June 29 2022

To whom it may concern

Re: 5 Town Dump Rd

Enclosed, please find a Special Permit waiver and Special Permit Application and related materials for T-Mobile wireless upgrades at the referenced existing SBA telecommunications site.*

Please let me know if you need anything further for review and I will be more than happy to assist.

Thank you,

John Morrison
SDS Specialist I

SBA Communications Corporation
134 Flanders Road
Suite 125
Westborough, MA 01581

x3808 + T
508.768.7960 + C
JoMorrison@sbasite.com

Your Signal Starts Here.

* This application is eligible for relief under Act 6409 of the Middle Class Tax Relief Act of 2012 and reserves its rights hereunder.

Town of Truro Planning Board

P.O. Box 2030, Truro, MA 02666

APPLICATION FOR TELECOMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES SITE PLAN REVIEW

To the Town Clerk and the Planning Board of the Town of Truro, MA Date _____

The undersigned hereby files an application with the Truro Planning Board for the following:

☐ ***Site Plan Review*** pursuant to §40.5 of the Truro Zoning Bylaw

1. General Information

Description of Property and Proposed Project Property is an existing tower at the town dump. Swap (3) antennas /w (3) new antennas, and related lines and equipment. Tower is existing, no changes being made to tower height.

Property Address 5 Town Dump Rd Map(s) and Parcel(s) 55-2-A

Registry of Deeds title reference: Book _____, Page _____, or Certificate of Title Number _____ and Land Ct. Lot # _____ and Plan # _____

Applicant's Name John Morrison - SBA Communications

Applicant's Legal Mailing Address 134 Flanders Road, Westborough, Ma 01581 Suite 125

Applicant's Phone(s), Fax and Email JoMorrison@SBASite.com 508-768-7960

Applicant is one of the following: *(please check appropriate box)* *Written Permission of the owner is required for submittal of this application.

☒ Owner ☐ Prospective Buyer* ☐ Other*

Owner's Name and Address SBA Towers II LLC

Representative's Name and Address 8051 Congress Ave Boca Raton Fl, 33487

Representative's Phone(s), Fax and Email JoMorrison@SBASite.com 508-768-7960

2. Waiver(s) Request – The Planning Board may, upon the request of the applicant, pursuant to §70.3.E, waive requirements of §40.5, provided that in the opinion of the Planning Board such a waiver would not be detrimental to the public interest, cause the Town any expense, or be inconsistent with the intent and purpose of this Bylaw. A request for a waiver by the applicant shall be accompanied by a reasonable explanation as to why the waiver is being requested. If multiple waivers are requested, the applicant shall explain why each waiver is requested.

- The applicant is ***advised*** to consult with the Building Commissioner, Planning Department, Conservation Department, and/or Health Department prior to submitting this application.

Signature(s)

John Morrison
Applicant(s)/Representative *Printed* Name(s)

Dulce Lara
Owner(s) *Printed* Name(s) or written permission

Applicant(s)/Representative *Signature(s)*

Owner(s) *Signature(s)* or written permission

Your signature ~~on this application authorizes the Members of the Planning Board and town staff to visit and enter upon the subject property.~~

TOWN OF TRURO
2022-008 SPR
JUL 07 2022
Supplemental
RECEIVED
TOWN CLERK

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: 5 Town Dump RD Applicant Name: John Morrison Date: 6/29/22

No.	Requirement	Included	Not Included	Explanation, if needed
B. Requirements				
1	All building permits for a communications structure, building or appurtenance shall require a special permit from the Planning Board.	✓		
2	The minimum distance from the perimeter of the communications structure to any property line shall be the height of the structure including any antennas or appurtenances, plus ten (10) feet. The minimum distance from any guy wire, anchor or brace to any property line shall be the length of the guy wire or brace plus ten (10) feet. The setbacks for a communications building shall comply with the setback requirements of the zoning district.		✓	N/A
3	The communications structure, building or appurtenance shall be installed, maintained and operated in accordance with all applicable federal, state, county and local codes, standards and regulations and shall be designed to withstand sustained winds and gusts of a category 5 hurricane. If Federal Aviation Administration (FAA) or Federal Communications Commission (FCC) regulations are changed, then the owner or operator shall bring the structure, building and appurtenances into compliance with the new regulations within six (6) months of the effective date of such regulations or earlier if a more stringent compliance schedule is included in the regulation. Failure to comply with any new regulations shall be grounds for the removal of non-complying structures, buildings and appurtenances at the owner's expense.		✓	N/A
4	The height of the communications structure (tower) shall be no greater than one hundred and fifty (150 feet) above ground level.		✓	N/A
5	Communication antennas shall be located on pre-existing structures unless the applicant demonstrates that there are no feasible pre-existing structures. The installation shall preserve the character of such pre-existing structures.		✓	N/A
6	If the applicant has demonstrated that there are no feasible pre-existing structures to support antennas and appurtenances for the intended use, then any communications structure, building or appurtenance may be sited on public land.		✓	N/A

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
7	To the extent lawful and feasible, all service providers shall co-locate on a single tower. Towers shall be designed to structurally accommodate the maximum number of foreseeable users (within a ten-year period) technically practicable. The applicant is required to document all co-location tenants and provide a tower design indicating types and location of all facilities.		✓	N/A
8	New facilities or structures shall be considered only upon a finding by the Planning Board that existing or approved facilities or structures cannot accommodate the wireless communications equipment planned for the proposed tower.		✓	N/A
9	The installation of a communications structure, building or appurtenance shall be designed to minimize visual impact; the maximum amount of natural vegetation shall be preserved; details of construction and finish shall blend with the surroundings; additional vegetative screening shall be employed where practical and particularly to screen abutting residential property whether developed or not. A detailed landscape plan will be required with the application.		✓	N/A
10	Location and siting of facilities and structures shall be consistent with any regional location and siting criteria established by the Cape Cod Commission.		✓	No change
11	Under normal operating conditions, noise emanating from the communications structure, building or appurtenance shall not be greater at the boundary of the lot on which it is sited than would otherwise exist in the absence of these facilities.		✓	No change
12	No hazardous waste shall be discharged on the site. Any storage of fuel shall be in compliance with the Board of Health regulations. Documentation shall be provided for the contents of all communications buildings and/or cabinets.		✓	
13	All run-off of storm water from communications structures, buildings, and appurtenances, driveways and parking areas shall be contained on site; the amount of impervious surface on the site shall be minimized.		✓	
14	Lighting, when required and permitted by the FAA or the Planning Board, shall be directed inward so as not to project onto surrounding properties.		✓	No Change

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
15	All structures, buildings or appurtenances must be secured to control access. Fencing materials shall be consistent with the character of abutting properties, with a locked gate and proper warning signals. A sign must be displayed indicating the name of the owner(s) and a 24 hour contact number. Only signs limited to safety will be allowed. Fencing is not required for antennas or other appurtenances mounted on a pre-existing structure.		✓	
16	As a condition of approval of the application the applicant shall agree, by execution of a covenant, to remove within six months any communications structure and building which has not operated for four consecutive months unless the cause is major damage which prohibits operation. In the event that major damage has rendered the facility inoperative, repair or removal of the facility shall begin within six months and be completed within an additional six months. Failure to comply with the conditions of the covenant shall be grounds for the removal of structures, buildings and appurtenances. Complete restoration of the site shall be at the owner(s) expense, secured by a bond from a recognized financial institution. The covenant shall include, also at the owner(s) expense, provision for liability insurance for any damage to any abutting property whether developed or not.		✓	
17	At least forty-five (45) days before submitting an application for a special permit for the installation of a communications structure, building or appurtenance the applicant shall consult with the Planning Board. The purpose of the consultation is to facilitate the permitting process by the exchange of information between the applicant and the Planning Board, and for the applicant to obtain a detailed description of the information and documentation required, in writing, by the Planning Board, in order to clarify and resolve concerns of the Board and minimize potential problems with the application.		✓	
18	The Planning Board shall hold a public hearing within sixty-five (65) days of the filing of an application and shall issue a decision within ninety (90) days following the date of the public hearing.		✓	
19	The applicant shall submit the following written information to the Planning Board:			

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
19.a.	A survey of all sites for the installation of communications structures, buildings or appurtenances which are feasible for providing the intended services. The survey shall include a rationale for the selection of a prime and at least one alternative site. All sites in Truro shall be located on the appropriate sheet(s) of the Truro Assessor's Atlas;		✓	
19.b.	A survey of all pre-existing structures which are capable of supporting the equipment necessary to provide the intended service and a technical report which demonstrates why any such structure cannot be used by the applicant;		✓	
19.c.	The radiation pattern of all proposed antennas showing the frequency and intensity of radiation at ground level and at 30 feet above ground level. At the expense of the applicant, Electro Magnetic Field (EMF) readings shall be provided to the Board of Health yearly and immediately after any addition to the facility;		✓	
19.d.	The sound level in decibels at ground level, at 30 feet above ground level and at the top of the facility and 10, 50, 100 and 500 feet from the communications structure, building or appurtenances for wind velocities between calm and 100 miles per hour with all equipment operating at normal levels, including before condition measured, after condition prediction and cumulative condition (with co-location) prediction;		✓	
19.e.	A delineation of the Assessor's Atlas of all areas in Truro which will not be served by the proposed installation for the prime and an alternative site;		✓	
19.f.	A statement of the services to be supported by the proposed communications structure, building or appurtenance;		✓	
19.g.	Plans of special design features and materials, including landscaping, to minimize the visual impact of proposed communications structures, buildings and appurtenances. Site plans, elevations and fall zone should be included;		✓	
19.h.	A certification that the applicant has complied with all federal (including FAA), state and regional requirements to provide the proposed service and demonstration of compliance with the FCC guidelines for EMF's under National Environmental Policy Act (NEPA), including copies of the FCC Form 600, plus Environmental Assessment/Environmental Impact Statements as applicable;		✓	No Change

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
19.i.	Within thirty (30) days after the application filing, the applicant shall arrange to fly a three-foot-diameter balloon at the primary and an alternate site at the maximum height of the proposed installation. The date and location of the flights shall be advertised at least 14 days, but not more than 21 days before the flights, in a newspaper with a general circulation in Truro. Photos shall be provided from all strategic viewing points, per agreement with the Planning Board prior to flight.		✓	no change to height
20	If a communications structure, building or appurtenance is to be installed on a pre-existing private structure or on land or a structure owned, prior to the effective date of the bylaw, by the Commonwealth of Massachusetts, or on land or a structure owned by the Town of Truro, the applicant shall submit the following written information to the Planning Board:		✓	no change
20.a.	A draft contract, including requirements for removal of all structures and for complete site restoration in the case of discontinued use, between the applicant and the owner (if different from the applicant).		✓	
20.b.	A description of the proposed facility at the proposed prime and alternate sites including:			
	i) Height of the facility and its associated equipment and antennas;		✓	
	ii) Access roads and power supplies;		✓	
	iii) Type, size and number of transmitters;		✓	
	iv) A list of all fuels to be used on the site and a detailed description of how each shall be contained.		✓	
20.c.	A site plan (scale not less than 1 inch=40 feet), showing the proposed facility, fall zones, existing and proposed contour elevations, 100-year flood zones, water resources, Zones of Contribution, waterways, wetlands and all associated equipment and structures on the site, including elevations of all equipment and structures with sufficient detail to delineate the external finish of all structures and equipment; and		✓	
20.d.	A landscape plan showing the proposed site before and after development, including topography and screening proposed to protect abutters.		✓	
21	For all applications other than those set forth in § 40.5.B.20 above, the applicant shall submit the following written information to the Planning Board:		✓	

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
21.a.	A statement of the purpose for which the application is made.		✓	
21.b.	The exact legal name of each person seeking a special permit and the address and telephone number or principal place of business of each such person.		✓	
21.c.	The name, title, address and telephone number of the attorney or other person to whom correspondence or communications in regard to the application are to be addressed. Notice, orders, and other papers may be served upon the person so named, and such service shall be deemed to be service upon the applicant;		✓	
21.d.	A statement of the need for the proposed facility with as much specific information as is practicable to demonstrate the need, including description of the proposed system and how the proposed facility would eliminate or alleviate any existing deficiency or limitation, including all co-location facilities;		✓	
21.e.	A statement of the benefits expected from the proposed facility with as much information as is practicable;		✓	
21.f.	A description of the proposed facility at the proposed prime and alternate sites including:		✓	
	i) Height of the facility and its associated equipment and antennas;		✓	
	ii) Access roads and power supplies;		✓	
	iii) Special design features and materials, including landscape plans;		✓	
	iv) Type, size and number of transmitters and receivers, as well as the signal frequency, power output, and power density at the tower base, site boundary, and building where people might be exposed to the maximum power densities from the facility;		✓	
	v) A map showing any fixed facilities with which the proposed facility would interact;		✓	
	vi) The coverage signal strength, and integration of the proposed facility with any adjacent fixed facility, to be accompanied by a network plan showing interfaces with any adjacent service areas;		✓	
	vii) A forecast of when maximum capability would be reached for the proposed facility and for facilities that would be integrated with the proposed facility;		✓	
	viii) Documentation of contents of communications buildings and/or cabinets.		✓	

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
21.g.	A description of the proposed prime and alternative site, including:		✓	
	i) The most recent U.S.G.S. topographic quadrangle map (scale 1 inch = 2,000 feet) marked to show the site of the facility and any significant changes within a one-mile-radius of the site;		✓	
	ii) A map (scale not less than 1 inch = 200 feet) of the lot or tract on which the facility is proposed to be located, showing the acreage and dimensions of such site, the name and location of adjacent public and private roads or the nearest public road, and the names of abutting owners and portions of their lands abutting the site;		✓	
	iii) A site plan (scale not less than 1 inch = 40 feet), showing the proposed facility, fall zones, existing and proposed contour elevations, 100-year flood zones, water resources, Zones of Contribution, waterways, wetlands and all associated equipment and structures on the site, including elevations of all equipment and structures with sufficient detail to delineate the external finish of all structures and equipment;		✓	
	iv) Where relevant, a terrain profile showing the proposed facility and access road and existing and proposed grades; and		✓	
	v) The most recent aerial photograph (scale not less than 1 inch = 1,000 feet) showing the proposed site, access roads and all abutting properties.		✓	
21.h.	A statement explaining mitigation measures for the proposed facility including:		✓	
	i) Construction techniques designed specifically to minimize adverse effects on natural areas and sensitive areas;		✓	
	ii) Special design features made specifically to avoid or minimize adverse effects on natural areas and sensitive areas;		✓	
	iii) Establishment of vegetation proposed near residential, recreation, and scenic areas;		✓	
	iv) Special design features made specifically so that the proposed structures, buildings and appurtenances shall blend with pre-existing structures and buildings;		✓	
	v) Methods for preservation of vegetation for wildlife habitat and screening;		✓	

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
	vi) A list of all fuels to be used on the site and a detailed description of how each shall be contained; and		✓	
	vii) A statement describing any hazardous materials or wastes (including quantities) to be used or generated on the site.		✓	
21.i.	A description of the existing and planned land uses of the proposed prime and alternative sites and surrounding areas;		✓	
21.j.	A description of the scenic, natural, historic, and recreational characteristics of the proposed prime and alternative sites and surrounding areas;		✓	
21.k.	Sight-line graphs to the proposed prime and alternative sites from visually impacted areas (a site from which the facility can be seen) such as residential developments, recreational areas, and historic sites;		✓	
21.l.	A list describing the type and height of all existing and proposed communication structures, buildings and appurtenances within a ten-mile radius within the search area, or within any other area from which use of the proposed prime or alterative structure might be feasible from a location standpoint for purposes of the application;		✓	
21.m.	A description of efforts to share existing and proposed structures, or consolidate telecommunications antennas of public and private services onto the proposed facility;		✓	
21.n.	A description of the technical alternatives and a statement containing justification for the proposed facility;		✓	
21.o.	A description of rejected sites with a U.S.G.S. topographic quadrangle map (scale 1 inch = 2,000 feet) marked to show the location of rejected sites;		✓	
21.p.	A detailed description and justification for the site selected, including a description of siting criteria and the process by which other possible sites were considered and eliminated including but not limited to, environmental effects, cost differential, coverages lost or gained, potential interference with other facilities, and signal loss due to topographical features compared to the proposed prime and alternate sites;		✓	
21.q.	A statement describing hazards to human health, if any, with supporting data and references to regulatory standards;		✓	
21.r.	A statement of the estimated costs for site acquisition and construction of a facility at the prime and alternative sites;		✓	

40.5 - COMMUNICATION STRUCTURES, BUILDINGS AND APPURTENANCES - Applicant

Address: _____ Applicant Name: _____ Date: _____.

No.	Requirement	Included	Not Included	Explanation, if needed
21.s.	A schedule showing the proposed program of site acquisition, construction, completion, operation and relocation or removal of the existing facilities for the prime and alternative sits;		✓	
21.t.	A copy of any filing or application that the applicant has been required to make together with any decision with regard to such filing or application;		✓	
21.u.	A landscape plan showing the proposed site and location before and after development, including topography screening proposed to protect abutters;		✓	
21.v.	Plans which show location and siting at a prime and at an alternate site; and		✓	
21.w.	A technical report which demonstrates that the maximum height of the installation is the minimum feasible to provide the intended service.		✓	
22	All written information submitted in accordance with the requirements listed in any previous section of this bylaw shall be certified by an appropriate licensed professional.			
23	The Planning Board may also refer applications to the Board of Health, the Zoning Board of Appeals, and the Conservation Commission for review.			
24	The Planning Board shall not approve any application that does not comply with all the requirements of this bylaw. The Board does, however, have the right to waive any part of this bylaw, when in its opinion, such a waiver would not be detrimental to the public interest, cause the Town any expense, or be inconsistent with the intent and purpose of this bylaw.			
25	Any permit issued by the Planning Board for a communications facility shall be valid for the applicant only; it may not be reassigned, leased or sold.			
26	Municipal and private, non-commercial uses are exempted from this bylaw.			
27	The Planning Board shall act in accordance with the standards and requirements set forth herein and in accordance with the Massachusetts General Laws.			
28	The invalidity of any section of this bylaw shall not invalidate any other section.			

TOWN OF TRURO

Assessors Office
Certified Abutters List
Request Form

RECEIVED
JUN 28 2022
ASSESSOR'S OFFICE
TOWN OF TRURO

DATE: 6/22/2022

NAME OF APPLICANT: John Morrison - SBA Communications

NAME OF AGENT (if any): _____

MAILING ADDRESS: 134 Flanders Road, Westborough, Ma 01581 Suite 125

CONTACT: HOME/CELL 508-768-7960 **EMAIL** jomorrison@sbasite.com

PROPERTY LOCATION: 5 Town Dump Rd
(street address)

PROPERTY IDENTIFICATION NUMBER: MAP 55 **PARCEL** 002-00A **EXT.** _____
(*if condominium*)

ABUTTERS LIST NEEDED FOR:
(*please check **all** applicable*)

FEE: $15.00 per checked item
(*Fee must accompany the application unless other arrangements are made*)

___ Board of Health[5]
___ Cape Cod Commission
___ Conservation Commission[4]
___ Licensing
Type: _____

Planning Board (PB)
✓ Special Permit[1]
___ Site Plan[2]
___ Preliminary Subdivision[3]
___ Definitive Subdivision[3]
___ Accessory Dwelling Unit (ADU)[2]

Zoning Board of Appeals (ZBA)
___ Special Permit[1]
___ Variance[1]

___ Other _____ ***(Fee: Inquire with Assessors)***
(*Please Specify*)

***Note**: Per M.G.L., processing may take up to 10 calendar days. Please plan accordingly.*

THIS SECTION FOR ASSESSORS OFFICE USE ONLY

Date request received by Assessors: June 28, 2022 Date completed: June 28, 2022

List completed by: Laura Geiges Date paid: 6/28/2022 Cash/Check # 2168948

[1]Abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line.

[2]Abutters to the subject property, abutters to the abutters, and owners of properties across the street from the subject property.

[3]Landowners immediately bordering the proposed subdivision, landowners immediately bordering the immediate abutters, and landowners located across the streets and ways bordering the proposed subdivision. Note: For Definitive Subdivision only, responsibility of applicant to notify abutters and produce evidence as required.

[4]All abutters within 300 feet of parcel, except Beach Point between Knowles Heights Road and Provincetown border, in which case it is all abutters within 100 feet. Note: Responsibility of applicant to notify abutters and produce evidence as required.

[5]Abutters sharing any boundary or corner in any direction – including land across a street, river or stream. Note: Responsibility of applicant to notify abutters and produce evidence as required.

TRURO ASSESSORS OFFICE
PO Box 2012 Truro, MA 02666
Telephone: (508) 214-0921
Fax: (508) 349-5506

Date: June 28, 2022

To: John Morrison, SBA Communications

From: Assessors Department

Certified Abutters List: 5 Town Dump Road (Map 55 Parcel 2.A)

Planning Board – Special Permit

Attached is a combined list of abutters for 5 Town Dump Road (Map 55 Parcel 002-00A).

The current owner is S B A Towers II LLC.

The names and addresses of the abutters are as of June 24, 2022 according to the most recent documents received from the Barnstable County Registry of Deeds.

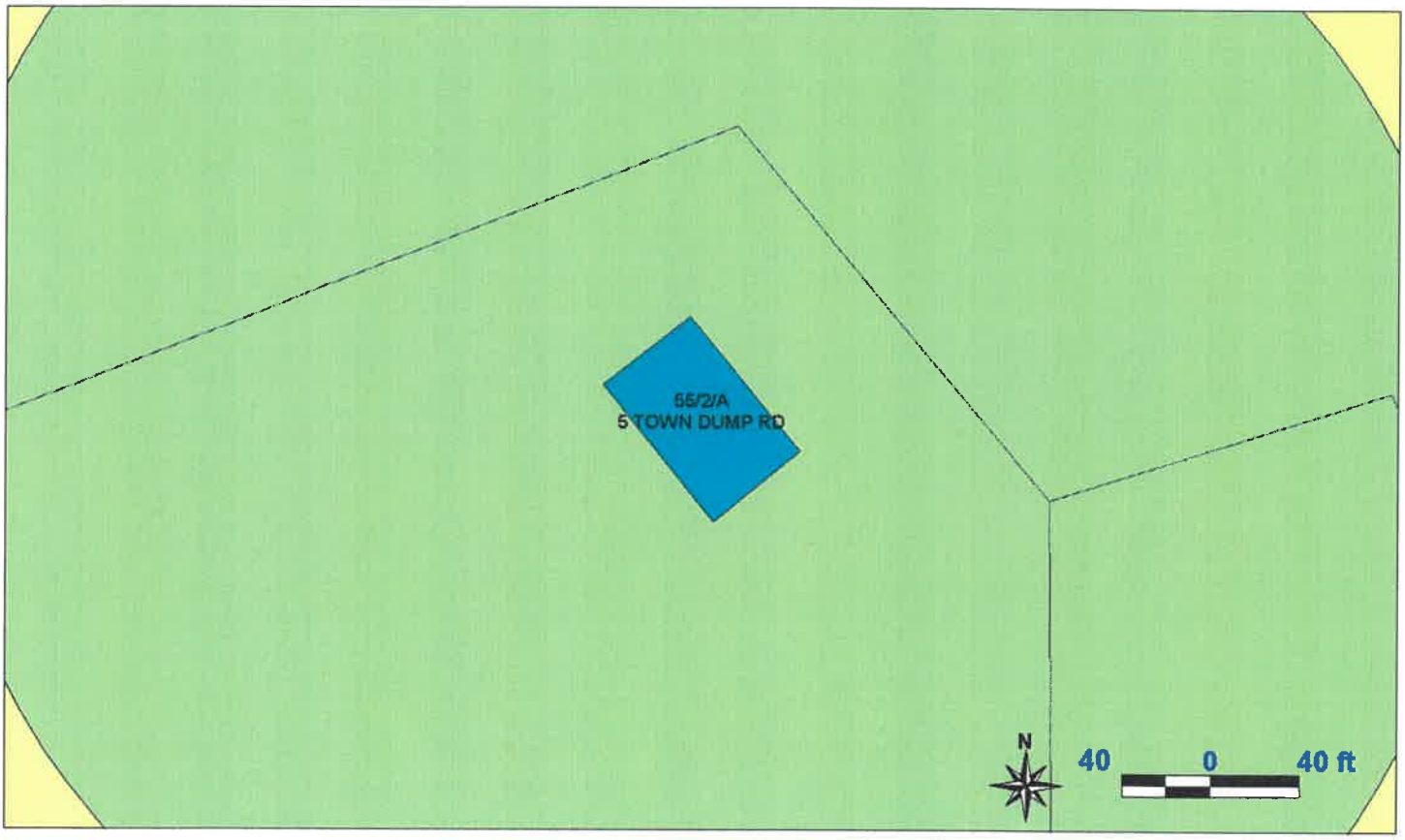
Certified by: _____

Laura Geiges
Assistant Assessor / Data Collector

5 Town Dump Road
Map 55 Parcel 2A
Planning Board - Special Permit

TOWN OF TRURO, MA
BOARD OF ASSESSORS
P.O. BOX 2012, TRURO MA 02666

Abutters List Within 300 feet of Parcel 55/2/A



Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
7292	40-999-0-E	USA-DEPT OF INTERIOR Cape Cod National Seashore	0 CAPE COD NATIONAL SEASHORE	99 Marconi Site Rd	Wellfleet	MA	02667
3341	55-2-0-E	TOWN OF TRURO	5 TOWN DUMP RD	PO BOX 2030	TRURO	MA	02666-2030
5944	55-2-A-R	S B A TOWERS II LLC	5 TOWN DUMP RD	TAX DEPT MA12227-A 8051 CONGRESS AVE	BOCA RATON	FL	33487
3342	55-3-0-E	TOWN OF TRURO	5-A TOWN DUMP RD	PO BOX 2030	TRURO	MA	02666-2030

LG 6/28/2022

40-999-0-E

USA-DEPT OF INTERIOR
Cape Cod National Seashore
99 Marconi Site Rd
Wellfleet, MA 02667

55-2-0-E

TOWN OF TRURO
PO BOX 2030
TRURO, MA 02666-2030

55-2-A-R

S B A TOWERS II LLC
TAX DEPT MA12227-A
8051 CONGRESS AVE
BOCA RATON, FL 33487

55-3-0-E

TOWN OF TRURO
PO BOX 2030
TRURO, MA 02666-2030

LG 6/28/2022

ELIGIBLE FACILITIES REQUEST (EFR) APPLICATION FORM

Date of Submittal: 6/21/2022

Submitted by:

Name: John Morrison
Title: Site Development Specialist on behalf of SBA Network Services and T-Mobile
Contact Information: JoMorrison@sbasite.com
508-768-7960

Name of Jurisdiction: Town of Truro

Address of Jurisdiction: 24 Town Hall Road

Contact Name for Jurisdiction: Elizabeth Sturdy

Name of Local Government Permit Application: Planning Application for Special Permit

Local Government File #: Click here to enter text.

Street Address of Site: 5 Town Dump Rd

Tax Parcel # of Site: Click here to enter text.

Latitude/Longitude of Site: 41.98578; -70.04133

List Each Piece of Transmission Equipment that will be Collocated or Added:
(3) Ericsson Antenas, (3) Ericsson 4480 Radios, (1) HCS Fiber Cable

List Each Piece of Transmission Equipment that will be Removed:
(3) Antennas, (3) Radios, (3) TMAs

List Cabinets that will be Collocated or Added at the Site:
None

List Cabinets that will be Removed at the Site:
None

Permit Application Amount: $350

Municipal Consultant Review Fee Deposit: Click here to enter text.

ELIGIBLE FACILITIES REQUEST (EFR) CERTIFICATION OF NON-SUBSTANTIAL CHANGES TO A WIRELESS TOWER NOT LOCATED WITHIN A PUBLIC RIGHT OF WAY

1) Address of the Wireless Tower: 5 Town Dump Road, Truro MA. 02666

2) The height (measured in feet above ground level) of the existing Tower as originally approved, including any modifications approved prior to February 22, 2012: 190

3) What is the height (measured in feet above ground level) at which the modifications to the Transmission Equipment will occur on the Tower? 190

4) What will be the height (measured in feet above ground level) of the existing Tower after the modifications to the Transmission Equipment are installed? 175'

5) Effect of modifications of Transmission Equipment on Tower height:

   a. Will the modifications in Transmission Equipment (addition, removal or replacement of Transmission Equipment) result in increasing the height above ground level of the existing Tower?
   ☐ Yes ☒ No

   b. Will the modifications in Transmission Equipment result in increasing the height above ground level of the existing Tower by more than: (i) 10% of the height of the existing Tower, as originally approved, including any modifications approved prior to February 22, 2012; or (ii) twenty feet above the height of the existing Tower, as originally approved, including any modifications approved prior to February 22, 2012, whichever height increase is greater?
   ☐ Yes ☒ No

6) Will the modifications in Transmission Equipment (measured at the height above ground level where the Transmission Equipment will be attached to the tower) result in any Transmission Equipment protruding horizontally from the edge of tower by more than twenty (20) feet or by more than the existing width of the tower at that height, whichever of these dimensions is greater?
☐ Yes ☒ No

7) Will the proposed changes in Transmission Equipment involve excavation or placement of new equipment outside the existing Tower site or outside any access or utility easements currently related to the site?
☐ Yes ☒ No

8) Will the proposed modification in Transmission Equipment involve installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four?
☐ Yes ☒ No

9) Will the proposed modification in Transmission Equipment defeat the existing concealment elements of the Tower?
☐ Yes ☒ No

10) Prior Conditions of Approval

a. Will the proposed modification in Transmission Equipment comply with conditions of approval imposed on the Tower prior to February 22, 2012?
☒ Yes ☐ No

b. If the answer to 10(a) is "No," is the non-compliance due solely to any of the conditions addressed in questions 5-9 above?
☐ Yes ☐ No

If the answer to either question 5(a) or 5(b) is "No," and the answers to questions 6-9 are "No," and the answer to either 10(a) or 10(b) is "Yes," then the proposed modifications do not substantially change the physical dimensions of the existing Tower. Click here to enter text.

This certification is dated this Twenty-First day of June, 2022

_____
Signature

John Morrison / Site Development Specialist on behalf of SBA Network Services LLC and T-Mobile

_____
Name & Title

Eligible Facilities Request to Modify Transmission Equipment at an Existing Communications Tower

Location: 5 Town Dump Rd, Truro Ma
T-Mobile Site No: 4HY0520A
SBA Communications: Agent for SBA Network Services LLC and T-Mobile

T-Mobile is Filing an Eligible Facilities Request

SBA Properties, LLC, on behalf of T-Mobile and SBA Network Services, LLC as General Contractor, is submitting an Eligible Facilities Request to add (collocate) Transmission Equipment on an existing SBA Telecommunications Tower located at 5 Town Dump Rd.

The existing Tower is a structure that is 190' high and presently contains wireless facilities. The existing Tower meets the Federal Communications Commission ("FCC") definition of a Tower and T-Mobile is an FCC licensed wireless carrier.

The list of equipment identified in this Eligible Facilities Request application is Transmission Equipment as determined by the FCC, and as defined as follows: "any equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas and other relevant equipment associated with and necessary to their operation, including coaxial or fiber-optic cable, and regular and back-up power supply. This definition includes equipment used in any technological configuration associated with any Commission-authorized wireless transmission, licensed or unlicensed, terrestrial or satellite, including commercial mobile, private mobile, broadcast and public safety services, as well as fixed wireless services such as microwave backhaul or fixed broadband."

Administrative Review and Approval

While local jurisdictions retain discretionary zoning review over the construction of new towers, **collocations and/or equipment upgrades such as reflected in this application must now be approved administratively.** The new law provides, in part, that:

> "**a State or local government** may not deny, and **shall approve**, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station." (Emphasis added.)

The FCC, in a Report and Order adopted on October 17, 2014, determined that **any modification to an existing telecommunications Tower that meets the following six criteria does not substantially change the physical dimensions of the existing Tower and therefore is an Eligible Facilities Request which must be granted:**

1. The modifications to the Transmission Equipment do not increase the height of the Tower by twenty feet or ten percent, whichever is greater;

2. The modifications to the Transmission Equipment do not protrude from the edge of the Tower by twenty feet or more than the width of the Tower (whichever of these two dimensions is greater) at the level where the transmission equipment modifications are made;
3. The modifications to the Transmission Equipment do not involve the installation of more than the standard number of equipment cabinets for the technology involved, not to exceed four;
4. The modifications to the Transmission Equipment do not entail any excavation or deployment outside of the Tower site;
5. The modifications to the Transmission Equipment do not defeat any existing concealment elements of the Tower;
6. The modifications to the Transmission Equipment comply with prior conditions of approval of the Tower, unless the non-compliance is due to an increase in height, increase in width, addition of equipment cabinets, or new excavation that does not exceed the corresponding "substantial change" thresholds in numbers 1-4.

We are providing certification that each of the six review criteria identified by the FCC will be met, and that the proposed collocation fully conforms to Section 6409(a) as enacted by Congress and as interpreted by the FCC.

Expedited Permit Processing and Deemed Granted Designation

Under federal law, an Eligible Facilities Request is deemed granted sixty (60) days after a complete application is filed with a local jurisdiction. Accordingly, this Eligible Facilities Request must be approved within 60 days, as required by federal law and FCC regulations. If sixty days pass after the submission of T-Mobile's application and the Truro Planning Board has not acted to grant or deny the request, it will be deemed granted.

HY520/BAY COMM.–TRURO

5 TOWN DUMP ROAD
TRURO, MA 02666
BARNSTABLE COUNTY

SITE NO.: 4HY0520A

SITE TYPE: 190'± SELF SUPPORT TOWER

RF DESIGN GUIDELINE: 67E02C OUTDOOR

APPROVALS

PROJECT MANAGER:	DATE:	ZONING/SITE ACQ.:	DATE:
CONSTRUCTION:	DATE:	OPERATIONS:	DATE:
RF ENGINEERING:	DATE:	TOWER OWNER:	DATE:

T–MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS BY CERTIFIED CLIMBER
SECTOR B:	ACCESS BY CERTIFIED CLIMBER
SECTOR C:	ACCESS BY CERTIFIED CLIMBER
SECTOR D:	ACCESS BY CERTIFIED CLIMBER
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE OMNIPOINT REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
12. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
15. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK.

AT LEAST 72 HOURS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CALL DIG SAFE AT 811

811 DigSafe
MA,ME,NH,RI,VT

VICINITY MAP

SCALE: 1" = 1000'–0"

DIRECTIONS

HEAD NORTHEAST TOWARD COMMERCE WAY. TURN RIGHT ONTO SOUTH WASHINGTON STREET. FOLLOW SIGNS TO I–495. TURN RIGHT TO MERGE ONTO I–495 SOUTH TOWARD CAPE COD. AT BOURNE ROTARY SOUTH. TAKE THE 5TH EXIT ONTO SANDWICH ROAD EAST. TURN RIGHT ONTO MID–CAPE CONNECTOR. MERGE ONTO US–6 EAST. TURN LEFT ONTO TOWN HALL ROAD. TURN RIGHT ONTO TRURO CENTER ROAD. TURN LEFT ONTO TOWN HALL ROAD. SITE IS LOCATED ON THE RIGHT SIDE.

SHEET INDEX

SHEET NO.	DESCRIPTION	REV. NO.
T–1	TITLE SHEET	1
GN–1	GENERAL NOTES	1
A–1	COMPOUND PLAN, EQUIPMENT PLANS & PHOTO	1
A–2	TOWER ELEVATION, ANTENNA PLANS & PHOTOS	1
A–3	SITE DETAILS	1
A–4	ANTENNA & FEEDLINE CHARTS	1
E–1	ELECTRIC & GROUNDING DETAILS & PHOTOS	1

DO NOT SCALE DRAWINGS

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

SCOPE OF WORK

REMOVE:
- 3 ANTENNA
- 3 RADIOS
- 3 TMA'S
- 3 T–ARM MOUNTS
- 1 100A–2P BREAKER

INSTALL:
- 3 ANTENNAS
- 3 RADIOS
- 1 HYBRID CABLE
- 3 SECTOR FRAME MOUNTS
- 1 125A–2P BREAKER

SITE NOTES

1. THIS IS AN UNMANNED AND RESTRICTED ACCESS TELECOMMUNICATION FACILITY, AND IS NOT FOR HUMAN HABITATION. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNAL FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - BUILDING CODE: MASSACHUSETTS STATE BUILDING CODE 780 CMR (9TH EDITION)
   - ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE
   - STRUCTURAL CODE: TIA/EIA–222–G STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

PROJECT SUMMARY

SITE NUMBER:	4HY0520A
SITE NAME:	HY520/BAY COMM.–TRURO
SBA SITE NUMBER:	MA12227–A
SBA SITE NAME:	TRURO
SITE ADDRESS:	5 TOWN DUMP ROAD TRURO, MA 02666
PROPERTY OWNER:	SBA TOWERS II, LLC TAX DEPT. MA 12227–A 8501 CONGRESS AVENUE BOCA RATON, FL 33487
TOWER OWNER:	SBA TOWERS II, LLC 8501 CONGRESS AVENUE BOCA RATON, FL 33487 PHONE: 561–226–9523
COUNTY:	BARNSTABLE
ZONING DISTRICT:	RESIDENTIAL
STRUCTURE TYPE:	SELF–SUPPORT TOWER
STRUCTURE HEIGHT:	190'±
APPLICANT:	T–MOBILE NORTHEAST LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766
ARCHITECT:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
STRUCTURAL ENGINEER:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
SITE CONTROL POINT:	LATITUDE: 41.985783° N41°59'08.82" LONGITUDE: –70.041333° W70°02'28.80"

SPECIAL ZONING NOTE:
BASED ON INFORMATION PROVIDED BY T–MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW, AND LIMITED/PARTIAL ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, OR ADMINISTRATIVE REVIEW).

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
(508) 286–2700

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
(508) 251–0720

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil ·Structural ·Land Surveying
R.K. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MARLBOROUGH, MA 01752
(508) 481–7400
www.chappellengineering.com

COMMONWEALTH OF MASSACHUSETTS
CLEMENT J. SALEK
CIVIL
NO. 47382
REGISTERED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	04/27/22	ISSUED FOR CONSTRUCTION	JRV
0	02/08/22	ISSUED FOR REVIEW	NWC

SITE NUMBER:
4HY0520A

SITE ADDRESS:
5 TOWN DUMP ROAD
TRURO, MA 02666

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

1815.419

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – T–MOBILE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR 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 CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR 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.

4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL, STATE AND FEDERAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

5. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER, T1 CABLES AND GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR AND/OR LANDLORD PRIOR TO CONSTRUCTION.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION AND RETURN DISTURBED AREAS TO ORIGINAL CONDITIONS.

13. THE SUBCONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE SUBCONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

14. SUBCONTRACTOR SHALL NOTIFY CHAPPELL ENGINEERING ASSOCIATES, LLC 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS AND POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEERING REVIEW.

15. CONSTRUCTION SHALL COMPLY WITH ALL T–MOBILE STANDARDS AND SPECIFICATIONS.

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITES ARE IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. IF THE EXISTING CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

2. 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 ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR 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.

3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.

6. 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.

7. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

8. 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 ENGINEERING, OWNER AND/OR LOCAL UTILITIES.

9. 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 IN THE PROJECT SPECIFICATIONS.

10. SUBCONTRACTOR 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.

11. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T–MOBILE SPECIFICATION FOR SITE SIGNAGE.

CONCRETE AND REINFORCING STEEL NOTES:

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. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000PSI) MAY BE USED. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 381 CODE REQUIREMENTS

3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF .....1½ IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER
   OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....¾ IN.
   BEAMS AND COLUMNS .....1½ IN.

5. A CHAMFER ¾" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHORS SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO THE MANUFACTURERS RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY SIMPSON OR APPROVED EQUAL.

7. CONCRETE CYLINDER TIES ARE NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TEST PERFORMED AT THE SUPPLIERS PLANT.
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.

8. AS AN ALTERNATIVE TO ITEM 7. TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.

9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS AND T–MOBILE SPECIFICATIONS UNLESS OTHERWISE NOTED. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".

2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. PAINTED SURFACES SHALL BE TOUCHED UP.

3. BOLTED CONNECTIONS SHALL USE BEARING TYPE ASTM A325 BOLTS (¾"ø) AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. ALL BOLTS SHALL BE GALVANIZED OR STAINLESS STEEL.

4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE ⅝" DIA. ASTM A 307 BOLTS (GALV) UNLESS NOTED OTHERWISE.

5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL

6. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL TO EXPOSE NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.

2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.

3. AS AN ALTERNATE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.

4. COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING #1 SIEVE.

5. AS AN ALTERNATE TO ITEMS 2 AND 3, THE SUBGRADE SOILS WITH 5 PASSES OR A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). AND SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUN, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
SUBCONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE ANTENNA PLATFORM LOCATION AND UTILITY TRENCHWORK.

2. COORDINATION OF WORK:
SUBCONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH CONTRACTOR.

3. CABLE LADDER RACK:
SUBCONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY AND/OR ICE BRIDGE, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. WIRING, RACEWAY, AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

2. SUBCONTRACTOR SHALL MODIFY OR INSTALL CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. SUBCONTRACTOR SHALL SUBMIT MODIFICATIONS TO CONTRACTOR FOR APPROVAL.

3. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

4. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.

5. EACH END OF EVERY POWER, GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA, AND MATCH INSTALLATION REQUIREMENTS.

6. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, ½ INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC AND OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.

13. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

14. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY HARGER (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

15. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

16. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

17. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

18. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

19. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

20. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

21. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

22. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

23. CABINETS, BOXES AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

24. CABINETS, BOXES AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

25. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

26. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

27. 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 RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

28. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

29. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

30. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

31. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

32. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

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COMMONWEALTH OF MASSACHUSETTS
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PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	04/27/22	ISSUED FOR CONSTRUCTION	JRV
0	02/08/22	ISSUED FOR REVIEW	NWC

SITE NUMBER:
4HY0520A

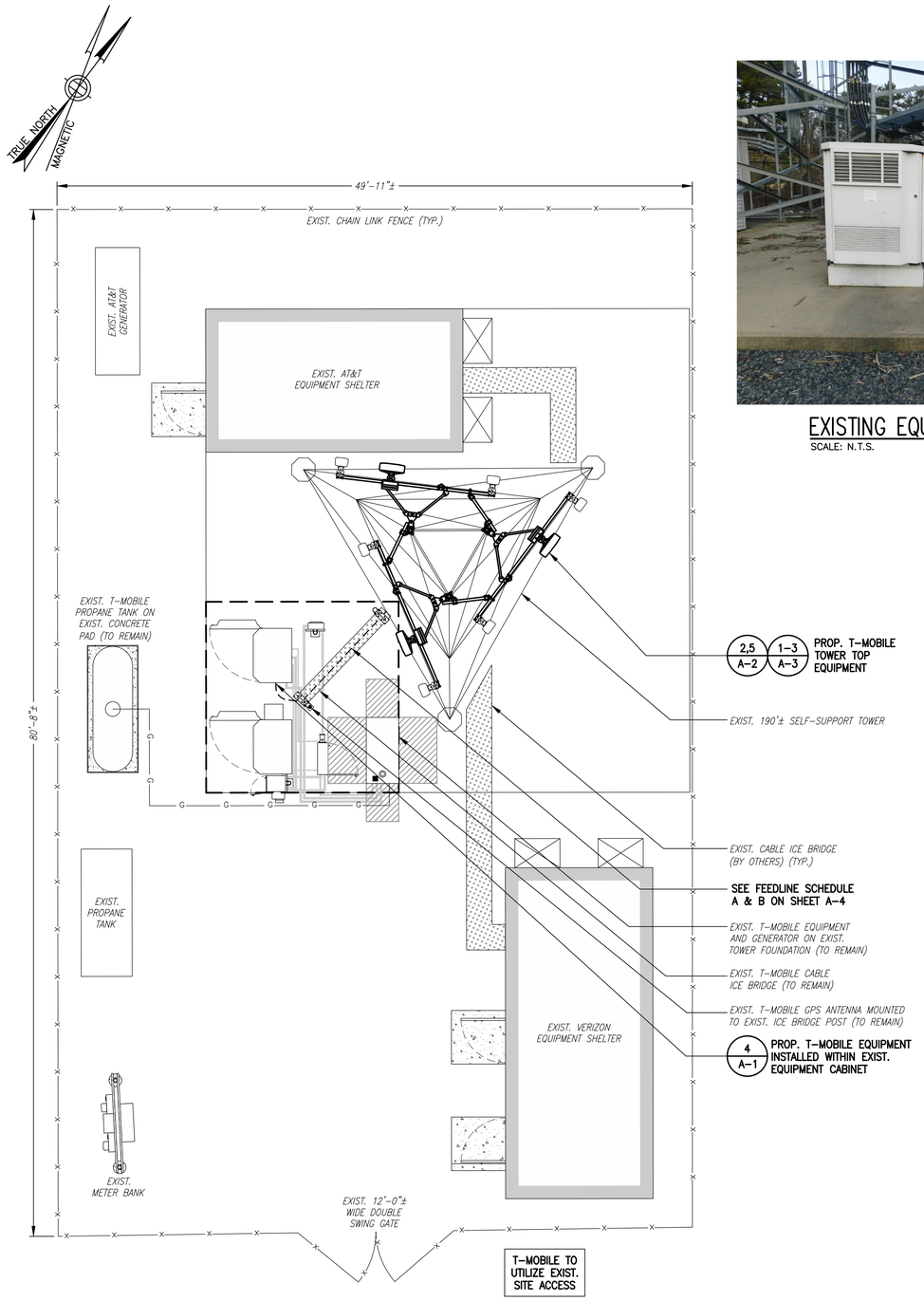
SITE ADDRESS:
5 TOWN DUMP ROAD
TRURO, MA 02666

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1

1815.419

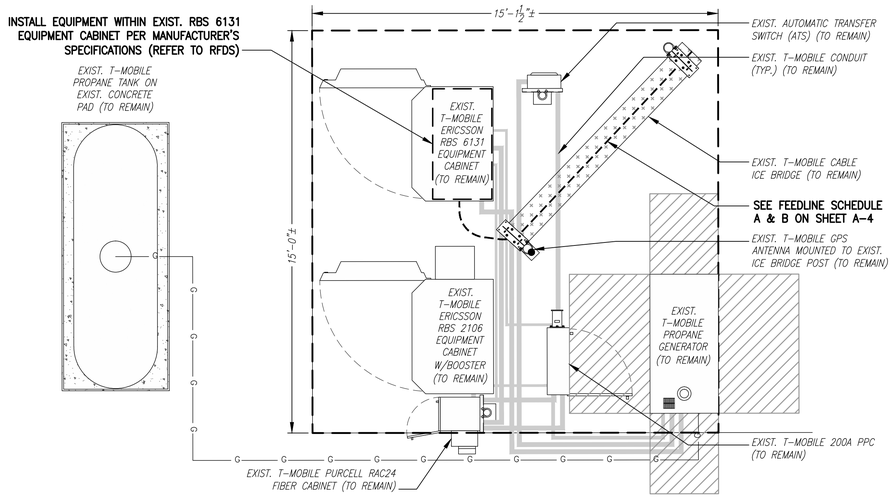
SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.



COMPOUND PLAN (1 / A-1)
SCALE: 3/16" = 1'-0"
0 2'-8" 5'-4" 10'-8" 16'-0"

EXISTING EQUIPMENT PHOTO (2 / A-1)
SCALE: N.T.S.

EXISTING EQUIPMENT PLAN (3 / A-1)
SCALE: 3/8" = 1'-0"
0 2'-8" 5'-4" 8'-0"



PROPOSED EQUIPMENT PLAN (4 / A-1)
SCALE: 3/8" = 1'-0"
0 2'-8" 5'-4" 8'-0"

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TRURO, MA 02666

SHEET TITLE
COMPOUND PLAN, EQUIPMENT PLANS & PHOTO

SHEET NUMBER
A-1

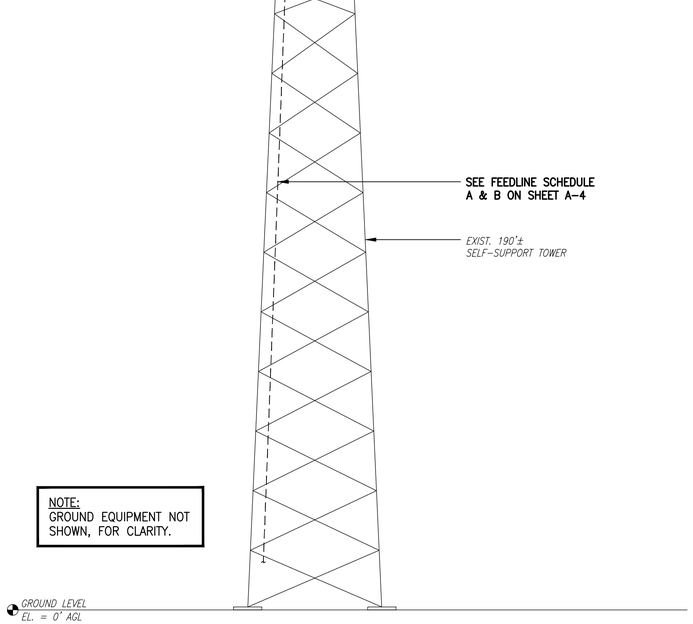
1815.419

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

RAD CENTER NOTE:
T-MOBILE RAD CENTER SHOWN IN RED TEXT BASED ON SBA-PROVIDED CO-LOCATION APPLICATION, EQUIPMENT DATABASE, AND STRUCTURAL ANALYSIS. THE SBA-PROVIDED ANTENNA RAD CENTER SHALL SUPERSEDE ANY CONFLICTING INFORMATION DERIVED FROM THE T-MOBILE RFDS.

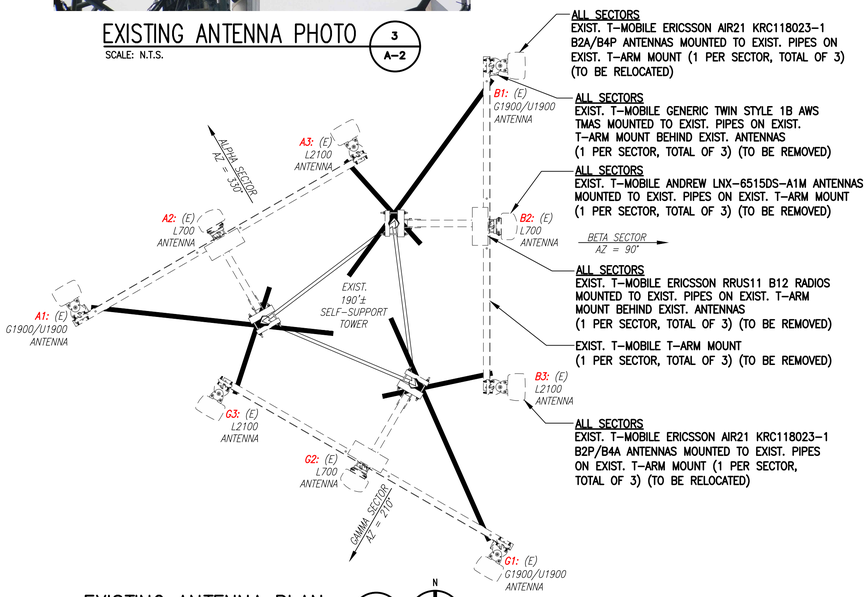
SPECIAL CONSTRUCTION NOTE:
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT T-MOBILE'S RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY OTHERS).

EXISTING TOWER PHOTO (1 / A-2)
SCALE: N.T.S.

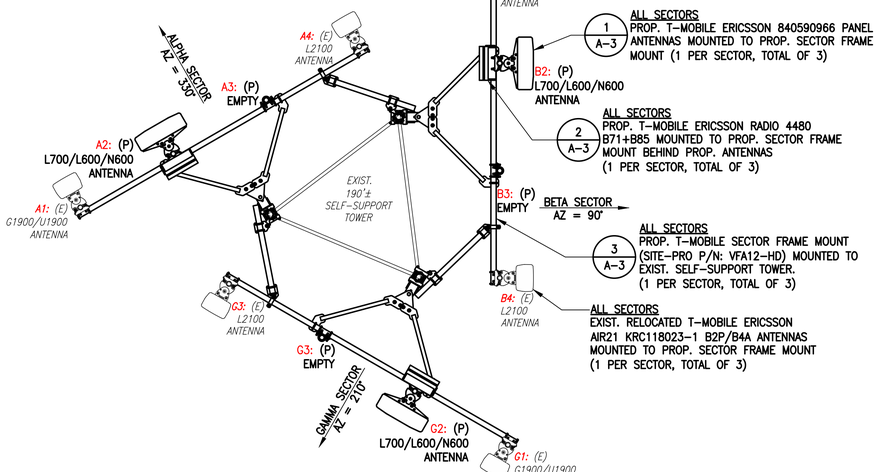


TOWER ELEVATION (2 / A-2)
SCALE: 1" = 12'-0"
0 12' 24' 36'

EXISTING ANTENNA PHOTO (3 / A-2)
SCALE: N.T.S.



EXISTING ANTENNA PLAN (4 / A-2)
SCALE: 3/8" = 1'-0"



PROPOSED ANTENNA PLAN (5 / A-2)
SCALE: 3/8" = 1'-0"

ANTENNA STATUS LEGEND:
EMPTY – EMPTY PIPE
(E) – EXISTING
(P) – INSTALL
(F) – FUTURE

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION.

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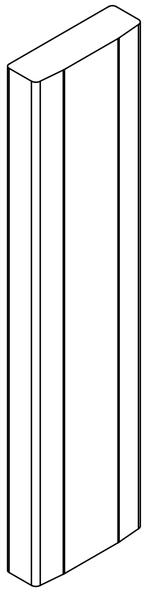
SHEET TITLE
TOWER ELEVATION, ANTENNA PLANS & PHOTOS

SHEET NUMBER
A-2

1815.419



ERICSSON 840590966 ANTENNA

DIMENSIONS: 95.9"H x 23.5"W x 7.1"D
WEIGHT: 101.4 lbs
QUANTITY: 1 PER SECTOR, TOTAL OF 3

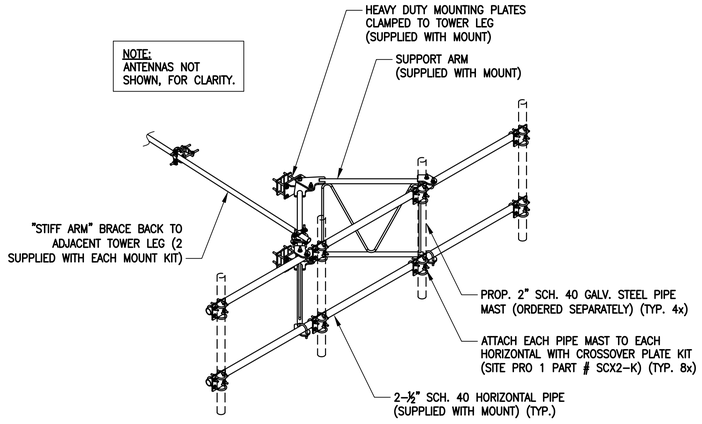
ANTENNA DETAILS (1 / A-3)
SCALE: N.T.S.

ERICSSON RADIO 4480 B71+B85

DIMENSIONS: 19.2"H x 15.1"W x 7.5"D
WEIGHT: 92.6 lbs
QUANTITY: 1 PER SECTOR, TOTAL OF 3

RADIO DETAIL (2 / A-3)
SCALE: N.T.S.

NOTE:
ANTENNAS NOT SHOWN, FOR CLARITY.



SITE-PRO 1 12'-6" HEAVY-DUTY V-FRAME

PART NUMBER: VFA12-HD
QUANTITY: TOTAL OF 3

ANTENNA MOUNT DETAIL (3 / A-3)
SCALE: N.T.S.

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SHEET TITLE
SITE DETAILS

SHEET NUMBER
A-3

1815.419

FINAL ANTENNA CONFIGURATION

SECTOR		ANTENNA	RAD CENTER	AZIMUTH (TRUE NORTH)	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	BAND	TMA/RADIOS	CABLES
ALPHA	A1	*ERICSSON AIR21 KRC118023-1 B2A/B4P*	*175'± AGL*	*330°*	*0°*	*2°*	*G1900/U1900*	–	*EXIST. (3) 7/8" (3x6) HCS FIBER CABLES (190'±)* **PROP. (1) 2" (6x24) HCS FIBER CABLE (230'±)**
	A2	**ERICSSON 840590966**	**175'± AGL**	**330°**	**0°**	**4°**	**L700/L600/N600**	**ERICSSON RADIO 4480 B71+B85**	
	A3	**EMPTY PIPE**	–	–	–	–	–	–	
	A4	*ERICSSON AIR21 KRC118023-1 B2P/B4A*	*175'± AGL*	*330°*	*0°*	*2°*	*L2100*	–	
BETA	B1	*ERICSSON AIR21 KRC118023-1 B2A/B4P*	*175'± AGL*	*90°*	*0°*	*2°*	*G1900/U1900*	–	
	B2	**ERICSSON 840590966**	**175'± AGL**	**90°**	**0°**	**4°**	**L700/L600/N600**	**ERICSSON RADIO 4480 B71+B85**	
	B3	**EMPTY PIPE**	–	–	–	–	–	–	
	B4	*ERICSSON AIR21 KRC118023-1 B2P/B4A*	*175'± AGL*	*90°*	*0°*	*2°*	*L2100*	–	
GAMMA	G1	*ERICSSON AIR21 KRC118023-1 B2A/B4P*	*175'± AGL*	*210°*	*0°*	*2°*	*G1900/U1900*	–	
	G2	**ERICSSON 840590966**	**175'± AGL**	**210°**	**0°**	**4°**	**L700/L600/N600**	**ERICSSON RADIO 4480 B71+B85**	
	G3	**EMPTY PIPE**	–	–	–	–	–	–	
	G4	*ERICSSON AIR21 KRC118023-1 B2P/B4A*	*175'± AGL*	*210°*	*0°*	*2°*	*L2100*	–	

CABLE NOTE: EXIST. (4) 1⅝" COAX CABLES TO REMAIN DISCONNECTED. SEE FEEDLINE SCHEDULE A & B BELOW.
ANCILLARY NOTE: EXIST. (3) GENERIC TWIN STYLE 1B AWS TMAS TO BE REMOVED.

NOTE: RFDS REV4 – 12/28/21

FEEDLINE SCHEDULE

SCHEDULE	FEEDLINES	LOCATION
A	*EXISTING TO REMAIN:* *(1) ½" COAX FOR GPS ANTENNA* *(4) 1⅝" COAX CABLES (CAPPED & WRAPPED)* *(3) 7/8" (3x6) HCS FIBER CABLE* *EXISTING TO BE REMOVED:* *NONE*	**ROUTED PER STRUCTURAL ANALYSIS**
B	**PROPOSED:** **(1) 2" (6x24) HCS FIBER CABLE**	

NOTE:
EXISTING T–MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.

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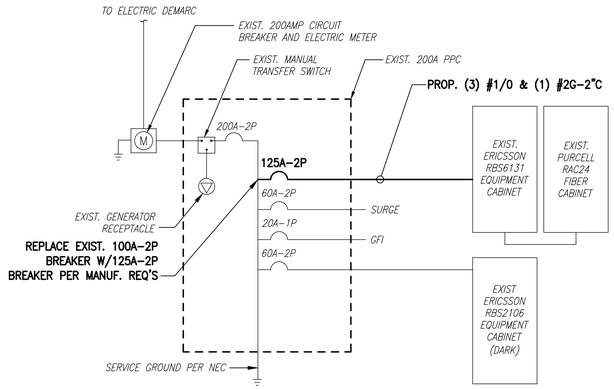
SHEET TITLE
ANTENNA & FEEDLINE CHARTS

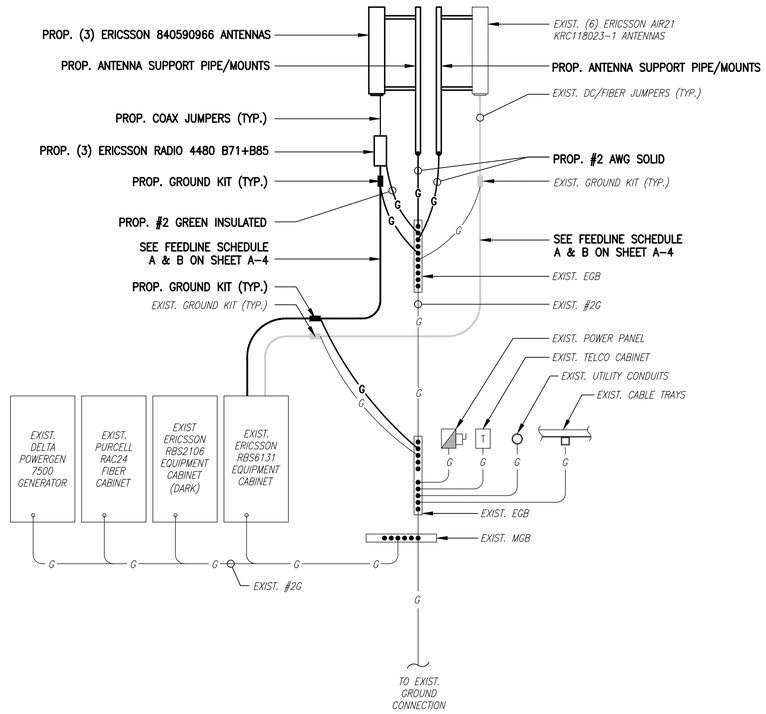
SHEET NUMBER
A-4

1815.419

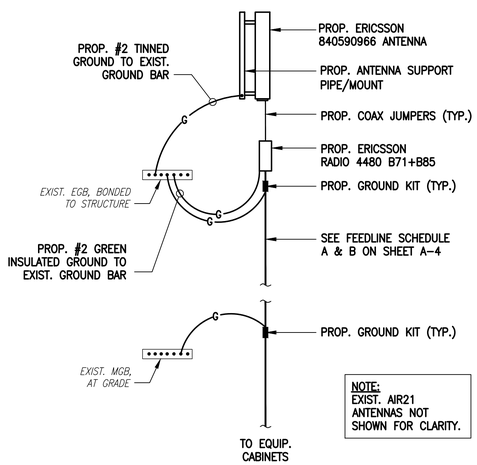
EXISTING POWER PANEL PHOTOS
SCALE: NOT TO SCALE
1 E-1



ONE LINE DIAGRAM
SCALE: NOT TO SCALE
2 E-1

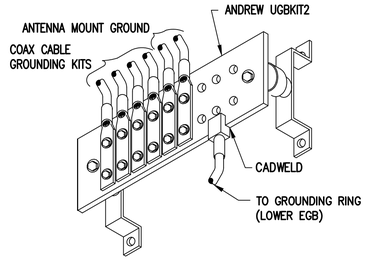


GROUNDING RISER DIAGRAM
SCALE: NOT TO SCALE
3 E-1

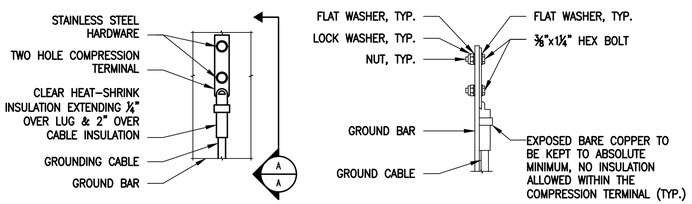


L700/L600/N600 ANTENNA

COAX CABLE CONNECTION AND GROUNDING DETAIL
SCALE: NOT TO SCALE
4 E-1



GROUND BAR (EGB)
SCALE: NOT TO SCALE
5 E-1



ELEVATION SECTION A-A

NOTES:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELL DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

TYPICAL GROUND BAR CONNECTIONS DETAIL
SCALE: NOT TO SCALE
6 E-1

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THININSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
12. PPC SUPPLIED BY PROJECT OWNER.
13. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "T-MOBILE BTS SITE GROUNDING STANDARDS".
14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
19. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
20. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXIST. TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
21. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMNS MINIMUM RESISTANCE REQUIRED.
22. CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
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134 FLANDERS ROAD, SUITE 125
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COMMONWEALTH OF MASSACHUSETTS
CLEMENT J. SALEK
CIVIL
No. 47382
REGISTERED PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	04/27/22	ISSUED FOR CONSTRUCTION	JRV
0	02/08/22	ISSUED FOR REVIEW	NWC

SITE NUMBER:
4HY0520A

SITE ADDRESS:
5 TOWN DUMP ROAD
TRURO, MA 02666

SHEET TITLE
ELECTRIC & GROUNDING DETAILS & PHOTOS

SHEET NUMBER
E-1

1815.419

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

Structural Analysis Report

Existing 190 ft Cellxion Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: MA12227-A

Customer Site Name: Truro

Carrier Name: T-Mobile (App#: 188222-1)

Carrier Site ID / Name: 4HY0520A / HY520/Bay Comm.-Truro

Site Location: 5 Town Dump Road

Truro, Massachusetts

Barnstable County

Latitude: 41.985783

Longitude: -70.041333

Exp.06/30/2022

03/23/2022

Analysis Result:

Max Structural Usage: 83.1% [Pass]

Max Foundation Usage: 54.0% [Pass]

Additional Usage Caused by New Mount: +2%

Report Prepared By : Tawfeeq. Alajaj

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Report Prepared By : Tawfeeq. Alajaj

Introduction

The purpose of this report is to summarize the analysis results on the 190 ft Cellxion Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Cellxion Drawing # TBAY01793, dated 01/13/2004
Foundation Drawing	Cellxion Drawing # TBAY01793, dated 01/13/2004
Geotechnical Report	Paul B. Aldinger & Associates Project # 03135, dated 11/19/2003
Modification Drawings	N/A
Mount Analysis	Verizon MA by Maser Consulting 21777817A. Dated 11/23/2021. T-Mobile MA by TES# 126141. Dated 03/17/2022.

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the TIA-222-G-2**.** In accordance with this standard, the structure was analyzed using **TESTowers,** 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:	Ultimate Design Wind Speed V_{ult} = 139.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 108.0 mph (3-Sec. Gust)
Wind Speed with Ice:	40 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-G-2 / 2015 IBC / Massachusetts State Building Code, Ninth Edition
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.164, S_1 = 0.057

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	187.3	3	KMW - AM-X-CD-16-65-00T-RET - Panel	(3) Sector Frames (Site Pro USF12-XX-U) + (3) Pipe Mounts	(12) 1 5/8" *(4) 3/4" DC *(2) 7/16" Fiber *(Inside (2) 3" Conduits)	AT&T
2		3	Cci - DMP5R-BU4DA - Panel			
3		3	Css - DUO1417-8686-0 - Panel			
4		3	Kathrein - 800-10121 - Panel			
5		6	Powerwave - LGP17201 - TMA			
6		3	Ericsson - RRUS 12 B4 - RRU			
7		3	Ericsson - RRUS 4478 B14 - RRU			
8		3	Ericsson - RRUS 4449 B5/B12 - RRU			
9		2	Raycap - DC6-48-60-18-8F - OVP			
10	175.0	3	Ericsson - AIR21 B2A B4P - Panel	(3) T-Frames	(6) 1 5/8" (1) 1-1/4" LMU (3) 7/8" Fiber	T-Mobile
11		3	Ericsson - AIR21 B4A B2P - Panel			
12	173.0	3	Ericsson - KRY 112 144 - TMA			
13	165.0	3	Swedcom - SWCP 2X7014 - Panel	(3) Modified Sector Frames with (3) BSAMNT-SBS-1-2, (3) VZWSMART-P40-238X150, (12) VZWSMART-MSK1, (3) VZWSMART-SFK1 and (3) VZWSMART-SFK3	(1) 1 5/8" Hybrid (1) W/G Ladder	Verizon
14		6	CommScope - NHH-65B-R2B - Panel			
15		3	Samsung - MT6407-77A - Panel			
16		3	B2/B66A RRH-BR049 (RFV01U-D1A)			
17		3	B5/B13 RRH-BR04C (RFV01U-D2A)			
18		1	Raycap RVZDC-6627-PF-48 - OVP			
18	155.0	3	JMA Wireless MX08FRO665-21 Panel	(3) Commscope MTC3975083 Sector frames	(1) 1.75" Hybrid	Dish Wireless
19		3	Fujitsu TA08025-B605 RRU			
20		3	Fujitsu TA08025-B604 RRU			
21		1	Raycap RDIDC-9181-PF-48 OVP			
22	138.0	3	RFS - APXVTM14-C-I20 - Panel	(3) T-Frame	(3) 1 1/4" (1) 5/8" Fiber	Sprint Nextel
23		3	RFS - APXVSPP18 - Panel			
24		3	ALU - 2500 MHz - RRU			
25		3	ALU - 1900 MHz - RRU			
26		3	ALU - 800 MHz - RRU			
27		3	ALU - 800MHz Filter			
28		4	RFS - ACU-A20-N - RET			

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
10	175.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) VFA12-HD	(4) 1 5/8" (1) 1-1/4" Fiber (1) 1.9" Fiber (3) 7/8" Hybrid	T-Mobile
11		3	Ericsson - AIR 21 B4A/B2P - Panel			
12		3	Ericsson - 840590966 - Panel			
13		3	Ericsson KRY 112 144/1			
14		3	Ericsson 4480 B71 + B85			

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:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	**53.3%**	**83.1%**	**2.3%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	407.4	339.3	39.3

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 0.0785 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

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 ANSI/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.

Structure: MA12227-A-SBA

Site Name:	Truro			**Code:**	TIA-222-G	3/23/2022
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	108.00	
Height:	190.00 (ft)	**Base Width:**	22.50	**Basic Ice WS:**	40.00	
Base Elev:	0.00 (ft)	**Top Width:**	5.41	**Operational WS:**	60.00	Page: 1

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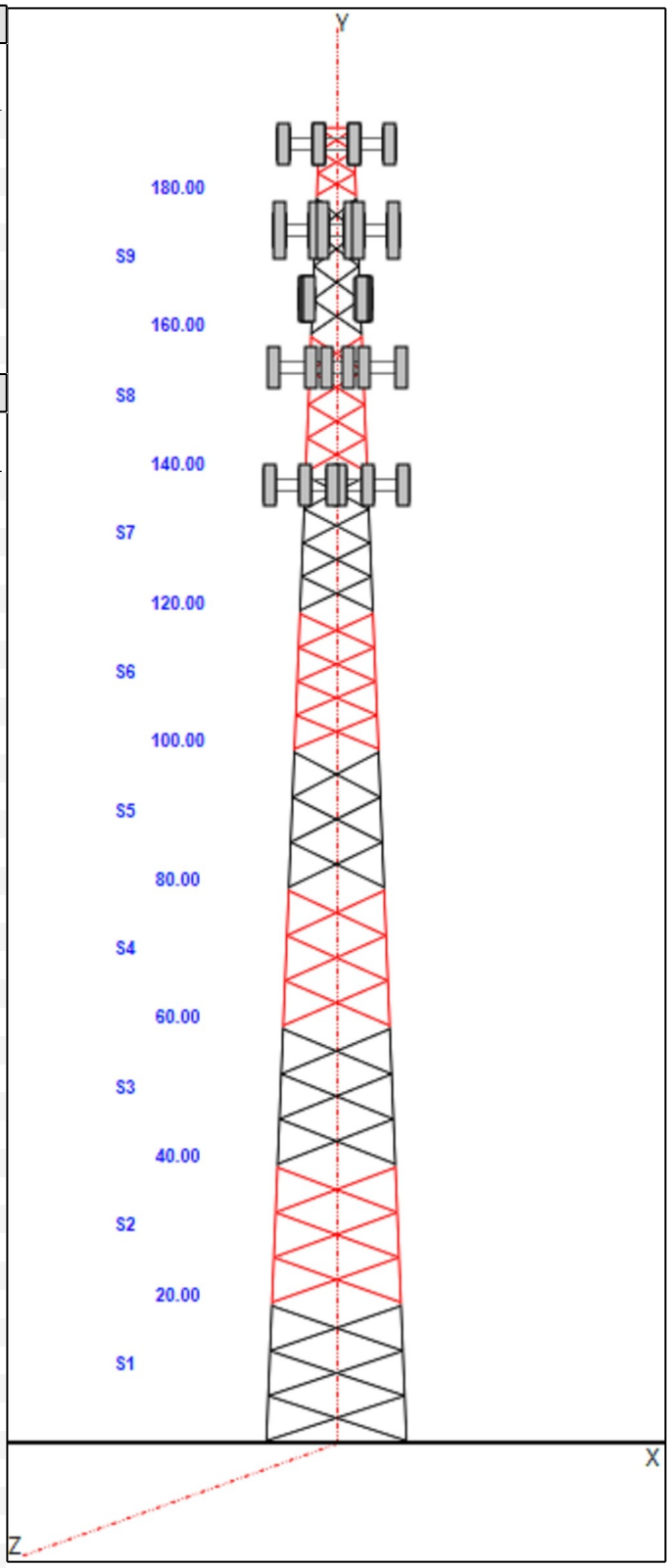
Section Properties

Sect	Leg Members	Diagonal Members	Horizontal Members
1-2	SOL 5 1/4" SOLID	SAE 4X4X0.25	
3	SOL 5" SOLID	SAE 4X4X0.25	
4	SOL 5" SOLID	SAE 3.5X3.5X0.25	
5	SOL 4 3/4" SOLID	SAE 3.5X3.5X0.25	
6	SOL 4 1/4" SOLID	SAE 3X3X0.1875	
7	SOL 4" SOLID	SAE 2.5X2.5X0.25	
8	SOL 3 3/4" SOLID	SAE 2.5X2.5X0.1875	
9	SOL 3 1/2" S0LID	SAE 2.5X2.5X0.1875	
10	SOL 3" SOLID	SAE 2X2X0.1875	SAE 2X2X0.1875

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
190.00	190.00	1	Lightning Rod
190.00	190.00	1	Beacon
187.30	187.30	1	(3) USF12-496-U
187.30	187.30	3	AM-X-CD-16-65-00T-RET
187.30	187.30	3	HPA65R-KE4A
187.30	187.30	3	DUO1417-8686-0
187.30	187.30	3	800 10121
187.30	187.30	6	LGP17201
187.30	187.30	3	RRUS 12
187.30	187.30	3	RRUS 4478 B14
187.30	187.30	3	4449 B5/B12
187.30	187.30	2	DC6-48-60-18-8F
175.00	175.00	3	AIR 21 B2A/B4P
175.00	175.00	3	AIR 21 B4A/B2P
175.00	175.00	3	840590966
175.00	175.00	3	Ericsson KRY 112 144/1
175.00	175.00	3	Ericsson 4480 B71 + B85
175.00	175.00	3	VFA12-HD
165.00	165.00	3	SWCP 2X7014
165.00	165.00	6	NHH-65B-R2B
165.00	165.00	3	MT6407-77A
165.00	165.00	3	B2/B66A RRH-BR049 (RFV01U-D1A)
165.00	165.00	3	B5/B13 RRH-BR04C (RFV01U-D2A)
165.00	165.00	1	Raycap RVZDC-6627-PF-48
165.00	165.00	1	(3) V-Brace Kits
165.00	165.00	1	(3) Stabilizer Kit
155.00	155.00	3	MX08FRO665-21
155.00	155.00	1	(3) MTC3975083
155.00	155.00	3	TA08025-B605
155.00	155.00	3	TA08025-B604
155.00	155.00	1	RDIDC-9181-PF-48
138.00	138.00	3	T-Arm (Flat)
138.00	138.00	3	APXVTM14-C-I20
138.00	138.00	3	APXVSPP18-C
138.00	138.00	3	1900MHz RRH
138.00	138.00	3	1900MHz RRH
138.00	138.00	3	800 MHz RRH
138.00	138.00	3	ALU 800MHz External Notch Filt
138.00	138.00	4	ACU-A20-N

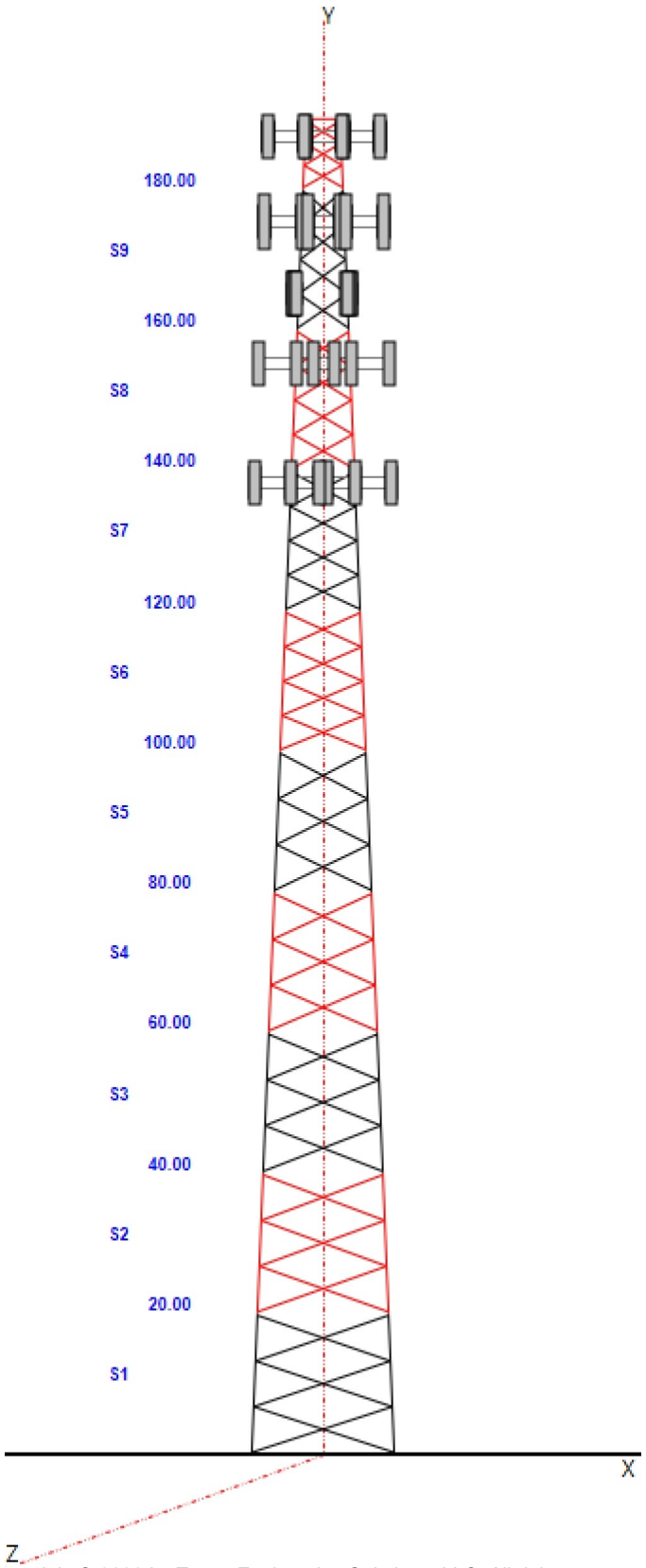
Linear Appurtenances



Elev From (ft)	Elev To (ft)	Qty	Description
0.00	187.00	12	1 5/8" Coax
0.00	187.00	2	3" Conduit
0.00	187.00	4	3/4" DC
0.00	187.00	2	7/16" Fiber
0.00	187.00	1	Climbing Ladder
0.00	187.00	1	Safety Cable
0.00	187.00	1	W/G Ladder
0.00	175.00	4	1 5/8" Coax
0.00	175.00	1	1-1/4" Fiber
0.00	175.00	1	1.9" Fiber
0.00	175.00	3	7/8" Hybrid
0.00	175.00	1	W/G Ladder
0.00	165.00	1	1 5/8" Hybrid
0.00	165.00	1	W/G Ladder
0.00	155.00	1	1.75" Hybrid
0.00	138.00	3	1 1/4" Coax
0.00	138.00	1	5/8" Fiber
0.00	138.00	1	W/G Ladder

Base Reactions

Leg			Overturning	
Max Uplift:	-339.30 (kips		Moment:	7401.92 (ft-kips)
Max Down:	407.36 (kips		Total Down:	82.48 (kips)
Max Shear:	39.25 (kips		Total Shear:	66.75 (kips)

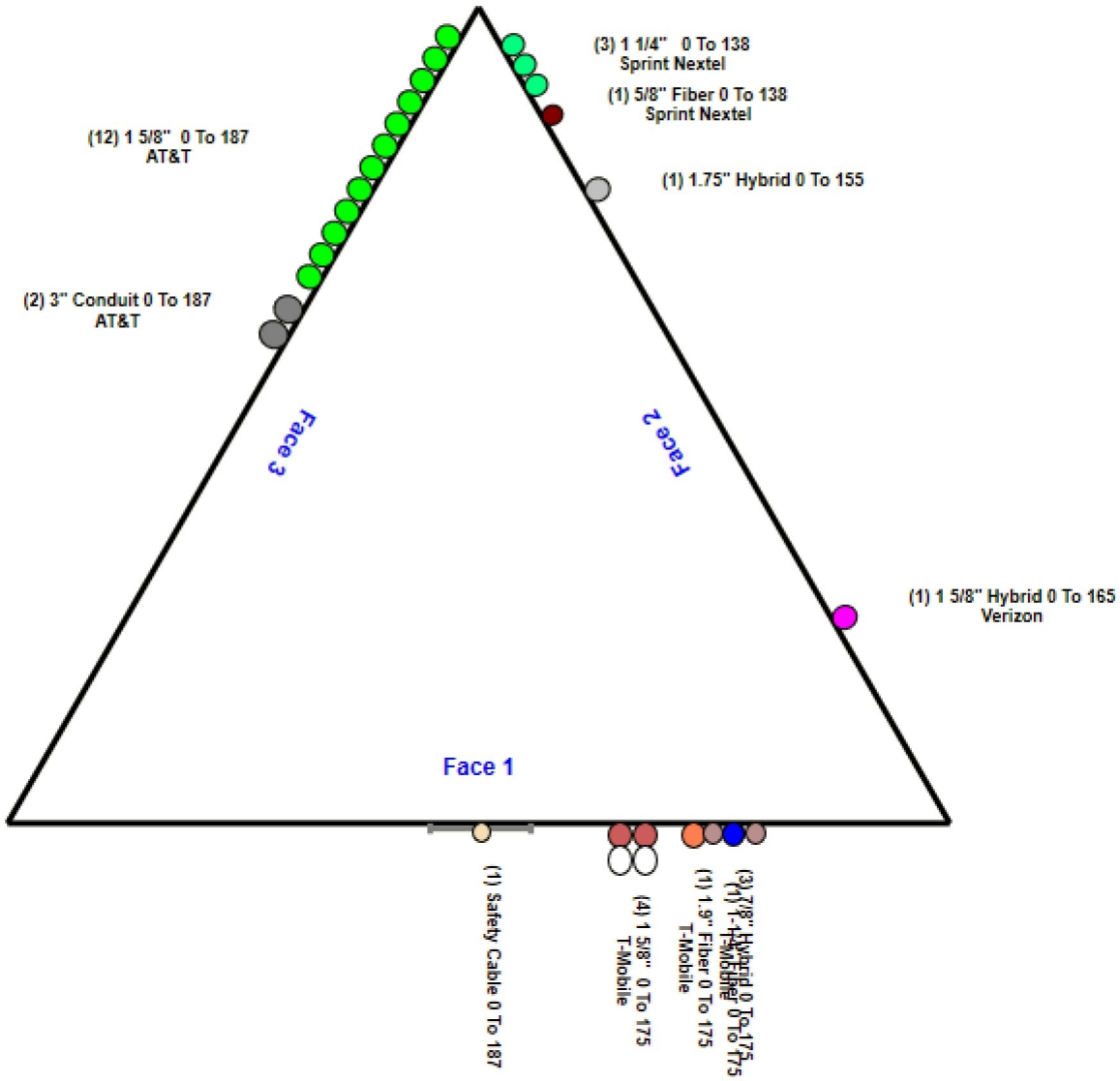


Structure: MA12227-A-SBA - Coax Line Placement

Type: Self Support
Site Name: Truro
Height: 190.00 (ft)

3/23/2022

Tower Engineering Solutions



Loading Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 5	

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Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	Ice Weight (lb)	Ice CaAa (sf)	Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
190.00	Lightning Rod	1	5.00	0.500	26.39	2.282	72.000	1.000	1.000	1.00	1.00	0.000
190.00	Beacon	1	36.00	2.720	172.02	3.689	28.000	17.500	17.500	1.00	1.00	0.000
187.30	(3) USF12-496-U	1	1598.0	34.800	3876.37	72.012	0.000	0.000	0.000	0.75	1.00	0.000
187.30	AM-X-CD-16-65-00T-RET	3	48.50	8.020	214.22	10.873	72.000	11.800	5.900	0.80	0.79	0.000
187.30	HPA65R-KE4A	3	20.30	8.280	228.20	9.531	48.000	20.700	7.700	0.80	0.71	0.000
187.30	DUO1417-8686-0	3	20.30	5.830	182.13	6.881	48.400	14.000	9.000	0.80	0.84	0.000
187.30	800 10121	3	46.30	5.150	163.60	7.301	54.500	10.300	5.900	0.80	0.82	0.000
187.30	LGP17201	6	31.00	1.950	70.03	2.968	13.900	14.400	3.700	0.80	0.50	0.000
187.30	RRUS 12	3	60.00	2.700	128.44	3.374	18.200	17.800	8.000	0.80	0.67	0.000
187.30	RRUS 4478 B14	3	59.40	1.650	101.75	2.179	15.000	13.200	7.300	0.80	0.67	0.000
187.30	4449 B5/B12	3	71.00	1.970	125.51	2.529	17.900	13.200	9.400	0.80	0.67	0.000
187.30	DC6-48-60-18-8F	2	31.80	0.920	94.93	1.367	24.000	11.000	11.000	0.80	1.00	0.000
175.00	AIR 21 B2A/B4P	3	91.50	6.090	262.93	7.202	56.000	12.100	7.900	0.80	0.86	0.000
175.00	AIR 21 B4A/B2P	3	90.30	6.090	261.73	7.202	56.000	12.100	7.900	0.80	0.86	0.000
175.00	840590966	3	101.40	19.880	509.28	21.791	95.900	23.500	7.100	0.80	0.69	0.000
175.00	Ericsson KRY 112 144/1	3	11.00	0.410	21.92	0.891	6.900	6.100	2.700	0.80	0.70	0.000
175.00	Ericsson 4480 B71 + B85	3	93.00	2.850	165.84	3.533	21.800	15.700	7.500	0.80	0.67	0.000
175.00	VFA12-HD	3	774.00	18.900	1539.97	42.948	0.000	0.000	0.000	0.75	1.00	0.000
165.00	SWCP 2X7014	3	30.00	9.940	313.11	11.362	76.700	14.000	11.300	0.80	0.93	0.000
165.00	NHH-65B-R2B	6	43.70	8.080	248.34	9.389	72.000	11.900	7.100	0.80	0.83	0.000
165.00	MT6407-77A	3	79.40	4.690	200.77	5.650	35.100	16.100	5.500	0.80	0.70	0.000
165.00	B2/B66A RRH-BR049	3	84.40	1.880	136.30	2.438	15.000	15.000	10.000	0.80	0.67	0.000
165.00	B5/B13 RRH-BR04C (RFV01U-D2A)	3	70.30	1.880	119.55	2.438	15.000	15.000	8.100	0.80	0.67	0.000
165.00	Raycap RVZDC-6627-PF-48	1	32.00	4.060	147.36	4.892	29.500	16.500	12.600	0.80	1.00	0.000
165.00	(3) V-Brace Kits	1	650.00	15.500	1477.05	31.935	0.000	0.000	0.000	0.75	1.00	0.000
165.00	(3) Stabilizer Kit	1	180.00	6.100	409.03	12.568	0.000	0.000	0.000	0.75	1.00	0.000
155.00	MX08FRO665-21	3	64.50	12.490	355.37	13.955	72.000	20.000	8.000	0.80	0.74	0.000
155.00	(3) MTC3975083	1	1056.4	29.450	2088.86	66.456	0.000	0.000	0.000	0.75	1.00	0.000
155.00	TA08025-B605	3	75.00	1.960	127.30	2.521	15.800	15.000	9.100	0.80	0.67	0.000
155.00	TA08025-B604	3	63.90	1.960	114.53	2.521	15.800	15.000	7.900	0.80	0.67	0.000
155.00	RDIDC-9181-PF-48	1	21.85	2.010	74.98	2.578	16.570	14.570	8.460	1.00	1.00	0.000
138.00	T-Arm (Flat)	3	400.00	10.000	675.27	18.602	0.000	0.000	0.000	0.75	0.75	0.000
138.00	APXVTM14-C-I20	3	56.20	6.340	212.18	7.435	56.300	12.600	6.300	0.80	0.78	0.000
138.00	APXVSPP18-C	3	57.00	8.020	227.40	10.774	72.000	11.800	7.000	0.80	0.83	0.000
138.00	1900MHz RRH	3	44.00	3.800	151.61	5.170	23.000	13.000	17.000	0.80	0.67	0.000
138.00	1900MHz RRH	3	44.00	3.800	151.61	5.170	23.000	13.000	17.000	0.80	0.67	0.000
138.00	800 MHz RRH	3	53.00	2.490	125.91	3.618	19.700	13.000	10.800	0.80	0.67	0.000
138.00	ALU 800MHz External Notch Filt	3	8.80	0.780	26.19	1.418	10.000	8.000	3.000	0.80	0.50	0.000
138.00	ACU-A20-N	4	1.00	0.140	5.24	0.432	4.000	2.000	3.500	0.80	0.50	0.000
	Totals:	**107**	**11,947.56**		**30,920.91**						**Number of Appurtenances :**	**39**

Loading Summary

Structure:	MA12227-A-SBA		**Code:**	TIA-222-G	3/23/2022
Site Name:	Truro		**Exposure:**	B	
Height:	190.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	0.85	**Topography:** 1	**Struct Class:**	II	Page: 6

IES
Tower Engineering Solutions

Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	187.00	1 5/8" Coax	12	1.98	1.04	100.00	3	Individual IR		N	0.50	1.00	
0.00	187.00	3" Conduit	2	3.02	1.78	100.00	3	Individual IR		N	0.50	1.00	
0.00	187.00	3/4" DC	4	0.75	0.40	100.00	3	Individual NR		N	0.50	1.00	0
0.00	187.00	7/16" Fiber	2	0.44	0.16	100.00	3	Individual NR		N	0.50	1.00	0
0.00	187.00	Climbing Ladder	1	3.00	6.90	100.00	1	Individual NR		N	0.50	1.00	
0.00	187.00	Safety Cable	1	0.38	0.27	100.00	1	Individual NR		N	0.50	1.00	
0.00	187.00	W/G Ladder	1	0.25	6.00	100.00	3	Individual NR		N	0.50	1.00	
0.00	175.00	1 5/8" Coax	4	1.98	1.04	50.00	1	Block		N	0.50	0.78	
0.00	175.00	1-1/4" Fiber	1	1.25	0.95	100.00	1	Individual NR		N	0.50	1.00	
0.00	175.00	1.9" Fiber	1	1.90	0.95	100.00	1	Individual NR		N	0.50	1.00	
0.00	175.00	7/8" Hybrid	3	0.88	0.65	100.00	1	Individual IR		N	0.50	0.70	
0.00	175.00	W/G Ladder	1	1.50	6.00	100.00	1	Individual NR		N	0.50	1.00	
0.00	165.00	1 5/8" Hybrid	1	1.98	1.04	100.00	2	Individual IR		N	0.50	0.76	
0.00	165.00	W/G Ladder	1	2.50	6.00	100.00	2	Individual NR		N	0.50	1.00	
0.00	155.00	1.75" Hybrid	1	1.75	1.99	100.00	2	Individual NR		N	1.00	1.00	
0.00	138.00	1 1/4" Coax	3	1.55	0.66	100.00	2	Individual IR		N	0.50	0.65	
0.00	138.00	5/8" Fiber	1	0.63	0.15	100.00	2	Individual NR		N	0.50	1.00	
0.00	138.00	W/G Ladder	1	2.00	6.00	100.00	1	Individual NR		N	0.50	1.00	

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W Normal Wind — 1.2D + 1.6W 108 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	1.00	1.00	0.00	53.54	104.28	0.00	10,021.	0.0	3632.60	1879.02	5,511.62
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	1.00	1.00	0.00	50.12	104.28	0.00	9,777.1	0.0	3385.31	1880.61	5,265.92
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	1.00	1.00	0.00	46.25	104.28	0.00	9,040.8	0.0	3601.03	2176.13	5,777.15
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	1.00	1.00	0.00	38.44	104.28	0.00	8,499.4	0.0	3326.19	2395.71	5,721.91
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	1.00	1.00	0.00	35.21	104.28	0.00	7,822.6	0.0	3253.28	2574.06	5,827.34
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	1.00	1.00	0.00	33.95	104.28	0.00	6,419.3	0.0	3270.69	2725.96	5,996.64
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	1.00	1.00	0.00	26.45	103.06	0.00	5,958.2	0.0	2708.50	2821.22	5,529.72
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	1.00	1.00	0.00	23.45	91.41	0.00	4,903.1	0.0	2469.73	2562.55	5,032.28
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	1.00	1.00	0.00	20.58	78.73	0.00	4,171.5	0.0	2201.24	2223.22	4,424.47
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	1.00	1.00	0.00	10.14	21.76	0.00	1,526.8	0.0	1069.39	609.01	1,678.40
														68,140.8	**0.0**			**50,765.45**

Load Case: 1.2D + 1.6W 60° Wind — 1.2D + 1.6W 108 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	0.80	1.00	0.00	44.69	104.28	0.00	10,021.	0.0	3032.26	1879.02	4,911.29
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	0.80	1.00	0.00	41.95	104.28	0.00	9,777.1	0.0	2834.02	1880.61	4,714.63
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	0.80	1.00	0.00	38.76	104.28	0.00	9,040.8	0.0	3017.87	2176.13	5,194.00
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	0.80	1.00	0.00	32.47	104.28	0.00	8,499.4	0.0	2810.09	2395.71	5,205.80
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	0.80	1.00	0.00	29.82	104.28	0.00	7,822.6	0.0	2755.10	2574.06	5,329.16
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	0.80	1.00	0.00	28.69	104.28	0.00	6,419.3	0.0	2763.68	2725.96	5,489.64
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	0.80	1.00	0.00	22.61	103.06	0.00	5,958.2	0.0	2315.29	2821.22	5,136.51
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	0.80	1.00	0.00	20.14	91.41	0.00	4,903.1	0.0	2121.28	2562.55	4,683.84
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	0.80	1.00	0.00	17.78	78.73	0.00	4,171.5	0.0	1901.49	2223.22	4,124.71
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	0.80	1.00	0.00	8.69	21.76	0.00	1,526.8	0.0	916.18	609.01	1,525.19
														68,140.8	**0.0**			**46,314.76**

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90° Wind — 1.2D + 1.6W 108 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	0.85	1.00	0.00	46.90	104.28	0.00	10,021.	0.0	3182.35	1879.02	5,061.37
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	0.85	1.00	0.00	43.99	104.28	0.00	9,777.1	0.0	2971.84	1880.61	4,852.45
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	0.85	1.00	0.00	40.63	104.28	0.00	9,040.8	0.0	3163.66	2176.13	5,339.79
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	0.85	1.00	0.00	33.97	104.28	0.00	8,499.4	0.0	2939.12	2395.71	5,334.83
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	0.85	1.00	0.00	31.17	104.28	0.00	7,822.6	0.0	2879.64	2574.06	5,453.70
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	0.85	1.00	0.00	30.00	104.28	0.00	6,419.3	0.0	2890.43	2725.96	5,616.39
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	0.85	1.00	0.00	23.57	103.06	0.00	5,958.2	0.0	2413.59	2821.22	5,234.81
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	0.85	1.00	0.00	20.97	91.41	0.00	4,903.1	0.0	2208.40	2562.55	4,770.95
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	0.85	1.00	0.00	18.48	78.73	0.00	4,171.5	0.0	1976.43	2223.22	4,199.65
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	0.85	1.00	0.00	9.05	21.76	0.00	1,526.8	0.0	954.48	609.01	1,563.49
														68,140.8	**0.0**			**47,427.44**

Load Case: 0.9D + 1.6W Normal Wind — 0.9D + 1.6W 108 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	1.00	1.00	0.00	53.54	104.28	0.00	7,516.4	0.0	3632.60	1879.02	5,511.62
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	1.00	1.00	0.00	50.12	104.28	0.00	7,332.9	0.0	3385.31	1880.61	5,265.92
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	1.00	1.00	0.00	46.25	104.28	0.00	6,780.6	0.0	3601.03	2176.13	5,777.15
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	1.00	1.00	0.00	38.44	104.28	0.00	6,374.5	0.0	3326.19	2395.71	5,721.91
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	1.00	1.00	0.00	35.21	104.28	0.00	5,867.0	0.0	3253.28	2574.06	5,827.34
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	1.00	1.00	0.00	33.95	104.28	0.00	4,814.4	0.0	3270.69	2725.96	5,996.64
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	1.00	1.00	0.00	26.45	103.06	0.00	4,468.7	0.0	2708.50	2821.22	5,529.72
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	1.00	1.00	0.00	23.45	91.41	0.00	3,677.3	0.0	2469.73	2562.55	5,032.28
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	1.00	1.00	0.00	20.58	78.73	0.00	3,128.6	0.0	2201.24	2223.22	4,424.47
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	1.00	1.00	0.00	10.14	21.76	0.00	1,145.1	0.0	1069.39	609.01	1,678.40
														51,105.6	**0.0**			**50,765.45**

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 60° Wind — 0.9D + 1.6W 108 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	0.80	1.00	0.00	44.69	104.28	0.00	7,516.4	0.0	3032.26	1879.02	4,911.29
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	0.80	1.00	0.00	41.95	104.28	0.00	7,332.9	0.0	2834.02	1880.61	4,714.63
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	0.80	1.00	0.00	38.76	104.28	0.00	6,780.6	0.0	3017.87	2176.13	5,194.00
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	0.80	1.00	0.00	32.47	104.28	0.00	6,374.5	0.0	2810.09	2395.71	5,205.80
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	0.80	1.00	0.00	29.82	104.28	0.00	5,867.0	0.0	2755.10	2574.06	5,329.16
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	0.80	1.00	0.00	28.69	104.28	0.00	4,814.4	0.0	2763.68	2725.96	5,489.64
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	0.80	1.00	0.00	22.61	103.06	0.00	4,468.7	0.0	2315.29	2821.22	5,136.51
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	0.80	1.00	0.00	20.14	91.41	0.00	3,677.3	0.0	2121.28	2562.55	4,683.84
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	0.80	1.00	0.00	17.78	78.73	0.00	3,128.6	0.0	1901.49	2223.22	4,124.71
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	0.80	1.00	0.00	8.69	21.76	0.00	1,145.1	0.0	916.18	609.01	1,525.19
														51,105.6	**0.0**			**46,314.76**

Load Case: 0.9D + 1.6W 90° Wind — 0.9D + 1.6W 108 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.77	44.239	17.52	0.00	0.14	2.81	0.85	1.00	0.00	46.90	104.28	0.00	7,516.4	0.0	3182.35	1879.02	5,061.37
2	30.0	17.78	40.806	17.52	0.00	0.14	2.79	0.85	1.00	0.00	43.99	104.28	0.00	7,332.9	0.0	2971.84	1880.61	4,852.45
3	50.0	20.58	37.445	16.69	0.00	0.15	2.78	0.85	1.00	0.00	40.63	104.28	0.00	6,780.6	0.0	3163.66	2176.13	5,339.79
4	70.0	22.65	29.822	16.69	0.00	0.14	2.81	0.85	1.00	0.00	33.97	104.28	0.00	6,374.5	0.0	2939.12	2395.71	5,334.83
5	90.0	24.34	26.961	15.85	0.00	0.14	2.79	0.85	1.00	0.00	31.17	104.28	0.00	5,867.0	0.0	2879.64	2574.06	5,453.70
6	110.0	25.77	26.314	14.19	0.00	0.16	2.75	0.85	1.00	0.00	30.00	104.28	0.00	4,814.4	0.0	2890.43	2725.96	5,616.39
7	130.0	27.03	19.196	13.35	0.00	0.15	2.79	0.85	1.00	0.00	23.57	103.06	0.00	4,468.7	0.0	2413.59	2821.22	5,234.81
8	150.0	28.16	16.544	12.52	0.00	0.16	2.75	0.85	1.00	0.00	20.97	91.41	0.00	3,677.3	0.0	2208.40	2562.55	4,770.95
9	170.0	29.19	14.015	11.68	0.00	0.17	2.69	0.85	1.00	0.00	18.48	78.73	0.00	3,128.6	0.0	1976.43	2223.22	4,199.65
10	185.0	29.90	7.266	5.01	0.00	0.20	2.59	0.85	1.00	0.00	9.05	21.76	0.00	1,145.1	0.0	954.48	609.01	1,563.49
														51,105.6	**0.0**			**47,427.44**

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 10	

IES Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind — 1.2D + 1.0Di + 1.0Wi 40 mph Wind at Normal From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	2.44	44.239	56.44	38.91	0.23	2.51	1.00	1.00	1.33	76.95	166.42	48.81	17,862.	7840.7	400.25	342.42	742.67
2	30.0	2.44	40.806	58.41	40.88	0.24	2.46	1.00	1.00	1.49	74.86	172.09	54.48	18,378.	8601.1	382.02	357.48	739.50
3	50.0	2.82	37.445	57.05	40.37	0.25	2.43	1.00	1.00	1.56	70.86	169.73	62.55	17,807.	8766.7	412.88	426.23	839.11
4	70.0	3.11	29.822	55.72	39.03	0.25	2.43	1.00	1.00	1.62	62.46	171.51	64.69	16,874.	8375.0	400.50	476.34	876.85
5	90.0	3.34	26.961	53.13	37.27	0.27	2.39	1.00	1.00	1.66	58.25	172.89	66.33	16,101.	8278.7	395.32	515.75	911.07
6	110.0	3.54	26.314	55.96	41.77	0.31	2.27	1.00	1.00	1.69	60.02	174.01	67.68	14,876.	8457.0	409.04	543.61	952.65
7	130.0	3.71	19.196	52.02	38.67	0.31	2.27	1.00	1.00	1.72	50.55	172.43	68.24	13,717.	7758.8	360.91	566.44	927.35
8	150.0	3.86	16.544	47.99	35.48	0.34	2.20	1.00	1.00	1.75	45.87	149.62	62.54	11,865.	6962.6	332.04	508.82	840.85
9	170.0	4.00	14.015	43.98	32.30	0.37	2.12	1.00	1.00	1.77	41.49	128.27	51.54	10,202.	6031.0	299.54	425.18	724.72
10	185.0	4.10	7.266	24.43	19.42	0.50	1.91	1.00	1.00	1.78	23.93	33.58	14.55	3,825.8	2299.0	159.08	92.91	251.99
														141,511.5	**73370.7**			**7,806.77**

Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind — 1.2D + 1.0Di + 1.0Wi 40 mph Wind at 60° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	2.44	44.239	56.44	38.91	0.23	2.51	0.80	1.00	1.33	68.10	166.42	48.81	17,862.	7840.7	354.23	342.42	696.65
2	30.0	2.44	40.806	58.41	40.88	0.24	2.46	0.80	1.00	1.49	66.70	172.09	54.48	18,378.	8601.1	340.37	357.48	697.85
3	50.0	2.82	37.445	57.05	40.37	0.25	2.43	0.80	1.00	1.56	63.37	169.73	62.55	17,807.	8766.7	369.25	426.23	795.48
4	70.0	3.11	29.822	55.72	39.03	0.25	2.43	0.80	1.00	1.62	56.50	171.51	64.69	16,874.	8375.0	362.26	476.34	838.60
5	90.0	3.34	26.961	53.13	37.27	0.27	2.39	0.80	1.00	1.66	52.86	172.89	66.33	16,101.	8278.7	358.73	515.75	874.48
6	110.0	3.54	26.314	55.96	41.77	0.31	2.27	0.80	1.00	1.69	54.76	174.01	67.68	14,876.	8457.0	373.17	543.61	916.79
7	130.0	3.71	19.196	52.02	38.67	0.31	2.27	0.80	1.00	1.72	46.71	172.43	68.24	13,717.	7758.8	333.50	566.44	899.93
8	150.0	3.86	16.544	47.99	35.48	0.34	2.20	0.80	1.00	1.75	42.56	149.62	62.54	11,865.	6962.6	308.08	508.82	816.90
9	170.0	4.00	14.015	43.98	32.30	0.37	2.12	0.80	1.00	1.77	38.69	128.27	51.54	10,202.	6031.0	279.30	425.18	704.48
10	185.0	4.10	7.266	24.43	19.42	0.50	1.91	0.80	1.00	1.78	22.48	33.58	14.55	3,825.8	2299.0	149.42	92.91	242.33
														141,511.5	**73370.7**			**7,483.51**

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind — 1.2D + 1.0Di + 1.0Wi 40 mph Wind at 90° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	2.44	44.239	56.44	38.91	0.23	2.51	0.85	1.00	1.33	70.31	166.42	48.81	17,862.	7840.7	365.73	342.42	708.15
2	30.0	2.44	40.806	58.41	40.88	0.24	2.46	0.85	1.00	1.49	68.74	172.09	54.48	18,378.	8601.1	350.78	357.48	708.27
3	50.0	2.82	37.445	57.05	40.37	0.25	2.43	0.85	1.00	1.56	65.25	169.73	62.55	17,807.	8766.7	380.16	426.23	806.39
4	70.0	3.11	29.822	55.72	39.03	0.25	2.43	0.85	1.00	1.62	57.99	171.51	64.69	16,874.	8375.0	371.82	476.34	848.16
5	90.0	3.34	26.961	53.13	37.27	0.27	2.39	0.85	1.00	1.66	54.21	172.89	66.33	16,101.	8278.7	367.88	515.75	883.63
6	110.0	3.54	26.314	55.96	41.77	0.31	2.27	0.85	1.00	1.69	56.07	174.01	67.68	14,876.	8457.0	382.14	543.61	925.75
7	130.0	3.71	19.196	52.02	38.67	0.31	2.27	0.85	1.00	1.72	47.67	172.43	68.24	13,717.	7758.8	340.35	566.44	906.79
8	150.0	3.86	16.544	47.99	35.48	0.34	2.20	0.85	1.00	1.75	43.38	149.62	62.54	11,865.	6962.6	314.07	508.82	822.89
9	170.0	4.00	14.015	43.98	32.30	0.37	2.12	0.85	1.00	1.77	39.39	128.27	51.54	10,202.	6031.0	284.36	425.18	709.54
10	185.0	4.10	7.266	24.43	19.42	0.50	1.91	0.85	1.00	1.78	22.84	33.58	14.55	3,825.8	2299.0	151.84	92.91	244.75
														141,511.5	**73370.7**			**7,564.32**

Load Case: 1.0D + 1.0W Normal Wind — 1.0D + 1.0W 60 mph Wind at Normal To Face

Wind Load Factor: 1.00
Dead Load Factor: 1.00
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.48	44.239	17.52	0.00	0.14	2.81	1.00	1.00	0.00	54.17	104.28	0.00	8,351.6	0.0	708.99	362.47	1,071.45
2	30.0	5.49	40.806	17.52	0.00	0.14	2.79	1.00	1.00	0.00	50.74	104.28	0.00	8,147.6	0.0	661.18	362.77	1,023.95
3	50.0	6.35	37.445	16.69	0.00	0.15	2.78	1.00	1.00	0.00	46.91	104.28	0.00	7,534.0	0.0	704.66	419.78	1,124.43
4	70.0	6.99	29.822	16.69	0.00	0.14	2.81	1.00	1.00	0.00	39.28	104.28	0.00	7,082.8	0.0	655.62	462.14	1,117.76
5	90.0	7.51	26.961	15.85	0.00	0.14	2.79	1.00	1.00	0.00	35.95	104.28	0.00	6,518.9	0.0	640.71	496.54	1,137.25
6	110.0	7.96	26.314	14.19	0.00	0.16	2.75	1.00	1.00	0.00	34.37	104.28	0.00	5,349.4	0.0	638.81	525.84	1,164.65
7	130.0	8.34	19.196	13.35	0.00	0.15	2.79	1.00	1.00	0.00	26.77	103.06	0.00	4,965.2	0.0	528.86	544.22	1,073.08
8	150.0	8.69	16.544	12.52	0.00	0.16	2.75	1.00	1.00	0.00	23.66	91.41	0.00	4,085.9	0.0	480.54	494.32	974.86
9	170.0	9.01	14.015	11.68	0.00	0.17	2.69	1.00	1.00	0.00	20.68	78.73	0.00	3,476.2	0.0	426.50	428.86	855.36
10	185.0	9.23	7.266	5.01	0.00	0.20	2.59	1.00	1.00	0.00	10.14	21.76	0.00	1,272.3	0.0	206.29	117.48	323.77
														56,784.0	**0.0**			**9,866.56**

Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 12	

IES Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60° Wind — 1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.48	44.239	17.52	0.00	0.14	2.81	0.80	1.00	0.00	45.32	104.28	0.00	8,351.6	0.0	593.18	362.47	955.65
2	30.0	5.49	40.806	17.52	0.00	0.14	2.79	0.80	1.00	0.00	42.58	104.28	0.00	8,147.6	0.0	554.83	362.77	917.61
3	50.0	6.35	37.445	16.69	0.00	0.15	2.78	0.80	1.00	0.00	39.42	104.28	0.00	7,534.0	0.0	592.16	419.78	1,011.94
4	70.0	6.99	29.822	16.69	0.00	0.14	2.81	0.80	1.00	0.00	33.31	104.28	0.00	7,082.8	0.0	556.07	462.14	1,018.20
5	90.0	7.51	26.961	15.85	0.00	0.14	2.79	0.80	1.00	0.00	30.56	104.28	0.00	6,518.9	0.0	544.61	496.54	1,041.15
6	110.0	7.96	26.314	14.19	0.00	0.16	2.75	0.80	1.00	0.00	29.11	104.28	0.00	5,349.4	0.0	541.01	525.84	1,066.85
7	130.0	8.34	19.196	13.35	0.00	0.15	2.79	0.80	1.00	0.00	22.93	103.06	0.00	4,965.2	0.0	453.01	544.22	997.23
8	150.0	8.69	16.544	12.52	0.00	0.16	2.75	0.80	1.00	0.00	20.35	91.41	0.00	4,085.9	0.0	413.33	494.32	907.65
9	170.0	9.01	14.015	11.68	0.00	0.17	2.69	0.80	1.00	0.00	17.87	78.73	0.00	3,476.2	0.0	368.68	428.86	797.54
10	185.0	9.23	7.266	5.01	0.00	0.20	2.59	0.80	1.00	0.00	8.69	21.76	0.00	1,272.3	0.0	176.73	117.48	294.21
														56,784.0	**0.0**			**9,008.02**

Load Case: 1.0D + 1.0W 90° Wind — 1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.48	44.239	17.52	0.00	0.14	2.81	0.85	1.00	0.00	47.53	104.28	0.00	8,351.6	0.0	622.13	362.47	984.60
2	30.0	5.49	40.806	17.52	0.00	0.14	2.79	0.85	1.00	0.00	44.62	104.28	0.00	8,147.6	0.0	581.42	362.77	944.19
3	50.0	6.35	37.445	16.69	0.00	0.15	2.78	0.85	1.00	0.00	41.30	104.28	0.00	7,534.0	0.0	620.29	419.78	1,040.06
4	70.0	6.99	29.822	16.69	0.00	0.14	2.81	0.85	1.00	0.00	34.80	104.28	0.00	7,082.8	0.0	580.95	462.14	1,043.09
5	90.0	7.51	26.961	15.85	0.00	0.14	2.79	0.85	1.00	0.00	31.91	104.28	0.00	6,518.9	0.0	568.64	496.54	1,065.18
6	110.0	7.96	26.314	14.19	0.00	0.16	2.75	0.85	1.00	0.00	30.43	104.28	0.00	5,349.4	0.0	565.46	525.84	1,091.30
7	130.0	8.34	19.196	13.35	0.00	0.15	2.79	0.85	1.00	0.00	23.89	103.06	0.00	4,965.2	0.0	471.97	544.22	1,016.19
8	150.0	8.69	16.544	12.52	0.00	0.16	2.75	0.85	1.00	0.00	21.17	91.41	0.00	4,085.9	0.0	430.13	494.32	924.45
9	170.0	9.01	14.015	11.68	0.00	0.17	2.69	0.85	1.00	0.00	18.57	78.73	0.00	3,476.2	0.0	383.13	428.86	812.00
10	185.0	9.23	7.266	5.01	0.00	0.20	2.59	0.85	1.00	0.00	9.05	21.76	0.00	1,272.3	0.0	184.12	117.48	301.60
														56,784.0	**0.0**			**9,222.66**

Force/Stress Compression Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	SOL - 5 1/4" SOLID	-400.81	1.2D + 1.6W Normal Wind	6.51	100	100	100	59.51	50.00	751.93	53.3	Member X
2	40	SOL - 5 1/4" SOLID	-359.56	1.2D + 1.6W Normal Wind	6.51	100	100	100	59.51	50.00	751.93	47.8	Member X
3	60	SOL - 5" SOLID	-316.20	1.2D + 1.6W Normal Wind	6.51	100	100	100	62.48	50.00	664.15	47.6	Member X
4	80	SOL - 5" SOLID	-272.20	1.2D + 1.6W Normal Wind	6.51	100	100	100	62.48	50.00	664.15	41.0	Member X
5	100	SOL - 4 3/4" SOLID	-227.27	1.2D + 1.6W Normal Wind	6.51	100	100	100	65.77	50.00	581.20	39.1	Member X
6	120	SOL - 4 1/4" SOLID	-183.32	1.2D + 1.6W Normal Wind	4.88	100	100	100	55.13	50.00	511.15	35.9	Member X
7	140	SOL - 4" SOLID	-136.44	1.2D + 1.6W Normal Wind	4.88	100	100	100	58.58	50.00	439.99	31.0	Member X
8	160	SOL - 3 3/4" SOLID	-86.64	1.2D + 1.6W Normal Wind	4.88	100	100	100	62.48	50.00	373.59	23.2	Member X
9	180	SOL - 3 1/2" S0LID	-39.59	1.2D + 1.6W Normal Wind	4.88	100	100	100	66.95	50.00	311.97	12.7	Member X
10	190	SOL - 3" SOLID	-8.47	1.2D + 1.6W Normal Wind	0.25	100	100	100	4.01	50.00	317.73	2.7	Member X

Splices

		Top Splice						Bottom Splice					
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	1.2D + 1.6W Normal Wind	368.39	0.00	0.0			1.2D + 1.6W Normal Wind	408.27	0.00			
2	40	1.2D + 1.6W Normal Wind	325.20	0.00	0.0			1.2D + 1.6W Normal Wind	368.39	0.00		1/2 A325	6
3	60	1.2D + 1.6W Normal Wind	281.20	0.00	0.0			1.2D + 1.6W Normal Wind	325.20	0.00		1/2 A325	6
4	80	1.2D + 1.6W Normal Wind	236.34	0.00	0.0			1.2D + 1.6W Normal Wind	281.20	0.00		1/2 A325	6
5	100	1.2D + 1.6W Normal Wind	190.39	0.00	0.0			1.2D + 1.6W Normal Wind	236.34	0.00		1/2 A325	6
6	120	1.2D + 1.6W Normal Wind	143.56	0.00	0.0			1.2D + 1.6W Normal Wind	190.39	0.00		3/8 A325	6
7	140	1.2D + 1.6W Normal Wind	93.43	0.00	0.0			1.2D + 1.6W Normal Wind	143.56	0.00		3/8 A325	6
8	160	1.2D + 1.6W Normal Wind	46.17	0.00	0.0			1.2D + 1.6W Normal Wind	93.43	0.00		3/8 A325	6
9	180	1.2D + 1.6W Normal Wind	8.71	0.00	0.0			1.2D + 1.6W Normal Wind	46.17	0.00		3/8 A325	6
10	190	1.2D + 1.0Di + 1.0Wi 60° Wind	0.39	0.00	0.0			1.2D + 1.6W Normal Wind	8.71	0.00		3/8 A325	6

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20										0.00	0	0				
2	40										0.00	0	0				
3	60										0.00	0	0				
4	80										0.00	0	0				
5	100										0.00	0	0				
6	120										0.00	0	0				
7	140										0.00	0	0				
8	160										0.00	0	0				
9	180										0.00	0	0				
10	190	SAE - 2X2X0.1875	-0.13	0.9D + 1.6W 90° Wind	5.41	100	100	100	164.65	36.00	5.92	1	1	12.43	9.79	2	Member Z

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20	SAE - 4X4X0.25	-11.4	1.2D + 1.6W 90° Wind	23.12	49	49	49	170.99	36.00	14.99	1	1	24.35	17.4	76	Member Z
2	40	SAE - 4X4X0.25	-12.0	1.2D + 1.6W 90° Wind	20.29	49	49	49	150.04	36.00	19.47	1	1	24.35	17.4	69	Bolt Bear
3	60	SAE - 4X4X0.25	-11.3	1.2D + 1.6W 90° Wind	18.59	49	49	49	137.49	36.00	23.19	1	1	24.35	17.4	65	Bolt Bear
4	80	SAE - 3.5X3.5X0.25	-10.5	1.2D + 1.6W 90° Wind	18.00	49	49	49	152.51	36.00	16.41	1	1	24.35	17.4	64	Member Z
5	100	SAE - 3.5X3.5X0.25	-10.1	1.2D + 1.6W 90° Wind	15.27	49	49	49	129.37	36.00	22.69	1	1	24.35	17.4	58	Bolt Bear
6	120	SAE - 3X3X0.1875	-8.94	1.2D + 1.6W 90° Wind	12.90	48	48	48	124.65	36.00	15.59	1	1	24.35	13.0	68	Bolt Bear

Force/Stress Compression Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 14	

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DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
7	140	SAE - 2.5X2.5X0.25	-8.27	1.2D + 1.6W 90° Wind	12.45	48	48	48	146.07	36.00	12.60	1	1	24.35	17.4	66	Member Z
8	160	SAE - 2.5X2.5X0.1875	-6.95	1.2D + 1.6W 90° Wind	10.82	48	48	48	125.91	36.00	12.69	1	1	24.35	13.0	55	Member Z
9	180	SAE - 2.5X2.5X0.1875	-5.86	1.2D + 1.6W 90° Wind	9.25	48	48	48	110.71	36.00	15.33	1	1	24.35	13.0	45	Bolt Bear
10	190	SAE - 2X2X0.1875	-1.99	0.9D + 1.6W 90° Wind	6.91	47	47	47	104.15	36.00	13.00	1	1	12.43	9.79	20	Bolt Bear

Force/Stress Tension Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 15	

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LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	SOL - 5 1/4" SOLID	341.05	0.9D + 1.6W 60° Wind	50	974.16	35.0	Member
2	40	SOL - 5 1/4" SOLID	308.47	0.9D + 1.6W 60° Wind	50	974.16	31.7	Member
3	60	SOL - 5" SOLID	273.82	0.9D + 1.6W 60° Wind	50	883.58	31.0	Member
4	80	SOL - 5" SOLID	237.92	0.9D + 1.6W 60° Wind	50	883.58	26.9	Member
5	100	SOL - 4 3/4" SOLID	200.65	0.9D + 1.6W 60° Wind	50	797.45	25.2	Member
6	120	SOL - 4 1/4" SOLID	161.70	0.9D + 1.6W 60° Wind	50	638.37	25.3	Member
7	140	SOL - 4" SOLID	120.89	0.9D + 1.6W 60° Wind	50	565.47	21.4	Member
8	160	SOL - 3 3/4" SOLID	77.42	0.9D + 1.6W 60° Wind	50	497.03	15.6	Member
9	180	SOL - 3 1/2" S0LID	35.68	0.9D + 1.6W 60° Wind	50	432.95	8.2	Member
10	190	SOL - 3" SOLID	5.39	0.9D + 1.6W 60° Wind	50	318.11	1.7	Member

Splices

		Top Splice					Bottom Splice				
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	0.9D + 1.6W 60° Wind	308.07	0.00	0.0			0.9D + 1.6W 60° Wind	341.0	0.00			
2	40	0.9D + 1.6W 60° Wind	273.34	0.00	0.0			0.9D + 1.6W 60° Wind	308.0	663.98	46.4	1 1/2 A325	6
3	60	0.9D + 1.6W 60° Wind	237.48	0.00	0.0			0.9D + 1.6W 60° Wind	273.3	663.98	41.2	1 1/2 A325	6
4	80	0.9D + 1.6W 60° Wind	200.24	0.00	0.0			0.9D + 1.6W 60° Wind	237.4	663.98	35.8	1 1/2 A325	6
5	100	0.9D + 1.6W 60° Wind	161.33	0.00	0.0			0.9D + 1.6W 60° Wind	200.2	663.98	30.2	1 1/2 A325	6
6	120	0.9D + 1.6W 60° Wind	120.64	0.00	0.0			0.9D + 1.6W 60° Wind	161.3	545.68	29.6	1 3/8 A325	6
7	140	0.9D + 1.6W 60° Wind	77.18	0.00	0.0			0.9D + 1.6W 60° Wind	120.6	545.68	22.1	1 3/8 A325	6
8	160	0.9D + 1.6W 60° Wind	35.49	0.00	0.0			0.9D + 1.6W 60° Wind	77.18	545.68	14.1	1 3/8 A325	6
9	180	0.9D + 1.6W 60° Wind	5.23	0.00	0.0			0.9D + 1.6W 60° Wind	35.49	545.68	6.5	1 3/8 A325	6
10	190		0.00	0.00	0.0			0.9D + 1.6W 60° Wind	5.23	545.68	1.0	1 3/8 A325	6

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	-			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	-			36	0.00	0	0					
8	160	-			36	0.00	0	0					
9	180	-			36	0.00	0	0					
10	190	SAE - 2X2X0.1875	0.17	1.2D + 1.6W 60° Wind	36	18.58	1	1	12.43	9.79	7.50	2.3	Blck Shear

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	SAE - 4X4X0.25	12.27	0.9D + 1.6W 90° Wind	36	55.14	1	1	24.35	17.40	16.95	72.4	Blck Shear
2	40	SAE - 4X4X0.25	11.88	0.9D + 1.6W 90° Wind	36	55.14	1	1	24.35	17.40	16.95	70.1	Blck Shear
3	60	SAE - 4X4X0.25	11.19	0.9D + 1.6W 90° Wind	36	55.14	1	1	24.35	17.40	16.95	66.0	Blck Shear
4	80	SAE - 3.5X3.5X0.25	10.55	1.2D + 1.6W 90° Wind	36	46.98	1	1	24.35	17.40	16.95	62.2	Blck Shear
5	100	SAE - 3.5X3.5X0.25	9.94	1.2D + 1.6W 90° Wind	36	46.98	1	1	24.35	17.40	16.95	58.6	Blck Shear
6	120	SAE - 3X3X0.1875	8.87	1.2D + 1.6W 90° Wind	36	29.44	1	1	24.35	13.05	10.67	83.1	Blck Shear
7	140	SAE - 2.5X2.5X0.25	8.36	1.2D + 1.6W 90° Wind	36	30.67	1	1	24.35	17.40	12.87	64.9	Blck Shear

Force/Stress Tension Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 16	

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DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
8	160	SAE - 2.5X2.5X0.1875	6.91	1.2D + 1.6W 90° Wind	36	23.31	1	1	24.35	13.05	9.65	71.5	Blck Shear
9	180	SAE - 2.5X2.5X0.1875	5.81	1.2D + 1.6W 90° Wind	36	23.31	1	1	24.35	13.05	9.65	60.2	Blck Shear
10	190	SAE - 2X2X0.1875	2.01	1.2D + 1.6W 90° Wind	36	18.58	1	1	12.43	9.79	7.50	26.8	Blck Shear

Seismic Section Forces

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 17	

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Load Case: 1.2D + 1.0E

Dead Load Factor	1.20	**Sds**	0.175	**Ss**	0.1640	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.091	**S1**	0.0570	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.152	**R**	3.0000	**Vs**	4.1917	**f1**	1.6710

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	10.00	8351.5	0.01	0.05	0.03	27.09
2	30.00	8147.6	0.05	0.07	0.04	56.67
3	50.00	7534.0	0.13	0.07	0.03	83.30
4	70.00	7082.8	0.26	0.05	0.02	116.77
5	90.00	6518.8	0.42	0.01	0.01	144.44
6	110.00	5349.3	0.63	-0.06	0.02	147.16
7	130.00	6958.1	0.88	-0.12	0.08	243.53
8	150.00	5774.4	1.18	-0.02	0.24	296.45
9	170.00	8876.3	1.51	0.53	0.56	758.88
10	185.00	4138.3	1.79	1.50	0.96	526.43

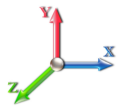
Load Case: 0.9D + 1.0E

Dead Load Factor	0.90	**Sds**	0.175	**Ss**	0.1640	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.091	**S1**	0.0570	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.152	**R**	3.0000	**Vs**	4.1917	**f1**	1.6710

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	10.00	8351.5	0.01	0.05	0.03	27.09
2	30.00	8147.6	0.05	0.07	0.04	56.67
3	50.00	7534.0	0.13	0.07	0.03	83.30
4	70.00	7082.8	0.26	0.05	0.02	116.77
5	90.00	6518.8	0.42	0.01	0.01	144.44
6	110.00	5349.3	0.63	-0.06	0.02	147.16
7	130.00	6958.1	0.88	-0.12	0.08	243.53
8	150.00	5774.4	1.18	-0.02	0.24	296.45
9	170.00	8876.3	1.51	0.53	0.56	758.88
10	185.00	4138.3	1.79	1.50	0.96	526.43

Support Forces Summary

Structure:	MA12227-A-SBA	**Code:**	TIA-222-G	3/23/2022	
Site Name:	Truro	**Exposure:**	B		
Height:	190.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 18	



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Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	-0.01	407.36	-39.25	
	1a	12.48	-162.45	-13.74	
	1b	-12.47	-162.44	-13.76	
1.2D + 1.6W 60° Wind	1	-4.98	207.62	-19.20	
	1a	-19.12	207.62	5.29	
	1b	-29.82	-332.75	-17.22	
1.2D + 1.6W 90° Wind	1	-6.01	27.49	-1.45	
	1a	-29.73	343.87	13.82	
	1b	-27.67	-288.88	-12.38	
0.9D + 1.6W Normal Wind	1	-0.01	400.14	-38.88	
	1a	12.79	-169.14	-13.93	
	1b	-12.78	-169.13	-13.94	
0.9D + 1.6W 60° Wind	1	-4.99	200.58	-18.83	
	1a	-18.80	200.58	5.10	
	1b	-30.14	-339.30	-17.40	
0.9D + 1.6W 90° Wind	1	-6.01	20.62	-1.08	
	1a	-29.41	336.70	13.63	
	1b	-27.99	-295.46	-12.55	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	113.46	-4.51	
	1a	3.01	28.99	-2.66	
	1b	-3.01	29.03	-2.66	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.76	84.62	-1.61	
	1a	-1.77	84.61	0.14	
	1b	-5.70	2.24	-3.29	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.89	57.15	1.12	
	1a	-3.37	105.02	1.44	
	1b	-5.33	9.30	-2.56	
1.2D + 1.0E	1	0.00	45.23	6.15	
	1a	7.12	18.63	-4.26	
	1b	-7.12	18.63	-4.26	
0.9D + 1.0E	1	0.00	38.34	6.54	
	1a	7.45	11.76	-4.45	
	1b	-7.45	11.76	-4.45	
1.0D + 1.0W Normal Wind	1	0.00	96.04	-8.57	
	1a	1.59	-13.66	-2.16	
	1b	-1.59	-13.65	-2.17	
1.0D + 1.0W 60° Wind	1	-0.98	57.61	-4.67	
	1a	-4.53	57.61	1.48	
	1b	-4.91	-46.49	-2.84	
1.0D + 1.0W 90° Wind	1	-1.17	22.91	-1.22	
	1a	-6.60	83.82	3.14	
	1b	-4.49	-38.00	-1.92	

Max Reactions

Leg			Overturning		
Max Uplift:	-339.30	(kips)	Moment:	7401.92	(ft-kips)
Max Down:	407.36	(kips)	Total Down:	82.48	(kips)
Max Shear:	39.25	(kips)	Total Shear:	66.75	(kips)

Max Reactions

Leg			Overturning		
Max Uplift:	-339.30	(kips)	Moment:	7401.92	(ft-kips)
Max Down:	407.36	(kips)	Total Down:	82.48	(kips)
Max Shear:	39.25	(kips)	Total Shear:	66.75	(kips)

Anchor Bolts

Bolt Size (in.):	2.00	Number Bolts:	8
Yield Strength (Ksi):	50.00	Tensile Strength (Ksi):	65.00
Detail Type:	A		

Interaction Ratio: 0.37

Max Usages

Max Leg: 53.3% (1.2D + 1.6W Normal Wind - Sect 1)
Max Diag: 83.1% (1.2D + 1.6W 90° Wind - Sect 6)
Max Horiz: 2.3% (1.2D + 1.6W 60° Wind - Sect 10)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0E - Normal To Face	139.75	0.0276	0.0011	0.0266
	154.88	0.0336	0.0011	0.0234
	165.13	0.0379	0.0011	0.0239
	174.88	0.0420	0.0011	0.0247
	186.58	0.0471	0.0011	0.0248
	190.00	0.0485	-0.0011	0.0253
0.9D + 1.6W 108 mph Wind at 60° From Face	139.75	0.4960	0.0184	0.4466
	154.88	0.5973	0.0174	0.3792
	165.13	0.6692	0.0174	0.3821
	174.88	0.7367	0.0178	0.3928
	186.58	0.8174	0.0174	0.3913
	190.00	0.8402	-0.0169	0.3840
0.9D + 1.6W 108 mph Wind at 90° From Face	139.75	0.5022	-0.0210	0.4415
	154.88	0.6046	-0.0200	0.3867
	165.13	0.6772	-0.0201	0.3894
	174.88	0.7454	-0.0207	0.4002
	186.58	0.8268	-0.0203	0.3946
	190.00	0.8499	-0.0197	0.3867
0.9D + 1.6W 108 mph Wind at Normal To Face	139.75	0.5200	-0.0188	0.4658
	154.88	0.6252	0.0181	0.3943
	165.13	0.6999	0.0182	0.3970
	174.88	0.7700	0.0187	0.4080
	186.58	0.8539	0.0183	0.4062
	190.00	0.8775	-0.0178	0.3988

1.0D + 1.0W 60 mph Wind at 60° From Face	139.75	0.0955	0.0035	0.0861
	154.88	0.1150	0.0033	0.0729
	165.13	0.1288	0.0033	0.0734
	174.88	0.1418	0.0034	0.0754
	186.58	0.1573	0.0033	0.0752
	190.00	0.1616	-0.0032	0.0738
1.0D + 1.0W 60 mph Wind at 90° From Face	139.75	0.0967	-0.0040	0.0848
	154.88	0.1163	-0.0038	0.0743
	165.13	0.1303	-0.0039	0.0748
	174.88	0.1433	-0.0040	0.0768
	186.58	0.1590	-0.0039	0.0758
	190.00	0.1634	-0.0038	0.0742
1.0D + 1.0W 60 mph Wind at Normal To Face	139.75	0.1001	-0.0036	0.0892
	154.88	0.1203	-0.0035	0.0757
	165.13	0.1346	-0.0035	0.0763
	174.88	0.1481	0.0036	0.0785
	186.58	0.1642	-0.0035	0.0779
	190.00	0.1687	-0.0034	0.0765
1.2D + 1.0Di + 1.0Wi 40 mph Wind at 60° From Face	139.75	0.0762	0.0027	0.0672
	154.88	0.0911	0.0026	0.0564
	165.13	0.1017	0.0026	0.0566
	174.88	0.1116	0.0027	0.0579
	186.58	0.1234	0.0026	0.0581
	190.00	0.1268	-0.0025	0.0571
1.2D + 1.0Di + 1.0Wi 40 mph Wind at 90° From Face	139.75	0.0765	-0.0031	0.0658
	154.88	0.0915	-0.0030	0.0572
	165.13	0.1021	-0.0030	0.0574
	174.88	0.1121	-0.0031	0.0589
	186.58	0.1240	-0.0030	0.0582
	190.00	0.1274	-0.0029	0.0571
1.2D + 1.0Di + 1.0Wi 40 mph Wind at Normal From Face	139.75	0.0774	-0.0028	0.0676
	154.88	0.0927	-0.0026	0.0575
	165.13	0.1035	-0.0026	0.0578
	174.88	0.1136	-0.0027	0.0596
	186.58	0.1258	-0.0027	0.0588
	190.00	0.1292	-0.0026	0.0580
1.2D + 1.0E - Normal To Face	139.75	0.0277	0.0011	0.0266
	154.88	0.0336	0.0011	0.0235
	165.13	0.0379	0.0011	0.0239
	174.88	0.0421	0.0011	0.0248
	186.58	0.0471	0.0011	0.0248
	190.00	0.0486	-0.0011	0.0254
1.2D + 1.6W 108 mph Wind at 60° From Face	139.75	0.4966	0.0185	0.4472
	154.88	0.5980	0.0174	0.3797
	165.13	0.6700	0.0174	0.3827
	174.88	0.7376	0.0178	0.3933
	186.58	0.8184	0.0175	0.3919
	190.00	0.8412	-0.0169	0.3845
1.2D + 1.6W 108 mph Wind at 90° From Face	139.75	0.5028	-0.0210	0.4421
	154.88	0.6053	-0.0200	0.3872
	165.13	0.6780	-0.0202	0.3899
	174.88	0.7462	-0.0207	0.4007
	186.58	0.8278	-0.0203	0.3951
	190.00	0.8510	-0.0197	0.3872
1.2D + 1.6W 108 mph Wind at Normal To Face	139.75	0.5206	-0.0189	0.4664
	154.88	0.6259	0.0181	0.3948
	165.13	0.7008	0.0182	0.3976
	174.88	0.7709	0.0187	0.4086
	186.58	0.8549	0.0183	0.4068
	190.00	0.8786	-0.0178	0.3993

Mat Foundation Design for Self Supporting Tower

			Date
			3/23/2022
Customer Name:	**SBA Communications Corp**	**TIA Standard:**	TIA-222-G
Site Name:		**Structure Height (Ft.):**	190
Site Nmber:	MA12227-A-SBA	**Engineer Name:**	H. You
Engr. Number:	126493	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Analysis or Design? Analysis

Number of Tower Legs: 3 Legs

Base Reactions (Factored):

(1). Individual Leg:

Axial Load (Kips):	407.4	Uplift Force (Kips):	339.3
Shear Force (Kips):	39.3		

(2). Tower Base:

Total Vertical Load (Kips):	82.5	Total Shear Force (Kips):	66.8
Moment (Kips-ft):	7401.9		

Foundation Geometries:

Leg distance (Center-to-Center ft.):		22.5	Mods required -Yes/No ?:	No	
Diameter of Pier (ft.):	Round	14.0	Pier Height A. G. (ft.):	0.00	
Tower center to mat center (ft):		0	Depth of Base BG (ft.):	4.5	
Length of Pad (ft.):		38	Width of Pad (ft.):	38	(W)
Thickness of Pad (ft):		4.50			38'

Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)		Tie steel yield (ksi):		
Vertical Rebar Size #:		Tie / Stirrup Size #:		
Qty. of Vertical Rebars:		Tie Spacing (in):		
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	10	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

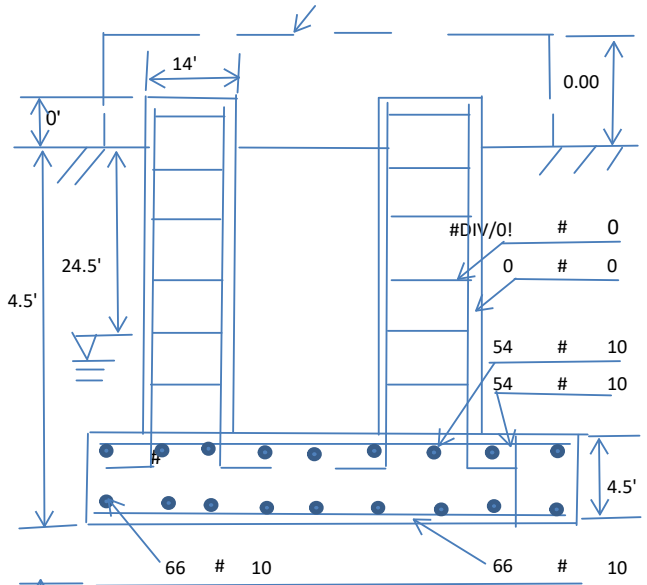
Qty. of Rebar in Pad (L):	66	Qty. of Rebar in Pad (W):	66

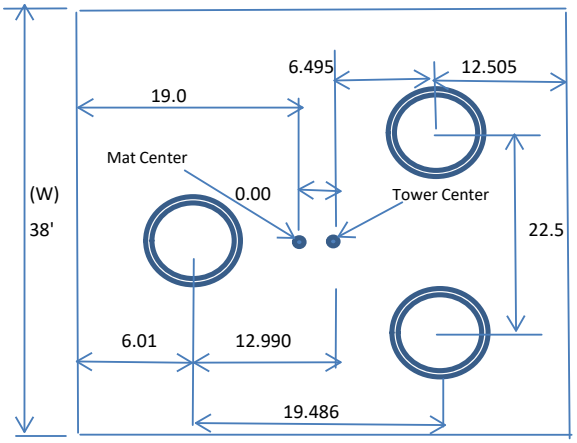
Rebar at the top of the concrete pad:

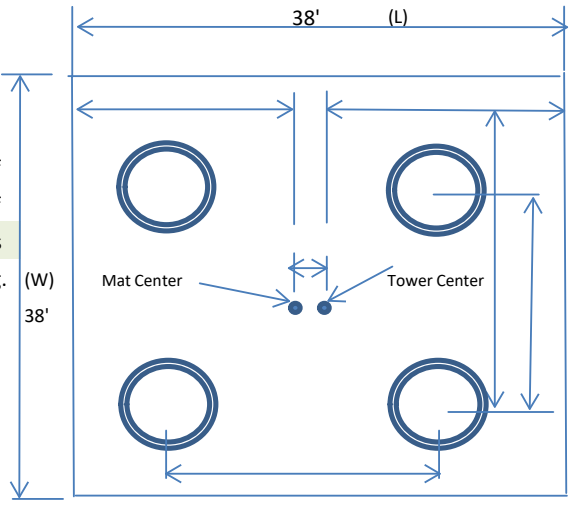
Qty. of Rebar in Pad (L):	54	Qty. of Rebar in Pad (W):	54

Soil Design Parameters:

Soil Unit Weight (pcf):	125.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	24.5	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	4000	Consider ties in concrete shear strength:		Yes
Consider Soil Lateral Resistance ?	Yes	Enter soil C (psf) or Phi (deg.):	30.0	Deg.
		Depth to ignor lateral resistance	1.0	Ft.







Apply 1.35 for e/w per G/H: 1.35

Foundation Analysis and Design:	Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75			
Total Dry Soil Volume (cu. Ft.):		0.00	Total Dry Soil Weight (Kips):	0.00			
Total Buoyant Soil Volume (cu. Ft.):		0.00	Total Buoyant Soil Weight (Kips):	0.00			
Total Effective Soil Weight (Kips):		0.00	Weight from the Concrete Block at Top (K):	0.00			
Total Dry Concrete Volume (cu. Ft.):		6500.31	Total Dry Concrete Weight (Kips):	975.05			
Total Buoyant Concrete Volume (cu. Ft.):		0.00	Total Buoyant Concrete Weight (Kips):	0.00			
Total Effective Concrete Weight (Kips):		975.05	Total Vertical Load on Base (Kips):	1057.52			
Check Soil Capacities:						Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):		1622.49	<	Allowable Factored Soil Bearing (psf):	3000	0.54	OK!
Allowable Foundation Overturning Resistance (kips-ft.):		18240.4	>	Design Factored Momont (kips-ft):	7703	0.42	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):		2.37	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		
(1) Concrete Pier:						Load/ Capacity Ratio	
	Vertical Steel Rebar Area (sq. in./each):	#N/A		Tie / Stirrup Area (sq. in./each):	#N/A		
	Calculated Moment Capacity (Mn,Kips-Ft):	#N/A	#N/A	Design Factored Moment (Mu, Kips-Ft)	0.2	#N/A	###
	Calculated Shear Capacity (Kips):	#N/A	#N/A	Design Factored Shear (Kips):	39.3	#N/A	###
	Calculated Tension Capacity (Tn, Kips):	#N/A	#N/A	Design Factored Tension (Tu Kips):	339.3	#N/A	###
	Calculated Compression Capacity (Pn, Kips):	#N/A	#N/A	Design Factored Axial Load (Pu Kips):	407.4	#N/A	###
	Moment & Tension Strength Combination:	#N/A	#N/A	Check Tie Spacing (Design/Req'd):	#DIV/0!		
	Pier Reinforcement Ratio:	#N/A		#N/A			
(2).Concrete Pad:							
	One-Way Design Shear Capacity (L or W Direction, Kips):	1887.3	>	One-Way Factored Shear (L/W-Dir Kips	258.9	0.14	OK!
	One-Way Design Shear Capacity (Diagonal Dir., Kips):	947.5	>	One-Way Factored Shear (Dia. Dir, Kips	235.8	0.25	OK!
	Lower Steel Pad Reinforcement Ratio (L or W-Direct.):	0.0036		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0035		
	Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	18185.3	>	Moment at Bottom (L-Direct. K-Ft):	1260.6	0.07	OK!
	Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	13242.5	>	Moment at Bottom (Dia. Dir. K-Ft):	1117.6	0.08	OK!
	Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0030		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0033		
	Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	15000.2	>	Moment at the top (L-Dir Kips-Ft):	574.1	0.04	OK!
	Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	12376.1	>	Moment at the top (Dia. Dir., K-Ft):	380.8	0.03	OK!
	Punching Failure Capacity (Kips):	4230.0	>	Punch. Failure Factored Shear (K):	407.4	0.10	OK!