.00	16.384	11.96	363.6	0.0	583.4
25.00		1.00	0.70	27.633	30.40	330.56	0.730	0.000	5.00	16.067	11.73	356.5	0.0	572.0
30.00		1.00	0.70	27.656	30.42	324.10	0.730	0.000	5.00	15.750	11.50	349.8	0.0	560.6
35.00		1.00	0.73	28.901	31.79	324.57	0.730	0.000	5.00	15.432	11.27	358.1	0.0	549.2
40.00		1.00	0.76	30.025	33.03	323.95	0.730	0.000	5.00	15.115	11.03	364.4	0.0	537.8
40.50	Bot - Section 2	1.00	0.76	30.132	33.14	323.84	0.730	0.000	0.50	1.494	1.09	36.1	0.0	53.2
45.00	Top - Section 1	1.00	0.79	31.053	34.16	322.46	0.730	0.000	4.50	13.494	9.85	336.5	0.0	858.1
50.00		1.00	0.81	32.002	35.20	324.98	0.730	0.000	5.00	14.692	10.73	377.5	0.0	418.9
55.00		1.00	0.83	32.885	36.17	322.24	0.730	0.000	5.00	14.375	10.49	379.6	0.0	409.8
60.00		1.00	0.85	33.713	37.08	318.99	0.730	0.000	5.00	14.057	10.26	380.6	0.0	400.6
65.00		1.00	0.87	34.493	37.94	315.29	0.730	0.000	5.00	13.740	10.03	380.6	0.0	391.5
70.00		1.00	0.89	35.231	38.75	311.20	0.730	0.000	5.00	13.423	9.80	379.7	0.0	382.4
75.00		1.00	0.91	35.932	39.53	306.77	0.730	0.000	5.00	13.105	9.57	378.1	0.0	373.3
79.00	Top - Section 2	1.00	0.92	36.470	40.12	302.99	0.730	0.000	4.00	10.256	7.49	300.3	0.0	292.1
80.00		1.00	0.93	36.601	40.26	358.71	0.600	0.000	1.00	3.000	1.80	72.5	0.0	76.0
84.00	Appurtenance(s)	1.00	0.94	37.115	40.83	361.22	0.600	0.000	4.00	12.000	7.20	293.9	0.0	304.0
85.00		1.00	0.94	37.240	40.96	361.83	0.600	0.000	1.00	3.000	1.80	73.7	0.0	76.0
87.00	Appurtenance(s)	1.00	0.95	37.489	41.24	363.04	0.600	0.000	2.00	6.000	3.60	148.5	0.0	152.0
89.00	Top - Section 3	1.00	0.96	37.733	41.51	364.22	0.600	0.000	2.00	6.000	3.60	149.4	0.0	152.0
90.00		1.00	0.96	37.854	41.64	364.80	0.600	0.000	1.00	3.000	1.80	75.0	0.0	76.0
94.00	Appurtenance(s)	1.00	0.97	38.327	42.16	367.07	0.600	0.000	4.00	12.000	7.20	303.5	0.0	304.0
95.00		1.00	0.97	38.443	42.29	367.63	0.600	0.000	1.00	3.000	1.80	76.1	0.0	76.0
97.00	Appurtenance(s)	1.00	0.98	38.672	42.54	368.72	0.600	0.000	2.00	6.000	3.60	153.1	0.0	152.0
99.00	Top - Section 4	1.00	0.99	38.899	42.79	369.80	0.600	0.000	2.00	6.000	3.60	154.0	0.0	152.0
100.00		1.00	0.99	39.010	42.91	370.33	0.600	0.000	1.00	3.000	1.80	77.2	0.0	34.9
103.00	Appurtenance(s)	1.00	1.00	39.341	43.28	371.90	0.600	0.000	3.00	9.000	5.40	233.7	0.0	104.8
103.50	Appurtenance(s)	1.00	1.00	39.396	43.34	372.16	0.600	0.000	0.50	1.500	0.90	39.0	0.0	17.5
104.00	Appurtenance(s)	1.00	1.00	39.450	43.40	372.41	0.600	0.000	0.50	1.500	0.90	39.1	0.0	17.5
105.00		1.00	1.00	39.558	43.51	372.92	0.600	0.000	1.00	3.000	1.80	78.3	0.0	34.9
108.00	Appurtenance(s)	1.00	1.01	39.878	43.87	374.43	0.600	0.000	3.00	9.000	5.40	236.9	0.0	104.8
109.00	Top - Section 5	1.00	1.01	39.983	43.98	374.92	0.600	0.000	1.00	3.000	1.80	79.2	0.0	34.9
110.00		1.00	1.02	40.087	44.10	375.41	0.600	0.000	1.00	3.000	1.80	79.4	0.0	47.1
113.00	Appurtenance(s)	1.00	1.02	40.397	44.44	376.86	0.600	0.000	3.00	9.000	5.40	240.0	0.0	141.4
114.00	Appurtenance(s)	1.00	1.03	40.499	44.55	377.33	0.600	0.000	1.00	3.000	1.80	80.2	0.0	47.1
115.00		1.00	1.03	40.600	44.66	377.80	0.600	0.000	1.00	3.000	1.80	80.4	0.0	47.1
119.00		1.00	1.04	40.998	45.10	379.65	0.600	0.000	4.00	12.000	7.20	324.7	0.0	188.5
								Totals:	**119.00**			**8,962.2**		**10,541.9**

Discrete Appurtenance Forces

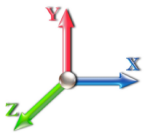
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 125 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	114.00	RFS Twin PCS TMAs	3	40.499	44.548	0.00	1.00	0.00	29.70	0.000	0.000	0.00	0.00	0.00
2	114.00	V18-209014	3	40.499	44.548	0.00	1.00	0.00	50.49	0.000	0.000	0.00	0.00	0.00
3	114.00	27" Canister at 114.0'	1	40.499	44.548	1.00	1.00	0.00	135.00	0.000	0.000	0.00	0.00	0.00
4	114.00	RFS Twin AWS TMAs	3	40.499	44.548	0.00	1.00	0.00	47.52	0.000	0.000	0.00	0.00	0.00
5	113.00	Flag (12'x18')	1	40.397	44.436	1.00	1.00	7.92	90.00	0.000	0.000	351.94	0.00	0.00
6	108.00	APXVBLL09B43-C-I20	3	39.772	43.749	0.00	1.00	0.00	96.39	0.000	-1.000	0.00	0.00	0.00
7	104.00	28" Canister at 104.0'	1	39.450	43.395	1.00	1.00	0.00	135.00	0.000	0.000	0.00	0.00	0.00
8	103.50	MT6407-77A	3	39.287	43.215	0.00	1.00	0.00	214.38	0.000	-1.000	0.00	0.00	0.00
9	103.00	Commscope	3	39.341	43.275	0.00	1.00	0.00	47.52	0.000	0.000	0.00	0.00	0.00
10	97.00	Raycap	1	38.672	42.540	0.00	1.00	0.00	19.71	0.000	0.000	0.00	0.00	0.00
11	97.00	FFVV-65B-R3	3	38.443	42.287	0.00	1.00	0.00	339.39	0.000	-2.000	0.00	0.00	0.00
12	94.00	29" Canister at 94.0'	1	38.327	42.160	1.00	1.00	0.00	135.00	0.000	0.000	0.00	0.00	0.00
13	87.00	Redconnex AN-80i	3	37.489	41.238	1.00	1.00	0.00	12.15	0.000	0.000	0.00	0.00	0.00
14	87.00	RFS	6	37.489	41.238	1.00	1.00	0.00	34.56	0.000	0.000	0.00	0.00	0.00
15	87.00	Andrew FPA5250D06-N	2	37.489	41.238	1.00	1.00	0.00	3.60	0.000	0.000	0.00	0.00	0.00
16	87.00	Commscope	3	37.240	40.964	1.00	1.00	0.00	122.58	0.000	-2.000	0.00	0.00	0.00
17	84.00	Redconnex AN-80i BTSs	3	37.115	40.826	1.00	1.00	0.00	12.15	0.000	0.000	0.00	0.00	0.00
18	84.00	Andrew FPA5250D06-N	1	36.860	40.546	1.00	1.00	0.00	12.60	0.000	-2.000	0.00	0.00	0.00
19	84.00	Argus LLPX310R	3	36.860	40.546	1.00	1.00	0.00	77.22	0.000	-2.000	0.00	0.00	0.00
20	84.00	30" Canister at 84.0'	1	37.115	40.826	1.00	1.00	0.00	135.00	0.000	0.000	0.00	0.00	0.00
							Totals:		**1,749.96**			**351.94**		

Total Applied Force Summary

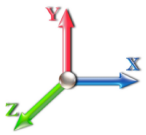
Structure:	CT13616-A-SBA		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 125 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		384.67	666.45	0.00	0.00
10.00		377.63	728.39	0.00	0.00
15.00		370.59	717.00	0.00	0.00
20.00		363.55	705.61	0.00	0.00
25.00		356.51	694.22	0.00	0.00
30.00		349.76	682.83	0.00	0.00
35.00		358.15	671.44	0.00	0.00
40.00		364.43	660.05	0.00	0.00
40.50		36.15	65.38	0.00	0.00
45.00		336.48	968.06	0.00	0.00
50.00		377.54	541.09	0.00	0.00
55.00		379.59	531.98	0.00	0.00
60.00		380.55	522.87	0.00	0.00
65.00		380.57	513.75	0.00	0.00
70.00		379.73	504.64	0.00	0.00
75.00		378.14	495.53	0.00	0.00
79.00		300.34	389.86	0.00	0.00
80.00		72.47	100.43	0.00	0.00
84.00	(8) attachments	293.95	638.70	0.00	0.00
85.00		73.74	99.62	0.00	0.00
87.00	(14) attachments	148.46	372.12	0.00	0.00
89.00		149.42	185.94	0.00	0.00
90.00		74.95	92.97	0.00	0.00
94.00	(1) attachments	303.55	506.88	0.00	0.00
95.00		76.12	92.97	0.00	0.00
97.00	(4) attachments	153.14	545.04	0.00	0.00
99.00		154.04	185.67	0.00	0.00
100.00		77.24	51.80	0.00	0.00
103.00	(3) attachments	233.69	202.91	0.00	0.00
103.50	(3) attachments	39.00	240.28	0.00	0.00
104.00	(1) attachments	39.06	160.90	0.00	0.00
105.00		78.32	51.80	0.00	0.00
108.00	(3) attachments	236.87	240.55	0.00	0.00
109.00		79.17	40.56	0.00	0.00
110.00		79.37	52.74	0.00	0.00
113.00	(1) attachments	591.89	248.22	0.00	0.00
114.00	(10) attachments	80.19	315.45	0.00	0.00
115.00		80.39	47.12	0.00	0.00
119.00		324.71	188.50	0.00	0.00
	Totals:	**9,314.11**	**14,720.33**	**0.00**	**0.00**

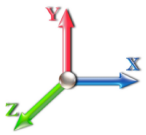
Calculated Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Load Case: 0.9D + 1.0W 125 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-14.71	-9.33	0.00	-609.35	0.00	609.35	2770.05	714.33	2432.17	2339.53	0.00	0.000	0.000	0.266
5.00	-14.03	-8.96	0.00	-562.72	0.00	562.72	2737.33	701.28	2344.09	2269.31	0.05	-0.096	0.000	0.253
10.00	-13.29	-8.61	0.00	-517.90	0.00	517.90	2703.94	688.22	2257.62	2199.58	0.20	-0.190	0.000	0.241
15.00	-12.56	-8.25	0.00	-474.86	0.00	474.86	2669.88	675.17	2172.78	2130.35	0.45	-0.281	0.000	0.228
20.00	-11.85	-7.90	0.00	-433.60	0.00	433.60	2635.15	662.11	2089.57	2061.66	0.79	-0.370	0.000	0.215
25.00	-11.14	-7.56	0.00	-394.08	0.00	394.08	2599.76	649.06	2007.98	1993.54	1.23	-0.455	0.000	0.202
30.00	-10.45	-7.22	0.00	-356.29	0.00	356.29	2563.70	636.00	1928.02	1926.02	1.75	-0.537	0.000	0.189
35.00	-9.78	-6.87	0.00	-320.21	0.00	320.21	2526.98	622.95	1849.68	1859.13	2.35	-0.616	0.000	0.176
40.00	-9.12	-6.50	0.00	-285.88	0.00	285.88	2489.59	609.89	1772.96	1792.91	3.04	-0.691	0.000	0.163
40.50	-9.05	-6.47	0.00	-282.63	0.00	282.63	2485.81	608.58	1765.38	1786.32	3.11	-0.698	0.000	0.162
45.00	-8.08	-6.13	0.00	-253.53	0.00	253.53	1840.21	485.30	1403.23	1320.44	3.80	-0.762	0.000	0.197
50.00	-7.53	-5.75	0.00	-222.88	0.00	222.88	1815.76	474.86	1343.48	1274.66	4.64	-0.830	0.000	0.179
55.00	-7.00	-5.37	0.00	-194.12	0.00	194.12	1790.64	464.41	1285.03	1229.18	5.55	-0.904	0.000	0.162
60.00	-6.48	-4.99	0.00	-167.24	0.00	167.24	1764.86	453.97	1227.89	1184.03	6.53	-0.973	0.000	0.145
65.00	-5.97	-4.61	0.00	-142.28	0.00	142.28	1738.40	443.52	1172.04	1139.25	7.59	-1.037	0.000	0.128
70.00	-5.46	-4.23	0.00	-119.23	0.00	119.23	1711.29	433.08	1117.49	1094.86	8.70	-1.094	0.000	0.112
75.00	-4.97	-3.84	0.00	-98.10	0.00	98.10	1683.50	422.64	1064.24	1050.90	9.88	-1.145	0.000	0.096
79.00	-4.59	-3.54	0.00	-82.74	0.00	82.74	1660.79	414.28	1022.58	1016.07	10.85	-1.182	0.000	0.084
79.00	-4.59	-3.54	0.00	-82.74	0.00	82.74	930.23	279.07	18866.3	173.90	10.85	-1.182	0.000	0.481
80.00	-4.47	-3.49	0.00	-79.20	0.00	79.20	930.23	279.07	18866.3	173.90	11.10	-1.191	0.000	0.460
84.00	-3.82	-3.20	0.00	-65.26	0.00	65.26	930.23	279.07	18866.3	173.90	12.36	-1.801	0.000	0.379
85.00	-3.71	-3.13	0.00	-62.06	0.00	62.06	930.23	279.07	18866.3	173.90	12.75	-1.935	0.000	0.361
87.00	-3.33	-2.99	0.00	-55.79	0.00	55.79	930.23	279.07	18866.3	173.90	13.62	-2.184	0.000	0.325
89.00	-3.15	-2.84	0.00	-49.81	0.00	49.81	930.23	279.07	18866.3	173.90	14.58	-2.407	0.000	0.290
89.00	-3.15	-2.84	0.00	-49.81	0.00	49.81	930.23	279.07	18866.3	173.90	14.58	-2.407	0.000	0.290
90.00	-3.04	-2.77	0.00	-46.97	0.00	46.97	930.23	279.07	18866.3	173.90	15.09	-2.509	0.000	0.273
94.00	-2.54	-2.45	0.00	-35.88	0.00	35.88	930.23	279.07	18866.3	173.90	17.35	-2.858	0.000	0.209
95.00	-2.45	-2.38	0.00	-33.43	0.00	33.43	930.23	279.07	18866.3	173.90	17.95	-2.932	0.000	0.195
97.00	-1.91	-2.20	0.00	-28.67	0.00	28.67	930.23	279.07	18866.3	173.90	19.21	-3.063	0.000	0.167
99.00	-1.73	-2.04	0.00	-24.27	0.00	24.27	930.23	279.07	18866.3	173.90	20.52	-3.174	0.000	0.141
99.00	-1.73	-2.04	0.00	-24.27	0.00	24.27	541.19	162.36	3641.39	63.23	20.52	-3.174	0.000	0.387
100.00	-1.67	-1.97	0.00	-22.23	0.00	22.23	541.19	162.36	3641.39	63.23	21.19	-3.223	0.000	0.355
103.00	-1.47	-1.74	0.00	-16.31	0.00	16.31	541.19	162.36	3641.39	63.23	23.48	-4.023	0.000	0.261
103.50	-1.23	-1.68	0.00	-15.45	0.00	15.45	541.19	162.36	3641.39	63.23	23.90	-4.133	0.000	0.247
104.00	-1.06	-1.64	0.00	-14.60	0.00	14.60	541.19	162.36	3641.39	63.23	24.34	-4.237	0.000	0.233
105.00	-1.01	-1.56	0.00	-12.97	0.00	12.97	541.19	162.36	3641.39	63.23	25.25	-4.428	0.000	0.207
108.00	-0.78	-1.31	0.00	-8.29	0.00	8.29	541.19	162.36	3641.39	63.23	28.17	-4.869	0.000	0.133
109.00	-0.75	-1.23	0.00	-6.98	0.00	6.98	541.19	162.36	3641.39	63.23	29.20	-4.974	0.000	0.112
109.00	-0.75	-1.23	0.00	-6.98	0.00	6.98	791.68	237.50	8195.40	85.75	29.20	-4.974	0.000	0.082
110.00	-0.70	-1.14	0.00	-5.75	0.00	5.75	791.68	237.50	8195.40	85.75	30.25	-5.062	0.000	0.068
113.00	-0.50	-0.53	0.00	-2.32	0.00	2.32	791.68	237.50	8195.40	85.75	33.48	-5.199	0.000	0.028
114.00	-0.20	-0.42	0.00	-1.79	0.00	1.79	791.68	237.50	8195.40	85.75	34.57	-5.222	0.000	0.021
115.00	-0.16	-0.34	0.00	-1.36	0.00	1.36	791.68	237.50	8195.40	85.75	35.66	-5.240	0.000	0.016
119.00	0.00	-0.32	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75	40.07	-5.271	0.000	0.000

Wind Loading - Shaft

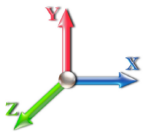
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	4.421	4.86	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	4.421	4.86	0.00	1.200	0.828	5.00	18.026	21.63	105.2	212.7	1036.1
10.00		1.00	0.70	4.421	4.86	0.00	1.200	0.887	5.00	17.759	21.31	103.6	224.2	1032.4
15.00		1.00	0.70	4.421	4.86	0.00	1.200	0.924	5.00	17.472	20.97	102.0	229.4	1022.4
20.00		1.00	0.70	4.421	4.86	0.00	1.200	0.951	5.00	17.177	20.61	100.2	231.8	1009.6
25.00		1.00	0.70	4.421	4.86	0.00	1.200	0.973	5.00	16.878	20.25	98.5	232.6	995.3
30.00		1.00	0.70	4.425	4.87	0.00	1.200	0.991	5.00	16.575	19.89	96.8	232.4	979.9
35.00		1.00	0.73	4.624	5.09	0.00	1.200	1.006	5.00	16.271	19.52	99.3	231.4	963.7
40.00		1.00	0.76	4.804	5.28	0.00	1.200	1.019	5.00	15.965	19.16	101.2	229.9	947.0
40.50	Bot - Section 2	1.00	0.76	4.821	5.30	0.00	1.200	1.021	0.50	1.579	1.89	10.0	23.0	93.8
45.00	Top - Section 1	1.00	0.79	4.968	5.47	0.00	1.200	1.032	4.50	14.268	17.12	93.6	208.0	1352.0
50.00		1.00	0.81	5.120	5.63	0.00	1.200	1.042	5.00	15.561	18.67	105.2	228.7	787.2
55.00		1.00	0.83	5.262	5.79	0.00	1.200	1.052	5.00	15.252	18.30	105.9	226.1	772.5
60.00		1.00	0.85	5.394	5.93	0.00	1.200	1.062	5.00	14.942	17.93	106.4	223.2	757.4
65.00		1.00	0.87	5.519	6.07	0.00	1.200	1.070	5.00	14.632	17.56	106.6	220.1	742.1
70.00		1.00	0.89	5.637	6.20	0.00	1.200	1.078	5.00	14.321	17.19	106.6	216.7	726.6
75.00		1.00	0.91	5.749	6.32	0.00	1.200	1.086	5.00	14.010	16.81	106.3	213.2	711.0
79.00	Top - Section 2	1.00	0.92	5.835	6.42	0.00	1.200	1.091	4.00	10.983	13.18	84.6	168.3	557.7
80.00		1.00	0.93	5.856	6.44	0.00	1.200	1.093	1.00	3.000	3.60	23.2	61.8	163.1
84.00	Appurtenance(s)	1.00	0.94	5.938	6.53	0.00	1.200	1.098	4.00	12.000	14.40	94.1	247.6	652.8
85.00		1.00	0.94	5.958	6.55	0.00	1.200	1.099	1.00	3.000	3.60	23.6	61.9	163.2
87.00	Appurtenance(s)	1.00	0.95	5.998	6.60	0.00	1.200	1.102	2.00	6.000	7.20	47.5	123.9	326.5
89.00	Top - Section 3	1.00	0.96	6.037	6.64	0.00	1.200	1.104	2.00	6.000	7.20	47.8	123.9	326.6
90.00		1.00	0.96	6.057	6.66	0.00	1.200	1.106	1.00	3.000	3.60	24.0	62.0	163.3
94.00	Appurtenance(s)	1.00	0.97	6.132	6.75	0.00	1.200	1.110	4.00	12.000	14.40	97.1	248.2	653.5
95.00		1.00	0.97	6.151	6.77	0.00	1.200	1.112	1.00	3.000	3.60	24.4	62.1	163.4
97.00	Appurtenance(s)	1.00	0.98	6.188	6.81	0.00	1.200	1.114	2.00	6.000	7.20	49.0	124.2	326.8
99.00	Top - Section 4	1.00	0.99	6.224	6.85	0.00	1.200	1.116	2.00	6.000	7.20	49.3	124.2	326.9
100.00		1.00	0.99	6.242	6.87	0.00	1.200	1.117	1.00	3.000	3.60	24.7	58.0	104.6
103.00	Appurtenance(s)	1.00	1.00	6.295	6.92	0.00	1.200	1.121	3.00	9.000	10.80	74.8	174.2	314.0
103.50	Appurtenance(s)	1.00	1.00	6.303	6.93	0.00	1.200	1.121	0.50	1.500	1.80	12.5	29.0	52.3
104.00	Appurtenance(s)	1.00	1.00	6.312	6.94	0.00	1.200	1.122	0.50	1.500	1.80	12.5	29.0	52.3
105.00		1.00	1.00	6.329	6.96	0.00	1.200	1.123	1.00	3.000	3.60	25.1	58.1	104.7
108.00	Appurtenance(s)	1.00	1.01	6.380	7.02	0.00	1.200	1.126	3.00	9.000	10.80	75.8	174.3	314.1
109.00	Top - Section 5	1.00	1.01	6.397	7.04	0.00	1.200	1.127	1.00	3.000	3.60	25.3	58.1	104.7
110.00		1.00	1.02	6.414	7.06	0.00	1.200	1.128	1.00	3.000	3.60	25.4	58.1	121.0
113.00	Appurtenance(s)	1.00	1.02	6.463	7.11	0.00	1.200	1.131	3.00	9.000	10.80	76.8	174.5	363.0
114.00	Appurtenance(s)	1.00	1.03	6.480	7.13	0.00	1.200	1.132	1.00	3.000	3.60	25.7	58.2	121.0
115.00		1.00	1.03	6.496	7.15	0.00	1.200	1.133	1.00	3.000	3.60	25.7	58.2	121.0
119.00		1.00	1.04	6.560	7.22	0.00	1.200	1.137	4.00	12.000	14.40	103.9	232.9	484.2
								Totals:	**119.00**			**2,620.2**		**20,010.1**

Discrete Appurtenance Forces

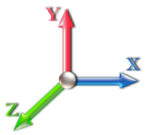
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	114.00	RFS Twin PCS TMAs	3	6.480	7.128	0.00	1.00	0.00	53.02	0.000	0.000	0.00	0.00	0.00
2	114.00	V18-209014	3	6.480	7.128	0.00	1.00	12.49	221.29	0.000	0.000	89.05	0.00	0.00
3	114.00	27" Canister at 114.0'	1	6.480	7.128	1.00	1.00	0.00	126.42	0.000	0.000	0.00	0.00	0.00
4	114.00	RFS Twin AWS TMAs	3	6.480	7.128	0.00	1.00	0.00	85.18	0.000	0.000	0.00	0.00	0.00
5	113.00	Flag (12'x18')	1	6.463	7.110	1.00	1.00	8.28	124.52	0.000	0.000	58.86	0.00	0.00
6	108.00	APXVBLL09B43-C-I20	3	6.364	7.000	0.00	1.00	15.14	366.59	0.000	-1.000	105.95	0.00	-105.95
7	104.00	28" Canister at 104.0'	1	6.312	6.943	1.00	1.00	0.00	120.96	0.000	0.000	0.00	0.00	0.00
8	103.50	MT6407-77A	3	6.286	6.914	0.00	1.00	15.74	497.77	0.000	-1.000	108.84	0.00	-108.84
9	103.00	Commscope	3	6.295	6.924	0.00	1.00	0.00	85.04	0.000	0.000	0.00	0.00	0.00
10	97.00	Raycap	1	6.188	6.806	0.00	1.00	0.00	47.56	0.000	0.000	0.00	0.00	0.00
11	97.00	FFVV-65B-R3	3	6.151	6.766	0.00	1.00	61.33	1367.11	0.000	-2.000	414.99	0.00	-829.97
12	94.00	29" Canister at 94.0'	1	6.132	6.746	1.00	1.00	0.00	546.61	0.000	0.000	0.00	0.00	0.00
13	87.00	Redconnex AN-80i	3	5.998	6.598	1.00	1.00	0.00	163.03	0.000	0.000	0.00	0.00	0.00
14	87.00	RFS	6	5.998	6.598	1.00	1.00	0.00	77.15	0.000	0.000	0.00	0.00	0.00
15	87.00	Andrew FPA5250D06-N	2	5.998	6.598	1.00	1.00	0.00	43.48	0.000	0.000	0.00	0.00	0.00
16	87.00	Commscope	3	5.958	6.554	1.00	1.00	0.00	403.54	0.000	-2.000	0.00	0.00	0.00
17	84.00	Redconnex AN-80i BTSs	3	5.938	6.532	1.00	1.00	0.00	33.18	0.000	0.000	0.00	0.00	0.00
18	84.00	Andrew FPA5250D06-N	1	5.898	6.487	1.00	1.00	0.58	28.25	0.000	-2.000	3.77	0.00	-7.54
19	84.00	Argus LLPX310R	3	5.898	6.487	1.00	1.00	0.00	195.69	0.000	-2.000	0.00	0.00	0.00
20	84.00	30" Canister at 84.0'	1	5.938	6.532	1.00	1.00	0.00	539.97	0.000	0.000	0.00	0.00	0.00
							Totals:		**5,126.39**			**781.46**		

Total Applied Force Summary

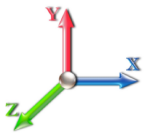
Structure:	CT13616-A-SBA		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 18

IES Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		105.20	1101.32	0.00	0.00
10.00		103.64	1195.37	0.00	0.00
15.00		101.97	1185.36	0.00	0.00
20.00		100.24	1172.60	0.00	0.00
25.00		98.50	1158.25	0.00	0.00
30.00		96.81	1142.84	0.00	0.00
35.00		99.31	1126.68	0.00	0.00
40.00		101.24	1109.94	0.00	0.00
40.50		10.05	110.14	0.00	0.00
45.00		93.57	1498.71	0.00	0.00
50.00		105.17	950.20	0.00	0.00
55.00		105.93	935.41	0.00	0.00
60.00		106.39	920.36	0.00	0.00
65.00		106.59	905.08	0.00	0.00
70.00		106.56	889.60	0.00	0.00
75.00		106.32	873.95	0.00	0.00
79.00		84.60	688.08	0.00	0.00
80.00		23.19	195.74	0.00	0.00
84.00	(8) attachments	97.83	1580.30	0.00	-7.54
85.00		23.60	194.73	0.00	0.00
87.00	(14) attachments	47.51	1076.74	0.00	0.00
89.00		47.82	371.87	0.00	0.00
90.00		23.98	185.95	0.00	0.00
94.00	(1) attachments	97.14	1290.65	0.00	0.00
95.00		24.36	186.02	0.00	0.00
97.00	(4) attachments	463.99	1786.78	0.00	-829.97
99.00		49.29	371.80	0.00	0.00
100.00		24.72	127.10	0.00	0.00
103.00	(3) attachments	74.78	466.43	0.00	0.00
103.50	(3) attachments	121.32	561.34	0.00	-108.84
104.00	(1) attachments	12.50	184.53	0.00	0.00
105.00		25.06	127.15	0.00	0.00
108.00	(3) attachments	181.75	733.15	0.00	-105.95
109.00		25.33	112.21	0.00	0.00
110.00		25.40	128.45	0.00	0.00
113.00	(1) attachments	135.64	509.97	0.00	0.00
114.00	(10) attachments	114.71	614.40	0.00	0.00
115.00		25.72	121.01	0.00	0.00
119.00		103.91	484.18	0.00	0.00
	Totals:	**3,401.64**	**28,374.43**	**0.00**	**-1,052.30**

Calculated Forces

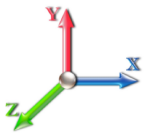
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.37	-3.41	0.00	-260.43	0.00	260.43	2770.05	714.33	2432.17	2339.53	0.00	0.000	0.000	0.122
5.00	-27.27	-3.33	0.00	-243.37	0.00	243.37	2737.33	701.28	2344.09	2269.31	0.02	-0.041	0.000	0.117
10.00	-26.07	-3.24	0.00	-226.74	0.00	226.74	2703.94	688.22	2257.62	2199.58	0.09	-0.082	0.000	0.113
15.00	-24.88	-3.15	0.00	-210.55	0.00	210.55	2669.88	675.17	2172.78	2130.35	0.20	-0.122	0.000	0.108
20.00	-23.71	-3.07	0.00	-194.78	0.00	194.78	2635.15	662.11	2089.57	2061.66	0.34	-0.162	0.000	0.103
25.00	-22.55	-2.98	0.00	-179.46	0.00	179.46	2599.76	649.06	2007.98	1993.54	0.53	-0.200	0.000	0.099
30.00	-21.41	-2.89	0.00	-164.57	0.00	164.57	2563.70	636.00	1928.02	1926.02	0.76	-0.238	0.000	0.094
35.00	-20.28	-2.80	0.00	-150.11	0.00	150.11	2526.98	622.95	1849.68	1859.13	1.03	-0.275	0.000	0.089
40.00	-19.17	-2.70	0.00	-136.12	0.00	136.12	2489.59	609.89	1772.96	1792.91	1.34	-0.310	0.000	0.084
40.50	-19.06	-2.69	0.00	-134.77	0.00	134.77	2485.81	608.58	1765.38	1786.32	1.37	-0.314	0.000	0.083
45.00	-17.56	-2.60	0.00	-122.64	0.00	122.64	1840.21	485.30	1403.23	1320.44	1.68	-0.344	0.000	0.102
50.00	-16.61	-2.50	0.00	-109.64	0.00	109.64	1815.76	474.86	1343.48	1274.66	2.06	-0.377	0.000	0.095
55.00	-15.67	-2.40	0.00	-97.13	0.00	97.13	1790.64	464.41	1285.03	1229.18	2.48	-0.414	0.000	0.088
60.00	-14.75	-2.29	0.00	-85.14	0.00	85.14	1764.86	453.97	1227.89	1184.03	2.93	-0.449	0.000	0.080
65.00	-13.84	-2.19	0.00	-73.68	0.00	73.68	1738.40	443.52	1172.04	1139.25	3.42	-0.482	0.000	0.073
70.00	-12.95	-2.08	0.00	-62.74	0.00	62.74	1711.29	433.08	1117.49	1094.86	3.94	-0.511	0.000	0.065
75.00	-12.08	-1.97	0.00	-52.35	0.00	52.35	1683.50	422.64	1064.24	1050.90	4.49	-0.539	0.000	0.057
79.00	-11.39	-1.88	0.00	-44.47	0.00	44.47	1660.79	414.28	1022.58	1016.07	4.95	-0.558	0.000	0.051
79.00	-11.39	-1.88	0.00	-44.47	0.00	44.47	930.23	279.07	18866.3	173.90	4.95	-0.558	0.000	0.268
80.00	-11.19	-1.89	0.00	-42.59	0.00	42.59	930.23	279.07	18866.3	173.90	5.07	-0.563	0.000	0.257
84.00	-9.61	-1.80	0.00	-35.03	0.00	35.03	930.23	279.07	18866.3	173.90	5.68	-0.891	0.000	0.212
85.00	-9.41	-1.79	0.00	-33.23	0.00	33.23	930.23	279.07	18866.3	173.90	5.87	-0.963	0.000	0.201
87.00	-8.33	-1.75	0.00	-29.64	0.00	29.64	930.23	279.07	18866.3	173.90	6.31	-1.095	0.000	0.179
89.00	-7.96	-1.70	0.00	-26.15	0.00	26.15	930.23	279.07	18866.3	173.90	6.79	-1.213	0.000	0.159
89.00	-7.96	-1.70	0.00	-26.15	0.00	26.15	930.23	279.07	18866.3	173.90	6.79	-1.213	0.000	0.159
90.00	-7.77	-1.69	0.00	-24.45	0.00	24.45	930.23	279.07	18866.3	173.90	7.05	-1.266	0.000	0.149
94.00	-6.48	-1.57	0.00	-17.69	0.00	17.69	930.23	279.07	18866.3	173.90	8.19	-1.444	0.000	0.109
95.00	-6.29	-1.55	0.00	-16.11	0.00	16.11	930.23	279.07	18866.3	173.90	8.50	-1.480	0.000	0.099
97.00	-4.51	-1.04	0.00	-13.01	0.00	13.01	930.23	279.07	18866.3	173.90	9.13	-1.541	0.000	0.080
99.00	-4.14	-0.99	0.00	-10.92	0.00	10.92	930.23	279.07	18866.3	173.90	9.79	-1.592	0.000	0.067
99.00	-4.14	-0.99	0.00	-10.92	0.00	10.92	541.19	162.36	3641.39	63.23	9.79	-1.592	0.000	0.180
100.00	-4.01	-0.97	0.00	-9.94	0.00	9.94	541.19	162.36	3641.39	63.23	10.12	-1.614	0.000	0.165
103.00	-3.55	-0.89	0.00	-7.02	0.00	7.02	541.19	162.36	3641.39	63.23	11.25	-1.966	0.000	0.118
103.50	-2.99	-0.76	0.00	-6.57	0.00	6.57	541.19	162.36	3641.39	63.23	11.46	-2.013	0.000	0.109
104.00	-2.81	-0.74	0.00	-6.19	0.00	6.19	541.19	162.36	3641.39	63.23	11.67	-2.057	0.000	0.103
105.00	-2.68	-0.72	0.00	-5.45	0.00	5.45	541.19	162.36	3641.39	63.23	12.11	-2.138	0.000	0.091
108.00	-1.95	-0.51	0.00	-3.30	0.00	3.30	541.19	162.36	3641.39	63.23	13.52	-2.319	0.000	0.056
109.00	-1.84	-0.48	0.00	-2.79	0.00	2.79	541.19	162.36	3641.39	63.23	14.01	-2.361	0.000	0.048
109.00	-1.84	-0.48	0.00	-2.79	0.00	2.79	791.68	237.50	8195.40	85.75	14.01	-2.361	0.000	0.035
110.00	-1.71	-0.45	0.00	-2.31	0.00	2.31	791.68	237.50	8195.40	85.75	14.51	-2.397	0.000	0.029
113.00	-1.21	-0.30	0.00	-0.95	0.00	0.95	791.68	237.50	8195.40	85.75	16.03	-2.452	0.000	0.013
114.00	-0.60	-0.16	0.00	-0.65	0.00	0.65	791.68	237.50	8195.40	85.75	16.55	-2.461	0.000	0.008
115.00	-0.48	-0.12	0.00	-0.50	0.00	0.50	791.68	237.50	8195.40	85.75	17.06	-2.468	0.000	0.006
119.00	0.00	-0.10	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75	19.14	-2.479	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT13616-A-SBA		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Tower Engineering Solutions

Load Case: 1.2D + 1.0Ev + 1.0Eh

Gust Response Factor	1.10			**Sds**	0.22	**Iterations**	25
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.09	**Ss**	0.20
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.52	**SA**	0.05	**S1**	0.05
						Seismic Importance Factor	1.00

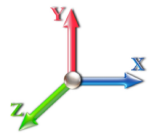
Top Elev (ft)	Description	Wz (lb)	Hz (lb)	Vertical Ev (lb)	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	
5.00		751.37	2.50	32.38	0.11	
10.00		836.49	7.50	36.05	0.88	
15.00		823.83	12.50	35.50	2.05	
20.00		811.17	17.50	34.96	3.54	
25.00		798.52	22.50	34.41	5.28	
30.00		785.86	27.50	33.87	7.24	
35.00		773.20	32.50	33.32	9.36	
40.00		760.55	37.50	32.77	11.61	
40.50	Bot - Section 2	75.36	40.25	3.25	0.26	
45.00	Top - Section 1	1100.0	42.75	47.41	27.23	
50.00		628.37	47.50	27.08	12.55	
55.00		618.25	52.50	26.64	14.47	
60.00		608.12	57.50	26.21	16.43	
65.00		598.00	62.50	25.77	18.41	
70.00		587.87	67.50	25.33	20.38	
75.00		577.75	72.50	24.90	22.35	
79.00	Top - Section 2	454.91	77.00	19.60	16.48	
80.00		107.42	79.50	4.63	1.49	
84.00	Appurtenance(s)	692.99	82.00	29.86	37.59	
85.00		106.34	84.50	4.58	1.62	
87.00	Appurtenance(s)	404.77	86.00	17.44	16.31	
89.00	Top - Section 3	194.95	88.00	8.40	4.88	
90.00		97.47	89.50	4.20	1.54	
94.00	Appurtenance(s)	539.90	92.00	23.27	29.88	
95.00		97.47	94.50	4.20	1.69	
97.00	Appurtenance(s)	593.95	96.00	25.60	37.80	
99.00	Top - Section 4	194.59	98.00	8.39	5.85	
100.00		51.69	99.50	2.23	0.63	
103.00	Appurtenance(s)	207.88	101.50	8.96	6.95	
103.50	Appurtenance(s)	264.05	103.25	11.38	10.75	
104.00	Appurtenance(s)	175.85	103.75	7.58	5.42	
105.00		51.69	104.50	2.23	0.68	
108.00	Appurtenance(s)	247.21	106.50	10.65	10.13	
109.00	Top - Section 5	36.72	108.50	1.58	0.41	
110.00		50.25	109.50	2.17	0.70	
113.00	Appurtenance(s)	250.75	111.50	10.81	11.22	
114.00	Appurtenance(s)	342.15	113.50	14.74	19.65	
115.00		42.76	114.50	1.84	0.58	
119.00		171.04	117.00	7.37	6.35	
	Totals:	**16,511.6**		**711.5**	**400.8**	**Total Wind:** **9,314.1**

Calculated Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

IES Tower Engineering Solutions

Load Case: 1.2D + 1.0Ev + 1.0Eh



Gust Response Factor	1.10			**Sds**	0.22	**Iterations**	25		
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.09	**Ss**	0.20		
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.52	**SA**	0.05	**S1**	0.05	**Seismic Importance Factor**	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-20.34	-0.40	0.00	-31.97	0.00	31.97	2770.05	714.33	2432.17	2339.53		0.00	0.00	0.021
5.00	-19.42	-0.40	0.00	-29.96	0.00	29.96	2737.33	701.28	2344.09	2269.31		0.00	-0.01	0.020
10.00	-18.41	-0.40	0.00	-27.95	0.00	27.95	2703.94	688.22	2257.62	2199.58		0.01	-0.01	0.020
15.00	-17.42	-0.40	0.00	-25.93	0.00	25.93	2669.88	675.17	2172.78	2130.35		0.02	-0.02	0.019
20.00	-16.44	-0.40	0.00	-23.92	0.00	23.92	2635.15	662.11	2089.57	2061.66		0.04	-0.02	0.018
25.00	-15.48	-0.40	0.00	-21.92	0.00	21.92	2599.76	649.06	2007.98	1993.54		0.07	-0.02	0.017
30.00	-14.54	-0.39	0.00	-19.94	0.00	19.94	2563.70	636.00	1928.02	1926.02		0.09	-0.03	0.016
35.00	-13.61	-0.38	0.00	-17.99	0.00	17.99	2526.98	622.95	1849.68	1859.13		0.13	-0.03	0.015
40.00	-12.70	-0.37	0.00	-16.09	0.00	16.09	2489.59	609.89	1772.96	1792.91		0.16	-0.04	0.014
40.50	-12.61	-0.37	0.00	-15.91	0.00	15.91	2485.81	608.58	1765.38	1786.32		0.17	-0.04	0.014
45.00	-11.27	-0.34	0.00	-14.25	0.00	14.25	1840.21	485.30	1403.23	1320.44		0.21	-0.04	0.017
50.00	-10.52	-0.33	0.00	-12.54	0.00	12.54	1815.76	474.86	1343.48	1274.66		0.25	-0.05	0.016
55.00	-9.78	-0.31	0.00	-10.90	0.00	10.90	1790.64	464.41	1285.03	1229.18		0.30	-0.05	0.014
60.00	-9.06	-0.30	0.00	-9.32	0.00	9.32	1764.86	453.97	1227.89	1184.03		0.36	-0.05	0.013
65.00	-8.35	-0.28	0.00	-7.83	0.00	7.83	1738.40	443.52	1172.04	1139.25		0.41	-0.06	0.012
70.00	-7.65	-0.26	0.00	-6.44	0.00	6.44	1711.29	433.08	1117.49	1094.86		0.48	-0.06	0.010
75.00	-6.97	-0.24	0.00	-5.14	0.00	5.14	1683.50	422.64	1064.24	1050.90		0.54	-0.06	0.009
79.00	-6.43	-0.22	0.00	-4.20	0.00	4.20	1660.79	414.28	1022.58	1016.07		0.60	-0.06	0.008
79.00	-6.43	-0.22	0.00	-4.20	0.00	4.20	930.23	279.07	18866.3	173.90		0.60	-0.06	0.031
80.00	-6.29	-0.22	0.00	-3.98	0.00	3.98	930.23	279.07	18866.3	173.90		0.61	-0.07	0.030
84.00	-5.41	-0.18	0.00	-3.10	0.00	3.10	930.23	279.07	18866.3	173.90		0.68	-0.10	0.024
85.00	-5.27	-0.18	0.00	-2.92	0.00	2.92	930.23	279.07	18866.3	173.90		0.70	-0.10	0.022
87.00	-4.76	-0.16	0.00	-2.56	0.00	2.56	930.23	279.07	18866.3	173.90		0.74	-0.11	0.020
89.00	-4.50	-0.16	0.00	-2.23	0.00	2.23	930.23	279.07	18866.3	173.90		0.79	-0.12	0.018
89.00	-4.50	-0.16	0.00	-2.23	0.00	2.23	930.23	279.07	18866.3	173.90		0.79	-0.12	0.018
90.00	-4.37	-0.16	0.00	-2.07	0.00	2.07	930.23	279.07	18866.3	173.90		0.82	-0.13	0.017
94.00	-3.67	-0.13	0.00	-1.44	0.00	1.44	930.23	279.07	18866.3	173.90		0.93	-0.14	0.012
95.00	-3.54	-0.13	0.00	-1.31	0.00	1.31	930.23	279.07	18866.3	173.90		0.96	-0.15	0.011
97.00	-2.79	-0.09	0.00	-1.06	0.00	1.06	930.23	279.07	18866.3	173.90		1.02	-0.15	0.009
99.00	-2.54	-0.08	0.00	-0.88	0.00	0.88	930.23	279.07	18866.3	173.90		1.09	-0.15	0.008
99.00	-2.54	-0.08	0.00	-0.88	0.00	0.88	541.19	162.36	3641.39	63.23		1.09	-0.15	0.019
100.00	-2.46	-0.08	0.00	-0.80	0.00	0.80	541.19	162.36	3641.39	63.23		1.12	-0.16	0.017
103.00	-2.18	-0.07	0.00	-0.56	0.00	0.56	541.19	162.36	3641.39	63.23		1.23	-0.18	0.013
103.50	-1.85	-0.06	0.00	-0.53	0.00	0.53	541.19	162.36	3641.39	63.23		1.25	-0.19	0.012
104.00	-1.63	-0.06	0.00	-0.50	0.00	0.50	541.19	162.36	3641.39	63.23		1.27	-0.19	0.011
105.00	-1.56	-0.05	0.00	-0.44	0.00	0.44	541.19	162.36	3641.39	63.23		1.31	-0.20	0.010
108.00	-1.23	-0.04	0.00	-0.28	0.00	0.28	541.19	162.36	3641.39	63.23		1.44	-0.21	0.007
109.00	-1.17	-0.04	0.00	-0.24	0.00	0.24	541.19	162.36	3641.39	63.23		1.48	-0.22	0.006
109.00	-1.17	-0.04	0.00	-0.24	0.00	0.24	791.68	237.50	8195.40	85.75		1.48	-0.22	0.004
110.00	-1.10	-0.04	0.00	-0.19	0.00	0.19	791.68	237.50	8195.40	85.75		1.53	-0.22	0.004
113.00	-0.76	-0.03	0.00	-0.07	0.00	0.07	791.68	237.50	8195.40	85.75		1.67	-0.22	0.002
114.00	-0.32	-0.01	0.00	-0.04	0.00	0.04	791.68	237.50	8195.40	85.75		1.72	-0.23	0.001
115.00	-0.26	-0.01	0.00	-0.03	0.00	0.03	791.68	237.50	8195.40	85.75		1.76	-0.23	0.001
119.00	0.00	-0.01	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75		1.95	-0.23	0.000

Seismic Segment Forces (Factored)

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 0.9D + 1.0Ev + 1.0Eh

Gust Response Factor	1.10			**Sds**	0.22	**Ss**	0.20
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.09	**S1**	0.05
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.52	**SA**	0.05	**Seismic Importance Factor**	1.00

Iterations 25

R: 1.50

Top Elev (ft)	Description	Wz (lb)	Hz (lb)	Vertical Ev (lb)	Lateral Fs (lb)
0.00		0.00	0.00	0.00	0.00
5.00		735.07	2.50	31.68	0.12
10.00		795.75	7.50	34.29	0.88
15.00		783.09	12.50	33.75	2.03
20.00		770.43	17.50	33.20	3.51
25.00		757.78	22.50	32.66	5.24
30.00		745.12	27.50	32.11	7.16
35.00		732.46	32.50	31.56	9.25
40.00		719.81	37.50	31.02	11.46
40.50	Bot - Section 2	71.28	40.25	3.07	0.25
45.00	Top - Section 1	1063.4	42.75	45.83	27.85
50.00		587.63	47.50	25.32	12.13
55.00		577.51	52.50	24.89	13.97
60.00		567.38	57.50	24.45	15.83
65.00		557.26	62.50	24.01	17.69
70.00		547.13	67.50	23.58	19.55
75.00		537.01	72.50	23.14	21.39
79.00	Top - Section 2	422.32	77.00	18.20	15.74
80.00		99.27	79.50	4.28	1.41
84.00	Appurtenance(s)	660.40	82.00	28.46	37.53
85.00		98.46	84.50	4.24	1.54
87.00	Appurtenance(s)	389.02	86.00	16.76	16.52
89.00	Top - Section 3	183.63	88.00	7.91	4.78
90.00		91.81	89.50	3.96	1.51
94.00	Appurtenance(s)	517.26	92.00	22.29	30.11
95.00		91.81	94.50	3.96	1.66
97.00	Appurtenance(s)	582.63	96.00	25.11	39.65
99.00	Top - Section 4	183.36	98.00	7.90	5.73
100.00		46.08	99.50	1.99	0.56
103.00	Appurtenance(s)	191.04	101.50	8.23	6.52
103.50	Appurtenance(s)	261.24	103.25	11.26	11.44
104.00	Appurtenance(s)	173.04	103.75	7.46	5.72
105.00		46.08	104.50	1.99	0.61
108.00	Appurtenance(s)	234.10	106.50	10.09	10.01
109.00	Top - Section 5	34.85	108.50	1.50	0.40
110.00		48.38	109.50	2.08	0.71
113.00	Appurtenance(s)	245.13	111.50	10.56	11.71
114.00	Appurtenance(s)	340.28	113.50	14.66	21.10
115.00		42.76	114.50	1.84	0.63
119.00		171.04	117.00	7.37	6.88
	Totals:	**15,702.1**		**676.7**	**400.8**

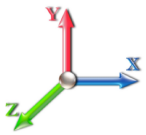
Total Wind: **9,314.1**

Calculated Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

IES Tower Engineering Solutions

Load Case: 0.9D + 1.0Ev + 1.0Eh



Gust Response Factor	1.10			**Sds**	0.22	**Iterations**	25		
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.09	**Ss**	0.20		
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.52	**SA**	0.05	**S1**	0.05	**Seismic Importance Factor**	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-15.40	-0.40	0.00	-31.96	0.00	31.96	2770.05	714.33	2432.17	2339.53		0.00	0.00	0.019
5.00	-14.70	-0.40	0.00	-29.96	0.00	29.96	2737.33	701.28	2344.09	2269.31		0.00	-0.01	0.019
10.00	-13.94	-0.40	0.00	-27.95	0.00	27.95	2703.94	688.22	2257.62	2199.58		0.01	-0.01	0.018
15.00	-13.19	-0.40	0.00	-25.93	0.00	25.93	2669.88	675.17	2172.78	2130.35		0.02	-0.02	0.017
20.00	-12.45	-0.40	0.00	-23.93	0.00	23.93	2635.15	662.11	2089.57	2061.66		0.04	-0.02	0.016
25.00	-11.72	-0.39	0.00	-21.93	0.00	21.93	2599.76	649.06	2007.98	1993.54		0.07	-0.02	0.016
30.00	-11.00	-0.39	0.00	-19.96	0.00	19.96	2563.70	636.00	1928.02	1926.02		0.09	-0.03	0.015
35.00	-10.30	-0.38	0.00	-18.03	0.00	18.03	2526.98	622.95	1849.68	1859.13		0.13	-0.03	0.014
40.00	-9.61	-0.37	0.00	-16.13	0.00	16.13	2489.59	609.89	1772.96	1792.91		0.16	-0.04	0.013
40.50	-9.54	-0.37	0.00	-15.95	0.00	15.95	2485.81	608.58	1765.38	1786.32		0.17	-0.04	0.013
45.00	-8.53	-0.34	0.00	-14.30	0.00	14.30	1840.21	485.30	1403.23	1320.44		0.21	-0.04	0.015
50.00	-7.96	-0.33	0.00	-12.60	0.00	12.60	1815.76	474.86	1343.48	1274.66		0.25	-0.05	0.014
55.00	-7.40	-0.31	0.00	-10.97	0.00	10.97	1790.64	464.41	1285.03	1229.18		0.30	-0.05	0.013
60.00	-6.86	-0.30	0.00	-9.40	0.00	9.40	1764.86	453.97	1227.89	1184.03		0.36	-0.05	0.012
65.00	-6.32	-0.28	0.00	-7.91	0.00	7.91	1738.40	443.52	1172.04	1139.25		0.42	-0.06	0.011
70.00	-5.79	-0.26	0.00	-6.52	0.00	6.52	1711.29	433.08	1117.49	1094.86		0.48	-0.06	0.009
75.00	-5.27	-0.24	0.00	-5.22	0.00	5.22	1683.50	422.64	1064.24	1050.90		0.54	-0.06	0.008
79.00	-4.86	-0.22	0.00	-4.27	0.00	4.27	1660.79	414.28	1022.58	1016.07		0.60	-0.07	0.007
79.00	-4.86	-0.22	0.00	-4.27	0.00	4.27	930.23	279.07	18866.3	173.90		0.60	-0.07	0.030
80.00	-4.76	-0.22	0.00	-4.04	0.00	4.04	930.23	279.07	18866.3	173.90		0.61	-0.07	0.028
84.00	-4.09	-0.18	0.00	-3.16	0.00	3.16	930.23	279.07	18866.3	173.90		0.68	-0.10	0.023
85.00	-3.99	-0.18	0.00	-2.97	0.00	2.97	930.23	279.07	18866.3	173.90		0.70	-0.10	0.021
87.00	-3.60	-0.17	0.00	-2.61	0.00	2.61	930.23	279.07	18866.3	173.90		0.74	-0.11	0.019
89.00	-3.41	-0.16	0.00	-2.27	0.00	2.27	930.23	279.07	18866.3	173.90		0.79	-0.12	0.017
89.00	-3.41	-0.16	0.00	-2.27	0.00	2.27	930.23	279.07	18866.3	173.90		0.79	-0.12	0.017
90.00	-3.31	-0.16	0.00	-2.11	0.00	2.11	930.23	279.07	18866.3	173.90		0.82	-0.13	0.016
94.00	-2.78	-0.13	0.00	-1.47	0.00	1.47	930.23	279.07	18866.3	173.90		0.94	-0.14	0.011
95.00	-2.68	-0.13	0.00	-1.34	0.00	1.34	930.23	279.07	18866.3	173.90		0.97	-0.15	0.011
97.00	-2.11	-0.09	0.00	-1.08	0.00	1.08	930.23	279.07	18866.3	173.90		1.03	-0.15	0.008
99.00	-1.92	-0.08	0.00	-0.90	0.00	0.90	930.23	279.07	18866.3	173.90		1.09	-0.16	0.007
99.00	-1.92	-0.08	0.00	-0.90	0.00	0.90	541.19	162.36	3641.39	63.23		1.09	-0.16	0.018
100.00	-1.87	-0.08	0.00	-0.82	0.00	0.82	541.19	162.36	3641.39	63.23		1.13	-0.16	0.016
103.00	-1.65	-0.07	0.00	-0.58	0.00	0.58	541.19	162.36	3641.39	63.23		1.24	-0.19	0.012
103.50	-1.40	-0.06	0.00	-0.54	0.00	0.54	541.19	162.36	3641.39	63.23		1.26	-0.19	0.011
104.00	-1.23	-0.06	0.00	-0.51	0.00	0.51	541.19	162.36	3641.39	63.23		1.28	-0.20	0.010
105.00	-1.18	-0.06	0.00	-0.46	0.00	0.46	541.19	162.36	3641.39	63.23		1.32	-0.20	0.009
108.00	-0.93	-0.04	0.00	-0.29	0.00	0.29	541.19	162.36	3641.39	63.23		1.45	-0.22	0.006
109.00	-0.89	-0.04	0.00	-0.24	0.00	0.24	541.19	162.36	3641.39	63.23		1.50	-0.22	0.006
109.00	-0.89	-0.04	0.00	-0.24	0.00	0.24	791.68	237.50	8195.40	85.75		1.50	-0.22	0.004
110.00	-0.83	-0.04	0.00	-0.20	0.00	0.20	791.68	237.50	8195.40	85.75		1.54	-0.22	0.003
113.00	-0.57	-0.03	0.00	-0.07	0.00	0.07	791.68	237.50	8195.40	85.75		1.68	-0.23	0.002
114.00	-0.24	-0.01	0.00	-0.04	0.00	0.04	791.68	237.50	8195.40	85.75		1.73	-0.23	0.001
115.00	-0.20	-0.01	0.00	-0.03	0.00	0.03	791.68	237.50	8195.40	85.75		1.78	-0.23	0.001
119.00	0.00	-0.01	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75		1.97	-0.23	0.000

Wind Loading - Shaft

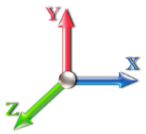
Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	5.412	5.95	174.49	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	5.412	5.95	171.33	0.730	0.000	5.00	17.336	12.66	75.3	0.0	686.2
10.00		1.00	0.70	5.412	5.95	168.16	0.730	0.000	5.00	17.019	12.42	74.0	0.0	673.5
15.00		1.00	0.70	5.412	5.95	165.00	0.730	0.000	5.00	16.702	12.19	72.6	0.0	660.9
20.00		1.00	0.70	5.412	5.95	161.83	0.730	0.000	5.00	16.384	11.96	71.2	0.0	648.2
25.00		1.00	0.70	5.412	5.95	158.67	0.730	0.000	5.00	16.067	11.73	69.8	0.0	635.6
30.00		1.00	0.70	5.416	5.96	155.57	0.730	0.000	5.00	15.750	11.50	68.5	0.0	622.9
35.00		1.00	0.73	5.660	6.23	155.79	0.730	0.000	5.00	15.432	11.27	70.1	0.0	610.2
40.00		1.00	0.76	5.880	6.47	155.50	0.730	0.000	5.00	15.115	11.03	71.4	0.0	597.6
40.50	Bot - Section 2	1.00	0.76	5.901	6.49	155.44	0.730	0.000	0.50	1.494	1.09	7.1	0.0	59.1
45.00	Top - Section 1	1.00	0.79	6.081	6.69	154.78	0.730	0.000	4.50	13.494	9.85	65.9	0.0	953.4
50.00		1.00	0.81	6.267	6.89	155.99	0.730	0.000	5.00	14.692	10.73	73.9	0.0	465.4
55.00		1.00	0.83	6.440	7.08	154.68	0.730	0.000	5.00	14.375	10.49	74.3	0.0	455.3
60.00		1.00	0.85	6.602	7.26	153.12	0.730	0.000	5.00	14.057	10.26	74.5	0.0	445.2
65.00		1.00	0.87	6.755	7.43	151.34	0.730	0.000	5.00	13.740	10.03	74.5	0.0	435.0
70.00		1.00	0.89	6.900	7.59	149.38	0.730	0.000	5.00	13.423	9.80	74.4	0.0	424.9
75.00		1.00	0.91	7.037	7.74	147.25	0.730	0.000	5.00	13.105	9.57	74.1	0.0	414.8
79.00	Top - Section 2	1.00	0.92	7.142	7.86	145.44	0.730	0.000	4.00	10.256	7.49	58.8	0.0	324.5
80.00		1.00	0.93	7.168	7.88	172.18	0.600	0.000	1.00	3.000	1.80	14.2	0.0	84.4
84.00	Appurtenance(s)	1.00	0.94	7.269	8.00	173.39	0.600	0.000	4.00	12.000	7.20	57.6	0.0	337.7
85.00		1.00	0.94	7.293	8.02	173.68	0.600	0.000	1.00	3.000	1.80	14.4	0.0	84.4
87.00	Appurtenance(s)	1.00	0.95	7.342	8.08	174.26	0.600	0.000	2.00	6.000	3.60	29.1	0.0	168.9
89.00	Top - Section 3	1.00	0.96	7.390	8.13	174.82	0.600	0.000	2.00	6.000	3.60	29.3	0.0	168.9
90.00		1.00	0.96	7.413	8.15	175.10	0.600	0.000	1.00	3.000	1.80	14.7	0.0	84.4
94.00	Appurtenance(s)	1.00	0.97	7.506	8.26	176.20	0.600	0.000	4.00	12.000	7.20	59.4	0.0	337.7
95.00		1.00	0.97	7.529	8.28	176.46	0.600	0.000	1.00	3.000	1.80	14.9	0.0	84.4
97.00	Appurtenance(s)	1.00	0.98	7.574	8.33	176.99	0.600	0.000	2.00	6.000	3.60	30.0	0.0	168.9
99.00	Top - Section 4	1.00	0.99	7.618	8.38	177.50	0.600	0.000	2.00	6.000	3.60	30.2	0.0	168.9
100.00		1.00	0.99	7.640	8.40	177.76	0.600	0.000	1.00	3.000	1.80	15.1	0.0	38.8
103.00	Appurtenance(s)	1.00	1.00	7.705	8.48	178.51	0.600	0.000	3.00	9.000	5.40	45.8	0.0	116.5
103.50	Appurtenance(s)	1.00	1.00	7.715	8.49	178.64	0.600	0.000	0.50	1.500	0.90	7.6	0.0	19.4
104.00	Appurtenance(s)	1.00	1.00	7.726	8.50	178.76	0.600	0.000	0.50	1.500	0.90	7.6	0.0	19.4
105.00		1.00	1.00	7.747	8.52	179.00	0.600	0.000	1.00	3.000	1.80	15.3	0.0	38.8
108.00	Appurtenance(s)	1.00	1.01	7.810	8.59	179.72	0.600	0.000	3.00	9.000	5.40	46.4	0.0	116.5
109.00	Top - Section 5	1.00	1.01	7.830	8.61	179.96	0.600	0.000	1.00	3.000	1.80	15.5	0.0	38.8
110.00		1.00	1.02	7.851	8.64	180.20	0.600	0.000	1.00	3.000	1.80	15.5	0.0	52.4
113.00	Appurtenance(s)	1.00	1.02	7.911	8.70	180.89	0.600	0.000	3.00	9.000	5.40	47.0	0.0	157.1
114.00	Appurtenance(s)	1.00	1.03	7.931	8.72	181.12	0.600	0.000	1.00	3.000	1.80	15.7	0.0	52.4
115.00		1.00	1.03	7.951	8.75	181.34	0.600	0.000	1.00	3.000	1.80	15.7	0.0	52.4
119.00		1.00	1.04	8.029	8.83	182.23	0.600	0.000	4.00	12.000	7.20	63.6	0.0	209.4
								Totals:	**119.00**			**1,755.2**		**11,713.2**

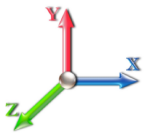
Discrete Appurtenance Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	114.00	RFS Twin PCS TMAs	3	7.931	8.724	0.00	1.00	0.00	33.00	0.000	0.000	0.00	0.00	0.00
2	114.00	V18-209014	3	7.931	8.724	0.00	1.00	0.00	56.10	0.000	0.000	0.00	0.00	0.00
3	114.00	27" Canister at 114.0'	1	7.931	8.724	1.00	1.00	0.00	150.00	0.000	0.000	0.00	0.00	0.00
4	114.00	RFS Twin AWS TMAs	3	7.931	8.724	0.00	1.00	0.00	52.80	0.000	0.000	0.00	0.00	0.00
5	113.00	Flag (12'x18')	1	7.911	8.702	1.00	1.00	7.92	100.00	0.000	0.000	68.92	0.00	0.00
6	108.00	APXVBLL09B43-C-I20	3	7.789	8.568	0.00	1.00	0.00	107.10	0.000	-1.000	0.00	0.00	0.00
7	104.00	28" Canister at 104.0'	1	7.726	8.498	1.00	1.00	0.00	150.00	0.000	0.000	0.00	0.00	0.00
8	103.50	MT6407-77A	3	7.694	8.463	0.00	1.00	0.00	238.20	0.000	-1.000	0.00	0.00	0.00
9	103.00	Commscope	3	7.705	8.475	0.00	1.00	0.00	52.80	0.000	0.000	0.00	0.00	0.00
10	97.00	Raycap	1	7.574	8.331	0.00	1.00	0.00	21.90	0.000	0.000	0.00	0.00	0.00
11	97.00	FFVV-65B-R3	3	7.529	8.282	0.00	1.00	0.00	377.10	0.000	-2.000	0.00	0.00	0.00
12	94.00	29" Canister at 94.0'	1	7.506	8.257	1.00	1.00	0.00	150.00	0.000	0.000	0.00	0.00	0.00
13	87.00	Redconnex AN-80i	3	7.342	8.076	1.00	1.00	0.00	13.50	0.000	0.000	0.00	0.00	0.00
14	87.00	RFS	6	7.342	8.076	1.00	1.00	0.00	38.40	0.000	0.000	0.00	0.00	0.00
15	87.00	Andrew FPA5250D06-N	2	7.342	8.076	1.00	1.00	0.00	4.00	0.000	0.000	0.00	0.00	0.00
16	87.00	Commscope	3	7.293	8.022	1.00	1.00	0.00	136.20	0.000	-2.000	0.00	0.00	0.00
17	84.00	Redconnex AN-80i BTSs	3	7.269	7.995	1.00	1.00	0.00	13.50	0.000	0.000	0.00	0.00	0.00
18	84.00	Andrew FPA5250D06-N	1	7.219	7.941	1.00	1.00	0.00	14.00	0.000	-2.000	0.00	0.00	0.00
19	84.00	Argus LLPX310R	3	7.219	7.941	1.00	1.00	0.00	85.80	0.000	-2.000	0.00	0.00	0.00
20	84.00	30" Canister at 84.0'	1	7.269	7.995	1.00	1.00	0.00	150.00	0.000	0.000	0.00	0.00	0.00
							Totals:		**1,944.40**			**68.92**		

Total Applied Force Summary

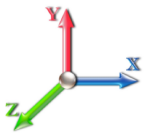
Structure:	CT13616-A-SBA		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 26

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		75.33	740.50	0.00	0.00
10.00		73.96	809.33	0.00	0.00
15.00		72.58	796.67	0.00	0.00
20.00		71.20	784.01	0.00	0.00
25.00		69.82	771.36	0.00	0.00
30.00		68.50	758.70	0.00	0.00
35.00		70.14	746.04	0.00	0.00
40.00		71.37	733.39	0.00	0.00
40.50		7.08	72.64	0.00	0.00
45.00		65.90	1075.62	0.00	0.00
50.00		73.94	601.21	0.00	0.00
55.00		74.34	591.09	0.00	0.00
60.00		74.53	580.96	0.00	0.00
65.00		74.53	570.84	0.00	0.00
70.00		74.37	560.71	0.00	0.00
75.00		74.05	550.59	0.00	0.00
79.00		58.82	433.18	0.00	0.00
80.00		14.19	111.59	0.00	0.00
84.00	(8) attachments	57.57	709.66	0.00	0.00
85.00		14.44	110.69	0.00	0.00
87.00	(14) attachments	29.07	413.47	0.00	0.00
89.00		29.26	206.60	0.00	0.00
90.00		14.68	103.30	0.00	0.00
94.00	(1) attachments	59.45	563.20	0.00	0.00
95.00		14.91	103.30	0.00	0.00
97.00	(4) attachments	29.99	605.60	0.00	0.00
99.00		30.17	206.30	0.00	0.00
100.00		15.13	57.55	0.00	0.00
103.00	(3) attachments	45.77	225.45	0.00	0.00
103.50	(3) attachments	7.64	266.98	0.00	0.00
104.00	(1) attachments	7.65	178.78	0.00	0.00
105.00		15.34	57.55	0.00	0.00
108.00	(3) attachments	46.39	267.27	0.00	0.00
109.00		15.50	45.07	0.00	0.00
110.00		15.54	58.60	0.00	0.00
113.00	(1) attachments	115.92	275.80	0.00	0.00
114.00	(10) attachments	15.70	350.50	0.00	0.00
115.00		15.74	52.36	0.00	0.00
119.00		63.59	209.44	0.00	0.00
	Totals:	**1,824.07**	**16,355.92**	**0.00**	**0.00**

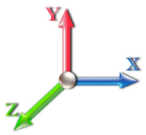
Calculated Forces

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-16.36	-1.83	0.00	-119.60	0.00	119.60	2770.05	714.33	2432.17	2339.53	0.00	0.000	0.000	0.057
5.00	-15.61	-1.76	0.00	-110.46	0.00	110.46	2737.33	701.28	2344.09	2269.31	0.01	-0.019	0.000	0.054
10.00	-14.80	-1.69	0.00	-101.68	0.00	101.68	2703.94	688.22	2257.62	2199.58	0.04	-0.037	0.000	0.052
15.00	-14.01	-1.62	0.00	-93.25	0.00	93.25	2669.88	675.17	2172.78	2130.35	0.09	-0.055	0.000	0.049
20.00	-13.22	-1.55	0.00	-85.16	0.00	85.16	2635.15	662.11	2089.57	2061.66	0.16	-0.073	0.000	0.046
25.00	-12.45	-1.48	0.00	-77.41	0.00	77.41	2599.76	649.06	2007.98	1993.54	0.24	-0.089	0.000	0.044
30.00	-11.69	-1.42	0.00	-70.00	0.00	70.00	2563.70	636.00	1928.02	1926.02	0.34	-0.105	0.000	0.041
35.00	-10.95	-1.35	0.00	-62.93	0.00	62.93	2526.98	622.95	1849.68	1859.13	0.46	-0.121	0.000	0.038
40.00	-10.21	-1.28	0.00	-56.19	0.00	56.19	2489.59	609.89	1772.96	1792.91	0.60	-0.136	0.000	0.035
40.50	-10.14	-1.27	0.00	-55.55	0.00	55.55	2485.81	608.58	1765.38	1786.32	0.61	-0.137	0.000	0.035
45.00	-9.06	-1.20	0.00	-49.84	0.00	49.84	1840.21	485.30	1403.23	1320.44	0.75	-0.150	0.000	0.043
50.00	-8.46	-1.13	0.00	-43.83	0.00	43.83	1815.76	474.86	1343.48	1274.66	0.91	-0.163	0.000	0.039
55.00	-7.87	-1.06	0.00	-38.18	0.00	38.18	1790.64	464.41	1285.03	1229.18	1.09	-0.178	0.000	0.035
60.00	-7.29	-0.98	0.00	-32.91	0.00	32.91	1764.86	453.97	1227.89	1184.03	1.28	-0.191	0.000	0.032
65.00	-6.72	-0.91	0.00	-28.01	0.00	28.01	1738.40	443.52	1172.04	1139.25	1.49	-0.204	0.000	0.028
70.00	-6.16	-0.83	0.00	-23.48	0.00	23.48	1711.29	433.08	1117.49	1094.86	1.71	-0.215	0.000	0.025
75.00	-5.61	-0.75	0.00	-19.33	0.00	19.33	1683.50	422.64	1064.24	1050.90	1.94	-0.225	0.000	0.022
79.00	-5.18	-0.69	0.00	-16.31	0.00	16.31	1660.79	414.28	1022.58	1016.07	2.13	-0.232	0.000	0.019
79.00	-5.18	-0.69	0.00	-16.31	0.00	16.31	930.23	279.07	18866.3	173.90	2.13	-0.232	0.000	0.099
80.00	-5.06	-0.69	0.00	-15.62	0.00	15.62	930.23	279.07	18866.3	173.90	2.18	-0.234	0.000	0.095
84.00	-4.35	-0.63	0.00	-12.88	0.00	12.88	930.23	279.07	18866.3	173.90	2.43	-0.354	0.000	0.079
85.00	-4.24	-0.62	0.00	-12.25	0.00	12.25	930.23	279.07	18866.3	173.90	2.51	-0.381	0.000	0.075
87.00	-3.83	-0.59	0.00	-11.01	0.00	11.01	930.23	279.07	18866.3	173.90	2.68	-0.430	0.000	0.067
89.00	-3.62	-0.56	0.00	-9.84	0.00	9.84	930.23	279.07	18866.3	173.90	2.87	-0.474	0.000	0.060
89.00	-3.62	-0.56	0.00	-9.84	0.00	9.84	930.23	279.07	18866.3	173.90	2.87	-0.474	0.000	0.060
90.00	-3.52	-0.55	0.00	-9.28	0.00	9.28	930.23	279.07	18866.3	173.90	2.97	-0.494	0.000	0.057
94.00	-2.96	-0.48	0.00	-7.09	0.00	7.09	930.23	279.07	18866.3	173.90	3.41	-0.563	0.000	0.044
95.00	-2.85	-0.47	0.00	-6.60	0.00	6.60	930.23	279.07	18866.3	173.90	3.53	-0.578	0.000	0.041
97.00	-2.25	-0.43	0.00	-5.67	0.00	5.67	930.23	279.07	18866.3	173.90	3.78	-0.604	0.000	0.035
99.00	-2.04	-0.40	0.00	-4.80	0.00	4.80	930.23	279.07	18866.3	173.90	4.04	-0.626	0.000	0.030
99.00	-2.04	-0.40	0.00	-4.80	0.00	4.80	541.19	162.36	3641.39	63.23	4.04	-0.626	0.000	0.080
100.00	-1.98	-0.39	0.00	-4.40	0.00	4.40	541.19	162.36	3641.39	63.23	4.17	-0.635	0.000	0.073
103.00	-1.76	-0.34	0.00	-3.23	0.00	3.23	541.19	162.36	3641.39	63.23	4.62	-0.793	0.000	0.054
103.50	-1.49	-0.33	0.00	-3.06	0.00	3.06	541.19	162.36	3641.39	63.23	4.70	-0.815	0.000	0.051
104.00	-1.31	-0.32	0.00	-2.89	0.00	2.89	541.19	162.36	3641.39	63.23	4.79	-0.836	0.000	0.048
105.00	-1.25	-0.31	0.00	-2.57	0.00	2.57	541.19	162.36	3641.39	63.23	4.97	-0.873	0.000	0.043
108.00	-0.99	-0.26	0.00	-1.64	0.00	1.64	541.19	162.36	3641.39	63.23	5.55	-0.961	0.000	0.028
109.00	-0.94	-0.24	0.00	-1.38	0.00	1.38	541.19	162.36	3641.39	63.23	5.75	-0.982	0.000	0.024
109.00	-0.94	-0.24	0.00	-1.38	0.00	1.38	791.68	237.50	8195.40	85.75	5.75	-0.982	0.000	0.017
110.00	-0.88	-0.23	0.00	-1.14	0.00	1.14	791.68	237.50	8195.40	85.75	5.96	-0.999	0.000	0.014
113.00	-0.61	-0.11	0.00	-0.46	0.00	0.46	791.68	237.50	8195.40	85.75	6.60	-1.026	0.000	0.006
114.00	-0.26	-0.08	0.00	-0.35	0.00	0.35	791.68	237.50	8195.40	85.75	6.81	-1.031	0.000	0.004
115.00	-0.21	-0.07	0.00	-0.27	0.00	0.27	791.68	237.50	8195.40	85.75	7.03	-1.034	0.000	0.003
119.00	0.00	-0.06	0.00	0.00	0.00	0.00	791.68	237.50	8195.40	85.75	7.90	-1.040	0.000	0.000

Final Analysis Summary

Structure:	CT13616-A-SBA	**Code:**	TIA-222-H	12/20/2022	
Site Name:	St. Judes	**Exposure:**	B		
Height:	119.00 (ft)	**Crest Height:**	674.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.0W 125 mph Wind	9.3	0.00	19.62	0.00	0.00	613.28
0.9D + 1.0W 125 mph Wind	9.3	0.00	14.71	0.00	0.00	609.35
1.2D + 1.0Di + 1.0Wi 50 mph Wind	3.4	0.00	28.37	0.00	0.00	260.43
1.2D + 1.0Ev + 1.0Eh	0.4	0.00	20.34	0.00	0.00	31.97
0.9D + 1.0Ev + 1.0Eh	0.4	0.00	15.40	0.00	0.00	31.96
1.0D + 1.0W 60 mph Wind	1.8	0.00	16.36	0.00	0.00	119.60

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.0W 125 mph Wind	-6.14	-3.57	0.00	-84.16	0.00	-84.16	1660.79	414.28	1022.58	1016.07	79.00	0.491
0.9D + 1.0W 125 mph Wind	-4.59	-3.54	0.00	-82.74	0.00	-82.74	1660.79	414.28	1022.58	1016.07	79.00	0.481
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-11.39	-1.88	0.00	-44.47	0.00	-44.47	1660.79	414.28	1022.58	1016.07	79.00	0.268
1.2D + 1.0Ev + 1.0Eh	-6.43	-0.22	0.00	-4.20	0.00	-4.20	1660.79	414.28	1022.58	1016.07	79.00	0.031
0.9D + 1.0Ev + 1.0Eh	-4.86	-0.22	0.00	-4.27	0.00	-4.27	1660.79	414.28	1022.58	1016.07	79.00	0.030
1.0D + 1.0W 60 mph Wind	-5.18	-0.69	0.00	-16.31	0.00	-16.31	1660.79	414.28	1022.58	1016.07	79.00	0.099

Base Plate Summary

Structure:	CT13616-A-SB		**Code:**	TIA-222-H	12/20/2022
Site Name:	St. Judes		**Exposure:**	B	
Height:	119.00 (ft)		**Crest Height:**	674.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 29

Tower Engineering Solutions

Reactions

Original Design

Moment (kip-ft):	1550.00
Axial (kip):	19.00
Shear (kip):	23.00

Analysis (1.2D + 1.0W)

Moment (kip-ft):	613.28
Axial (kip):	19.62
Shear (kip):	9.33

Base Plate

Yield (ksi):	50.00
Width (in):	46.00
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	6.00
Effective Len (in):	9.38
Moment (kip-in):	175.37
Allow Stress (ksi):	67.50
Applied Stress (ksi):	14.85
Stress Ratio:	0.22

Anchor Bolts

Bolt Circle:	48.00
Number Bolts:	12.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00

Compression

Force (kip):	52.74
Allowable (kip):	268.39
Ratio:	0.20

Tension

Force (kip):	49.47
Allowable (kip):	243.75
Ratio:	0.20

Monopole Mat Foundation Design

			Date: 12/20/2022
Customer Name:	Dish Wireless	**TIA Standard:**	TIA-222-H
Site Name:		**Structure Height (Ft.):**	119
Site Number:	CT13616-A-SBA	**Engineer Name:**	H. You
Engr. Number:	136551	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

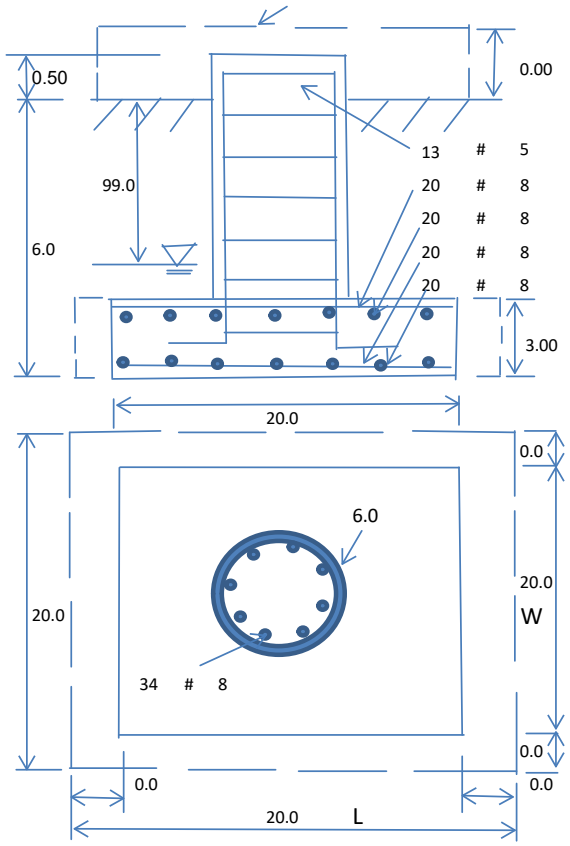
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	19.6	Shear Force (Kips):	9.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	613.3
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	6.0	Depth of Base BG (ft.):	6.0
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	3.00
Length of Pad (ft.):	20	Width of Pad (ft.):	20
Final Length of pad (ft)	20.0	Final width of pad (ft):	20.0



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	40	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	34	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	20	Qty. of Rebar in Pad (W):	20	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	20	Qty. of Rebar in Pad (W):	20	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	120.0	Soil Buoyant Weight:	47.6	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	12000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:			1.00	

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	1115.18	Total Dry Soil Weight (Kips):	133.82
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	133.82	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1298.96	Total Dry Concrete Weight (Kips):	194.84
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	194.84	Total Vertical Load on Base (Kips):	348.27

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1020	<	Allowable Factored Soil Bearing (psf):	9000	0.11	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	3154.0	>	Design Factored Momont (kips-ft):	552	0.17	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	5.72	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.00		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	3716.1	>	Design Factored Moment (Mu, Kips-F	645.9	0.17	OK!
Calculated Shear Capacity (Kips):	572.6	>	Design Factored Shear (Kips):	9.3	0.02	OK!
Calculated Tension Capacity (Tn, Kips):	1450.4	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	5363.2	>	Design Factored Axial Load (Pu Kips):	19.6	0.00	OK!
Moment & Axial Strength Combination:	0.17	OK!	Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.007		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	640.8	>	One-Way Factored Shear (L-D. Kips):	58.0	0.09	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	640.8	>	One-Way Factored Shear (W-D., Kips)	58.0	0.09	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	540.5	>	One-Way Factored Shear (C-C, Kips):	47.9	0.09	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0020	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0020		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2255.7	>	Moment at Bottom (L-Dir. K-Ft):	279.2	0.12	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2255.7	>	Moment at Bottom (W-Dir. K-Ft):	279.2	0.12	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3169.0	>	Moment at Bottom (C-C Dir. K-Ft):	394.8	0.12	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0020	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0020		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	2255.7	>	Moment at the top (L-Dir K-Ft):	83.3	0.04	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	2255.7	>	Moment at the top (W-Dir K-Ft):	83.3	0.04	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3169.0	>	Moment at the top (C-C Dir. K-Ft):	78.4	0.02	OK!
(3).Check Punching Shear Capacity due to Moment in the Pier:						
Moment transferred by punching shear:	245.3	k-ft.	Max. factored shear stress v_{u_CD}:		0.2	Psi
Max. factored shear stress v_{u_AB}:	3.0	Psi	Factored shear Strength ϕv_n:		164.3	Psi
Max. factored shear stress v_u:	3.0	Psi	Check Usage of Punching Shear Capacity:		0.02	OK!
(4).Check Bending Capacity of the Pad Within the Effective Slab Width:						
Overturning moment to be transferred by flexure:	184.0	k-ft.	Effective Width for resisting OT moment:		15.0	ft.
Calculated number of Rebar in Effective width:	15		Actual number of Rebar in Effective width:		13	
Steel Pad Moment Capacity (L-Direc. Kips-ft):	1471.0	k-ft.	Check Usage of the Flexure Capacity:		0.13	OK!

EXHIBIT 8

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOHVN00049A

DISH Wireless L.L.C. SITE ADDRESS:

71 PLEASANT VIEW ROAD
DERBY, CT 06418

CONNECTICUT CODE OF 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	2022 CT STATE BUILDING CODE/2021 IBC W/ CT AMENDMENTS
MECHANICAL	2022 CT STATE BUILDING CODE/2021 IMC W/ CT AMENDMENTS
ELECTRICAL	2022 CT STATE BUILDING CODE/2020 NEC W/ CT AMENDMENTS

SHEET INDEX

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:

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (1) PROPOSED ANTENNA FLUSH MOUNT
- INSTALL (4) PROPOSED 36" O.D. x 10'-0" CANISTER SHROUDS
- INSTALL PROPOSED JUMPERS
- INSTALL (12) PROPOSED COAX CABLES
- INSTALL (1) PROPOSED CABLE CLAMP
- INSTALL (6) TWIN DIPLEXERS (TOP)

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
- INSTALL (6) PROPOSED RRUs
- INSTALL (6) TWIN DIPLEXERS (BOTTOM)

SITE PHOTO

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

811

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.

SITE INFORMATION

PROPERTY OWNER:	OUR LADY, QUEEN OF THE APOSTLES PARISH C
ADDRESS:	212 ELIZABETH ST DERBY, CT 06418
TOWER TYPE:	STEALTH POLE
TOWER CO SITE ID:	CT13616-A
TOWER APP NUMBER:	173334
COUNTY:	NEW HAVEN
LATITUDE (NAD 83):	41° 18' 54.15" N 41.31504167
LONGITUDE (NAD 83):	73° 3' 51.53" W -73.0643138899
ZONING JURISDICTION:	CITY OF DERBY
ZONING DISTRICT:	P
PARCEL NUMBER:	5-6 101&113
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	UNITED ILLUMINATIONS
TELEPHONE COMPANY:	VERIZON

PROJECT DIRECTORY

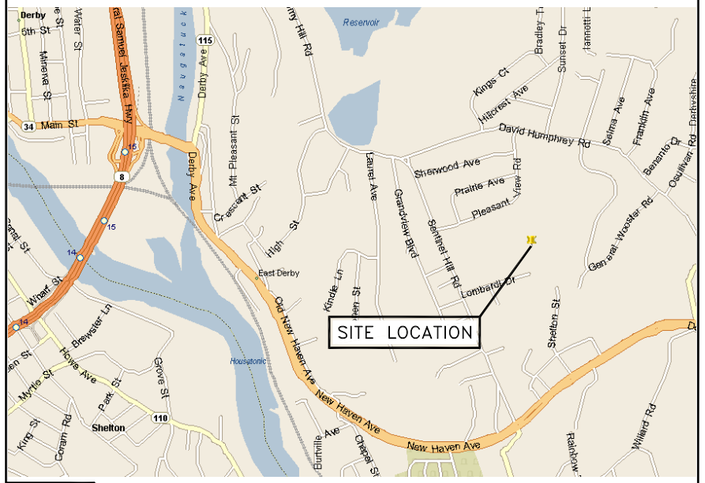
APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	SBA COMMUNICATAIONS CORP. 8051 CONGRESS AVENUE BOCA RATON, FL 33487 (800) 487-7483
SITE DESIGNER:	B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587-4630
SITE ACQUISITION:	DAVE EVANS devans@sbasite.com
CONST. MANAGER:	CHAD WILCOX chad.wilcox@dish.com
RF ENGINEER:	DIPESH PARIKH dipesh.parikh@dish.com

DIRECTIONS

DIRECTIONS FROM BRADLEY INTERNATIONAL AIRPORT:

HEAD NORTH TOWARD BRADLEY INTERNATIONAL AIRPORT. SLIGHT LEFT ONTO BRADLEY INTERNATIONAL AIRPORT. CONTINUE STRAIGHT. CONTINUE ONTO BRADLEY INTERNATIONAL AIRPORT CON. CONTINUE ONTO CT-20 E/ BRADLEY INTERNATIONAL AIRPORT CON. TAKE THE EXIT ONTO I-91 S TOWARD HARTFORD. KEEP RIGHT TO STAY ON I-91 S. TAKE EXIT 17 TO MERGE ONTO CT-15 S. TAKE EXIT 58 TO MERGE ONTO CT-34 W/DERBY AVE/ DERBY TURNPIKE TOWARD DERBY. MERGE ONTO CT-34 W/DERBY AVE/DERBY TURNPIKE. TURN RIGHT ONTO SENTINEL HILL RD. TURN RIGHT AT TURNER AVE TOWARD ST JUDE CHURCH. DESTINATION WILL BE ON THE RIGHT. ARRIVE AT BOHVN00049A.

VICINITY MAP



N

NO SCALE

dish wireless™
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD WILCOX
No. 23924
LICENSED
PROFESSIONAL ENGINEER

2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

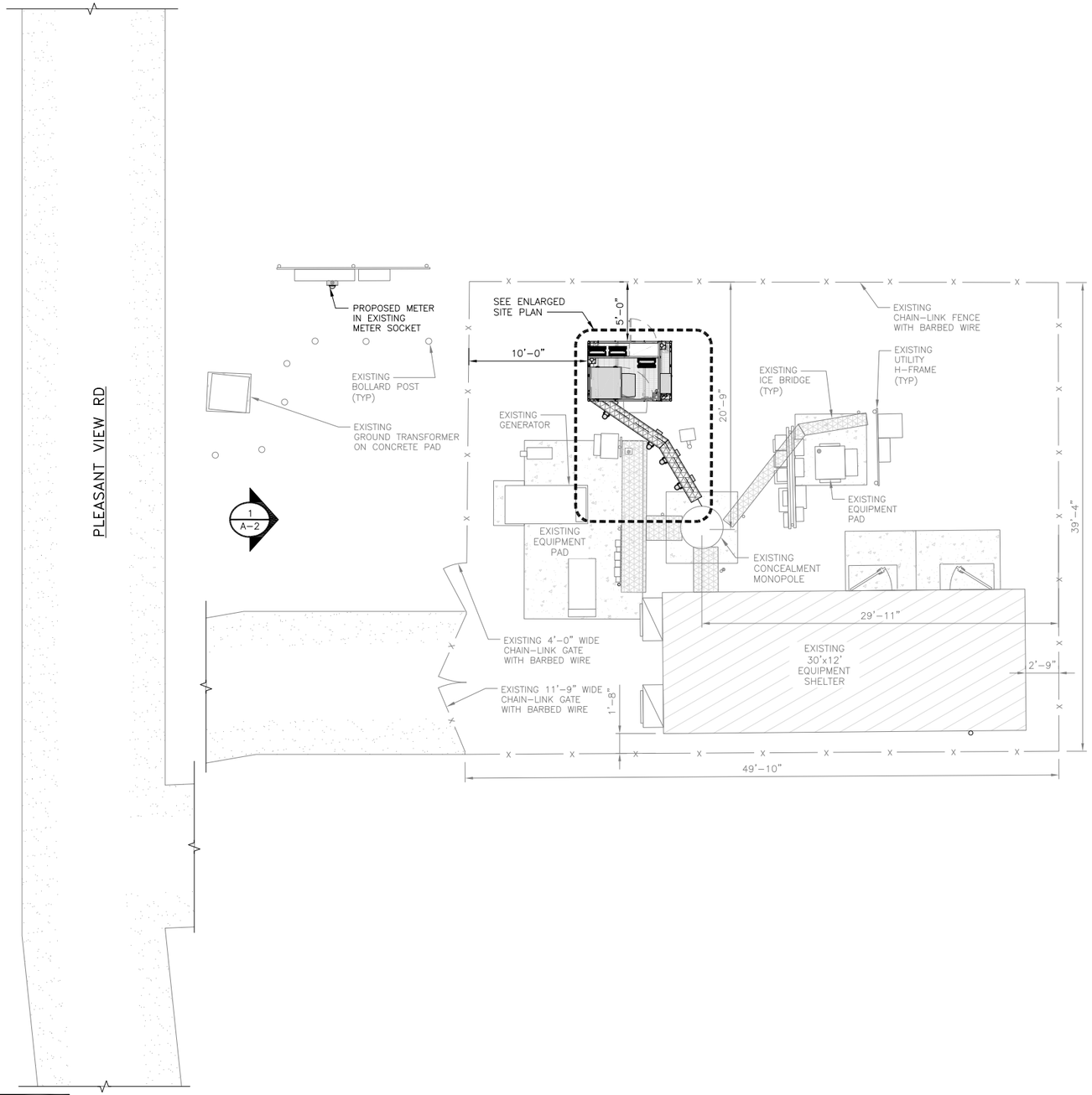
TITLE SHEET

SHEET NUMBER

T-1

NOTES

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



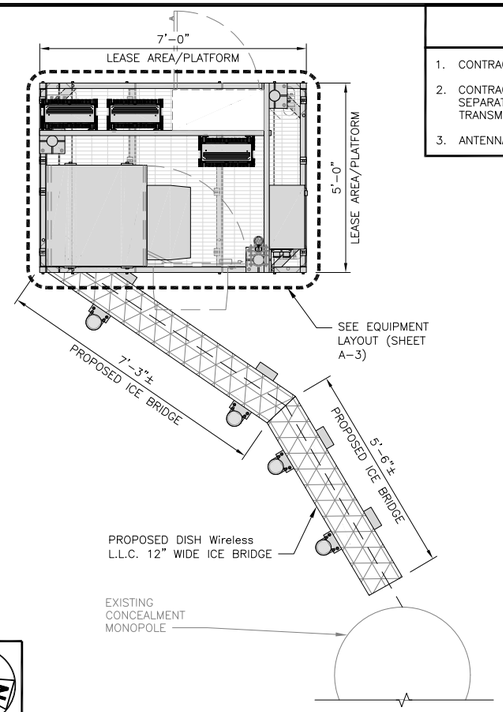
OVERALL SITE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

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

12" 6" 0 1' 2' 3' 4' 5'
1/2"=1'-0"

2

NOT USED

NO SCALE

3

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

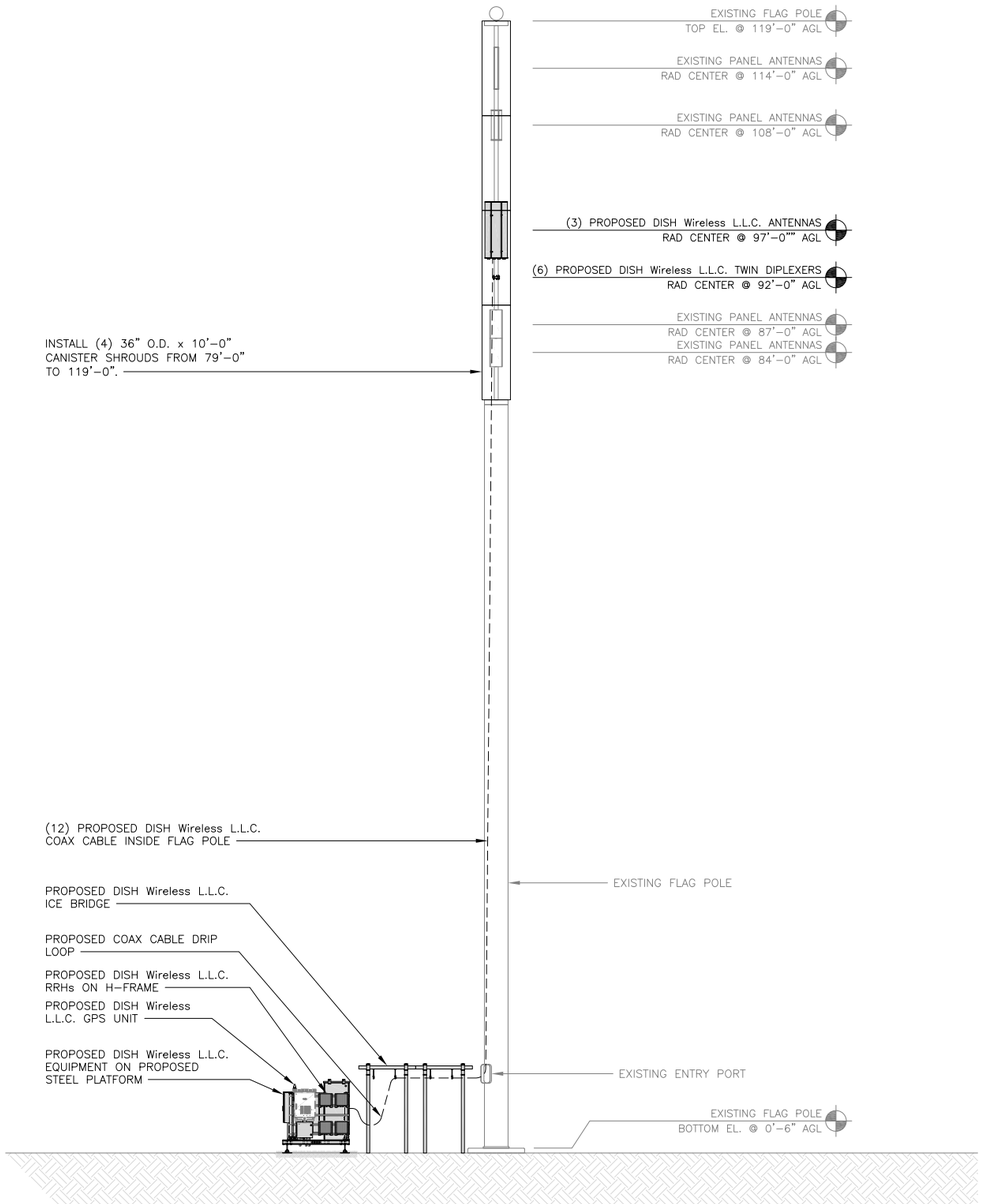
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

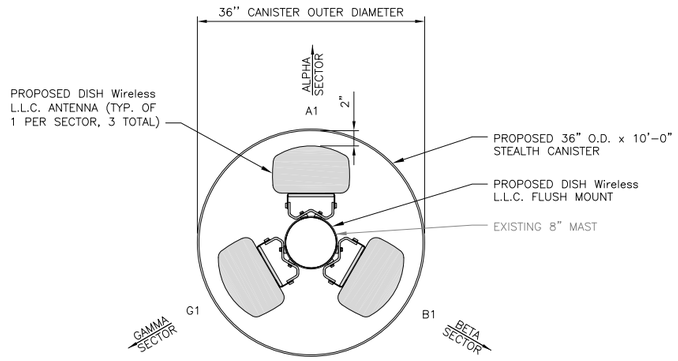
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.
4. RFDS STILL IN PRELIMINARY AT TIME OF RELEASE.



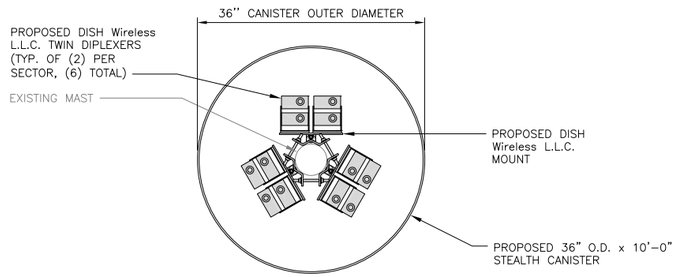
PROPOSED NORTH ELEVATION

8' 4' 0 8' 16'
1/8"=1'-0"

1



ANTENNA LAYOUT
RAD CENTER @ 97'-0" A.G.L.



DIPLEXER LAYOUT
RAD CENTER @ 92'-0" A.G.L.

N

ANTENNA & DIPLEXER LAYOUT

12" 9" 6" 3" 0 1' 2'
1"=1'-0"

2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	COMMSCOPE – FVV-65B-R3	5G	72.0" x 25.2"	0°	95'-0"	(12) 7/8"ø COAX CABLES (135' LONG)
BETA	B1	PROPOSED	COMMSCOPE – FVV-65B-R3	5G	72.0" x 25.2"	120°	95'-0"	
GAMMA	G1	PROPOSED	COMMSCOPE – FVV-65B-R3	5G	72.0" x 25.2"	240°	95'-0"	

SECTOR	POSITION	RRH	
		MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	CABINET	FUJITSU – TA08025-B605	5G
	CABINET	FUJITSU – TA08025-B604	5G
BETA	CABINET	FUJITSU – TA08025-B605	5G
	CABINET	FUJITSU – TA08025-B604	5G
GAMMA	CABINET	FUJITSU – TA08025-B605	5G
	CABINET	FUJITSU – TA08025-B604	5G

NOTES

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.

ANTENNA SCHEDULE

NO SCALE

3

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD M. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

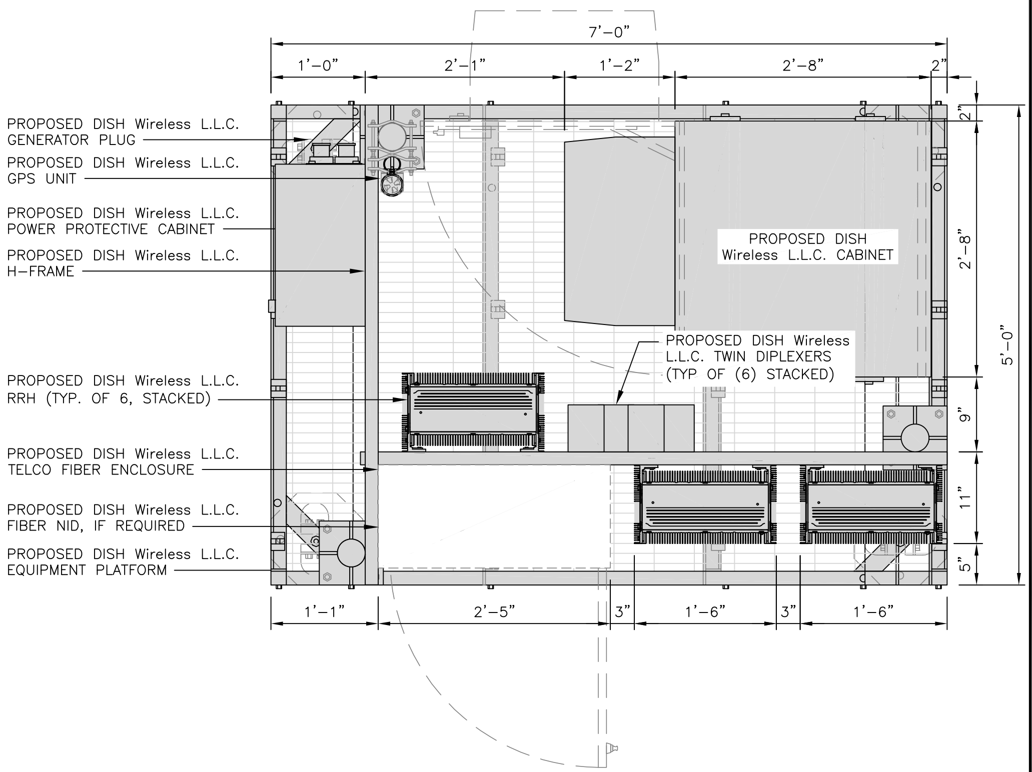
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

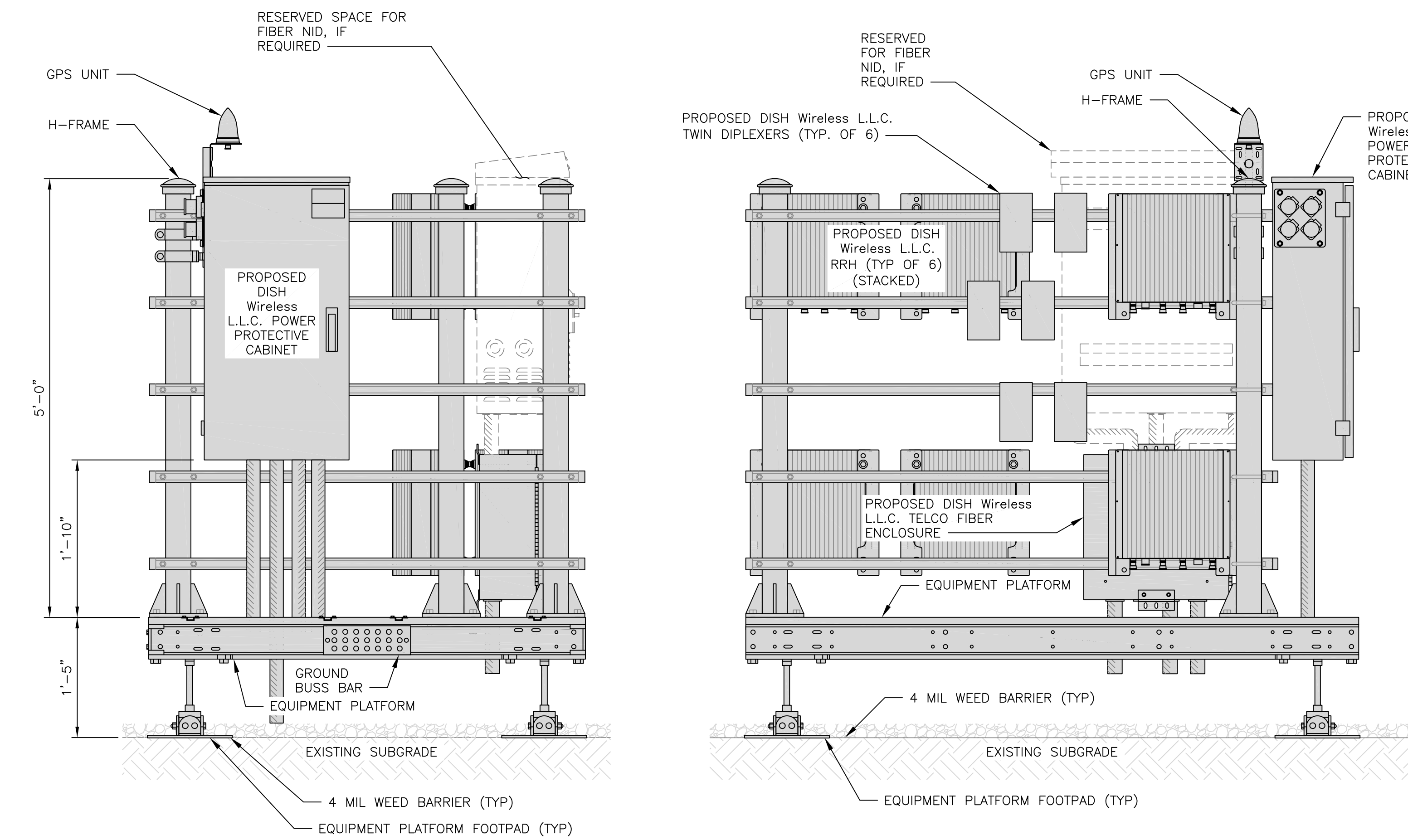
A-2

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.



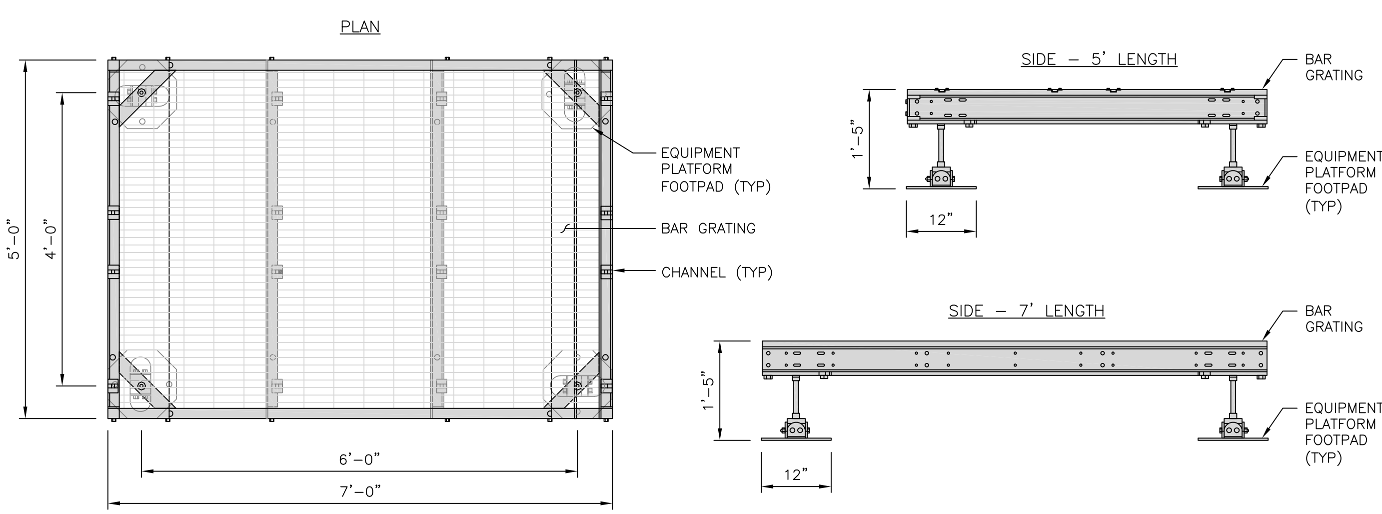
PLATFORM EQUIPMENT PLAN	NO SCALE	1



H-FRAME EQUIPMENT ELEVATION	NO SCALE	2

COMMSCOPE MTC4045LP 5X7 PLATFORM	
DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

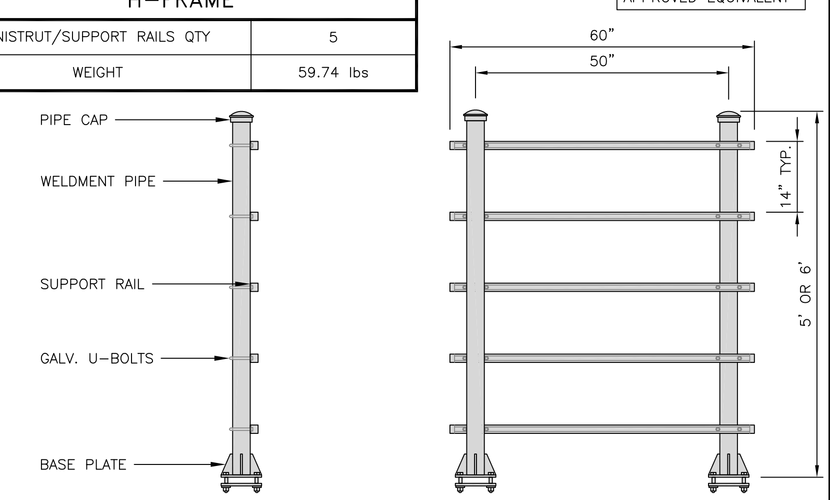
NOTE:
GC TO PROVIDE EXTENDED THREAD FOR PLATFORM IF REQUIRED HEIGHT EXCEEDS 17"



PLATFORM DETAIL	NO SCALE	3

COMMSCOPE MTC4045HFLD H-FRAME	
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs

NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



H-FRAME DETAIL	NO SCALE	4

dish wireless

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD ... TILE
No. 23924
LICENSED PROFESSIONAL ENGINEER
2/27/23
B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

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:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149474.001.01

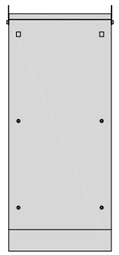
DISH Wireless L.L.C. PROJECT INFORMATION
BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

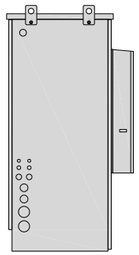
SHEET NUMBER
A-3

CHARLES INDUSTRY HVAC CUBE–PM63915IN4	
DIMENSIONS (HxWxD)	74"x32"x32"
POWER PLANT	–48VDC ABB/600W
TOTAL WEIGHT (EMPTY)	383 lbs

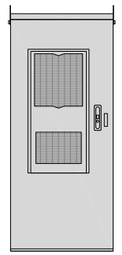
PLAN



BACK



SIDE

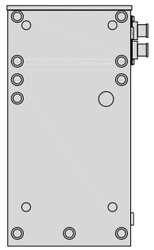


FRONT

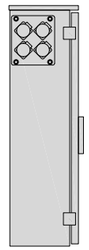
CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS	
ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

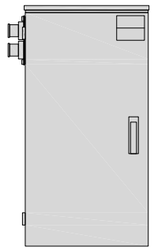
TOP



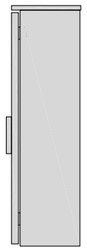
BACK



SIDE



FRONT

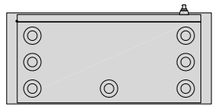


SIDE

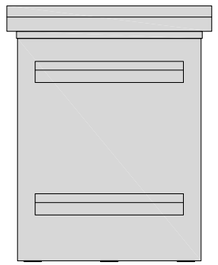
POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

NOT USED | NO SCALE | 3

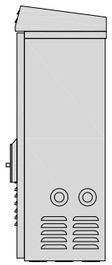
ZAYO 5RU (LEFT SWING DOOR) FIBER NID ENCLOSURE	
DIMENSIONS (HxWxD)	36.1"x29"x12.9"
WEIGHT	85 lbs



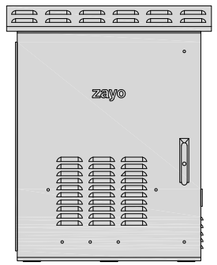
BOTTOM



BACK



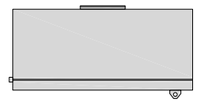
SIDE



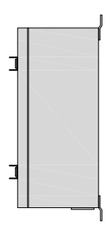
FRONT

FIBER NID ENCLOSURE DETAIL | NO SCALE | 5

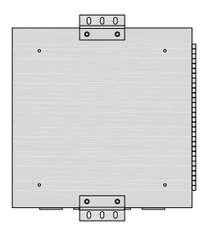
CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



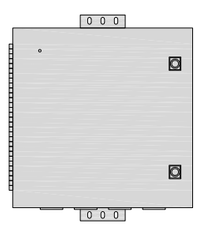
FRONT



SIDE



BACK



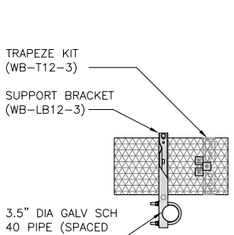
FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

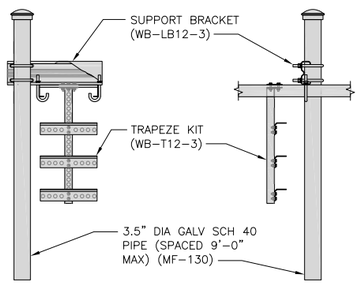
NOT USED | NO SCALE | 4

COMMSCOPE WB–K110–B WAVEGUIDE BRIDGE KIT	
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

INCLUDED PRODUCTS:	
	WB–T12–3 TRAPEZE KIT, 3 RUNGS
	WB–LB12–3 SUPPORT BRACKET
	MF–130 DIRECT BURIAL PIPE COLUMN, 13'–4"

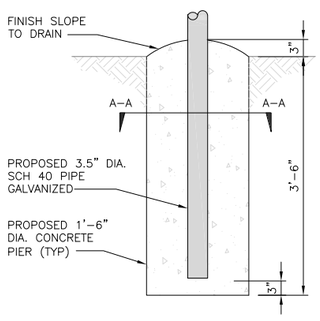


PLAN

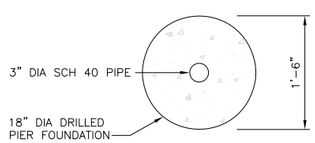


FRONT SIDE

ICE BRIDGE DETAIL | NO SCALE | 7

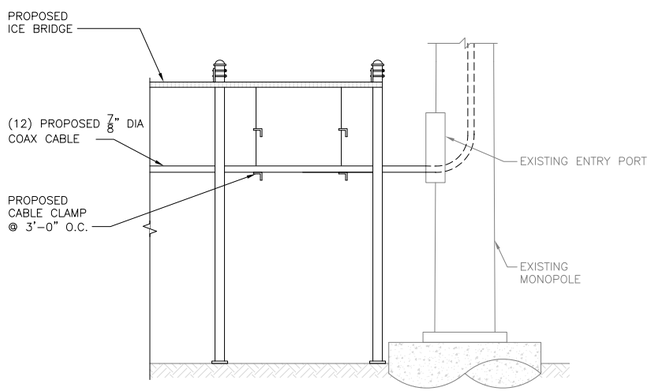


CONCRETE PIER



A–A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

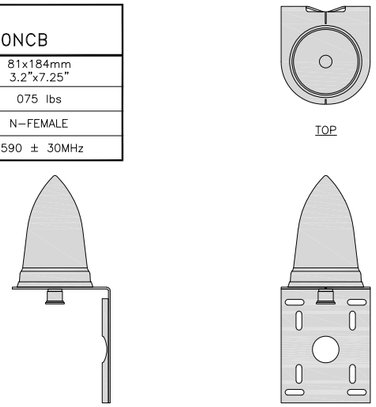
SHEET TITLE

EQUIPMENT DETAILS

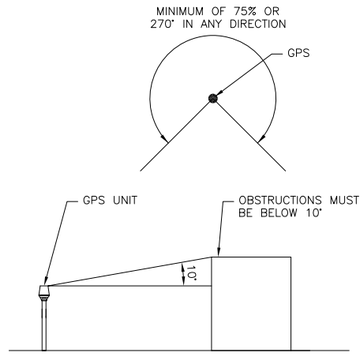
SHEET NUMBER

A-4

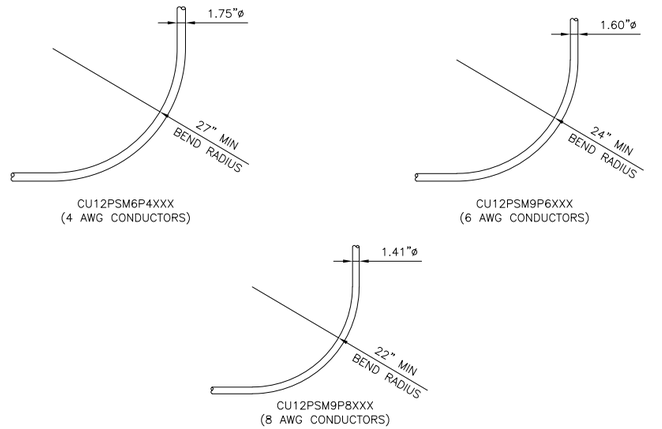
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



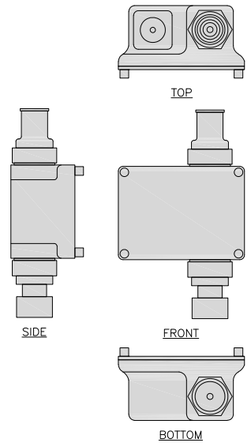
GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



CABLES UNLIMITED HYBRID CABLE
MINIMUM BEND RADIUSES | NO SCALE | 3

NOT USED | NO SCALE | 4

KAELUS SMART BIAS TEE SBT0003F1V1 (BOTTOM OF TOWER)	
DIMENSIONS (HxWxD)	5.41"x3.27"x1.88"
WEIGHT	0.88 lbs
RF TO RF+AISG	
PASSBAND	555-3800 MHz
INSERTION LOSS	0.1dB MAX
RETURN LOSS	20dB MIN
MAX INPUT POWER	750W CW/5kW PEP
INTERMODULATION PRODUCTS	-160dBc(IM3)MAX @ 2x20W CW CARRIERS
RF IMPEDANCE	50 Ohms



SMART BIAS TEE DETAIL | 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.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD M. TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23
B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

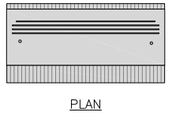
SHEET TITLE

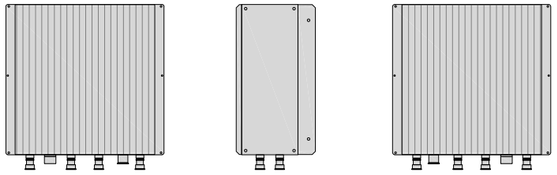
EQUIPMENT DETAILS

SHEET NUMBER

A-5

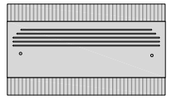
FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V

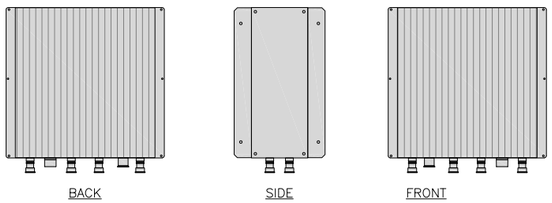

PLAN


BACK SIDE FRONT

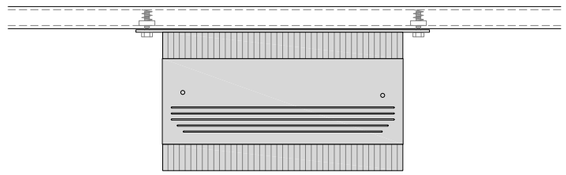
RRH DETAIL | NO SCALE | 1

FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V


PLAN


BACK SIDE FRONT

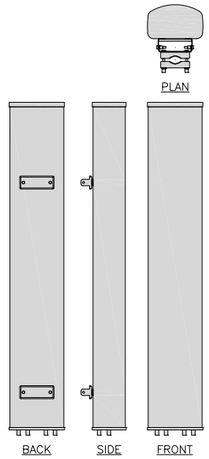
RRH DETAIL | NO SCALE | 2



NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

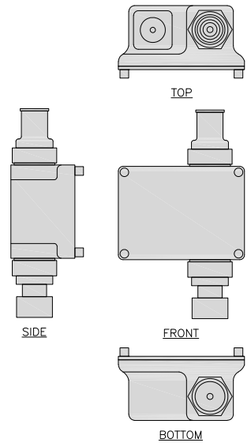
RRH UNISTRUT MOUNT DETAIL | NO SCALE | 3

COMMSCOPE FVV-65B-R3	
DIMENSIONS (HxWxD)(MM/IN)	1828x300x181 71.9"x11.8"x7.1"
RF CONNECTOR INTERFACE	4.3-10 FEMALE
WEIGHT	43.8 lbs
WEIGHT WITH BRACKETS	70.9 lbs


PLAN BACK SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

KAELUS SMART BIAS TEE SBT0003F1V2 (TOP OF TOWER)	
DIMENSIONS (HxWxD)	5.41"x3.27"x1.88"
WEIGHT	0.88 lbs
RF TO RF+AISG	
PASSBAND	555-3800 MHz
INSERTION LOSS	0.1dB MAX
RETURN LOSS	20dB MIN
MAX INPUT POWER	750W CW/5kW PEP
INTERMODULATION PRODUCTS	-160dBc(IM3)MAX @ 2x20W CW CARRIERS
RF IMPEDANCE	50 Ohms


TOP SIDE FRONT BOTTOM

SMART BIAS TEE DETAIL | NO SCALE | 5

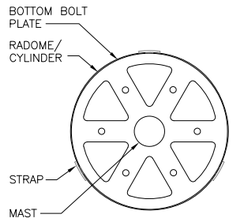
SEE ATTACHED SPEC SHEET

ANTENNA BRACKET DETAIL | NO SCALE | 6

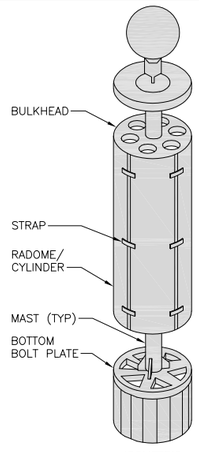
NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

RAYCAP STEALTH SMOOTH MULTI-PART	
RADOME OUTSIDE DIAMETERS	24"-60" DIA.
APPROX. MATERIAL THICKNESS	3/16"
MAX. HEIGHT	12'-0"
CONNECTION	BOLTS OR STRAPS



PLAN



ISOMETRIC

RADOME CANISTER DETAIL | NO SCALE | 9

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

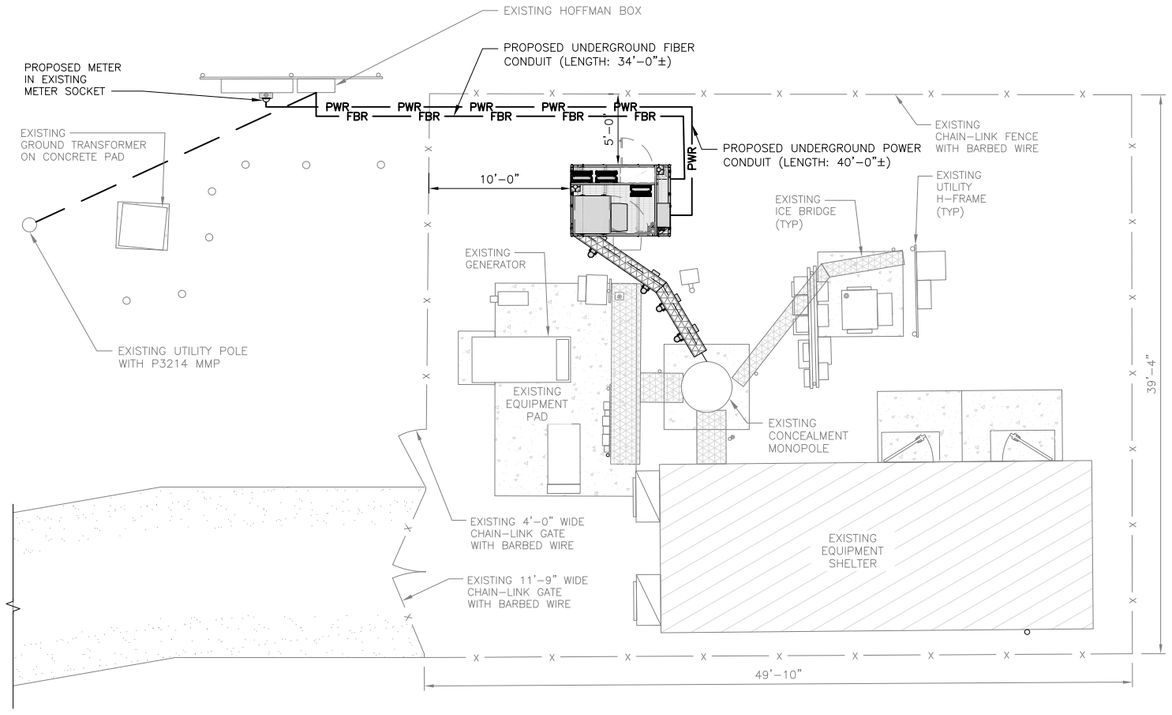
EQUIPMENT DETAILS

SHEET NUMBER

A-6

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. THE GROUND LEASE PROVIDES BROAD/BLANKET UTILITY RIGHTS. "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 ARE BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO FIELD VERIFICATION, PRIOR PROJECT DOCUMENTATION AND OTHER REAL PROPERTY RIGHTS DOCUMENTS. WHEN INSTALLING THE UTILITIES PLEASE LOCATE AND FOLLOW EXISTING PATH. IF EXISTING PATH IS NOT AN OPTION, PLEASE NOTIFY TOWER OWNER AS FURTHER COORDINATION MAY BE NEEDED.



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

UTILITY ROUTE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

ELECTRICAL NOTES

NO SCALE

2

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TYLER
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

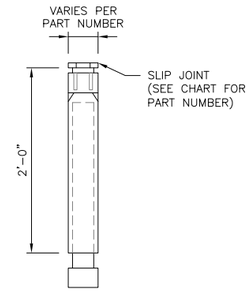
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

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"

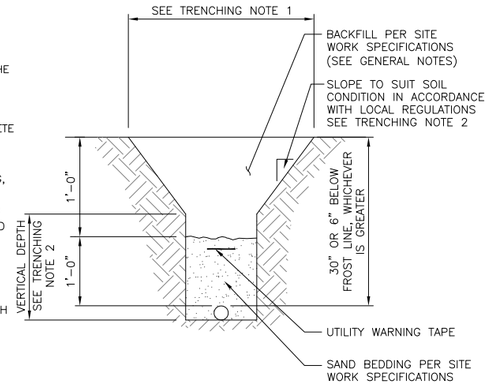


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

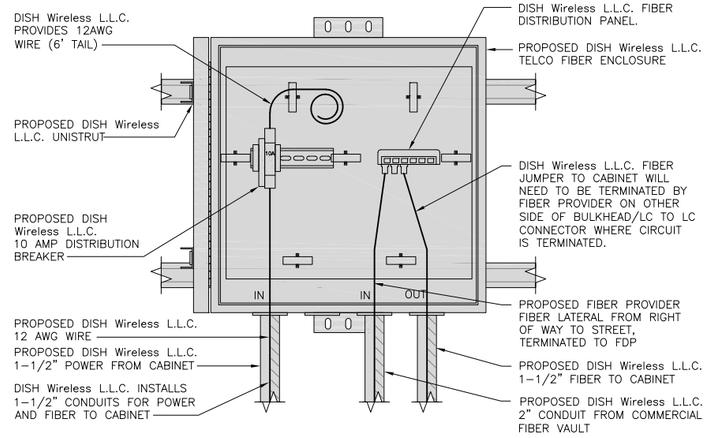
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

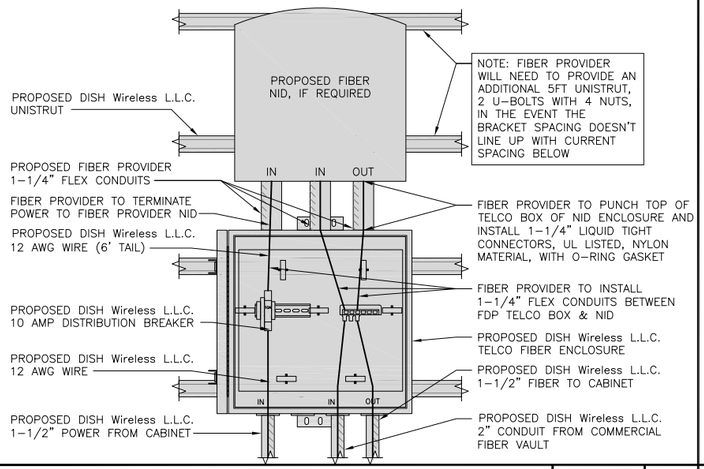
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
3. 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.



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

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD M. TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

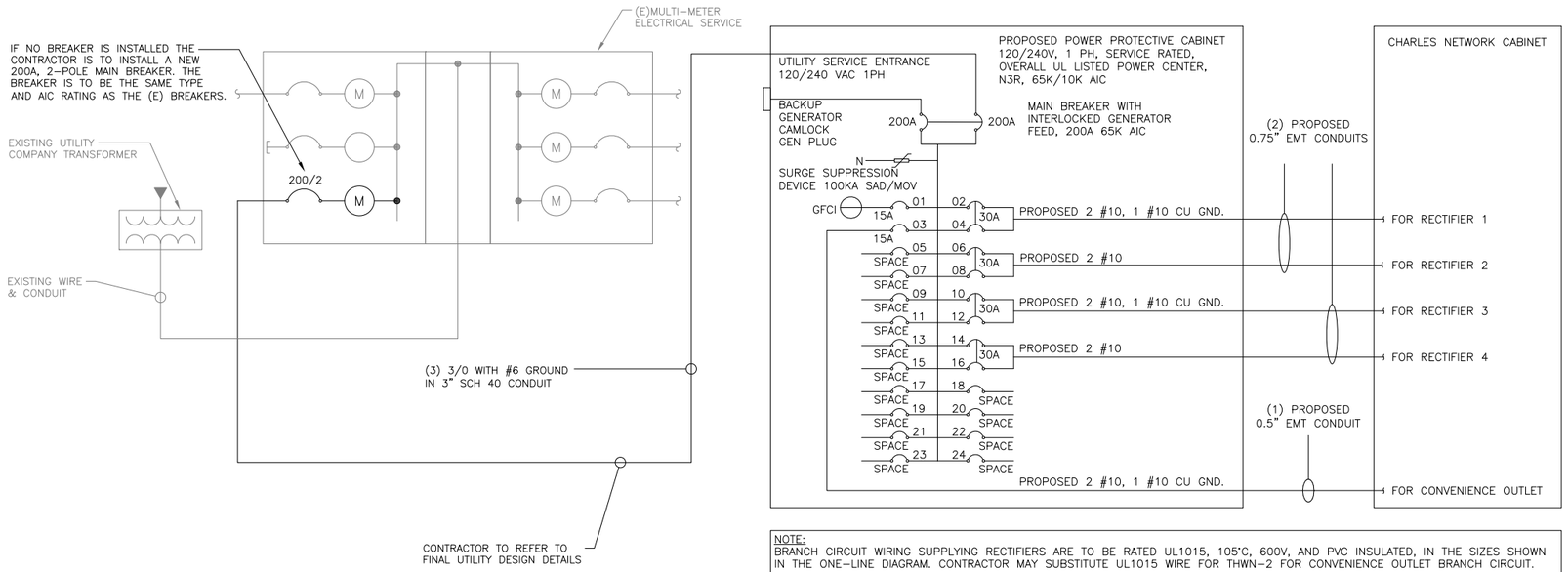
BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2



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:QO230
(1) 15A, 1P BREAKER - SQUARE D P/N:QO115

NOTES

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED SHORT CIRCUIT CALCULATIONS AND THE AIC RATINGS FOR EACH DEVICE IS ADEQUATE TO PROTECT THE EQUIPMENT AND THE ELECTRICAL SYSTEM.

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED VOLTAGE DROP CALCULATIONS AND ALL BRANCH CIRCUIT AND FEEDERS COMPLY WITH THE NEC (LISTED ON T-1) ARTICLE 210.19(A)(1) FPN NO. 4.

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)(a) 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.

PPC ONE-LINE DIAGRAM

NO SCALE | 1

PROPOSED CHARLES PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	30A	2880		ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4			2880	
-SPACE-				5	A	6	30A	2880		ABB/GE INFINITY RECTIFIER 2
-SPACE-				7	B	8			2880	
-SPACE-				9	A	10	30A	2880		ABB/GE INFINITY RECTIFIER 3
-SPACE-				11	B	12			2880	
-SPACE-				13	A	14	30A	2880		ABB/GE INFINITY RECTIFIER 4
-SPACE-				15	B	16			2880	
-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		VOLTAGE AMPS			
			98		98		AMPS			
			98				MAX AMPS			
			123				MAX 125%			

PANEL SCHEDULE

NO SCALE | 2

NOT USED

NO SCALE | 3

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23
B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

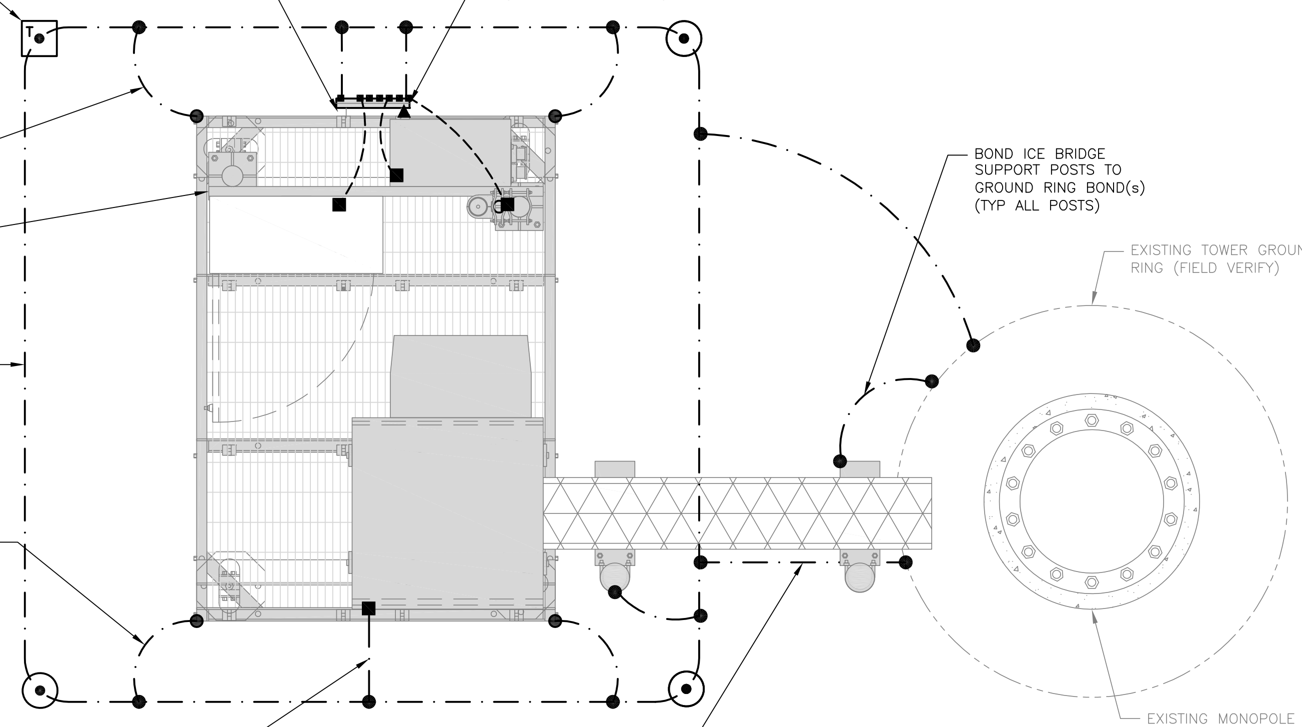
REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149474.001.01

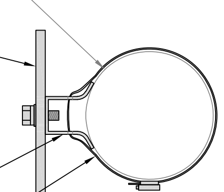
DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

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

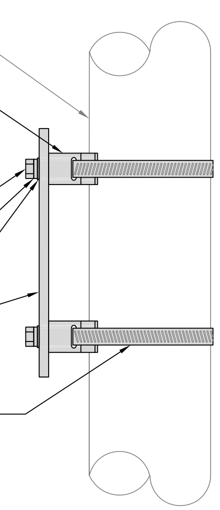
SHEET NUMBER
E-3



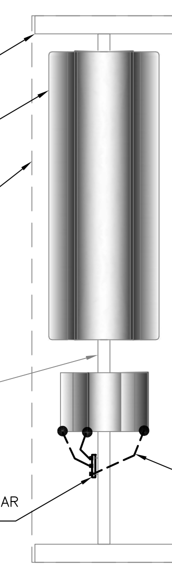
TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1



BUSS BAR PLAN



BUSS BAR ELEVATION



ANTENNA GROUNDING ELEVATION

TYPICAL ANTENNA GROUNDING DETAIL | NO SCALE | 2

- ● EXOTHERMIC CONNECTION
- ■ MECHANICAL CONNECTION
- GROUND BUS BAR
- ⊙ GROUND ROD
- TEST GROUND ROD WITH INSPECTION SLEEVE
- - - - - #6 AWG STRANDED & INSULATED
- — · — #2 AWG SOLID COPPER TINNED
- ▲ BUSS BAR INSULATOR

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 AND 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.

REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES | NO SCALE | 3

dish wireless

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT · CHAD TILLE · No. 23924 · LICENSED · PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149474.001.01

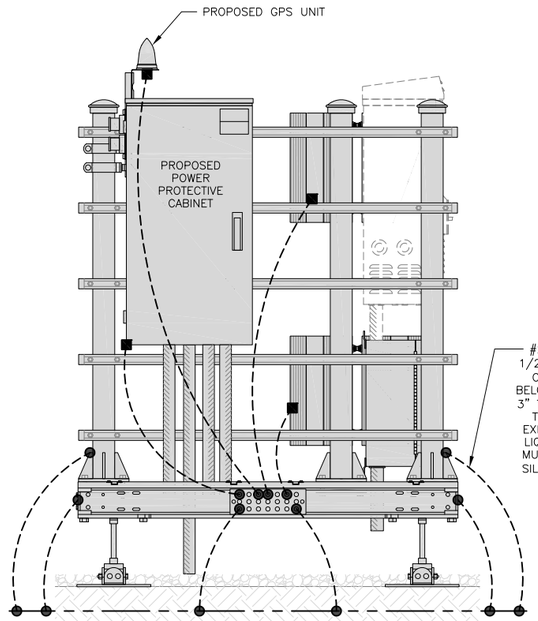
DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE
GROUNDING PLANS AND NOTES

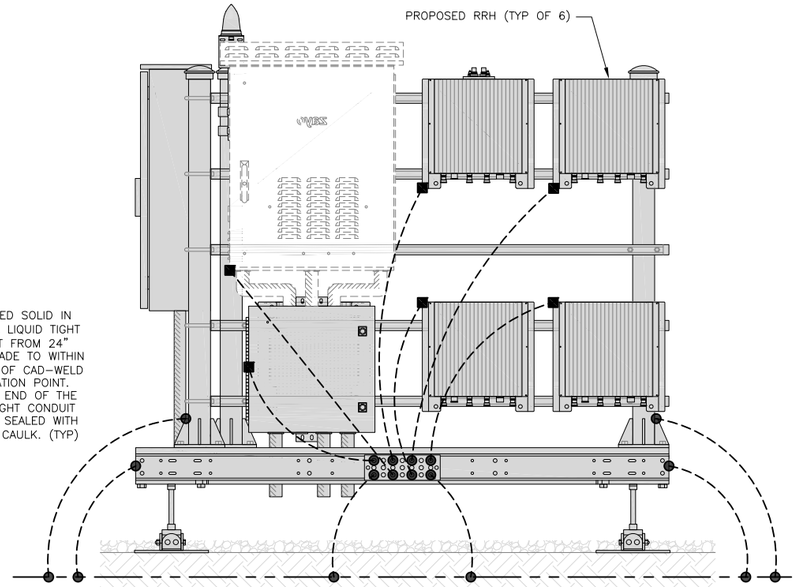
SHEET NUMBER
G-1

NOTES

EQUIPMENT CABINET OMITTED FOR CLARITY



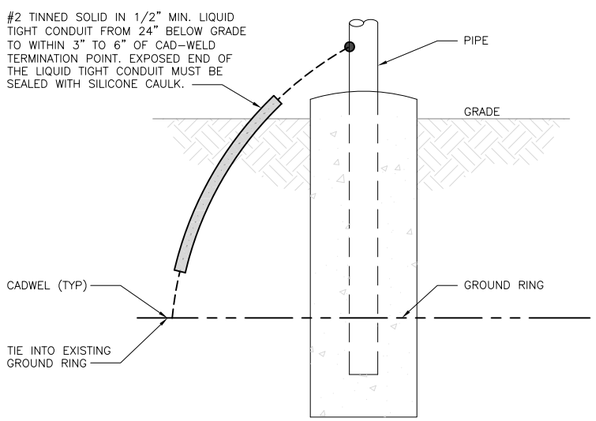
FRONT ELEVATION



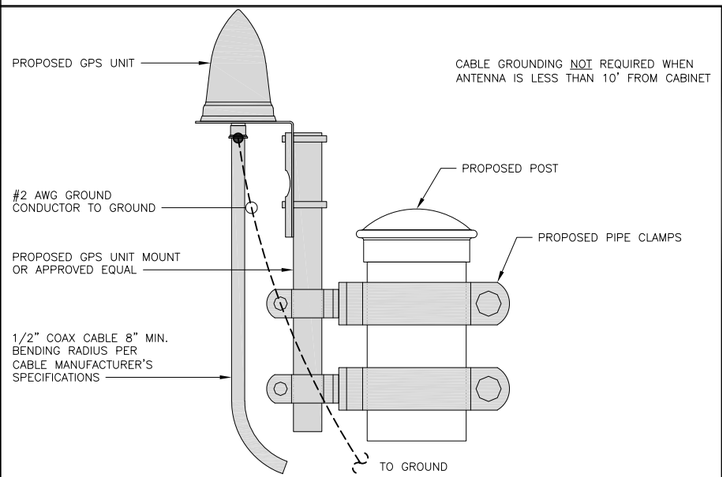
SIDE ELEVATION

NOT USED | NO SCALE | 1

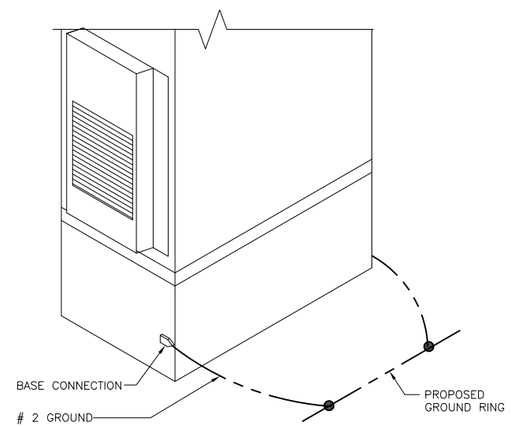
H-FRAME GROUNDING DETAIL | NO SCALE | 2



TRANSITIONING GROUND DETAIL | NO SCALE | 3



TYPICAL GPS UNIT GROUNDING | NO SCALE | 4



OUTDOOR CABINET GROUNDING | NO SCALE | 5

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

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

STATE OF CONNECTICUT
CHAD M. TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

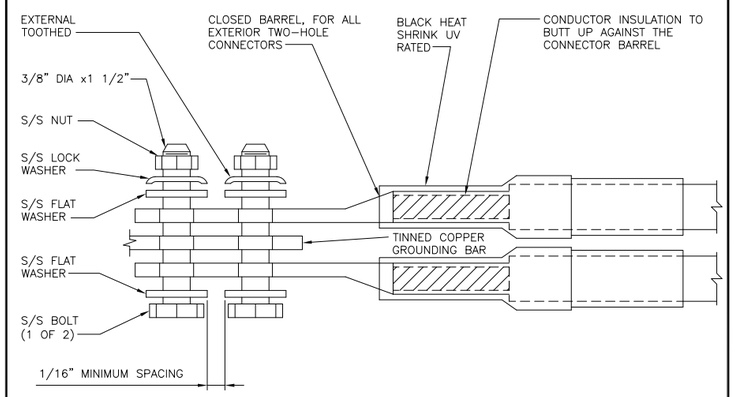
GROUNDING DETAILS

SHEET NUMBER

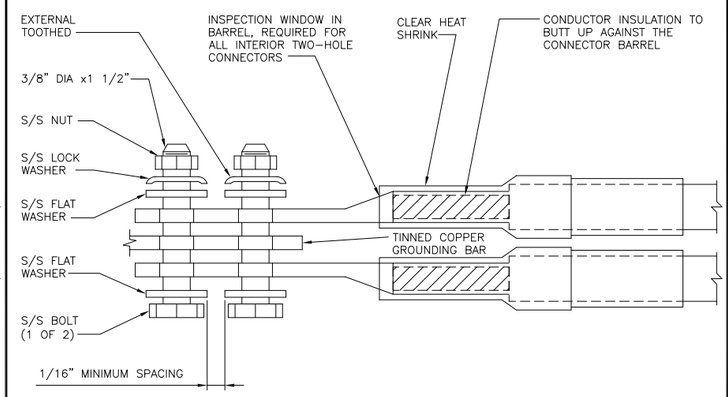
G-2

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).

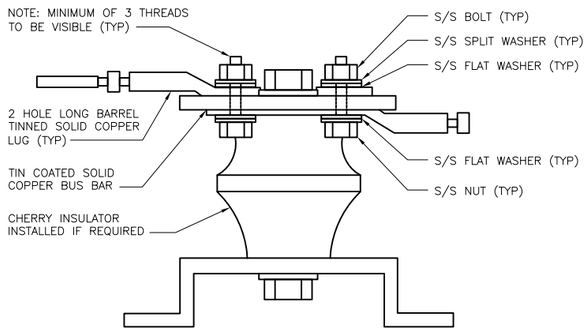
TYPICAL GROUNDING NOTES | NO SCALE | 1



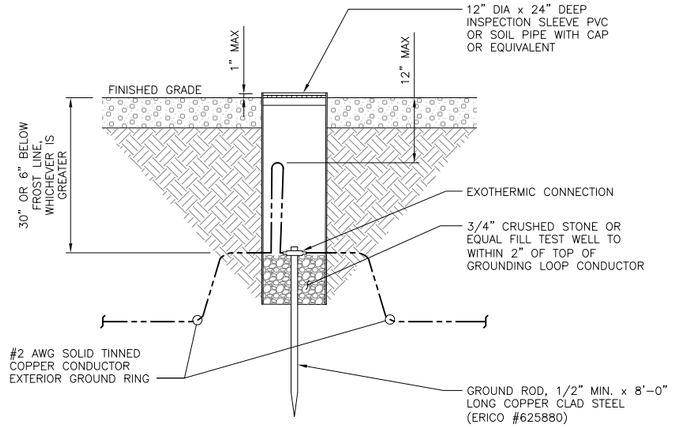
TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

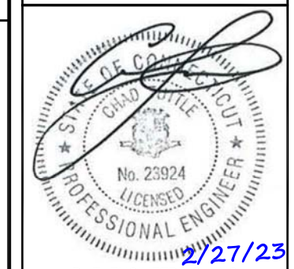
NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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



2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-3

HYBRID/DISCREET CABLES — 3/4" TAPE WIDTHS WITH 3/4" SPACING

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

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

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 3 – MAIN COAX WITH GROUND MOUNTED RRHs.

EXAMPLE 1	EXAMPLE 2	EXAMPLE 3 COAX#1 (ALPHA)	CANISTER COAX #2 (ALPHA)
RED	RED	RED	RED
BLUE	BLUE		RED
GREEN	GREEN		
ORANGE	YELLOW		
PURPLE			

CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RD DETAILS. FINAL RFDS IS IN NEXSYSONE.

FIBER JUMPERS TO RRHs

LOW–BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.

LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

POWER CABLES TO RRHs

LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY

LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

RET MOTORS AT ANTENNAS

RET CONTROL IS HANDLED BY THE MID–BAND RRH WHEN ONE SET OF RET PORTS EXIST ON ANTENNA.

SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.

ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN	ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN	ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN
RED	RED	BLUE	BLUE	GREEN	GREEN
PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE

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 PRIMARY	SECONDARY	FORWARD AZIMUTH OF 120–240 DEGREES PRIMARY	SECONDARY	FORWARD AZIMUTH OF 240–359 DEGREES 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)	ORANGE
AWS (N66+N70+H–BLOCK)	PURPLE
CBRS TECH (3 GHz)	YELLOW
NEGATIVE SLANT PORT ON ANT/RRH	WHITE
ALPHA SECTOR	RED
BETA SECTOR	BLUE
GAMMA SECTOR	GREEN

COLOR IDENTIFIER — NO SCALE — 2

NOT USED — NO SCALE — 3

NOT USED — NO SCALE — 4

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
No. 23924
LICENSED PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE
RF
CABLE COLOR CODE

SHEET NUMBER
RF-1

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–DDBTXD

CHAIN LINK FENCE

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE

UNDERGROUND POWER

UNDERGROUND TELCO

OVERHEAD POWER

OVERHEAD TELCO

UNDERGROUND TELCO/POWER

ABOVE GROUND POWER

ABOVE GROUND TELCO

ABOVE GROUND TELCO/POWER

WORKPOINT

W.P.

SECTION REFERENCE

XX
X–X

DETAIL REFERENCE

XX
X–X

LEGEND

AB	ANCHOR BOLT
ABV	ABOVE
AC	ALTERNATING CURRENT
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGL	ABOVE GROUND LEVEL
AIC	AMPERAGE INTERRUPTION CAPACITY
ALUM	ALUMINUM
ALT	ALTERNATE
ANT	ANTENNA
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BTC	BARE TINNED COPPER CONDUCTOR
BOF	BOTTOM OF FOOTING
CAB	CABINET
CANT	CANTILEVERED
CHG	CHARGING
CLG	CEILING
CLR	CLEAR
COL	COLUMN
COMM	COMMON
CONC	CONCRETE
CONSTR	CONSTRUCTION
DBL	DOUBLE
DC	DIRECT CURRENT
DEPT	DEPARTMENT
DF	DOUGLAS FIR
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DWG	DRAWING
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
IN	INCH
INT	INTERIOR
LB(S)	POUND(S)
LF	LINEAR FEET
LTE	LONG TERM EVOLUTION
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MECH	MECHANICAL
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
MTS	MANUAL TRANSFER SWITCH
MW	MICROWAVE
NEC	NATIONAL ELECTRIC CODE
NM	NEWTON METERS
NO.	NUMBER
#	NUMBER
NTS	NOT TO SCALE
OC	ON–CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OPNG	OPENING
P/C	PRECAST CONCRETE
PCS	PERSONAL COMMUNICATION SERVICES
PCU	PRIMARY CONTROL UNIT
PRC	PRIMARY RADIO CABINET
PP	POLARIZING PRESERVING
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PWR	POWER CABINET
QTY	QUANTITY
RAD	RADIUS
RECT	RECTIFIER
REF	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
RET	REMOTE ELECTRIC TILT
RF	RADIO FREQUENCY
RMC	RIGID METALLIC CONDUIT
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SCH	SCHEDULE
SHT	SHEET
SIAD	SMART INTEGRATED ACCESS DEVICE
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
TEMP	TEMPORARY
THK	THICKNESS
TMA	TOWER MOUNTED AMPLIFIER
TN	TOE NAIL
TOA	TOP OF ANTENNA
TOC	TOP OF CURB
TOF	TOP OF FOUNDATION
TOP	TOP OF PLATE (PARAPET)
TOS	TOP OF STEEL
TOW	TOP OF WALL
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
UPS	UNITERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
VIF	VERIFIED IN FIELD
W	WIDE
W/	WITH
WD	WOOD
WP	WEATHERPROOF
WT	WEIGHT

ABBREVIATIONS

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

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

STATE OF CONNECTICUT
CHAD M. TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

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.

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

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.

dish wireless

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

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.

dish wireless.

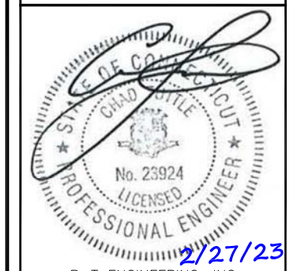
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

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



2/27/23

B+T ENGINEERING, INC
PEC: 0001564
Expires 2/1/24

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	MLC	RMC

RFDS REV #: 4

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
1	5/12/22	ISSUED FOR CONSTRUCTION
2	5/27/22	ISSUED FOR CONSTRUCTION
3	8/23/22	ISSUED FOR CONSTRUCTION
4	2/9/23	ISSUED FOR CONSTRUCTION
5	2/27/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149474.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00049A
71 PLEASANT VIEW ROAD
DERBY, CT 06418

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

EXHIBIT 9

MOD Drawings

PER THE INTERNATIONAL BUILDING CODE THIS STRUCTURE IS CLASSIFIED AS:

1. CONSTRUCTION TYPE II-B (TABLE 601)
2. GROUP U OCCUPANCY (SECTION 312.1 UNOCCUPIED TOWER SITE)

MODIFICATION AND DESIGN DRAWINGS FOR AN EXISTING 119' PENNSUMMIT MONOPOLE TOWER

PROPOSED CARRIER: DISH WIRELESS

SITE: CT13616-A-SBA / ST. JUDES

COORDINATES (LATITUDE: 41.315042°, LONGITUDE: -73.064314°)

CONSTRUCTION CLASS

THE RIGGING PLAN FOR THIS SITE WOULD BE A MINIMUM OF A CLASS III AND THE CONTRACTOR SHALL MAKE FINAL DETERMINATION

NOTE:

1. THE MODIFICATION DRAWINGS ARE BASED ON THE **TES** PROJECT NO. 136303, DATED 11/17/2022.

SHEET	SHEET TITLE	REV
T-1	TITLE SHEET	0
BOM	BILL OF MATERIALS	0
GN-1	GENERAL NOTES	0
A-1	TOWER PROFILE	0

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO: 136551

CUSTOMER SITE NO: CT13616-A-SBA

CUSTOMER SITE NAME: ST. JUDES

71 PLEASANTVIEW ROAD
DERBY, CT 06418

STATE OF CONNECTICUT
JARRYD TIBBETTS
No. 24178
LICENSED
PROFESSIONAL ENGINEER

DRAWN BY: LC | CHECKED BY: AD/TA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	LC	12/20/22

SHEET TITLE: TITLE SHEET

SHEET NUMBER: T-1 | REV #: 0

BILL OF MATERIALS

QUANTITY COUNTED	QUANTITY PROVIDED	PART NUMBER	DESCRIPTIONS	LENGTH	SHEET LIST (INSTALLATION)	SHEET LIST (FABRICATE)	PIECE WEIGHT (LBS)	WEIGHT (LB)	NOTES
			MATERIAL & HARDWARE						
			Following Items are Non-standard Parts						
4	4	---	36" O.D. SMOOTH ROUND, MULTI-PART, PERFORATED/VENTILATED CANISTER SHROUD W/ EXPANSION KIT & TOP CAP	10'-0"±	A-1	---	TBD	---	Designed/Provided By Others
1	1	---	TRANSITION CONE	---	A-1	---	TBD	---	Designed/Provided by Others
1	1	---	FLAG TRUCK AND DECORATIVE BALL FOR 36" O.D. SHROUDS	---	A-1	---	TBD	---	Designed/Provided by Others
2	2	---	LANCO RC-300 OR HENRY 287 WHITE ACRYLIC ELASTOMERIC COATING AND SEALER OR EQUIV (GALLON)	---	A-1	---	---	---	Provided By Contractor

ALL APLXXXX, LPXXXX AND RLPXXXX ARE PATENTED PRODUCTS AND CANNOT BE FABRICATED BY THIRD PARTIES. THESE PARTS ARE AVAILABLE FROM:

METROSITE, LLC.
180 IND PARK BLVD COMMERCE, GA 30529
OFFICE: (706) 335-7045
FAX: (706) 335-7056

NOTE: ALL MATERIALS, WHICH WEREN'T LISTED IN THIS SHEET, ARE ASSUMED TO BE PROVIDED BY THE CONTRACTOR.

TOTAL WEIGHT (LBS) = **0.0**

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
136551

CUSTOMER SITE NO:
CT13616-A-SBA
CUSTOMER SITE NAME:
ST. JUDES
71 PLEASANTVIEW ROAD
DERBY, CT 06418

DRAWN BY: LC | CHECKED BY: AD/TA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	LC	12/20/22

SHEET TITLE:
BILL OF MATERIALS

SHEET NUMBER: BOM
REV #: 0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE ANSI/TIA-222-H, ANSI/ASSP A10.48, 2022 CONNECTICUT STATE BUILDING CODE, AND ANY OTHER GOVERNING BUILDING CODES AND OSHA SAFETY REGULATIONS.
2. ALL WORK INDICATED ON THE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TELECOMMUNICATIONS TOWER, POLE AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF ALL MISCELLANEOUS PARTS (SUCH AS SHIMS), TEMPORARY SUPPORTS, AND GUYINGS, ETC., PER ANSI/ASSP A10.48, TO COMPLETE THE ASSEMBLY AS SHOWN IN THE DRAWINGS.
4. CONTRACTOR SHALL PROCEED WITH THE INSTALLATION WORK CAREFULLY SO THE WORK WILL NOT DAMAGE ANY EXISTING CABLE, EQUIPMENT OR THE STRUCTURE.
5. THE USE OF GAS TORCH OR WELDER, ARE NOT ALLOWED ON ANY TOWER STRUCTURE WITHOUT THE CONSENT OF THE TOWER OWNER.
6. GENERALLY THE CONTRACTOR IS RESPONSIBLE TO CONDUCT AN ONSITE VISIT SURVEY OF THE JOB SITE AFTER AWARD, AND REPORT ANY ISSUES WITH THE SITE TO **TES** BEFORE PROCEEDING CONSTRUCTION.

FABRICATION

1. ALL STEEL SHALL MEET OR EXCEED THE MINIMUM STRENGTH AS SPECIFIED IN THE DRAWINGS. IF YIELD STRENGTH WAS NOT NOTED IN THE DRAWINGS, CONTRACTORS SHALL CONTACT TES FOR DIRECTION.
2. ALL FIELD CUT EDGES SHALL BE GROUND SMOOTH. ALL FIELD CUT AND DRILLED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNO. (E70XX UNLESS NOTED OTHERWISE).
2. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING APPROX. 0.5" BEYOND THE PROPOSED FIELD WELD SURFACES.
3. ALL WELDS SHALL BE INSPECTED VISUALLY. A MINIMUM OF 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. 100% OF WELDS SHALL BE INSPECTED IF DEFECTS ARE FOUND.
4. WELD INSPECTIONS SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
5. AFTER INSPECTION, ALL FIELD WELDED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

BOLTED ASSEMBLIES AND TIGHTENING OF CONNECTIONS

1. ALL HIGH STRENGTH BOLTS SHALL CONFORM TO THE PROVISIONS OF THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS AS APPROVED BY THE RCSC.
2. FLANGE BOLTS SHALL BE TIGHTENED BY THE AISC "TURN-OF-THE-NUT" METHOD. THE FOLLOWING TABLE SHOULD BE USED FOR THE "TURN-OF-THE-NUT" TIGHTENING.
3. SPLICE BOLTS AND ALL OTHER BOLTS IN BEARING TYPE CONNECTIONS SHALL BE TIGHTENED TO A SNUG-TIGHT CONDITION.
4. THE SNUG-TIGHT CONDITION IS DEFINED AS THE TIGHTNESS ATTAINED BY EITHER A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER WITH AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
5. HB HOLLO-BOLT SHALL BE INSTALLED PER ICC ESR-3330 INSTRUCTIONS.

VERIFICATION AND INSPECTION

1. IF APPLICABLE, VERIFICATION INSPECTION TO BE PERFORMED SHALL BE IN ACCORDANCE TO IBC-2021 SECTION 1705.2 FOR STEEL CONSTRUCTION & TABLE 1705.3 FOR CONCRETE CONSTRUCTION.

POST INSTALLED EPOXY INJECTED ANCHOR BOLTS:

1. CONCRETE MUST BE A MINIMUM OF 28 DAYS OLD.
2. FOLLOW MANUFACTURER'S REQUIREMENTS FOR CURE TIME VS. AMBIENT TEMPERATURE.
3. DRILL HOLE TO REQUIRED DIAMETER AND DEPTH. ALL WATER, DIRT, OIL, DEBRIS, GREASE OR DUST MUST BE REMOVED FROM EACH CORE HOLE. FOLLOW MANUFACTURER'S RECOMMENDATION FOR CORRECT TYPE OF CORE BIT. AVOID DAMAGING EXISTING REINFORCING STEEL OR OTHER EMBEDDED ITEMS. NOTIFY TES ENGINEERING IF VOIDS IN THE CONCRETE, REINFORCING STEEL OR OTHER EMBEDDED ITEMS ARE ENCOUNTERED. STOP CORING IMMEDIATELY IF THIS OCCURS.
4. A HOLE ROUGHENING DEVICE FROM EITHER HILTI OR ALLFASTENERS SHALL BE USED WITH ALL HOLES. FOLLOW ALL MANUFACTURER'S RECOMMENDED CORING AND INSTALLATION INSTRUCTIONS.
5. AFTER CORING AND ROUGHENING, FLUSH EACH HOLE WITH RUNNING WATER TO REMOVE ANY SLURRY OR DEBRIS. REMOVE ALL WATER FROM THE HOLE BY MECHANICAL PUMPING.
6. BRUSH EACH HOLE WITH AN APPROPRIATE SIZED NYLON BRUSH AND FLUSH WITH RUNNING WATER A SECOND TIME. REMOVE ALL WATER FROM THE HOLE.
7. AFTER THE SECOND WATER FLUSH BRUSH THE HOLE AGAIN WITH THE APPROPRIATE SIZED NYLON BRUSH.
8. BLOW EACH HOLE WITH COMPRESSED AIR TWO TIMES MINIMUM.
9. CONFIRM THAT EACH HOLE IS PROPERLY ROUGHED AND DRY.
10. NO EPOXY INJECTION SHALL TAKE PLACE IN RAINY CONDITIONS.
11. EPOXY SHOULD BE VISIBLE AT THE TOP OF THE CORE HOLE AFTER INSTALLATION.
12. CONTRACTOR TO SUPPLY ONE PHOTO OF EACH ROUGHED AND CLEANED HOLE IN CLOSEOUT PHOTO PACKAGE.

TABLE 8.2 NUT ROTATION FROM SNUG-TIGHT CONDITION FOR TURN-OF-NUT PRETENSIONING [a,b]

BOLT LENGTH [c]	DISPOSITION OF OUTER FACE OF BOLTED PARTS		
	BOTH FACES NORMAL TO BOLT AXIS	ONE FACE NORMAL TO BOLT AXIS, OTHER SLOPED NOT MORE THAN 1:20 [d]	BOTH FACES SLOPED NOT MORE THAN 1:20 FROM NORMAL TO BOLT AXIS [d]
NOT MORE THAN $4d_b$	1/3 TURN	1/2 TURN	2/3 TURN
MORE THAN $4d_b$ BUT NOT MORE THAN $8d_b$	1/2 TURN	2/3 TURN	5/6 TURN
MORE THAN $8d_b$ BUT NOT MORE THAN $12d_b$	2/3 TURN	5/6 TURN	1 TURN

[a] NUT ROTATION IS RELATIVE TO BOLT REGARDLESS OF THE ELEMENT (NUT OR BOLT) BEING TURNED. FOR REQUIRED NUT ROTATIONS OF 1/2 TURN AND LESS, THE TOLERANCE IS PLUS OR MINUS 30 DEGREES; FOR REQUIRED NUT ROTATIONS OF 2/3 TURN AND MORE, THE TOLERANCE IS PLUS OR MINUS 45 DEGREES.

[b] APPLICABLE ONLY TO JOINTS IN WHICH ALL MATERIAL WITHIN THE GRIP IS STEEL.

[c] WHEN THE BOLT LENGTH EXCEEDS $12d_b$, THE REQUIRED NUT ROTATION SHALL BE DETERMINED BY ACTUAL TESTING IN A SUITABLE TENSION CALIBRATOR THAT SIMULATES THE CONDITIONS OF SOLIDLY FITTING STEEL.

[d] BEVELED WASHER NOT USED.

SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, JUNE 30, 2004 RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

INSTALLATION TORQUE REQUIRED FOR HOLLO BOLTS AND AJAX BOLTS:

1. HB12 HOLLO BOLT: 59 FT-LBS
2. HB16 HOLLO BOLT: 140 FT-LBS
3. HB20 HOLLO BOLT: 221 FT-LBS
4. M20 AJAX BOLT: 280 FT-LBS.

FIELD HOT WORK PLAN NOTES:

FOLLOWING GUIDELINES SHALL BE COMPLIED WITH:

1. CONTRACTOR'S RESPONSIBILITY TO COMPLETE A HOT WORK PLAN IF AWARDED PER CUSTOMER SPECIFICATIONS GUIDELINES FOR WELDING, CUTTING & SPARK PRODUCING WORK.
2. HAVE A FIRE PLAN APPROVED BY THE CUSTOMER AND THEIR SAFETY MANAGEMENT DEPT.
3. CONTRACTOR MUST OBTAIN THE CONTACT INFO OF THE LOCAL FIRE DEPARTMENT AND THE 911 ADDRESS OF THE TOWER SITE BEFORE CONSTRUCTION.
4. CONTRACTOR SHALL MAKE SURE THAT CELL PHONE COVERAGE IS AVAILABLE IN THE TOWER SITE. IF CELL COVERAGE IS NOT AVAILABLE, AN IMMEDIATE AVAILABLE MEANS OF DIRECT COMMUNICATION WITH THE FIRE DEPARTMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION START.
5. ALL CONSTRUCTION SHALL BE PERFORMED UNDER WIND SPEED LESS THAN 10 MPH ON THE GROUND LEVEL. IF WIND SPEED INCREASE, CONTRACTOR MUST DETERMINE IF CONSTRUCTION SHALL BE DISCONTINUED.
6. FIRE SUPPRESSION EQUIPMENT MUST BE MADE AVAILABLE ON SITE AND READY TO USE.
7. CONTRACTOR SHALL ASSIGN A FIRE WATCHER TO PERFORM FIRE-FIGHTING DUTIES.
8. ALL WELDERS SHALL BE AWS OR STATE CERTIFIED. THEY MUST ALSO BE EXPERIENCED IN WELDING ON GALVANIZED MATERIALS.
9. IF IT IS POSSIBLE, ALL EXISTING COAX NEAR WELDING AREA SHALL BE TEMPORARILY MOVED AWAY FROM THE WELDING AREA BEFORE WELDING THE PLATES.
10. PLEASE REPORT ANY FIELD ISSUE TO TES @ 972-483-0607.

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
136551

CUSTOMER SITE NO:
CT13616-A-SBA
CUSTOMER SITE NAME:
ST. JUDES
71 PLEASANTVIEW ROAD
DERBY, CT 06418

DRAWN BY: LC | CHECKED BY: AD/TA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	LC	12/20/22

SHEET TITLE:
GENERAL NOTES

SHEET NUMBER: GN-1
REV #: 0

NOTES:

1. TEMPORARILY RELOCATE ANY EXISTING COAX ATTACHED TO THE MONOPOLE AND ANY OTHER MEMBERS WHERE OBSTRUCTION WITH THE PROPOSED MODIFICATION MAY OCCUR.

2. TEMPORARY RELOCATION OF EXISTING EQUIPMENT AROUND THE FOUNDATION MAY BE REQUIRED DURING CONSTRUCTION.

SCOPE OF WORK

1. REPLACE EXISTING (1) 30" O.D. X 10'-0", (1) 29" O.D. X 10'-0", (1) 28" O.D. X 10'-0" & (1) 27" O.D. X 10'-0" CANISTER SHROUDS WITH NEW (4) 36" O.D. X 10'-0"± SMOOTH-ROUND, MULTI-PART, PERFORATED/VENTILATED CANISTER SHROUDS W/ EXPANSION KITS & TOP CAP (TO BE DESIGNED & PROVIDED BY OTHERS) FROM ±79'-0" TO ±199'-0" ELEV.
   NOTE:
   NEW CANISTER SHROUD COLOR SHOULD MATCH EXISTING SHROUD COLOR.
2. INSTALL NEW TRANSITION CONE. (TO BE DESIGNED & PROVIDED BY OTHERS)
   NOTE:
   NEW TRANSITION CONE COLOR SHOULD MATCH EXISTING SHROUD COLOR.
3. INSTALL NEW FLAG TRUCK AND DECORATIVE BALL FOR 36" O.D. CANISTER SHROUD.
4. APPLY FOUNDATION COATING
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP, REMOVAL AND DISPOSAL OF EXCESS MATERIALS USED AND REMOVED FROM THE STRUCTURE AT THE COMPLETION OF THE PROJECT.

INSTALLATION NOTE:

CONTRACTOR TO MAINTAIN THE VERTICAL PLUMB OF THE POLE WHILE INSTALLING THE NEW CANISTER SHROUDS.

FOUNDATION PHOTO

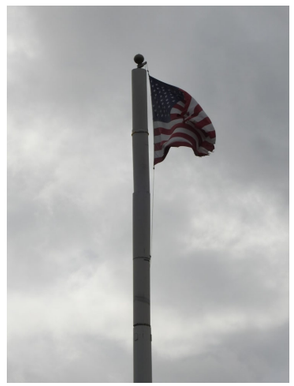
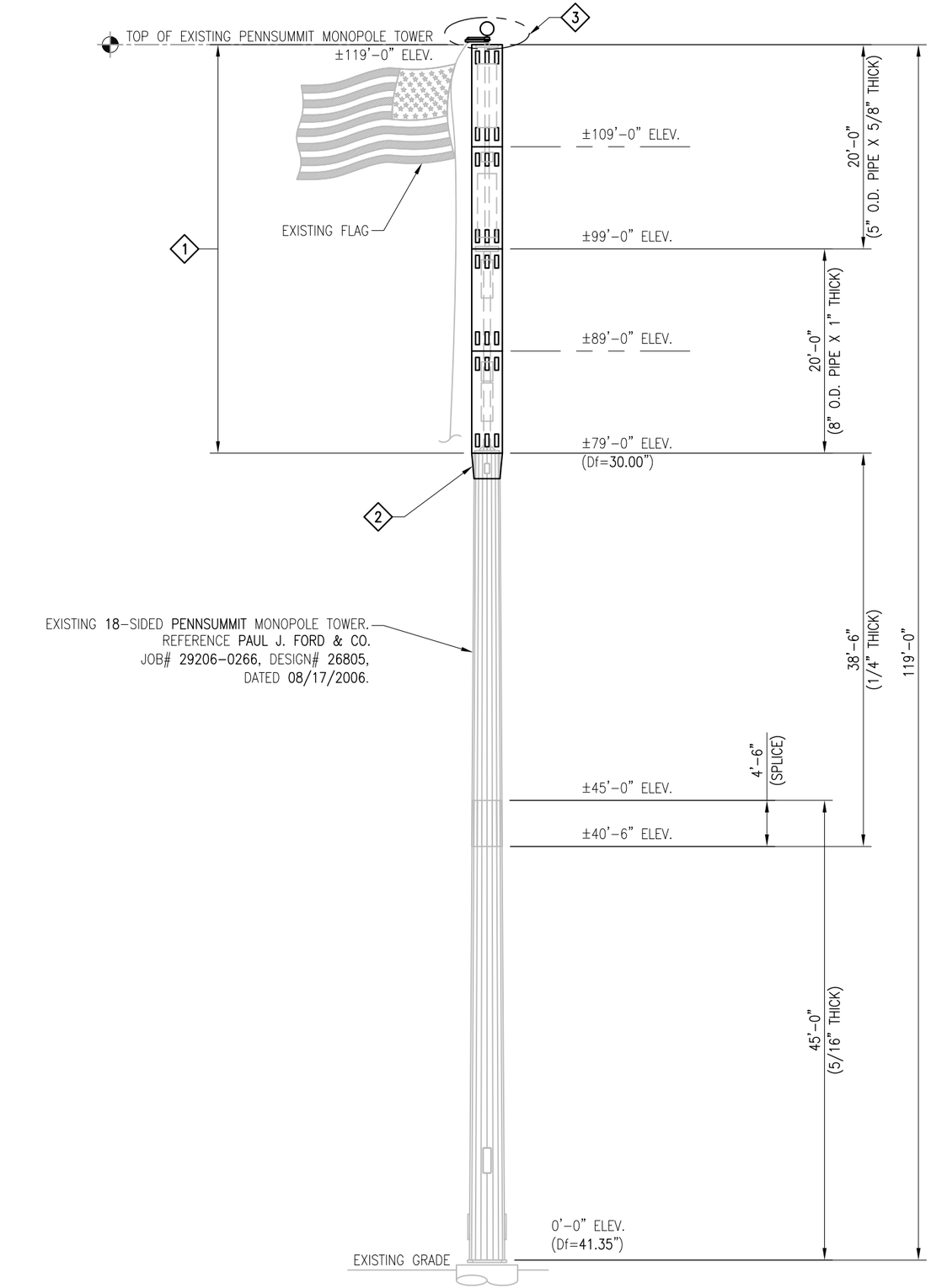


PHOTO 1

FOUNDATION COATING NOTES:

1. THE COATING MATERIALS SHALL BE LANCO WHITE ACRYLIC ELASTOMERIC COATING AND SEALER, OR HYDRO ARMOR COATING.
2. THE COATING CAN BE PLACED AT LEAST (2) DAYS AFTER THE PLACEMENT OF THE CONCRETE FOR FOUNDATION REINFORCEMENT, AND MINIMUM (4) DAYS FOR NEW FOUNDATION CONSTRUCTION.
3. THE CONCRETE SURFACE SHALL BE CLEAN AND DRY PRIOR TO THE APPLICATION OF THE COATING.
4. THE COATING SHALL BE APPLIED TO ALL THE SURFACES OF THE CONCRETE ABOVE THE GROUND AND 6" BELOW THE GRADE SURFACE IF APPLICABLE.
5. MINIMUM 30 MILS COATING IS REQUIRED.



ELEVATION VIEW

Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
136551

CUSTOMER SITE NO:
CT13616-A-SBA
CUSTOMER SITE NAME:
ST. JUDES
71 PLEASANTVIEW ROAD
DERBY, CT 06418

DRAWN BY: LC | CHECKED BY: AD/TA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	LC	12/20/22

SHEET TITLE:

TOWER PROFILE

SHEET NUMBER: A-1

REV #: 0