COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS AND TOWERCO 2013, LLC FOR ISSUANCE OF A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A WIRELESS COMMUNICATIONS FACILITY IN THE COMMONWEALTH OF KENTUCKY IN THE COUNTY OF GRAVES	))))))))	CASE NO. 2024-00128

SITE NAME: FARMINGTON

* * * * * * *

APPLICATION FOR
CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY
FOR CONSTRUCTION OF A WIRELESS COMMUNICATIONS FACILITY

Cellco Partnership, d/b/a Verizon Wireless and TowerCo 2013, LLC ("Co-Applicants"), by counsel, pursuant to (i) KRS §§278.020, 278.040, 278.650, 278.665, and other statutory authority, and the rules and regulations applicable thereto, and (ii) the Telecommunications Act of 1996, respectfully submit this Application requesting issuance of a Certificate of Public Convenience and Necessity ("CPCN") from the Kentucky Public Service Commission ("PSC") to construct, maintain, and operate a Wireless Communications Facility ("WCF") to serve the customers of the Co-Applicant with wireless communications services.

In support of this Application, Co-Applicants respectfully provide and state the following information:

1. The complete name and address of the Co-Applicants:

    a. Cellco Partnership, d/b/a Verizon Wireless, having a local address of 2902 Ring Road, Elizabethtown, KY, 42701.

b. TowerCo 2013, LLC, having a local address of 5000 Valleystone Drive, Cary, NC 27519

2. Co-Applicants:

a. Cellco Partnership, d/b/a Verizon Wireless is a Delaware general partnership and a copy of the Statement of Good Standing from Delaware, and the Certificate of Assumed Name is on file with the Secretary of State of Commonwealth of Kentucky and included as part of **Exhibit A**.

b. TowerCo 2013, LLC is a Delaware limited liability company and copies of the formulation document and the Statement of Good Standing from Delaware, and the Certificate of Authorization is on file with the Secretary of State of Commonwealth of Kentucky, are included as part of **Exhibit A**.

3. Co-Applicants propose construction of an antenna tower for communications services, which is to be located in an area outside the jurisdiction of a planning commission, and Co-Applicants submit this application to the PSC for a certificate of public convenience and necessity pursuant to KRS §§ 278.020(1), 278.040, 278.650, 278.665, and other statutory authority.

4. The Co-Applicant operates on frequencies licensed by the Federal Communications Commission ("FCC") pursuant to applicable FCC requirements. A copy of the Co-Applicants' FCC Registration and Licenses with Authorization to provide wireless services are attached to this Application or described as part of **Exhibit B**, and the facility will be constructed and operated in accordance with applicable FCC regulations.

5. The public convenience and necessity require the construction of the proposed WCF. The construction of the WCF will bring or improve the Co-Applicant's services to an area

currently not served or not adequately served by the Co-Applicants by increasing coverage or capacity and thereby enhancing the public's access to innovative and competitive wireless communications services. A statement from Co-Applicant's RF Design Engineer outlining said need is attached as **Exhibit Q** along with Propagation Maps attached as **Exhibit R**. The WCF is an integral link in the Applicant's network design that must be in place to provide adequate coverage to the service area.

6. To address the above-described service needs, Co-Applicants propose to construct a WCF located on the east side of Dove Road, south of KY-121, Farmington, KY 42020 (North Latitude: (36° 40' 04.65", West Longitude 88° 31' 54.91"), on a parcel of land located entirely within the county referenced in the caption of this application. The property on which the WCF will be located is owned by Scott Wilferd pursuant to a Deed recorded in Deed Book 384, Page 591 in the office of the County Clerk. The proposed WCF will consist of a 255-foot tall tower, with an approximately 5-foot tall lightning arrestor attached at the top, for a total height of 260-feet. The WCF will also include concrete foundations and a shelter or cabinets to accommodate the placement of the Co-Applicant's radio electronics equipment and appurtenant equipment. The Co-Applicant's equipment cabinet or shelter will be approved for use in the Commonwealth of Kentucky by the relevant building inspector. The WCF compound will be fenced and all access gate(s) will be secured. A description of the manner in which the proposed WCF will be constructed is attached as **Exhibit C** and **Exhibit D**.

7. A list of utilities, corporations, or persons with whom the proposed WCF is likely to compete along with a map showing the proposed location as well as the identified like facilities is attached as **Exhibit E**.

8. The site development plan and a vertical profile sketch of the WCF signed and sealed by a professional engineer registered in Kentucky depicting the tower height, as well as a proposed configuration for the antennas of the Co-Applicant has also been included as part of **Exhibit C**.

9. Foundation design plans signed and sealed by a professional engineer registered in Kentucky and a description of the standards according to which the tower was designed are included as part of **Exhibit D**.

10. Co-Applicants have considered the likely effects of the installation of the proposed WCF on nearby land uses and values and has concluded that there is no more suitable location reasonably available from which adequate services can be provided, and that there are no reasonably available opportunities to co-locate Co-Applicant's antennas on an existing structure. When suitable towers or structures exist, Co-Applicant attempts to co-locate on existing structures such as communications towers or other structures capable of supporting Co-Applicant's facilities; however, no other suitable or available co-location site was found to be located in the vicinity of the site. A statement from Co-Applicant, Cellco Partnership, d/b/a Verizon Wireless's RF Design Engineer outlining exploration of co-location opportunities is attached as **Exhibit Q**.

11. A copy of the Application for Federal Aviation Administration's ("FAA") and the FAA Determination of No Hazard (DNH) are attached as **Exhibit F**

The DNH from the FAA approves the total height of the tower at 265 feet. However, the tower will be constructed at the 255 feet height approved by PSC and as indicated on the application and site plans. The FAA will be notified upon the tower stack that the height changed from 265' to 255' in a 7460-2 submittal.

12. A copy of the documentation of application submission to the Kentucky Airport Zoning Commission ("KAZC") is attached as **Exhibit G**. The KAZC Approval will be provided as soon as received.

The KAZC Application indicates a height of 265', however, the tower will be constructed at the 255 feet height approved by PSC and as indicated on the application and site plans.

13. A geotechnical engineering report was performed at the WCF site by Engineered Tower Solutions, PLLC, 3227 Wellington Court, Raleigh, NC 27615, dated January 31, 2024 and is attached as **Exhibit H**. The name and address of the geotechnical engineering firm and the professional engineer registered in Kentucky who prepared the report are included as part of **Exhibit H and Exhibit S**.

14. Clear directions to the proposed WCF site from the County seat are attached as **Exhibit I**. The name and telephone number of the preparer of **Exhibit I** are included as part of this exhibit.

15. Applicant, pursuant to a written agreement, has acquired the right to use the WCF site and associated property rights. A copy of the agreement or an abbreviated agreement recorded with the County Clerk is attached as **Exhibit J**.

16. Personnel directly responsible for the design and construction of the proposed WCF are well qualified and experienced. The tower and foundation drawings for the proposed tower submitted as part of **Exhibit D** bear the signature and stamp of a professional engineer registered in the Commonwealth of Kentucky. All tower designs meet or exceed the minimum requirements of applicable laws and regulations. The identity and qualifications of each person directly responsible for design and construction of the proposed tower are contained in **Exhibit S**.

17. The Construction Manager for the proposed facility is Larry Rhoads and the identity and qualifications of each person directly responsible for design and construction of the proposed tower are contained in **Exhibit S**.

18. As noted on the Survey attached as part of **Exhibit C**, the surveyor has determined that the tower site and access easement are not within any flood hazard area per Flood Hazard Boundary Map, Community Panel Number 21083C0275C, Dated December 13, 2009.

19. **Exhibit C** includes a map drawn to an appropriate scale that shows the location of the proposed tower and identifies every owner of real estate within 500 feet of the proposed tower, every owner of real estate within 200 feet of the access road including intersection with the public street system and all abutting property owners (according to the records maintained by the County Property Valuation Administrator). Attached as **Exhibit K** is the Notification List with screen shots of the PVA records verified and updated using the Graves County PVA on April 25, 2024. **Exhibit C** also identifies every structure and every easement within 500 feet of the proposed tower or within 200 feet of the access road including intersection with the public street system.

20. Co-Applicants have sent certified notices to every person who, according to the records of the County Property Valuation Administrator, owns property which is within 500 feet of the proposed tower or contiguous to the site property, by certified mail, return receipt requested, of the proposed construction. Each notified property owner has been provided with a map of the location of the proposed construction, the PSC docket number for this application, the address of the PSC, and informed of his or her right to request intervention. A copy of the form of the notice sent by certified mail to each landowner on April 25, 2024, is attached as **Exhibit L-1**. Eight (8) notices were sent to surrounding property owners; to date four (4) notice green cards have been returned. USPS tracking indicates that four (4) notices are "moving though the system". New

notice has been sent to the four owners, whose April 25th notices have been identified "as working through the system" on May 30, 2024 and a copy of the form of notice is attached as **Exhibit L-2**. Copies of the mailed envelopes, returned green cards and USPS tracking are included in **Exhibit L-1 and Exhibit L-2**.

21. Co-Applicants have notified the applicable County Judge/Executive by certified mail, return receipt requested, of the proposed construction. This notice included the PSC docket number under which the application will be processed and informed the County Judge/Executive of his/her right to request intervention. A copy of this notice along with a copy of the mailed envelope and returned green card is attached as **Exhibit M**.

22. Notice signs meeting the requirements prescribed by 807 KAR 5:063, Section 1(2) that measure at least 2 feet in height and 4 feet in width and that contain all required language in letters of required height, have been posted, one in a visible location on the proposed site and one on the nearest public road. Such signs shall remain posted for at least two weeks after filing of the Application, and a copy of the posted text is attached as **Exhibit N**.

23. A legal notice advertisement regarding the location of the proposed facility has been published in a newspaper of general circulation in the county in which the WCF is proposed to be located. A copy of the newspaper legal notice advertisement is attached as **Exhibit O**.

24. The area of the proposed facility is in the unincorporated area of Graves County, Kentucky. The site is located on the east side of Dove Road, south of KY-121, Farmington, KY 42020. The area is buffered by a treed area to the north, within an agricultural field. The area is largely agricultural with single family homes further north and east. The terrain is fairly flat. There is no zoning or Plan Commission in this area of Graves County. The proposed facility is removed

a significant distance from any residential structures. The nearest residential structure is 611 feet from the proposed tower site.

25. The process that was used by the Co-Applicant's radio frequency engineers in selecting the site for the proposed WCF was consistent with the general process used for selecting all other existing and proposed WCF facilities within the proposed network design area. Co-Applicant's radio frequency engineers have conducted studies and tests in order to develop a highly efficient network that is designed to handle voice and data traffic in the service area. The engineers determined an optimum area for the placement of the proposed facility in terms of elevation and location to provide the best quality service to customers in the service area. A radio frequency design search area prepared in reference to these radio frequency studies was considered by the Co-Applicant when searching for sites for its antennas that would provide the coverage deemed necessary by the Co-Applicant. A map of the area in which the tower is proposed to be located which is drawn to scale and clearly depicts the necessary search area within which the site should be located pursuant to radio frequency requirements is attached as **Exhibit P**.

26. The tower must be located at the proposed location and proposed height to provide necessary service to wireless communications users in the subject area, as set out and documented in the RF Design Engineer's Statement of Need and Propagation Maps attached as **Exhibit Q** and **Exhibit R,** respectively. The proposed tower will expand and improve voice and data service for Verizon Wireless customers.

27. Attached hereto as **Exhibit T** please find an Affidavit of Certification for all information contained in this application.

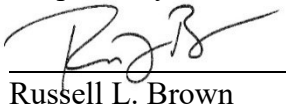
28. All Exhibits to this Application are hereby incorporated by reference as if fully set out as part of the Application.

29. All responses and requests associated with this Application may be directed to:

Russell L. Brown
Clark, Quinn, Moses, Scott & Grahn, LLP
320 North Meridian Street, Suite 1100
Indianapolis, IN 46204
Phone: (317) 637-1321
FAX: (317) 687-2344
Email: rbrown@clarkquinnlaw.com

WHEREFORE, Co-Applicants respectfully request that the PSC accept the foregoing Application for filing and, having met the requirements of KRS §§278.020(1), 278.650, and 278 .665 and all applicable rules and regulations of the PSC, grant a Certificate of Public Convenience and Necessity to construct and operate the WCF at the location set forth herein.

Respectfully submitted,



Russell L. Brown
Clark, Quinn, Moses, Scott & Grahn, LLP
320 North Meridian Street, Suite 1100
Indianapolis, IN 46204
Phone: (317) 637-1321 / FAX: (317) 687-2344
Email: rbrown@clarkquinnlaw.com
Attorney for Cellco Partnership d/b/a Verizon Wireless

LIST OF EXHIBITS

A	Applicant Entities
B	FCC Registration and License Documentation
C	Site Development Plan: 500' Vicinity Map Legal Descriptions Flood Plain Certification Site Plan Vertical Tower Profile
D	Tower and Foundation Design
E	Competing Utilities List and Map
F	FAA Application and Determination of No Hazard
G	KAZC Application Documentation
H	Geotechnical Report
I	Directions to WCF Site
J	Real Estate Agreement
K	Notification Listing with PVA Verification
L-1	April 25 Property Owner Notification
L-2	May 30 Property Owner Notification
M	County Judge/Executive notice
N	Posted Notices
O	Newspaper Legal Notice Advertisement
P	Radio Frequency Design Search Area
Q	RF Design Engineer Statement of Need
R	Propagation Maps
S	List of Qualified Professionals
T	Affidavit of Certification

Delaware

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "CELLCO PARTNERSHIP" IS DULY FORMED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE TWENTY-SEVENTH DAY OF APRIL, A.D. 2023.

AND I DO HEREBY FURTHER CERTIFY THAT THE ANNUAL TAXES HAVE BEEN PAID TO DATE.

3341134 8300

Authentication: 203227418

SR# 20231665976

Date: 04-27-23

You may verify this certificate online at corp.delaware.gov/authver.shtml

COMMONWEALTH OF KENTUCKY

Michael G. Adams
Secretary of State

Certificate

I, Michael G. Adams, Secretary of State for the Commonwealth of Kentucky, do hereby certify that the foregoing writing has been carefully compared by me with the original thereof, now in my official custody as Secretary of State and remaining on file in my office, and found to be a true and correct copy of

CERTIFICATE OF ASSUMED NAME OF VERIZON WIRELESS ADOPTED BY GENERAL PARTNERS OF CELLCO PARTNERSHIP FILED JUNE 21, 2006.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at Frankfort, Kentucky, this 10th day of May, 2023.

COMMONWEALTH OF KENTUCKY
OFFICE OF SECRETARY OF STATE

Michael G. Adams

Michael G. Adams
Secretary of State
Commonwealth of Kentucky
kdcoleman/0641227 - Certificate ID: 290787

COMMONWEALTH OF KENTUCKY
TREY GRAYSON
SECRETARY OF STATE

0641227.07 Dcornish C226

Trey Grayson
Secretary of State
Received and Filed
06/21/2006 12:06:09 PM
Fee Receipt: $20.00

CERTIFICATE OF ASSUMED NAME

This certifies that the assumed name of

Verizon Wireless

[Name under which the business will be conducted]

has been adopted by See Addendum

[Real name - KRS 365.015(1)]

which is the "real name" of [YOU MUST CHECK ONE]

- [ ] a Domestic General Partnership
- [ ] a Domestic Registered Limited Liability Partnership
- [ ] a Domestic Limited Partnership
- [ ] a Domestic Business Trust
- [ ] a Domestic Corporation
- [ ] a Domestic Limited Liability Company
- [ ] a Joint Venture
- [x] a Foreign General Partnership
- [ ] a Foreign Registered Limited Liability Partnership
- [ ] a Foreign Limited Partnership
- [ ] a Foreign Business Trust
- [ ] a Foreign Corporation
- [ ] a Foreign Limited Liability Company

organized and existing in the state or country of Delaware, and whose address is

One Verizon Way	Basking Ridge	NJ	07920
Street address, if any	City	State	Zip Code

The certificate of assumed name is executed by

NYNEX PCS Inc.

Jane A. Schapker

Signature

Jane A. Schapker-Assistant Secretary

Print or type name and title

June 15, 2006

Date

Signature

Print or type name and title

Date

SSC-228 (7/98) (See attached sheet for instructions)

Addendum

The full name of the Partnership is Cellco Partnership; a Delaware general partnership with its headquarters located One Verizon Way, Basking Ridge NJ 07920-1097.

General Partners of Cellco Partnership	**Address**
Bell Atlantic Cellular Holdings, L.P.	One Verizon Way Basking Ridge, NJ 07920
NYNEX PCS Inc.	One Verizon Way Basking Ridge, NJ 07920
PCSCO Partnership	One Verizon Way Basking Ridge, NJ 07920
GTE Wireless Incorporated	One Verizon Way Basking Ridge, NJ 07920
GTE Wireless of Ohio Incorporated	One Verizon Way Basking Ridge, NJ 07920
PCS Nucleus, L.P.	2999 Oak Road, 7th Floor Walnut Creek, CA 94597
JV PartnerCo, LLC	2999 Oak Road, 7th Floor Walnut Creek, CA 94597

Commonwealth of Kentucky
Michael G. Adams, Secretary of State

Michael G. Adams
Secretary of State
P. O. Box 718
Frankfort, KY 40602-0718
(502) 564-3490
http://www.sos.ky.gov

Certificate of Authorization

Authentication number: 297432
Visit https://web.sos.ky.gov/ftshow/certvalidate.aspx to authenticate this certificate.

I, Michael G. Adams, Secretary of State of the Commonwealth of Kentucky, do hereby certify that according to the records in the Office of the Secretary of State,

TOWERCO 2013 LLC

, a limited liability company authorized under the laws of the state of Delaware, is authorized to transact business in the Commonwealth of Kentucky, and received the authority to transact business in Kentucky on June 12, 2013.

I further certify that all fees and penalties owed to the Secretary of State have been paid; that an application for certificate of withdrawal has not been filed; and that the most recent annual report required by KRS 14A.6-010 has been delivered to the Secretary of State.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at Frankfort, Kentucky, this 15th day of September, 2023, in the 232nd year of the Commonwealth.

Michael G. Adams
Secretary of State
Commonwealth of Kentucky
297432/0859822

Delaware

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "TOWERCO 2013 LLC" IS DULY FORMED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE TWENTY-SEVENTH DAY OF SEPTEMBER, A.D. 2023.

AND I DO HEREBY FURTHER CERTIFY THAT THE SAID "TOWERCO 2013 LLC" WAS FORMED ON THE THIRD DAY OF OCTOBER, A.D. 2012.

AND I DO HEREBY FURTHER CERTIFY THAT THE ANNUAL TAXES HAVE BEEN PAID TO DATE.

5222115 8300

Authentication: 204256340

SR# 20233593958

Date: 09-27-23

You may verify this certificate online at corp.delaware.gov/authver.shtml

12/05/2023 at 11:57:57
A1262553

FCC Form 854
Main Form

Approved by OMD – 3060-0139
See instructions for public burden estimate

Application for Antenna Structure Registration

Purpose of Filing

1) Enter the application purpose: (**NE**)

AM – Amendment of a Pending Application
AU – Administrative Update
CA – Cancellation of an Antenna Structure Registration
DI – Notification of an Antenna Structure Dismantlement
MD – Modification of a Antenna Structure Registration
NE – Registration of a New Antenna Structure
NT – Required Construction/Alteration Notification
OC – Ownership Change
RE – Registration of a Replacement Antenna Structure
WD – Withdrawal of a Pending Application

2a) If the answer to 1 is AU, CA, DI, MD, NT, OC or RE, provide the FCC Antenna Structure Registration (ASR) Number.	FCC ASR Number:
2b) If the answer to 1 is AM or WD, provide the File Number of the pending application on file.	File Number:
2c) If the answer to 1 is MD or NT, provide the date the Antenna Structure was constructed or the date it was last altered (mm/dd/yyyy).	Date:
2d) If the answer to 1 is DI, provide the date the Antenna Structure was dismantled (mm/dd/yyyy).	Date:

Antenna Structure Ownership Information

3) Select one of the entity types:

( ) Individual ( ) Unincorporated Association ( ) Trust ( ) Government Entity
( ) Corporation (**X**) Limited Liability Company ( ) General Partnership ( ) Limited Partnership
( ) Consortium ( ) Limited Liability Partnership ( ) Other: _____

4) FCC Registration Number (FRN): **0024950685**		5) Assignor FCC Registration Number (FRN):	
6) First Name (if individual):	MI:	Last Name:	Suffix:
7) Legal Entity Name (if not an individual): **TowerCo V Holdings LLC**			
8) Attention To: **TowerCo ID: KY0104**		9) P.O. Box:	**And/Or**
10a) Street Address 1: **5000 Valleystone Dr**	10b) Street Address 2: **Suite 200**		
11) City: **Cary**	12) State: **NC**	13) Zip Code: **27519**	
14) Telephone Number (xxx-xxx-xxxx): **(919) 653-5700**		15) Fax Number: (xxx-xxx-xxxx):	
16) E-mail Address: **hbyrne@towerco.com**			

Contact Representative Information

17) First Name (if individual):	MI:	Last Name:	Suffix:

18) Business Name: **TowerCo V Holdings LLC**		
19) Attention To: **Henry Byrne**	20) P.O. Box	**And/Or**
21a) Street Address 1: **5000 Valleystone Dr**		21b) Street Address 2: **Suite 200**
22) City: **Cary**	23) State: **NC**	24) Zip Code: **27519**
25) Telephone Number (xxx-xxx-xxxx): **(919) 653-5700**		26) Fax Number: (xxx-xxx-xxxx):
27) E-mail Address: **hbyrne@towerco.com**		

Antenna Structure Information

28a) Latitude (DD-MM-SS.S): **36- 40- 04.7**		28b) North or South: **North**
29a) Longitude (DDD-MM-SS.S): **088- 31- 54.9**		29b) East or West: **West**
30) Street Address or Geographic Location: **Dove Rd**		31) City: **Farmington**
32) County: **GRAVES**	33) State: **KENTUCKY**	34) Zip Code: **42040**

35) Elevation of site above mean sea level (meters):	**159.1** meters
36) Overall height above ground level (AGL) of the supporting structure without appurtenances:	**77.7** meters
37) Overall height above ground level (AGL) of the antenna structure including all appurtenances:	**80.8** meters
38) Overall height above mean sea level (add items 35 and 37 together):	**239.9** meters

39a) Enter the type of structure on which the antenna will be mounted: (**LTOWER**)

B – Building
BANT – Building with Antenna on Top
BMAST – Building with Mast
BPIPE – Building with Pipe
BPOLE – Building with Pole
BRIDG – Bridge
BTWR – Building with Tower
GTOWER – Guyed Structure Used For Communication Purposes
LTOWER – Lattice Tower
MAST – Mast
MTOWER – Monopole
NNGTANN – Guyed Tower Array
NNLTANN – Lattice Tower Array
NNMTANN – Monopole Array
PIPE – Any type of Pipe
POLE – Any type of Pole
RIG – Oil or Other Type of Rig
SIGN – Any type of Sign or Billboard
SILO – Any type of Silo
STACK – Smoke Stack
TANK – Any type of Tank (water, gas, etc.)
TREE – When used as a support for an antenna
UPOLE – Utility Pole/Tower used to provide service (electric, telephone, etc.)

39b) Number of Towers in Array:	39c) Position of this Tower in the Array:
40a) Array Center Latitude (DD-MM-SS.S):	40b) North or South
41a) Array Center Longitude (DDD-MM-SS.S):	41b) East or West:

Proposed Marking and/or Lighting

42) Enter the proposed marking and/or lighting: (7)
See Form 854 Item 42 Instructions for detailed tier and lighting information.

1) None
2) Paint Only
3) Other _____
4) FAA Style B
5) FAA Style D
6) FAA Style C
7) FAA Style E
8) FAA Style F
9) FAA Style A
10) FAA Style G

FAA Notification

43) FAA Study Number: **2023-ASO-30240-OE**	44) Date Issued: **12/04/2023**

Environmental Compliance

45) Does the applicant request a waiver of the Commission's rules for environmental notice prior to construction due to an emergency situation?	(**No**) Yes or No
46a) If the answer to 45 is No, is another federal agency taking responsibility for environmental review of the Antenna Structure?	(**No**) Yes or No
46b) If the answer to 46a is Yes, indicate why: 1) The Antenna Structure is on Federal Land and the landholding agency is taking responsibility for the environmental review of the Antenna Structure. 2) Another federal agency has agreed with the FCC in writing to take responsibility for the environmental review of the Antenna Structure.	( ) 1 or 2
46c) If the answer to 46a is Yes, provide the name of the federal agency taking responsibility for the environmental review of the Antenna Structure.	Name:
47) If the answers to 45 and 46a are No, provide the National Notice Date for the application to be posted on the FCC's website (mm/dd/yyyy).	Date: **02/05/2024**
48) Is the applicant submitting an environmental assessment?	(**No**) Yes or No
49) Does the applicant certify that grant of Authorizations at this location would not have a significant environmental effect pursuant to Section 1.1307 of the FCC's rules?	( ) Yes or No
50) If the answer to 49 is Yes, select the basis for this certification. 1) The construction is exempt from environmental notification (other than due to another agency's review) and it does not fall within one of the categories in Section 1.1307(a) or (b) of the FCC's rules? 2) The construction is exempt from environmental notification due to another agency's review, and the other agency has issued a Finding of No Significant Impact. 3) The environmental notification has been completed, and the FCC has notified the applicant that an Environmental Assessment is not required under Section 1.1307(c) or (d) of the FCC's rules, and the Construction does not fall within one of the categories in Section 1.1307(a) or (b) of the FCC's rules. 4) The FCC has issued a Finding of No Significant Impact.	( ) 1, 2, 3, 4
51) If the answer to 50 is 3 or 4, enter the date that Local Notice was provided (mm/dd/yyyy).	Date:

Certification Statements

1) The applicant certifies that all statements made in this application and in the exhibits, attachments, or documents incorporated by reference are material, are part of this application, and are true, complete, correct, and made in good faith.
2) The applicant certifies that neither the applicant nor any other party to the application is subject to a denial of Federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862, because of a conviction for possession or distribution of a controlled substance. See Section 1.2002(b) of the rules, 47 CFR § 1.2002(b), for the definition of "party to the application" as used in this certification.

Signature (Typed or Printed Name of Party Authorized to Sign) (For OC Applications, to be completed by Assignee)

52) First Name: **Henry**	MI:	Last Name: **Byrne**	Suffix:
53) Title: **FCC Contact**			
54) Signature: **Henry Byrne**			55) Date: **Dec 05, 2023**

Signature (Typed or Printed Name of Party Authorized to Sign) (For OC Applications, to be completed by Assignor)

56) First Name:	MI:	Last Name:	Suffix:
57) Title:			
58) Signature:			59) Date:

Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: KENTUCKY RSA NO. 1 PARTNERSHIP

ATTN: LICENSING MANAGER
KENTUCKY RSA NO. 1 PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
KNKQ306	0009611390
Radio Service CL - Cellular	
Market Numer CMA443	**Channel Block** B
Sub-Market Designator 0	

FCC Registration Number (FRN): 0001836709

Market Name
Kentucky 1 - Fulton

Grant Date	Effective Date	Expiration Date	Five Yr Build-Out Date	Print Date
08-31-2021	08-31-2021	10-01-2031		08-31-2021

Site Information:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
1	36-20-59.2 N	089-22-12.3 W	98.0		

Address: 0.68 MILE SOUTH OF LASSITER CORNER & REEL FOOT LAKE
City: LASSITER CORNER **County:** LAKE **State:** TN **Construction Deadline:**

Antenna: 1
Maximum Transmitting ERP in Watts: 135.800

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	148.000	117.000	107.000	117.000	121.000	147.000	149.000	146.000
Transmitting ERP (watts)	133.300	103.500	36.500	4.500	1.500	3.900	38.800	109.600

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

FCC 601-C
March 2018

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
2	36-45-58.0 N	088-38-50.0 W	143.0	147.8	1043917

Address: 416 Jimtown Road
City: MAYFIELD **County:** GRAVES **State:** KY **Construction Deadline:**

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	124.300	120.000	100.800	92.100	88.300	103.100	108.600	100.800
Transmitting ERP (watts)	91.200	87.100	85.110	85.110	89.130	87.100	89.130	89.130

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
4	36-54-35.5 N	089-04-01.6 W	110.3	121.0	1030662

Address: (Wickliffe) 353 CR 1307
City: Bardwell **County:** CARLISLE **State:** KY **Construction Deadline:**

Antenna: 4
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.500	98.100	119.800	96.700	86.900	133.300	130.900	130.400
Transmitting ERP (watts)	189.230	48.640	1.690	0.930	0.930	0.930	1.810	52.120

Antenna: 5
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.500	98.100	119.800	96.700	86.900	133.300	130.900	130.400
Transmitting ERP (watts)	1.710	64.860	368.980	174.580	8.750	0.930	0.930	0.930

Antenna: 6
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.800	98.100	119.800	96.700	86.900	133.300	130.900	130.400
Transmitting ERP (watts)	0.350	0.350	1.230	35.330	112.440	35.270	1.000	0.350

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
6	36-31-12.4 N	088-50-41.5 W	144.2	122.2	1030665

Address: (Fulton) 550 Powell Road
City: Fulton **County:** HICKMAN **State:** KY **Construction Deadline:**

Antenna: 4
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	128.200	122.800	123.200	135.200	147.500	157.200	143.900	141.700
Transmitting ERP (watts)	110.570	412.100	98.560	4.220	1.510	0.920	0.920	6.530

Antenna: 5
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	128.200	122.800	123.200	135.200	147.500	157.200	143.900	141.700
Transmitting ERP (watts)	0.550	0.550	0.550	0.550	1.480	16.430	11.480	0.700

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
6	36-31-12.4 N	088-50-41.5 W	144.2	122.2	1030665

Address: (Fulton) 550 Powell Road
City: Fulton **County:** HICKMAN **State:** KY **Construction Deadline:**

Antenna: 6
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	128.200	122.800	123.200	135.200	147.500	157.200	143.900	141.700
Transmitting ERP (watts)	135.480	5.650	2.230	0.920	1.320	5.450	78.640	402.820

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
7	36-38-26.2 N	088-16-00.1 W	165.8	90.8	1030663

Address: (Murray) 1431 Van Cleave Road
City: Murray **County:** CALLOWAY **State:** KY **Construction Deadline:**

Antenna: 4
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	106.900	107.100	115.000	106.900	87.400	91.300	86.200	97.500
Transmitting ERP (watts)	124.240	6.420	0.560	0.560	0.560	0.830	39.630	251.940

Antenna: 5
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	106.900	107.100	115.000	106.900	87.400	91.300	86.200	97.500
Transmitting ERP (watts)	3.450	96.460	263.070	57.230	1.700	0.560	0.560	0.560

Antenna: 6
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	106.900	107.100	115.000	106.900	87.400	91.300	86.200	97.500
Transmitting ERP (watts)	0.370	0.370	0.370	12.730	121.110	104.340	9.310	0.370

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
8	37-03-51.4 N	088-57-23.6 W	116.4	92.4	1030664

Address: (La Center) 220 RICHARDSON LN
City: LA CENTER **County:** BALLARD **State:** KY **Construction Deadline:**

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.600	78.400	71.900	66.000	65.300	67.000	87.700	96.100
Transmitting ERP (watts)	2.110	71.430	167.460	63.670	0.330	0.640	0.330	0.330

Antenna: 3
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.600	78.400	71.900	66.000	65.300	67.000	87.700	96.100
Transmitting ERP (watts)	1.230	1.000	1.380	23.440	338.840	457.090	66.070	2.240

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
8	37-03-51.4 N	088-57-23.6 W	116.4	92.4	1030664

Address: (La Center) 220 RICHARDSON LN
City: LA CENTER **County:** BALLARD **State:** KY **Construction Deadline:**

Antenna: 4
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.600	78.400	71.900	66.000	65.300	67.000	87.700	96.100
Transmitting ERP (watts)	165.960	6.610	0.910	0.500	0.500	0.890	45.710	223.870

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
10	36-44-07.9 N	088-58-29.2 W	131.9	92.9	1030723

Address: 3975 State Route 2206
City: CLINTON **County:** HICKMAN **State:** KY **Construction Deadline:**

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	100.500	101.900	98.900	84.700	107.900	118.900	119.900	100.400
Transmitting ERP (watts)	96.610	96.610	96.610	96.610	96.610	96.610	96.610	96.610

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
11	37-02-00.0 N	088-22-10.0 W	105.5	106.7	1040303

Address: (Calvert City) 641 Jary Johnson Rd.
City: Calvert City **County:** MARSHALL **State:** KY **Construction Deadline:**

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	78.900	77.600	88.100	83.000	68.600	85.300	97.900	93.100
Transmitting ERP (watts)	23.380	330.300	378.360	36.130	0.970	0.970	0.970	0.970

Antenna: 3
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	78.900	77.600	88.100	83.000	68.600	85.300	97.900	93.100
Transmitting ERP (watts)	0.970	0.970	0.970	14.730	240.930	357.480	49.940	1.230

Antenna: 4
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	78.900	77.600	88.100	83.000	68.600	85.300	97.900	93.100
Transmitting ERP (watts)	63.740	2.060	0.660	0.660	0.660	4.020	107.530	274.970

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
12	36-34-49.2 N	088-31-45.2 W	155.5	91.4	1202399

Address: 12201 SR 97

City: TriCity **County:** GRAVES **State:** KY **Construction Deadline:**

Antenna: 2

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	75.100	73.400	74.100	70.100	102.600	100.900	74.700	81.300
Transmitting ERP (watts)	0.280	4.680	67.610	91.200	13.180	0.450	0.250	0.200

Antenna: 3

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	75.100	73.400	74.100	70.100	102.600	100.900	74.700	81.300
Transmitting ERP (watts)	0.360	0.200	0.200	0.350	18.200	89.130	66.070	2.630

Antenna: 4

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	75.100	73.400	74.100	70.100	102.600	100.900	74.700	81.300
Transmitting ERP (watts)	100.000	38.020	0.200	0.380	0.200	0.200	1.260	42.660

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
14	37-05-47.2 N	088-42-35.2 W	104.2	63.4	1200593

Address: (Paducah West) 4415 Merredith Rd.

City: Paducah **County:** MCCRACKEN **State:** KY **Construction Deadline:** 07-08-2014

Antenna: 4

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.900	55.900	65.200	50.700	38.200	34.700	42.800	64.600
Transmitting ERP (watts)	24.580	50.820	50.310	19.100	0.840	0.330	0.330	1.370

Antenna: 5

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.900	55.900	65.200	50.700	38.200	34.700	42.800	64.600
Transmitting ERP (watts)	0.440	0.440	12.210	76.570	112.800	57.980	5.460	0.440

Antenna: 6

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.900	55.900	65.200	50.700	38.200	34.700	42.800	64.600
Transmitting ERP (watts)	20.830	0.780	0.440	0.440	2.790	42.940	108.040	89.900

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
15	36-46-54.2 N	088-03-28.1 W	199.0	126.5	1205551

Address: 14664 Canton Road
City: Golden Pond **County:** TRIGG **State:** KY C**onstruction Deadline:** 05-19-2006

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	165.000	178.000	160.400	174.500	170.600	167.000	177.000	183.900
Transmitting ERP (watts)	96.610	96.610	96.610	96.610	96.610	96.610	96.610	96.610

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
16	36-34-03.0 N	089-10-30.9 W	109.4	91.4	1282534

Address: (Hickman site) Holley Street
City: Hickman **County:** FULTON **State:** KY C**onstruction Deadline:** 05-28-2014

Antenna: 1
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.500	102.800	96.700	89.300	75.700	68.400	107.900	107.300
Transmitting ERP (watts)	141.700	118.910	1.140	0.580	0.580	0.580	0.580	4.050

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.500	102.800	96.700	89.300	75.700	68.400	107.900	107.300
Transmitting ERP (watts)	0.580	4.050	141.730	118.910	1.140	0.580	0.580	0.580

Antenna: 3
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.500	102.800	96.700	89.300	75.700	68.400	107.900	107.300
Transmitting ERP (watts)	0.460	0.460	0.460	0.460	0.460	7.710	45.610	24.600

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
17	37-10-55.4 N	088-56-43.7 W	102.7	99.1	1252613

Address: (Monkey's Eyebrow) 4625 Odgen Colvin Circle
City: Kevil **County:** BALLARD **State:** KY C**onstruction Deadline:** 10-24-2014

Antenna: 1
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.900	83.500	90.600	69.600	74.300	84.600	86.500	83.200
Transmitting ERP (watts)	7.080	125.890	478.630	112.200	4.570	1.580	1.000	1.000

Antenna: 2
Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.900	83.500	90.600	69.600	74.300	84.600	86.500	83.200
Transmitting ERP (watts)	1.000	1.410	12.020	213.800	446.680	64.570	2.820	1.000

Licensee Name: KENTUCKY RSA NO. 1 PARTNERSHIP

Call Sign: KNKQ306 **File Number:** 0009611390 **Print Date:** 08-31-2021

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
17	37-10-55.4 N	088-56-43.7 W	102.7	99.1	1252613

Address: (Monkey's Eyebrow) 4625 Odgen Colvin Circle

City: Kevil **County:** BALLARD **State:** KY C**onstruction Deadline:** 10-24-2014

Antenna: 4

Maximum Transmitting ERP in Watts: 140.820

Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	85.900	83.500	90.600	69.600	74.300	84.600	86.500	83.200
Transmitting ERP (watts)	2.000	2.000	2.000	2.000	2.000	398.110	549.540	4.900

Control Points:

Control Pt. No. 3

Address: 500 W. Dove Rd.

City: Southlake **County:** TARRANT **State:** TX **Telephone Number:** (800)264-6620

Waivers/Conditions:

NONE

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
KNLH404	
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
04-24-2017	11-30-2017	04-28-2027	

Market Number	Channel Block	Sub-Market Designator
BTA339	D	0

Market Name
Paducah-Murray-Mayfield, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
04-28-2002			

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNLH404 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: ALLTEL CORPORATION

ATTN: REGULATORY
ALLTEL CORPORATION
5055 NORTH POINT PKWY, NP2NE ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQBT313	
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0002942159

Grant Date	Effective Date	Expiration Date	Print Date
06-05-2015	05-07-2020	06-23-2025	

Market Number	Channel Block	Sub-Market Designator
MTA026	A	18

Market Name
Louisville-Lexington-Evansvill

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
10-23-2000			

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is subject to the condition that the remaining balance of the winning bid amount will be paid in accordance with Part 1 of the Commission's rules, 47 C.F.R. Part 1.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

This license is conditioned upon compliance with the provisions of Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation For Consent to Transfer Control of Licenses and Authorizations, Memorandum Opinion and Order, FCC 04-255 (rel. Oct. 26, 2004).

Licensee Name: ALLTEL CORPORATION

Call Sign: WQBT313 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: ALLTEL CORPORATION

ATTN: REGULATORY
ALLTEL CORPORATION
5055 NORTH POINT PKWY, NP2NE ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQBT318	
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0002942159

Grant Date	Effective Date	Expiration Date	Print Date
06-05-2015	05-07-2020	06-23-2025	

Market Number	Channel Block	Sub-Market Designator
MTA026	A	16

Market Name
Louisville-Lexington-Evansvill

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
06-23-2000			

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is subject to the condition that the remaining balance of the winning bid amount will be paid in accordance with Part 1 of the Commission's rules, 47 C.F.R. Part 1.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

Licensee Name: ALLTEL CORPORATION

Call Sign: WQBT318 **File Number:** **Print Date:**

This license is conditioned upon compliance with the provisions of Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation For Consent to Transfer Control of Licenses and Authorizations, Memorandum Opinion and Order, FCC 04-255 (rel. Oct. 26, 2004).

Licensee Name: ALLTEL CORPORATION

Call Sign: WQBT318 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQGA718	0009793647
Radio Service AW - AWS (1710-1755 MHz and 2110-2155 MHz)	

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
02-22-2022	02-22-2022	11-29-2036	02-23-2022

Market Number	Channel Block	Sub-Market Designator
REA004	F	15

Market Name
Mississippi Valley

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WQGA718 **File Number:** 0009793647 **Print Date:** 02-23-2022

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQGA960	0009775572
Radio Service AW - AWS (1710-1755 MHz and 2110-2155 MHz)	

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
01-03-2022	01-03-2022	11-29-2036	01-05-2022

Market Number	Channel Block	Sub-Market Designator
BEA072	B	0

Market Name
Paducah, KY-IL

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WQGA960 **File Number:** 0009775572 **Print Date:** 01-05-2022

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQGD606	0009565676

Radio Service
AW - AWS (1710-1755 MHz and 2110-2155 MHz)

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
12-16-2021	12-16-2021	12-18-2036	07-09-2022

Market Number	Channel Block	Sub-Market Designator
BEA072	C	0

Market Name
Paducah, KY-IL

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

Special Condition for AU/name change (6/4/2016): Grant of the request to update licensee name is conditioned on it not reflecting an assignment or transfer of control (see Rule 1.948); if an assignment or transfer occurred without proper notification or FCC approval, the grant is void and the station is licensed under the prior name.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WQGD606 **File Number:** 0009565676 **Print Date:** 07-09-2022

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WQJQ692	

Radio Service
WU - 700 MHz Upper Band (Block C)

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
01-10-2020	02-11-2021	06-13-2029	

Market Number	Channel Block	Sub-Market Designator
REA004	C	0

Market Name
Mississippi Valley

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
06-13-2013	06-13-2019		

Waivers/Conditions:

If the facilities authorized herein are used to provide broadcast operations, whether exclusively or in combination with other services, the licensee must seek renewal of the license either within eight years from the commencement of the broadcast service or within the term of the license had the broadcast service not been provided, whichever period is shorter in length. See 47 CFR §27.13(b).

This authorization is conditioned upon compliance with section 27.16 of the Commission's rules

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WQJQ692 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WREF214	

Radio Service
UU - Upper Microwave Flexible Use Service

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
10-02-2019	10-02-2019	10-02-2029	

Market Number	Channel Block	Sub-Market Designator
C21083	L1	0

Market Name
GRAVES, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

NONE

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WREF214 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: STRAIGHT PATH SPECTRUM, LLC

ATTN: REGULATORY
STRAIGHT PATH SPECTRUM, LLC
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WRHG984	
Radio Service UU - Upper Microwave Flexible Use Service	

FCC Registration Number (FRN): 0012576435

Grant Date	Effective Date	Expiration Date	Print Date
06-04-2020	06-04-2020	06-04-2030	

Market Number	Channel Block	Sub-Market Designator
PEA243	M1	0

Market Name
Paducah, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

NONE

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: STRAIGHT PATH SPECTRUM, LLC

Call Sign: WRHG984 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: STRAIGHT PATH SPECTRUM, LLC

ATTN: REGULATORY
STRAIGHT PATH SPECTRUM, LLC
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WRHG994	
Radio Service UU - Upper Microwave Flexible Use Service	

FCC Registration Number (FRN): 0012576435

Grant Date	Effective Date	Expiration Date	Print Date
06-04-2020	06-04-2020	06-04-2030	

Market Number	Channel Block	Sub-Market Designator
PEA243	N1	0

Market Name
Paducah, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

NONE

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: STRAIGHT PATH SPECTRUM, LLC

Call Sign: WRHG994 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WRNG985	
Radio Service PM - 3.7 GHz Service	

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
07-23-2021	07-23-2021	07-23-2036	

Market Number	Channel Block	Sub-Market Designator
PEA243	A1	0

Market Name
Paducah, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
07-23-2029	07-23-2033		

Waivers/Conditions:

This final license provides authorization during the full 15-year license term. Operation under this final license may begin on the earlier of (1) 12/5/2025 or (2) the date that the certification for accelerated relocation for this PEA is validated by the FCC pursuant to 47 CFR § 27.1412(g).

License is conditioned on compliance with all applicable FCC rules and regulations, including licensee making payments required by 47 C.F.R. §§ 27.1401- 27.1424 as described in FCC 20-22. See FCC 20-22, paras. 178-331.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WRNG985 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign	File Number
WRNG990	
Radio Service PM - 3.7 GHz Service	

FCC Registration Number (FRN): 0003290673

Grant Date	Effective Date	Expiration Date	Print Date
07-23-2021	07-23-2021	07-23-2036	

Market Number	Channel Block	Sub-Market Designator
PEA243	B1	0

Market Name
Paducah, KY

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
07-23-2029	07-23-2033		

Waivers/Conditions:

This final license provides authorization during the full 15-year license term. Operation under this final license may begin on the earlier of (1) 12/5/2025 or (2) the date that the certification for accelerated relocation for this PEA is validated by the FCC pursuant to 47 CFR § 27.1412(g).

License is conditioned on compliance with all applicable FCC rules and regulations, including licensee making payments required by 47 C.F.R. §§ 27.1401- 27.1424 as described in FCC 20-22. See FCC 20-22, paras. 178-331.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

FCC 601-MB
August 2021

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WRNG990 **File Number:** **Print Date:**

700 MHz Relicensed Area Information:

Market	Market Name	Buildout Deadline	Buildout Notification	Status

EV FARMINGTON
KY0104

DOVE ROAD
FARMINGTON, KY 42020
GRAVES COUNTY
TENANT: KENTUCKY RSA 1 PSHP
d/b/a VERIZON WIRELESS
"EV FARMINGTON"

TowerCo®

5000 VALLEYSTONE DR
CARY, NC 27519

NEW 255' SELF SUPPORT TOWER
w/5' LIGHTNING ROD
TOTAL TOWER HEIGHT 260'

FROM: EVANSVILLE MTSO: 800 RUSSELL ROAD CHANDLER, IN 47610: HEAD NORTH ON RUSSELL RD (0.3 MI.). TURN LEFT (WEST) ONTO GARDNER RD (1.6 MI.). TURN LEFT (WEST) ONTO IN-62 (4.2 MI.). TAKE THE RAMP ONTO I-69 S (0.3 MI.). MERGE ONTO I-69 S (8.1 MI.). TAKE EXIT 0 FOR VETERANS MEM PKWY/US-41 TOWARD VINCENNES/HENDERSON KY(0.1 MI.). KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR US-41 S AND MERGE ONTO US-41 S (0.9 MI.). MERGE ONTO US-41 S (6.1 MI.). KEEP LEFT TO STAY ON US-41 S (4.3 MI.). CONTINUE ONTO PENNYRILE PKWY AND THEN CONTINUE ONTO I-69 80.2 MI.). TAKE EXIT 68B TO MERGE ONTO I-24 W/I-69 S TOWARD PADUCAH (16.2 MI.). TAKE EXIT 25A ON THE LEFT FOR I-69 S TOWARD FULTON S (0.9 MI.). MERGE ONTO I-69 (9.6 MI.). TAKE EXIT 41 FOR US-641 SPUR TOWARD HARDIN/MURRAY (0.9 MI.). CONTINUE ONTO US-641 SPUR S (0.2 MI.) TURN RIGHT (WEST) ONTO KY-58 W (8.7 MI.). TURN LEFT (SOUTH) ONTO KY-564 (8.2 MI.). TURN RIGHT (WEST) ONTO KY-121 N/KY-564 (1.1 MI.). TURN LEFT (SOUTH) ONTO DOVE RD (0.2 MI.). SITE WILL BE LOCATED ON THE EAST SIDE OF THE ROAD.

FROM: GRAVES COUNTY SEAT: 1102 PARIS RD, MAYFILED, KY 42066: TURN LEFT (EAST) ONTO BARTON DR (0.1 MI.). TURN RIGHT (SOUTH) ONTO S COMMONWEALTH DR AND THEN LEFT (EAST) TOWARD KY-121 BYPASS N. TURN RIGHT (SOUTH) ONTO KY-121 BYPASS N (0.6 MI.). TURN LEFT (EAST) ONTO KY-121 S/KY-80 E (3.2 MI.). TURN RIGHT (SOUTH) ONTO KY-121 S (2.8 MI.). TURN RIGHT (SOUTH) ONTO DOVE RD (0.2 MI.). SITE WILL BE LOCATED ON THE EAST SIDE OF THE ROAD.

PROJECT SUMMARY

TOWERCO SITE
EV FARMINGTON
KY0104

VERIZON WIRELESS SITE
EV FARMINGTON
PROJECT#: 16999849
MARKET ID: EVANSVILLE
MDG#: 5000917995

SITE ADDRESS
DOVE RD
FARMINGTON, KY 42020
GRAVES COUNTY
E911 ADDRESS: TBD

TOWER OWNER
TOWERCO
5000 VALLEYSTONE DR
CARY, NC 27519
CONTACT: EDWARD SCHAFER
PHONE: 336-325-1066
E-MAIL: eschafer@towerco.com

PROPERTY OWNER
SCOTT WILFERD
PO BOX 100
FARMINGTON, KY 42040
CONTACT: SCOTT WILFERD
PHONE: 270-832-1097
E-MAIL: TBD

POLICE
GRAVES COUNTY SHERIFF'S OFFICE
1102 PARIS ROAD, STE #6
MAYFIELD, KY 42066
PHONE: 270-247-4501

FIRE
FARMINGTON FIRE DEPARTMENT
35 DUBRIN ST
FARMINGTON, KY 42040
PHONE: 270-345-2215

GENERAL INFORMATION
LATITUDE - 36° 40' 04.65" N
LONGITUDE - 88° 31' 54.91" W
(NAD83)

ELEVATION - 521.50' AMSL

TOWERCO LEASE AREA
100'-0" x 100'-0"
(10000 SF)

VERIZON WIRELESS LEASE AREA
12'-0" x 30'-0"
(360 SF)

PROJECT TOTAL DISTURBED AREA
GROSS GRAVEL
COMPOUND: (4,900 SF) = (.12 ACRE)
ACCESS DRIVE: (3,023 SF) = (.07 ACRE)
GROSS AREA: (7,923 SF) = (.19 ACRE)

PROJECT DESCRIPTION

PROJECT DESCRIPTION:
NOTE: ALL ITEMS WITHIN THESE CONSTRUCTION DOCUMENTS ARE BY TOWER OWNER'S GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS UNLESS NOTED AS (VZW GC) WHICH SHALL INCLUDE VERIZON WIRELESS GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS. GENERALLY DESCRIBED BELOW:

TOWERCO SCOPE:
- INSTALL A NEW 000' TYPE TOWER w/ 0' LIGHTNING ROD (TOTAL 000')
- INSTALL A NEW TOWER FOUNDATION SYSTEM
- INSTALL A NEW 00'X00' FENCED GRAVEL COMPOUND
- INSTALL A NEW ELECTRICAL SERVICE RUN TO SITE UTILITY H-FRAME
- INSTALL A NEW GRAVEL ACCESS DRIVE
- NO WATER OR SEWAGE SERVICES RUN TO SITE
- INSTALL NEW TOWER & SITE GROUNDING SYSTEM
- INSTALL NEW VZW SUBSURFACE GROUNDING SYSTEM
- INSTALL A NEW VZW CONCRETE EQUIPMENT AND GENERATOR PADS
- INSTALL A NEW LIQUID PROPANE TANK PAD
- INSTALL VZW ICE BRIDGE AND FOUNDATIONS
- INSTALL VZW EQUIPMENT H-FRAME AND FOUNDATIONS
- INSTALL ELECTRICAL SERVICE CONDUIT WITH PULL TAPES FROM ILC ENCLOSURE STUB-UP TO UTILITY H-FRAME
- INSTALL NEW CONDUITS WITH PULL TAPES FROM VZW ILC STUB-UP LOCATION TO THE GENERATOR STUB-UP AT VZW GENERATOR PAD
- INSTALL (1) NEW "VERIZON WIRELESS ONLY" FIBER OPTIC CONDUIT WITH INTEGRAL (3) 1-1/4" INNERDUCTS WITH PULL TAPES AND TRACER WIRE FROM VZW EQUIPMENT TO NEW "VERIZON WIRELESS ONLY" 24"X36" HAND HOLE OUTSIDE COMPOUND THEN TO NEW "VERIZON WIRELESS ONLY" 24"X36" HAND HOLE AT R.O.W.
- PERMANENT ELECTRIC POWER MUST BE AVAILABLE FOR VERIZON WIRELESS AT THE METER BASE PRIOR TO THE SITE BEING RELEASED AS TENANT READY

VERIZON WIRELESS SCOPE (VZW GC):
- INSTALL VZW PREFABRICATED CANOPY AND FOUNDATIONS
- INSTALL VZW ANTENNA MOUNTING SUPPORT STRUCTURE ON TOWER
- INSTALL VZW ANTENNAS, LINES, COAX, GPS ANTENNA AND RADIO EQUIPMENT
- INSTALL EXISTING SUBSURFACE GROUND LEADS TO VZW EQUIPMENT & FACILITIES
- INSTALL VZW ELECTRIC SERVICE CONDUCTORS FROM UTILITY H-FRAME TO VZW ILC ENCLOSURE
- INSTALL NEW CONDUITS WITH PULL TAPES FROM RF CABINET TO OVP H-FRAME LIT FIBER LOCATION
- INSTALL NEW CONDUITS AND CIRCUITS FROM VZW ILC ENCLOSURE TO EQUIPMENT ENCLOSURES AT VZW EQUIPMENT PAD
- INSTALL VZW GENERATOR CIRCUITS FROM VZW ILC & EQUIPMENT ENCLOSURES TO VZW GENERATOR
- INSTALL NEW OUTDOOR OVPs AND CABLING ON VERIZON EQUIPMENT H-FRAME
- INSTALL NEW PROPANE TANK AND UNDERGROUND SERVICE LINE

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

BUILDING CODE	2014 INDIANA BUILDING CODE (IBC 2012)
STRUCTURAL CODE	TIA/EIA-222 - REVISION G
MECHANICAL CODE	2014 INDIANA MECHANICAL CODE (IMC 2012)
PLUMBING CODE	2012 INDIANA PLUMBING CODE (IPC 2006)
ELECTRICAL CODE	2008 NATIONAL ELECTRICAL CODE (NEC) - NFPA 70
FIRE/LIFE SAFETY CODE	2014 INDIANA FIRE CODE (2012 IFC)
ENERGY CODE	2010 INDIANA ENERGY CODE ASHRAE 90.1-2010 (COMMERCIAL)
GAS CODE	2014 INDIANA FUEL GAS CODE (IFGC 2012)

ACCESSIBILITY REQUIREMENTS:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2012 IBC BUILDING CODE.

APPLICABLE CODES

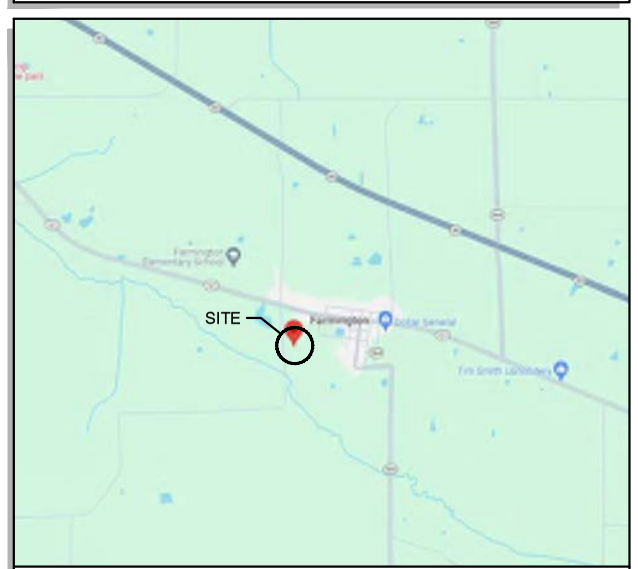
CONSULTANT TEAM

SURVEYOR
BENCHMARK SERVICES, INC
318 NORTH MAIN ST
HUNTINGBURG, IN 47542
PHONE: 812-683-3049

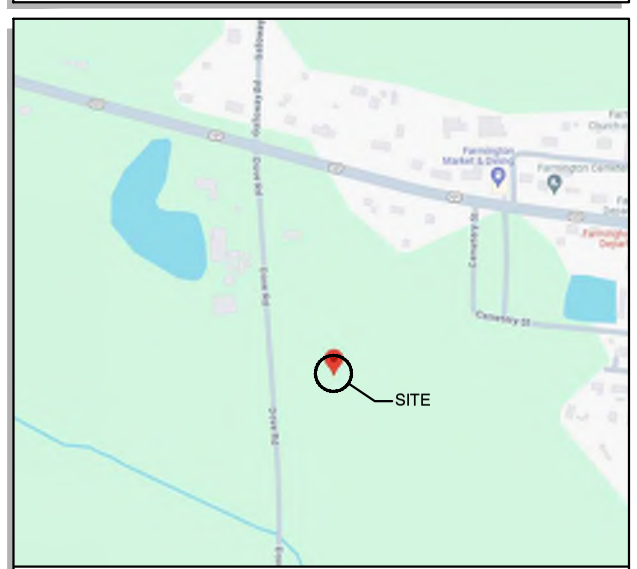
ELECTRICAL
WEST KENTUCKY RURAL ELECTRIC COOPERATIVE CORPORATION
ADDRESS: TBD
CONTACT: SERVICE INSTALLATION
PHONE: 1-877-495-7322
EMAIL: TBD

ARCHITECTURAL
GPD GROUP, INC
520 SOUTH MAIN STREET, SUITE 2531
AKRON, OH 44311
CONTACT: TRACI PREBLE,
317-299-2996

ELECTRICAL UTILITY COORDINATION IS NOT FINALIZED. DO NOT PROCEED WITH CONSTRUCTION.



VICINITY MAP (© 2024 GOOGLE)



LOCATION MAP (© 2024 GOOGLE)

AERIAL (© 2024 GOOGLE)

SHEET NUMBER	DESCRIPTION
T-1	PROJECT INFORMATION, SITE MAPS, SHEET INDEX
	SURVEY PLAN
CIVIL	
C-0	ENVIRONMENTAL EVALUATION "NOTICE TO CONTRACTOR" (REFERENCE ONLY)
C-1	OVERALL SITE PLAN w/AERIAL OVERLAY
C-1A	OVERALL SITE PLAN w/PLATFORM DISTANCE TO PROPERTY LINES
C-2	GRADING AND E&S CONTROL PLAN
C-3	DETAILED SITE PLAN
C-4	DIMENSIONED SITE PLAN
C-5	DETAILED EQUIPMENT PAD PLAN
C-6	GENERAL SITE CONSTRUCTION NOTES
C-7	BEST MANAGEMENT PRACTICES & EROSION CONTROL DETAILS AND NOTES
C-8	UNDERGROUND GAS PIPING PLAN AND NOTES
SITE DETAILS	
D-1	FENCE DETAILS AND NOTES
D-2	SITE DETAILS
D-3	EQUIPMENT PAD & CANOPY ELEVATIONS
D-4	VERIZON WIRELESS SIGNAGE (REFERENCE ONLY)
D-5	TOWER OWNER SITE FENCE SIGNAGE (REFERENCE ONLY)
STRUCTURAL	
S-1	EQUIPMENT PAD FOUNDATION PLAN, DETAILS AND STRUCTURAL NOTES
S-2	ICE BRIDGE PLAN AND DETAILS
S-3	FOUNDATION PLAN AND DETAILS
TOWER ELEVATION	
TE-1	TOWER ELEVATION
ELECTRICAL	
E-1	SITE UTILITY PLAN
E-2	PANEL SCHEDULE, ONE LINE DIAGRAM, ELECTRICAL NOTES AND DETAILS
E-3	EQUIPMENT PAD UTILITY PLAN & EQUIPMENT PAD TRENCH SECTIONS
E-4	OVP & INTEGRATED LOAD CENTER H-FRAME ELEVATIONS AND DETAILS
E-5	ELECTRICAL DETAILS
E-6	EQUIPMENT CABINET ELEVATIONS
E-7	EQUIPMENT PAD LIGHTING PLAN
E-8	ALARMING TABLE AND DETAILS (REFERENCE ONLY)
E-9	ALARMING DIAGRAMS AND DETAILS (REFERENCE ONLY)
E-10	ALARM AND FIBER CABLE ROUTING (REFERENCE ONLY)
GROUNDING	
G-1	GROUNDING SITE PLAN
G-2	GROUNDING NOTES
G-3	VERIZON WIRELESS GROUNDING PLAN AND NOTES
G-4	GROUNDING DETAILS
G-5	GROUNDING DETAILS
G-6	GROUNDING DETAILS
REFERENCE DRAWINGS	
RF-1	ANTENNA PLAN AND DETAILS (REFERENCE ONLY)
ER-1	EMERGENCY RESPONCE TIER II SITE MAP (REFERENCE ONLY)
ER-2	EMERGENCY RESPONSE TIER II VERIZON WIRELESS EQUIPMENT PLAN (REFERENCE ONLY)
TOWER (BY OTHERS)	
TW-1	TOWER DETAILS (REFERENCE ONLY)

GPD GROUP, INC.®
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

TowerCo®
5000 VALLEYSTONE DR
CARY, NC 27519

REV	DATE	DESCRIPTION
A	04/29/24	ISSUED FOR 90% REVIEW
0	05/31/24	FINAL CDs FOR PSC FILING

STATE OF KENTUCKY
CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

TITLE SHEET

ISSUED FOR:	
REVIEW	--/--/--
PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

T-1

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 1:17 AM - skirschner

POINT OF COMMENCEMENT
IRON PIN FOUND AT THE N/W CORNER OF
S/E QUARTER OF SECTION 3, T2, R2E
GRAVES COUNTY, KY

(PROPERTY LINE)
N 81°12'19" W 420.78'

5/8" CAPPED IRON
PIN (FOUND)

DOVE ROAD
(PUBLIC R/W)

(RIGHT OF WAY)

S 02°12'53" E 926.20'(RUN UP)

30' BUILDING SET BACK

CENTER OF TOWER
COORDINATE POINT LOCATION
NAD 1983
LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W
NAVD 1988
SITE ELEVATION: 521.50 AMSL

UTILITIES
POWER COMPANY:
WEST KENTUCKY RURAL
ELECTRIC CORPORATIVE CORPORATION
877.495.7322

EMERGENCY INFORMATION:
FARMINGTON FIRE DEPARTMENT
270.345.2215
GRAVES COUNTY, SHERIFF
270.247.4501

Parcel Number
139.00.00.047.00
Ownership
WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

GRID NORTH BY G.P.S. OBSERVATION +/- 10 SECONDS

SCALE: 1"=40'

NORTH IS BASED ON KENTUCKY SINGLE ZONE COORDINATE SYSTEM AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON OCTOBER 12, 2023

0 40 80

STATE OF KENTUCKY
RALPH M. WALLEM
2195
LICENSED PROFESSIONAL LAND SURVEYOR

POINT OF BEGINNING
ACCESS & UTILITY ESMT.

POINT OF BEGINNING
LEASE AREA

N 90°00'00" E 233.87'

30' ACCESS &
UTILITY EASEMENT
N 90°00'00" W 202.71'

N 02°12'53" W
30.02'

100.00'
N 90°00'00" E

S 00°00'00" W 100.00'

100.00'
N 90°00'00" W

N 00°00'00" E 100.00'

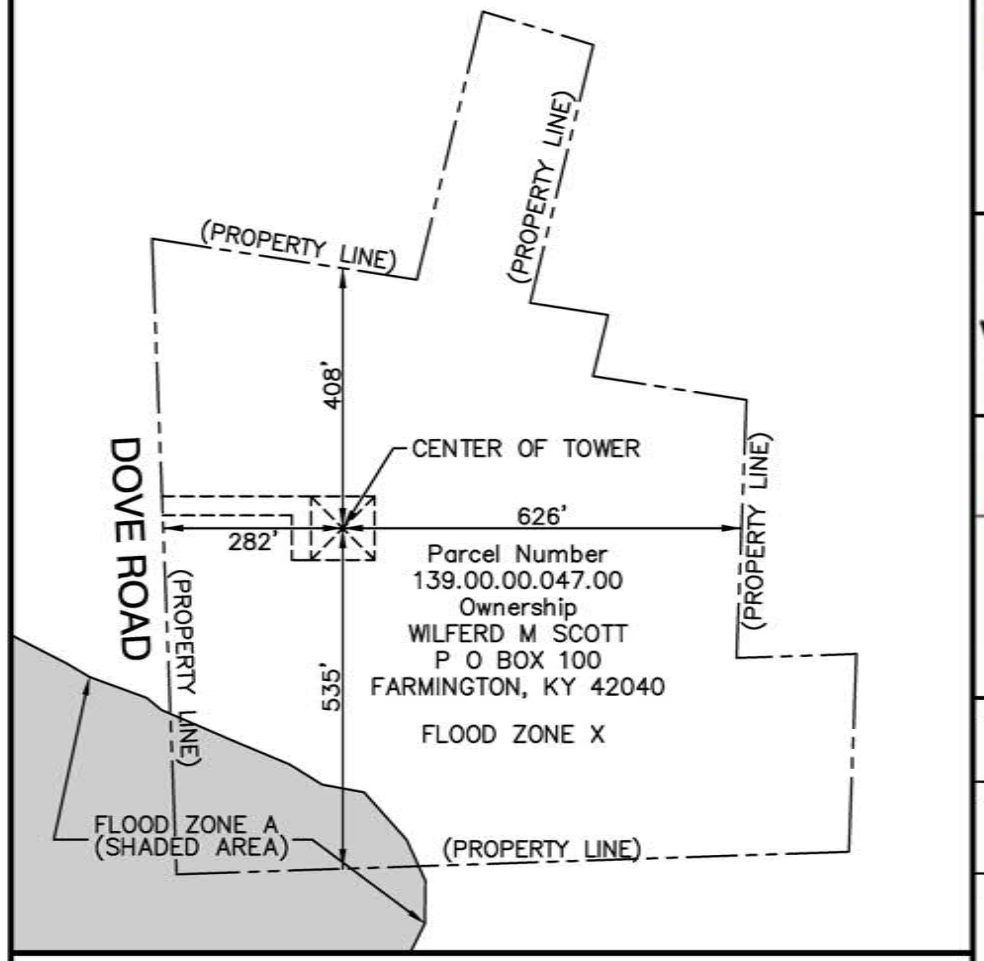
100'x100'
LEASE AREA

N 90°00'00" W
30.00'

CENTER OF TOWER
COORDINATE POINT LOCATION
NORTH: 3414844.69073
EAST: 4105339.32122
ELEV: 521.50
LAT: 36°40'04.65"
LONG: 88°31'54.91"

525 524 523 522 521 520 519 518 517 516 515

OHE



OVERALL SITE

SCALE: 1"=300'

LAND SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT AND SURVEY WERE MADE UNDER MY SUPERVISION AND THAT THE ANGULAR AND LINEAR MEASUREMENTS AS WITNESSED BY MONUMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

RALPH M. WALLEM PLS NO. 80040185

FLOOD DATA THIS LEASE AREA IS IN ZONE X OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 21083C0275C WHICH HAS AN EFFECTIVE DATE OF 12/13/2009 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. THERE WAS NO FIELD SURVEY PERFORMED TO DETERMINE THIS ZONE. AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION FROM FEMA. NOTE: A SMALL PORTION, ON THE SOUTHWEST CORNER OF THE PARENT TRACT LIES IN ZONE "A" (SEE DETAIL IN OVERALL SITE DETAIL)

GENERAL NOTES:
THE ACCESS & UTILITY EASEMENT TERMINATE AT THE CENTER OF THE ROADWAY AND IS THE WEST PROPERTY LINE OF THE PARCEL. THE ACCESS & UTILITY EASEMENT PASS OVER THE RIGHT OF WAY LINE AND END AT THE CENTERLINE, AND PROPERTY LINE. 139.00.00.047.00

THE LEASE AREA AND EASEMENT LIE ENTIRELY WITHIN THE PARENT PARCEL.

AT THE TIME OF THE SURVEY, THERE WERE NO VISIBLE ENCROACHMENTS LOCATED ON THE LEASE AREA OR EASEMENTS.

NOTE: THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519
PH: (919) 653-5744

verizon

BENCHMARK SERVICES, INC.
Consulting Engineers
Land Surveyors
318 North Main Street
Huntingburg, IN 47542
(812) 683-3049
benchmark@nw.twcbc.com

PROJECT No.

SITE NAME: EV FARMINGTON

SITE ADDRESS: DOVE ROAD
FARMINGTON, KY 42040

LEASE AREA: 10,000 SQ. FT.

PROPERTY OWNER: WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

SECTION/TOWNSHIP/RANGE: SEC 3, T2, R2E

COUNTY: GRAVES COUNTY

PARCEL: 139.00.00.047.00

LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W

DWG BY:	CHKD BY:	DATE:
GVW	RMW	10.26.23

NO.	REVISION/ISSUE	DATE:
1.	FLOOD NOTE	1.17.24
2.	REVIEW ITEM	1.19.24

TITLE: SURVEY PLAN

SHEET: 1 OF 2

Issued By U.S. TITLE SOLUTIONS
FILE NO. UST75502
REFERENCE NO. KY0104
DATE OF REPORT: JUNE 28, 2023
SCOPE OF SEARCH: MARCH 4, 1920 TO JUNE 12, 2023

TITLE TO SAID REAL ESTATE OR INTEREST IN THE LAND DESCRIBED OR REFERENCED TO IN THIS REPORT IS AT THE EFFECTIVE DATE HEREOF VESTED IN:

M. SCOTT WILFERD AND WIFE, KELLIE WILFERD

SCORCE OF TITLE:
WARRANTY DEED MADE BY M. SCOTT WILFERD AND WIFE, KELLIE WILFERD, SABRINA WILFERD, A SINGLE PERSON AND RUTH WILFERD, A SINGLE PERSON, DATE NOVEMBER 24, 1999, RECORDED NOVEMBER 30, 1999, IN DEED BOOK 384, PAGE 591.

PROPERTY ID: 139.00.00.047.00

I, RALPH M. WALLEM, CERTIFY TO:
TOWERCO IV HOLDINGS, LLC
LAND SURVEYOR'S CERTIFICATE

I CERTIFY THAT THIS PLAT AND SURVEY WERE MADE UNDER MY SUPERVISION, AND THAT THE ANGULAR AND LINEAR MEASUREMENTS, AS WHITNESSED BY MONUMENTS SHOWN HEREON, ARE TRUE AND CORRECT TO THE BEST OF MY ABILITIES AND BELIEFS.
THIS SURVEY AND PLAT MEETS OR EXCEEDS THE MINIMUM STANDARDS OF THE GOVERNING AUTHORITIES.
SURVEYOR STATEMENT–MY COMMENTS ARE BASED SOLELY ON THE TITLE DOCUMENT THAT HAVE BEEN SUPPIED TO ME BY THE TITLE COMPANY . SINCE THE TITLE DOCUMENTS ARE FURNISHED FOR THE PARENT TRACT, OUR TOPOGRAPHIC SURVEY IS OF A PORTION OF THAT TRACT. MY COMMENTS ARE RESTRICTED TO EXCLUSIONS THAT I CAN DETERMINE AFFECT ONLY OUR PORTION OF THE PARENT TRACT. NO BOUNDARY SURVEY WAS PERFORMED ON THE PARENT TRACT, THUS IT IS NOT POSSIBLE TO DETERMINE WITH CERTAINTY EXCLUSIONS REFERENCING THE PARENT TRACT.

SCHEDULE "B" ITEMS
NO SCHEDULE "B" ITEMS TO ADDRESS.

STATE OF KENTUCKY
RALPH M. WALLEM
2195
LICENSED PROFESSIONAL LAND SURVEYOR

END OF SCHEDULE B, PART II

Ralph M Wallem

RALPH M. WALLEM — PLS NO. KY LS 2195

DESCRIPTION OF LEASE AREA

A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO A POINT; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 FEET TO THE TRUE PLACE OF BEGINNING; THENCE CONTINUING NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 10,000 SQUARE FEET, (0.23 ACRES), MORE OR LESS.

DESCRIPTION OF 30' ACCESS AND UTILITY EASEMENT

A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO THE TRUE PLACE OF BEGINNING; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 TO THE NORTHWEST LEASE CORNER; THENCE ALONG THE WEST LEASE LINE BEARING SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET TO THE SOUTHWEST LEASE CORNER; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 30.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 70.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 202.71 FEET; THENCE NORTH 02 DEGREES 12 MINUTES 53 SECONDS WEST 30.02 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 9099 SQUARE FEET, (0.21 ACRES), MORE OR LESS.

DESCRIPTION OF PARENT PARCEL DEED (FURNISHED)

PARCEL NO. I:
Being 22.6 acres of land in the Southeast Quarter of Section 3 T 2 R 2 E described as beginning at a post at the Harley Cloys Northwest corner on the east line of the old Farmington–Sedalia Road at a distance of 90 poles south from the northwest corner of the quarter, and running thence North 85 degrees East 64 poles along the Cloys line 64 poles to a post; thence North 1/2 degrees West 41 poles to a post; thence North 83 degrees West 24–3/4 poles to a post; thence North 12 degrees East 6 poles to a post; thence North 83 degrees West 7–1/2 poles to a post; thence North 12 degrees East 25–1/4 poles to an iron stake on the south line of the Mayfield–Murray Road; thence North 75 degrees West 11 poles along the road to an iron stake; thence South 12 degrees West 26–1/4 poles to a post; thence North 83 degrees West 25–1/2 poles to a post on the east line of the old Farmington– Sedalia Road; thence South 4 degrees East 60–1/2 poles along the east line of the old Farmington–Sedalia Road to the point of beginning.

LESS AND EXCEPT:
Being two acres, more or less, out of the Southeast Quarter of Section 3, T 2 R 2 E and being out of the North part of a 22.6 acre tract of land described in Deed Book 246, Page 399, Graves County Court Clerk's Office, and with said two acres, more or less, being more particularly described as follows:
Beginning at a stake on the South right–of–way line of Kentucky Highway No. 121 with said stake being at the northeast corner of the 22.6 acre tract more fully described in Deed Book 246, Page 399, Graves County Court Clerk's Office; thence North 75 degrees West 11 poles along the South line of the Mayfield–Murray Road (Kentucky Highway No. 121) to an iron stake; thence South 12 degrees West 26–1/4 poles to a stake; thence South 83 degrees East 11 poles to a stake; thence North 12 degrees East 25–1/4 poles to an iron stake on the South line of the Mayfield–Murray Road (Kentucky Highway No. 121) and the point of beginning and containing 2 acres, more or less.
There is excepted from the above 2 acres, a 30 foot right–of–way in the Southeast corner of said property, leaving 151–1/2 foot frontage on Kentucky Highway 121, and 200 feet, more or less, off the back portion of said 2 acres, leaving said lot being conveyed 151–1/2 feet wide and 234–1/4 feet deep, more or less.
Being the same real estate conveyed to Gary Dale Derrington and wife, Sandra Jean Derrington, by deed from Bobby G. Wilferd and wife, Mary Edna Wilferd, dated February 11, 1981, of record in Deed Book 281, Page 28, Graves County Clerk's Office.
Less and Except that property conveyed in Deed Book 405 page 686 and Deed Book 475 page 398.

NOTE: THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519
PH: (919) 653–5744

verizon

BENCHMARK SERVICES, INC.
Consulting Engineers
Land Surveyors
318 North Main Street
Huntingburg, IN 47542
(812) 683-3049
benchmark@mw.twcbc.com

PROJECT No.

SITE NAME: EV FARMINGTON

SITE ADDRESS: DOVE ROAD FARMINGTON, KY 42040

LEASE AREA: 10,000 SQ. FT.

PROPERTY OWNER: WILFERD M SCOTT P O BOX 100 FARMINGTON, KY 42040

SECTION/TOWNSHIP/RANGE: SEC 3, T2, R2E

COUNTY: GRAVES COUNTY

PARCEL: 139.00.00.047.00

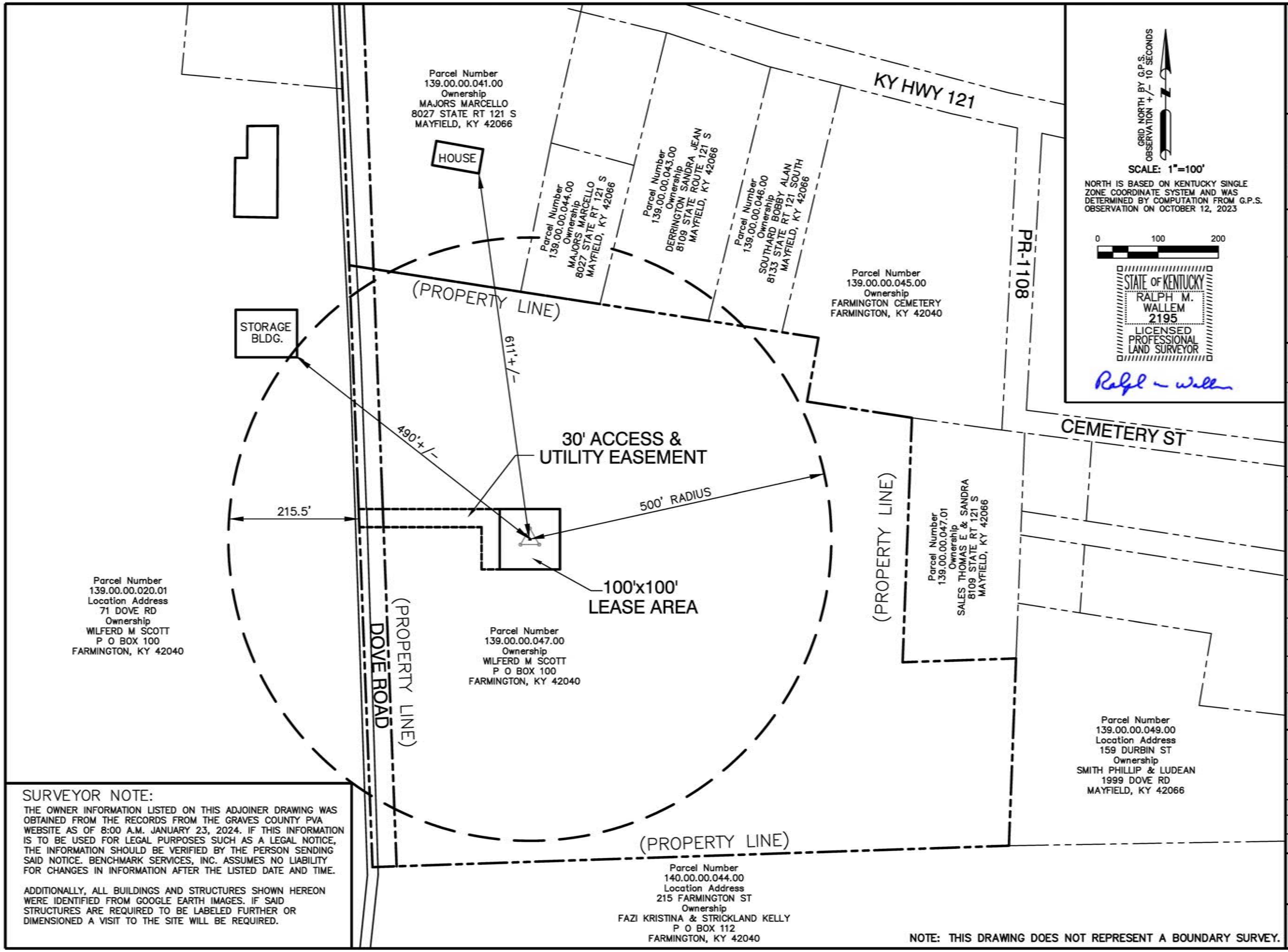
LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W

DWG BY:	CHKD BY:	DATE:
GVW	RMW	10.26.23

NO.	REVISION/ISSUE	DATE:
1.	FLOOD NOTE	1.17.24
2.	REVIEW ITEM	1.19.24

TITLE: SURVEY PLAN

SHEET: 2 OF 2



GRID NORTH BY G.P.S. OBSERVATION +/- 10 SECONDS

SCALE: 1"=100'

NORTH IS BASED ON KENTUCKY SINGLE ZONE COORDINATE SYSTEM AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON OCTOBER 12, 2023

0 100 200

STATE OF KENTUCKY
RALPH M. WALLEM
2195
LICENSED PROFESSIONAL LAND SURVEYOR

Ralph M. Wallem

SURVEYOR NOTE:

THE OWNER INFORMATION LISTED ON THIS ADJOINER DRAWING WAS OBTAINED FROM THE RECORDS FROM THE GRAVES COUNTY PVA WEBSITE AS OF 8:00 A.M. JANUARY 23, 2024. IF THIS INFORMATION IS TO BE USED FOR LEGAL PURPOSES SUCH AS A LEGAL NOTICE, THE INFORMATION SHOULD BE VERIFIED BY THE PERSON SENDING SAID NOTICE. BENCHMARK SERVICES, INC. ASSUMES NO LIABILITY FOR CHANGES IN INFORMATION AFTER THE LISTED DATE AND TIME.

ADDITIONALLY, ALL BUILDINGS AND STRUCTURES SHOWN HEREON WERE IDENTIFIED FROM GOOGLE EARTH IMAGES. IF SAID STRUCTURES ARE REQUIRED TO BE LABELED FURTHER OR DIMENSIONED A VISIT TO THE SITE WILL BE REQUIRED.

NOTE: THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519
PH: (919) 653-5744

verizon

BENCHMARK SERVICES, INC.
Consulting Engineers
Land Surveyors
318 North Main Street
Huntingburg, IN 47542
(812) 683-3049
benchmark@mw.twcbc.com

PROJECT No.

SITE NAME: EV FARMINGTON

SITE ADDRESS: DOVE ROAD
FARMINGTON, KY 42040

LEASE AREA: 10,000 SQ. FT.

PROPERTY OWNER:
WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

SECTION/TOWNSHIP/RANGE: SEC 3, T2, R2E

COUNTY: GRAVES COUNTY

PARCEL: 139.00.00.047.00

LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W

DWG BY:	CHKD BY:	DATE:
GVW	RMW	1.23.24

NO.	REVISION/ISSUE	DATE:

TITLE: 500' RADIUS & ADJOINERS MAP

SHEET: 1 OF 1

Site Restrictions

It is the responsibility of Company to adhere to the following restrictions in response to the above environmental conditions.

Excavation/Construction	Yes
Excavation/Construction Type	Soil Erosion and Sedimentation Controls / Best Management Practices: To prevent any negative impact to the sensitive receptors, sediment and erosion control measures, such as silt fences, straw wattles, and other storm-water best management practices, must be implemented prior to and maintained throughout construction. Staging and Stockpiling Restrictions: Construction related staging and stockpiling of soils and equipment may not occur in the vicinity of the sensitive receptors or in a manner that will cause impacts
Describe Excavation/Construction	EBI observed discarded debris within a wooded drainageway on the
	Subject Property to include wood, building materials, an empty 55-gallon drum, and miscellaneous household items. The discarded debris was located approximately 25 feet to 40 feet north of the proposed access/utility easement. Avoid Debris. Previous agricultural use-soils to stay onsite
Environmental Covenants	No
Diesel/Gasoline Restriction (DR)	No
Diesel Sensitive (DS)	Yes
NSTD399 Option Chosen	Propane or Natural Gas
Other Site Restrictions?	No

PROCEDURE: This signed original is to be returned to VZW Construction and uploaded to FUZE Site Project Management (SPM) Module along with the EES Close-Out Notification.

Contractor's Signature	
Contractor's Printed Name	
Date	
Company Name	
Company Address	
Phone Number	

TowerCo®
5000 VALLEYSTONE DR
CARY, NC 27519

REV.	DATE	DESCRIPTION
A	03/29/24	ISSUED FOR 90% REVIEW
0	05/31/24	FINAL CDs FOR PSC FILING

REFERENCE ONLY

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

ENVIRONMENTAL EVALUATION "NOTICE TO CONTRACTOR"

ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

C-0

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 1:17 AM - skirschner

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

NOTICE TO CONTRACTOR
PER INDIANA STATE LAW IC 8-1-26-16 IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK

GRAPHIC SCALE
80 0 40 80 160

OVERALL SITE PLAN w/AERIAL OVERLAY
SCALE: 1" = 80'

NORTH

GPD GROUP, INC.
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519

REV.	DATE	DESCRIPTION
A	05/29/24	ISSUED FOR 90% REVIEW
0	05/31/24	FINAL CDs FOR PSC FILING

STATE OF KENTUCKY
CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

OVERALL SITE PLAN w/ AERIAL OVERLAY

ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

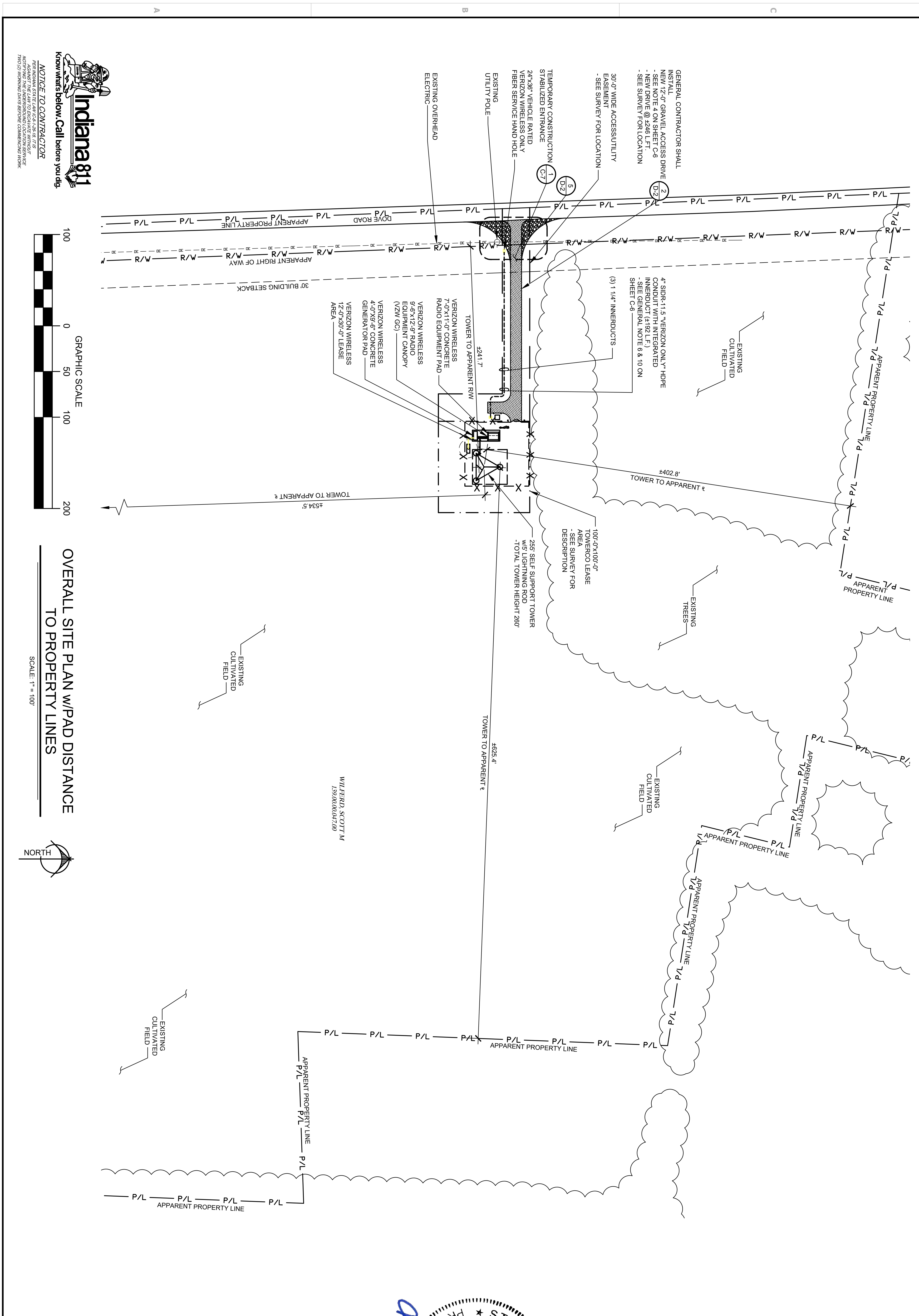
PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO. 2023706.11

C-1

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 1:18 AM - skitschner

Drawing Name: O:\2023\2023706\11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:8 AM - skirschner



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PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO. 2023706.11

C-1A

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

OVERALL SITE PLAN w/TOWER DISTANCE TO PROPERTY LINES

STATE OF KENTUCKY — CHRISTOPHER J. SCHEKS — 29760 — LICENSED PROFESSIONAL ENGINEER
05/31/2024

REV.	DATE	DESCRIPTION
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GPD GROUP, INC.®
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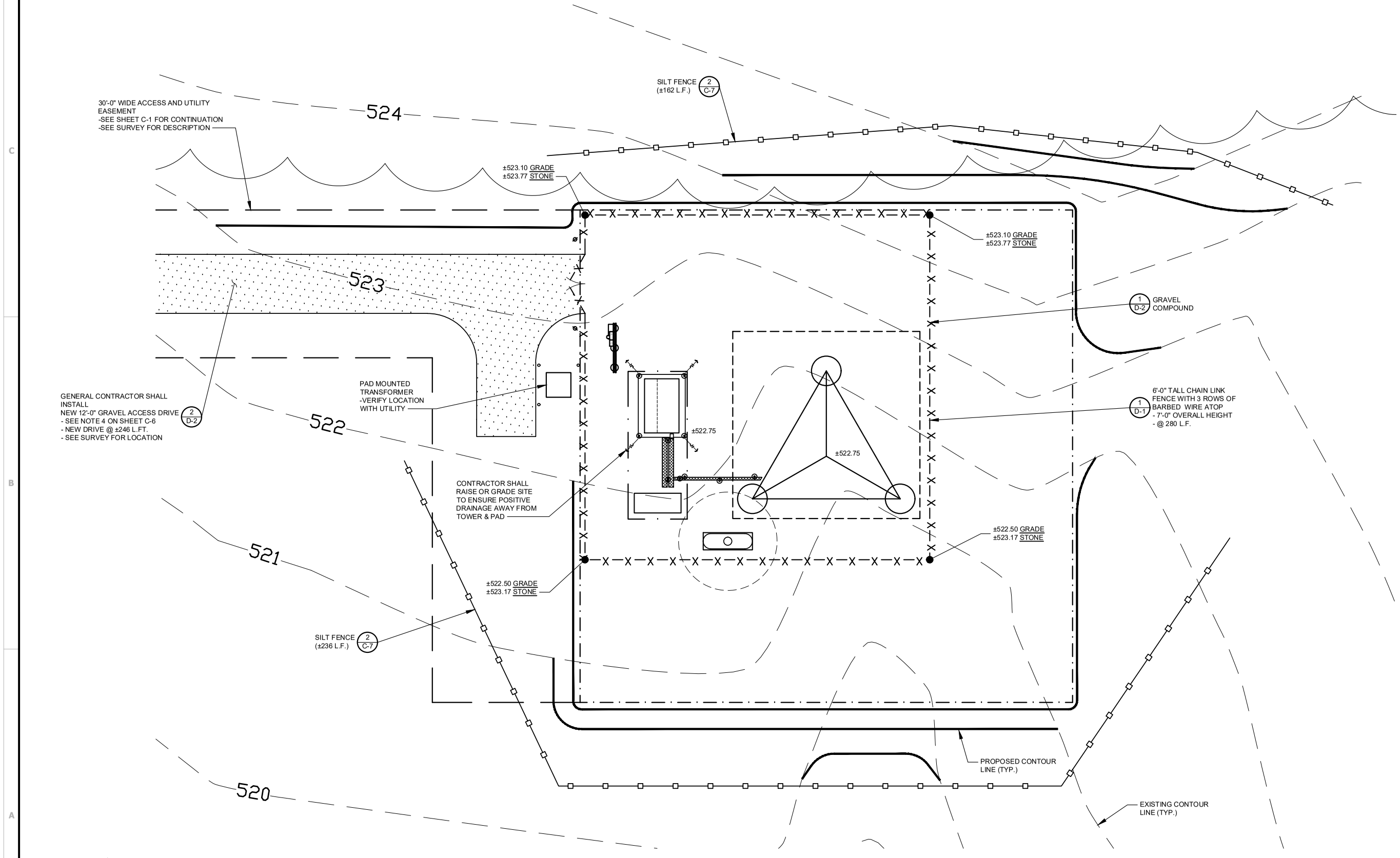

Indiana 811
Know what's below. Call before you dig.

NOTICE TO CONTRACTOR
PER INDIANA STATE LAW IC 8-1-26-16, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

GRADING AND E&S CONTROL PLAN

SCALE: 1" = 20'

NORTH

GRAPHIC SCALE
20 0 10 20 40

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330.572.2100 Fax 330.572.2101

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5000 VALLEYSTONE DR
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STATE OF KENTUCKY
CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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DOVE RD
FARMINGTON, KY 42020

GRADING AND E&S CONTROL PLAN

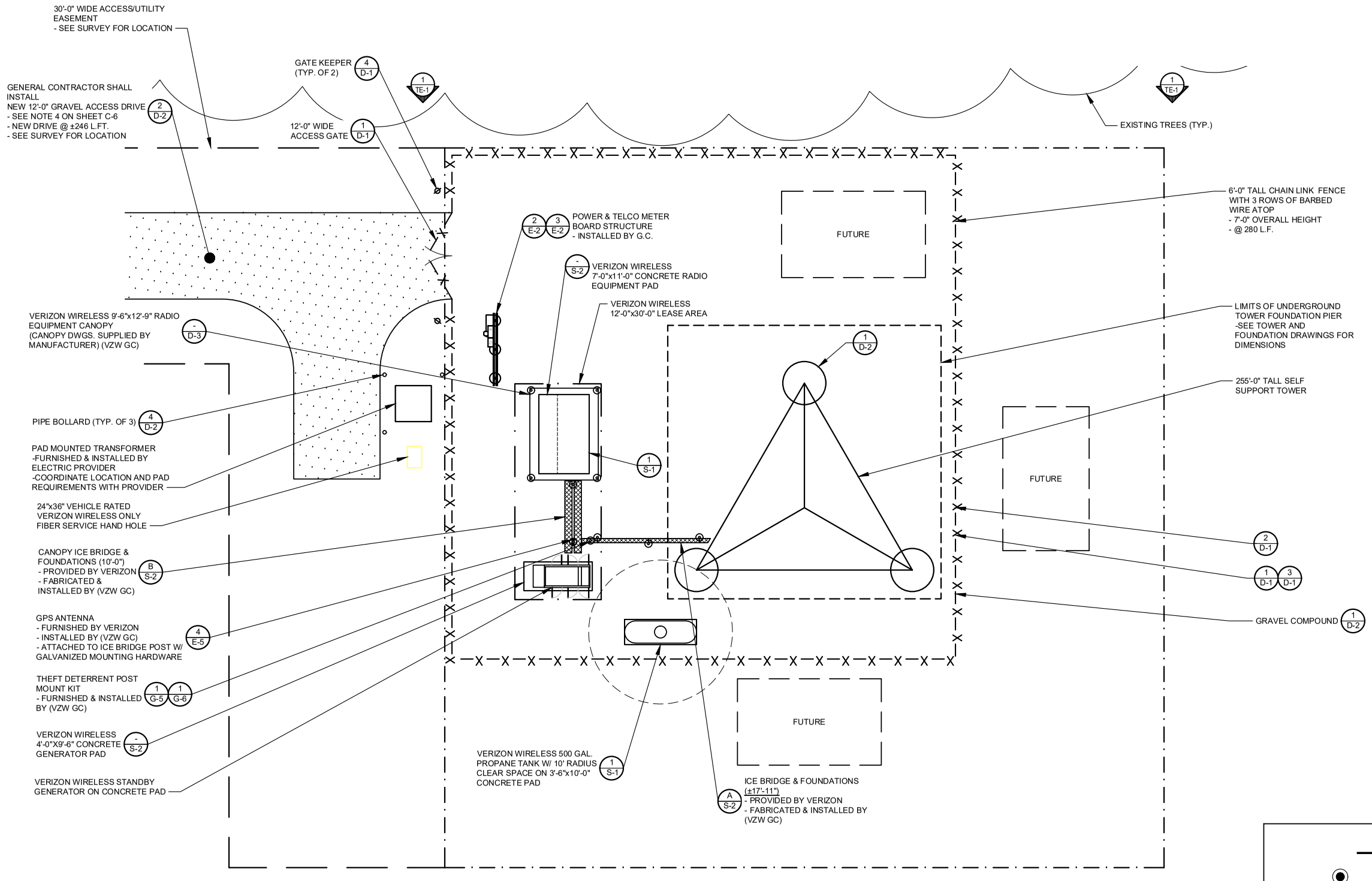
ISSUED FOR:	
REVIEW	--/--/--
PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

C-2

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:8 AM - skirschner



DETAILED SITE PLAN

SCALE: 1/16" = 1'-0"

NORTH

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NOTICE TO CONTRACTOR

PER INDIANA STATE LAW IC-8-1-26-18, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

*NOTE:
GENERAL CONTRACTOR IS TO ENSURE THERE IS NO DISTURBANCE OF PROPERTY, SOIL, ETC. OUTSIDE OF THE STAKED LEASE AREA WITHOUT APPROVAL FROM VERIZON WIRELESS CONSTRUCTION MANAGER

LEGEND

	IRON PIN
+XXX.XX	DRAINAGE LINE / SPOT ELEVATION
	GRAVEL COMPOUND
	CENTER LINE
	NEW FENCE LINE
	NEW SILT FENCE LINE
OE	POWER POLE w/OVERHEAD ELEC./TELE.
	EDGE OF NEW DRIVE
	UNDERGROUND ELECTRICAL CONDUIT
	UNDERGROUND TELEPHONE CONDUIT
	EXISTING CONTOURS
	NEW CONTOURS
	FENCED COMPOUND
	CONCRETE
	ACCESS DRIVE

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CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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DOVE RD
FARMINGTON, KY 42020

DETAILED SITE PLAN

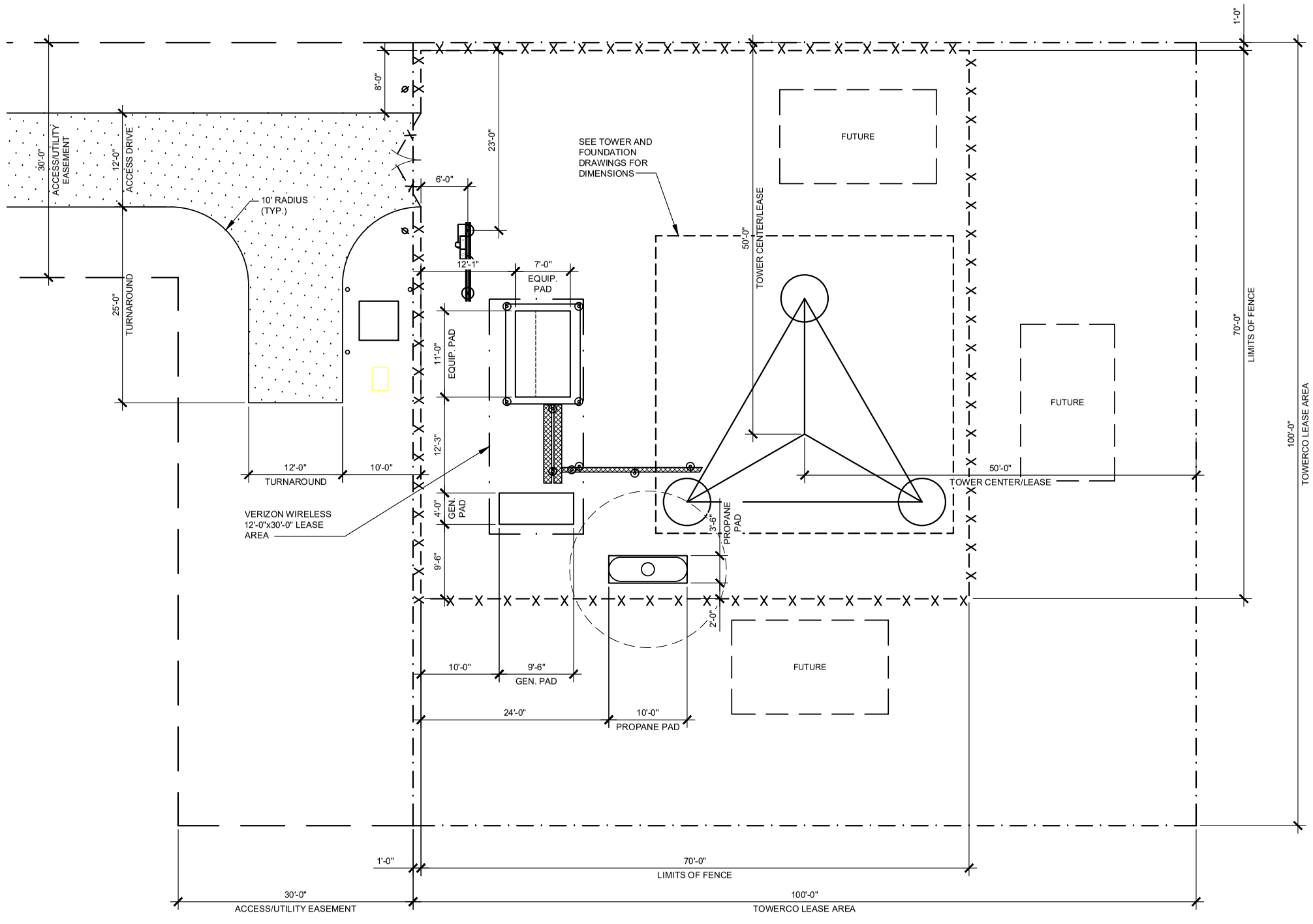
ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

C-3

Drawing Name: Q:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:9 AM - skirschner



DIMENSIONED SITE PLAN

SCALE: 1/16" = 1'-0"

NORTH

LEGEND

	IRON PIN
	DRAINAGE LINE
+XXX.XX	SPOT ELEVATION
	GRAVEL COMPOUND
	CENTER LINE
—X—X—X—X—X—	NEW FENCE LINE
	NEW SILT FENCE LINE
— — DE — — DE — — DE —	POWER POLEw/OVERHEAD ELEC./TELE.
	EDGE OF NEW DRIVE
	UNDERGROUND ELECTRICAL CONDUIT
	UNDERGROUND TELEPHONE CONDUIT
	EXISTING CONTOURS
	NEW CONTOURS
	NEW LEASE AREA AND EASEMENT
	FENCED COMPOUND
	CONCRETE
	ACCESS DRIVE

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

NOTICE TO CONTRACTOR
PER INDIANA STATE LAW IC-8-1-26-18, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

*NOTE:
GENERAL CONTRACTOR IS TO ENSURE THERE IS NO DISTURBANCE OF PROPERTY, SOIL, ETC. OUTSIDE OF THE STAKED LEASE AREA WITHOUT APPROVAL FROM VERIZON WIRELESS CONSTRUCTION MANAGER

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CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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DOVE RD
FARMINGTON, KY 42020

DIMENSIONED SITE PLAN

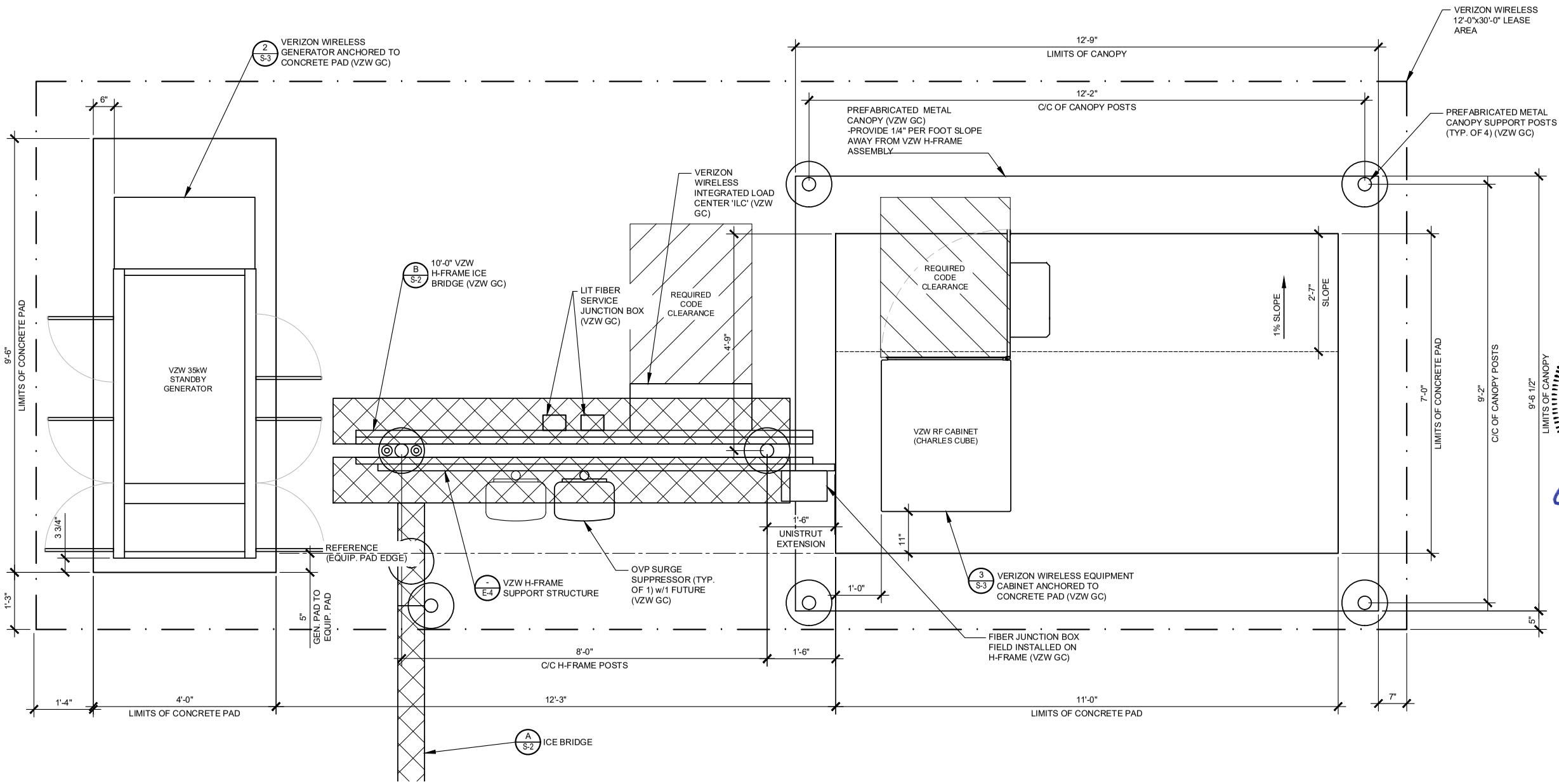
ISSUED FOR:	
REVIEW	--/--/--
PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

C-4

Drawing Name: C:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:9 AM - skirschner



DETAILED VZW EQUIPMENT PLAN

SCALE: 3/8" = 1'-0"

NORTH

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

NOTICE TO CONTRACTOR

PER INDIANA STATE LAW IC-8-1-26-18, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

*NOTE:
GENERAL CONTRACTOR IS TO ENSURE THERE IS NO DISTURBANCE OF PROPERTY, SOIL, ETC. OUTSIDE OF THE STAKED LEASE AREA WITHOUT APPROVAL FROM VERIZON WIRELESS CONSTRUCTION MANAGER

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330.572.2100 Fax 330.572.2101

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STATE OF KENTUCKY
CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

DETAILED EQUIPMENT PAD PLAN

ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

C-5

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\r4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 1:19 AM - skitschner

GENERAL SITE CONSTRUCTION NOTES

1. SCHEDULE:

THE CONSTRUCTION OF THE SITE REQUIRES A CERTAIN SEQUENCE OF EVENTS TO MINIMIZE CONSTRUCTION TIME REQUIRED UNTIL AVAILABILITY OF CELLULAR TELEPHONE SERVICE. VERIFY SCHEDULE DURING BID WALK.

2. TOWER OWNER REPRESENTATIVE:

TOWERCO
5000 VALLEYSTONE DR
CARY, NC 27519
CONTACT: EDWARD SCHAFER
PHONE: 336-325-1066
E-MAIL: eschafer@towerco.com

PROPERTY OWNER REPRESENTATIVE:

SCOTT WILFERD
PO BOX 100
FARMINGTON, KY 42040
CONTACT: SCOTT WILFERD
PHONE: 270-832-1097
E-MAIL: TBD

3. ANTENNA INSTALLATION:

THE VERIZON WIRELESS CONTRACTOR (VZW GC) INSTALLING THE FRAME/PLATFORM SHALL ENSURE THAT THE PLATFORM IS ALIGNED BASED ON THE VERIZON WIRELESS RF PLAN. DURING THIS WORK, THE GENERAL CONTRACTOR SHALL BE LIMITED TO THE WORK WHICH CAN BE PERFORMED OUTSIDE THE VICINITY OF THE TOWER.

4. ACCESS DRIVEWAY:

THE GENERAL CONTRACTOR SHALL CONSTRUCT THE ACCESS DRIVE PER THE ALIGNMENT AS SHOWN ON THESE DRAWINGS. IF ANY AREA OF CONSTRUCTION REQUIRES ADDITIONAL FILL OF AGGREGATE STONE THAN SHOWN ON THE DRAWINGS, THE GENERAL CONTRACTOR SHALL NOTIFY THE ENGINEER FOR APPROVAL OF THE SIZE, TYPE AND QUANTITY OF STONE/FILL NECESSARY AND SHALL NOT BE USED UNTIL APPROVAL BY THE ENGINEER. THE GENERAL CONTRACTOR SHALL ALSO OBTAIN DRIVE PERMIT FOR NEW ACCESS DRIVE.

5. PREFABRICATED EQUIPMENT CABINETS, CANOPY AND GENERATOR:

THIS VERIZON WIRELESS CONTRACTOR (VZW GC) SHALL PROVIDE ALL LABOR, EQUIPMENT AND MATERIALS FOR THE PROPER LIFTING, TRANSPORTING AND ASSEMBLY OF THE PREFABRICATED EQUIPMENT CANOPY FROM THE TRANSPORT TRUCK BED TO THE FINAL POSITION. THE EQUIPMENT CABINETS SHALL BE LIFTED INTO PLACE ON THE CONCRETE EQUIPMENT PAD. THE GENERATOR SHALL BE LIFTED INTO PLACE BY USING TWO SPREADER BAR ASSEMBLIES. EACH SPREADER BAR SHALL BE A MINIMUM 3' WIDE (RATED TO CARRY 3 TONS). THE GENERATOR WEIGHT IS 1,425# WITH TANK PEDESTAL. VERIZON WIRELESS CONTRACTOR (VZW GC) SHALL ANCHOR THE EQUIPMENT CABINETS AND GENERATOR BASE TO THE CONCRETE SLAB USING ANCHOR BOLTS. EXTREME CAUTION SHALL BE TAKEN IN THE INSTALLATION OF ALL EQUIPMENT TO AVOID CONTACT WITH EXISTING OVERHEAD UTILITY LINES.

THE VERIZON WIRELESS CONTRACTOR (VZW GC) IS RESPONSIBLE FOR ATTACHING, SECURING OR ASSEMBLING ANY ACCESSORY OR LOOSE ITEMS THAT ARE SHIPPED WITH THE PREFABRICATED EQUIPMENT CABINETS, CANOPY AND GENERATOR AND SHALL INCLUDE THIS WORK IN THE VZW EQUIPMENT INSTALLATION PORTION OF THE BID.

6. UTILITIES:

THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXCAVATION AND PROPER BACKFILLING OF TRENCHES AND SUPPLY CONDUIT REQUIRED FOR UNDERGROUND TELEPHONE & ELECTRICAL UTILITIES. ALL TRENCHING SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE W/ASTM D-1557.

THE CONTRACTOR SHALL RUN AN ELECTRICAL TRENCH WITH 2 1/2" CONDUIT AND DETECTABLE PULL TAPE FROM THE NEW RADIO EQUIPMENT PAD AND END AT THE NEW METER BOARD STRUCTURE. THE CONTRACTOR SHALL THEN RUN (2) TWO 4" CONDUIT WITH PULL TAPE FROM THE METER BOARD TO THE NEW PAD MOUNTED TRANSFORMER LOCATION AND STUB UP 6" ABOVE GRADE. THE ELECTRICAL PROVIDER WILL THEN RUN UNDERGROUND CONDUIT FROM THE NEW TRANSFORMER TO THE NEW UTILITY POLE, CONTACT ------ @ ###-###-####, WITH ???????? BEFORE BEGINNING CONSTRUCTION TO VERIFY LOCATION OF CONDUIT AND TRANSFORMER. CONDUITS MUST HAVE A MINIMUM DEPTH OF 36". CONTRACTOR SHALL CONTACT ELECTRIC PROVIDER TO HAVE TRENCH AND CONDUIT INSPECTED BEFORE THE TRENCH IS COVERED. THE ELECTRIC PROVIDER SHALL SUPPLY SERVICE TO THE NEW METER BOARD STRUCTURE. THE CONTRACTOR SHALL CONTACT ---- ENERGY TO SETUP AN INSPECTION OF THE TRENCHES BEFORE THEY ARE BACKFILLED. THE CONTRACTOR SHALL PROPERLY BACKFILL THE TRENCHES AFTER INSPECTION AND SETTLEMENT. CONTACT ELECTRIC PROVIDER THREE TO FOUR WEEKS PRIOR TO CONSTRUCTION FOR NEW SERVICE AND COORDINATION OF ACCESS TO SITE. THE CONTRACTOR SHALL CONTACT -------- FOR A COPY OF THEIR SPECIFICATIONS BEFORE CONSTRUCTION

THE TOWER OWNER SHALL ENSURE PERMANENT ELECTRIC POWER IS AVAILABLE FOR VERIZON WIRELESS AT THE METER BASE PRIOR TO THE SITE BEING RELEASED TO VERIZON WIRELESS AS TENANT READY.

THE VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL RUN ELECTRICAL CONDUCTORS FROM NEW METER CENTER TO NEW VZW INTEGRATED LOAD CENTER WITHIN TOWER OWNER INSTALLED 2 1/2" CONDUIT CONTACT ELECTRIC PROVIDER TO HAVE NEW METER INSTALLED.

THE VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL BE RESPONSIBLE FOR THE ORDERING AND COORDINATING THE DELIVERY OF A FIBER OPTIC SERVICE LINE TO THE RADIO EQUIPMENT ENCLOSURE. COORDINATE WITH THE FIBER PROVIDER AND THE VERIZON WIRELESS FACILITY ENGINEER.

1. ONE 4" SIDR-11.5 HDPE FIBER CONDUITS w/INTEGRATED INNERDUCTS SHALL BE INSTALLED FROM HANDHOLE OUTSIDE COMPOUND MEET POINT AT THE PUBLIC RIGHT-OF-WAY WITHIN UTILITY EASEMENT WITH PULL TAPE THE HANDHOLE MODEL AS FOLLOWS:
   - THE VERIZON FIBER CONDUIT HANDHOLES SHALL BE OLDCASTLE INFRASTRUCTURE MODEL 24361480 PC2436-30 T22 - VERIZON LOGO OR QUAZITE|HUBBELL POWER SYSTEMS MODEL PG2436Z1857B4 ASSY T22 SW OB 24x36x30 VERIZON V, OR APPROVED EQUALS. ALTERNATIVE HANDHOLES MAY BE USED IF MEETING THE DESIGNATED LOADING AND HAVING DIMENSIONS OF AT LEAST 2'x3'x2.5'. ALL VERIZON HANDHOLES TO HAVE "VERIZON" LOGO ON COVER.
   - THE GENERAL USE FIBER CONDUIT HANDHOLE SHALL BE A MODEL AS APPROVED BY THE CONSTRUCTION MANAGER.
2. CONTRACTOR SHALL PLACE ADDITIONAL HANDHOLES ALONG ROUTE, AS NECESSARY, SO THAT SPACING BETWEEN HANDHOLES IS NO GREATER THAN 500 FEET.
3. CONTRACTOR SHALL PLACE (1) COPPERHEAD INDUSTRIES ORANGE TRACER WIRE (PART NO. 1230N-HS) OR APPROVED EQUIVALENT ABOVE PROPOSED FIBER CONDUIT(S)
4. ONE 4" SIDR-11.5 HDPE FIBER CONDUIT w/INTEGRATED INNERDUCTS SHALL BE INSTALLED FROM VERIZON WIRELESS ONLY HANDHOLE OUTSIDE COMPOUND TO VERIZON WIRELESS EQUIPMENT PAD LOCATION (PER PLANS)

ELECTRIC SERVICE PROVIDED BY:

WEST KENTUCKY RURAL ELECTRIC
COOPERATIVE CORPORATION
ADDRESS: TBD
CONTACT: SERVICE INSTALLATION
PHONE: 1-877-495-7322
EMAIL: TBD

FIBER OPTIC SERVICE PROVIDED BY:

FIBER PROVIDER TO BE DETERMINED
BY VERIZON WIRELESS

7. SITE GRADING

A. UNIFORMLY GRADE AREA TO BE SMOOTH SURFACE FREE FROM IRREGULAR SURFACE CHANGES. COMPLY WITH COMPACTION REQUIREMENTS AND GRADE TO CROSS SECTION, TOPO LINES AND ELEVATIONS INDICATED.

1. COMPOUND SURFACE GRADES ARE TO BE SLOPED TO DIRECT WATER AWAY FROM EQUIPMENT PAD AND TOWER TO PREVENT STANDING AND PONDING WATER.

2. COMPOUND SURFACE SHALL BE COMPACTED TO A 95% MAXIMUM DRY DENSITY TO ALLOW PROPER STERILIZATION FOR ACCESS TO ALL CUSTOMERS DENSITY TESTING MAY BE REQUIRED AT VERIZON WIRELESS' DISCRETION DUE TO QUESTIONABLE COMPACTION OF FINISH SURFACE GRADE OR SUB-GRADE.

3. DITCHES/SWALES AROUND THE COMPOUND AREA AND ALONG ACCESS ROAD SHALL BE CONSTRUCTED SO TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING GRADES/SLOPE AND NEW PROPOSED GRADES.

4. SITE GRADING AND DRAINAGE SHOULD BE CONSTRUCTED TO PREVENT WATER FROM ENTERING THE COMPOUND SURFACE OR THE ACCESS ROAD SUB-GRADE.

B. MOISTURE CONTROL - UNIFORMLY MOISTEN OR AERATE SUB-GRADE AND EACH SUBSEQUENT FILL OR BACK FILL LAYER BEFORE COMPACTION TO WITHIN 90% OF OPTIMUM MOISTURE CONTENT. DO NOT PLACE BACK FILL OR FILL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN OR CONTAIN FROST, SNOW OR ICE.

C. STOCKPILING MATERIAL (TOP SOIL OR FILL DIRT) - SHOULD BE PLACED IN AN AREA THAT CAN BE CONTROLLED TO PREVENT WATER, SNOW, OR ICE FROM EFFECTING MOISTURE CONTENT. STOCKPILES MAY HAVE TO BE COVERED TO PREVENT ADDITIONAL MOISTURE FROM ACCUMULATING SO ACCEPTABLE FILL CAN BE USED.

D. DE-WATERING - PREVENT SURFACE WATER AND SUBSURFACE OR GROUND WATER FROM ENTERING EXCAVATIONS, FROM PONDING ON PREPARED SUB-GRADE, AND FROM FLOODING PROJECT OR BUILD AREA.

E. EROSION CONTROL - MEASURES SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
1. ALL INLETS, DRAINS, PIPES, SWELLS, AND ROADS SHALL BE KEPT CLEAN AND FREE OF DIRT AND SILT.

F. GEOTEXTILE FABRIC - AFTER PLACEMENT AND COMPACTION OF FILL WITHIN THE WORK AREA AND BEFORE THE PLACEMENT OF LIMESTONE AGGREGATE, (SEE SITE AREA SURFACING DETAIL ON D-1), THE ENTIRE DISTURBED WORK AREA SHALL BE COVERED WITH A GEOTEXTILE FABRIC. THIS FABRIC SHALL BE "TENCATE (MIRAFI 500X) WOVEN ENGINEERING FABRIC" INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS.

8. TRASH REMOVAL & SANITATION:

THE GENERAL CONTRACTOR AND VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL REMOVE ALL TRASH AS CREATED BY THEMSELVES AND THEIR SUBCONTRACTORS. TRASH SHALL BE REMOVED FROM THE SITE IN A TIMELY FASHION TO A LEGAL DISPOSAL AREA. THE GENERAL CONTRACTOR SHALL ALSO REMOVE ALL TRASH CREATED BY OTHER CONTRACTORS INCLUDING CABLE REELS, CARDBOARD BOXES AND PACKING. NO BURNING OR BURYING OF TRASH IS PERMITTED.

THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN A PORTABLE TOILET FOR THE DURATION OF THE CONSTRUCTION PROJECT.

9. TOWER:

A. THE GENERAL CONTRACTOR SHALL VERIFY THE EQUIPMENT PAD FOUNDATION IS LOCATED CORRECTLY WITH RESPECT TO THE TOWER FOUNDATION. THE CONTRACTOR MUST NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO POURING CONCRETE.

B. TOWER & FOUNDATION DESIGN ARE BY OTHERS FOR TOWER OWNER. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY IN WRITING FROM TOWER OWNER THAT THE TOWER IS STRUCTURALLY SUFFICIENT TO SUPPORT ALL LOADINGS AS OUTLINED IN THESE DOCUMENTS. TOWER AND FOUNDATION DESIGN SHALL BE PERFORMED BY A LICENSED ENGINEER.

C. THE GENERAL CONTRACTOR SHALL VERIFY THE TOP OF FOUNDATION MATCHES THE FAA APPROVAL LETTER.

10. EXCAVATION OF UTILITIES:

A. FIELD VERIFY THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATING IN THE VICINITY OF THE SITE. ALL EXCAVATIONS SHALL BE MADE BY HAND OVER OR UNDER OR IMMEDIATELY ADJACENT TO ANY EXISTING UTILITIES & GROUNDING.

B. ALL UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION ON THIS PROJECT. CONTACT UNDERGROUND UTILITY PROTECTION SERVICE BEFORE YOU DIG AT 1-800-382-5544 OR 811.

C. EXISTING UTILITIES ARE SHOWN FROM THE SURVEY AND ARE NOT NECESSARILY COMPLETE AND ACCURATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE, EXPOSE AND DETERMINE IF CONFLICTS EXIST WITH THE NEW IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER (A&E FIRM) IN ORDER TO RESOLVE ANY CONFLICTS.

11. CONTRACTOR'S LICENSE:

THE GENERAL CONTRACTOR, VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) AND ALL OF THEIR SUBCONTRACTORS THAT DO ANY WORK ON THIS PROJECT SHALL BE CURRENTLY LICENSED TO PERFORM WORK IN THE LOCATION OF THIS SITE. PROOF OF LICENSES SHALL BE SUPPLIED TO VERIZON WIRELESS PRIOR TO THE COMMENCEMENT OF ANY WORK.

12. SEEDING:

ALL DISTURBED AREAS SHALL BE REPAIRED AND SEEDED BY THE GENERAL CONTRACTOR, UNLESS OTHERWISE NOTED. SEED DISTURBED AREAS W/4 POUNDS/1000 SQ. FT. - 60% KENTUCKY BLUEGRASS, 18% CREEPING RED FESCUE, 22% ANNUAL RYEGRASS.

13. TRAFFIC CONTROL:

THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN ALL REQUIRED TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES OR GOVERNING LOCAL AGENCIES.

14. CONSTRUCTION STAKING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING NEEDED TO COMPLETE ALL THE CONSTRUCTION SHOWN HEREON. CONTACT DESIGN ENGINEER TO SCHEDULE CONSTRUCTION STAKING.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING PROPERTY RESULTING FROM THE CONSTRUCTION ACTIVITIES, INCLUDING BUT NOT LIMITED TO PAVEMENT, FINISHED GRADES, LANDSCAPING, BUILDINGS, SURVEY MARKERS, FIELD TILES, CULVERTS, ETC.

16. IN THE EVENT ANY DISCREPANCIES OR ERRORS ARE FOUND ON THESE PLANS OR ANY CONFLICT OR PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE GENERAL CONTRACTOR OR VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH THE WORK. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE GENERAL CONTRACTOR OR VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) FOR WORK HAVING TO BE REDONE FOR GRADE OR GEOMETRIC DISCREPANCIES IF NOTICE TO THE ENGINEER HAS NOT BEEN PROVIDED. THE ENGINEER RESERVES THE RIGHT TO MAKE MINOR ADJUSTMENTS AS NECESSARY TO ACCOMPLISH THE INTENT OF THESE PLANS.

17. ALL SITE WORK AND CONSTRUCTION SHALL CONFORM TO ANY AND ALL APPLICABLE CODES AND VERIZON WIRELESS STANDARDS AND SPECIFICATIONS.

18. ALL ELEVATIONS AND TOPOGRAPHIC INFORMATION WAS TAKEN FROM A SURVEY SUPPLIED TO GPD GROUP, INC BY BENCMHARK SERVICES, INC. GPD GROUP, INC HAS NOT VERIFIED THIS INFORMATION AND DOES NOT WARRANT ANY INFORMATION SUPPLIED BY OTHERS.

19. THE GENERAL CONTRACTOR SHALL MAINTAIN A COMPLETE AS-BUILT SET OF PLANS AND CONDITIONS, AND SUBMIT SAME TO THE ENGINEER WITHIN 7 DAYS OF COMPLETION OF CONSTRUCTION. AS-BUILT PLANS SUBMITTED TO THE ENGINEER SHALL INCLUDE A DRAWING WITH DIMENSIONS SHOWING THE LOCATION OF THE UNDERGROUND UTILITIES, GROUNDING GRID, EQUIPMENT PAD, TOWER FOUNDATION, TOWER PLATFORM ORIENTATION, AND FENCE WITHIN THE LEASE AREA OR PROPERTY AND BE CERTIFIED BY A LICENSED PROFESSIONAL SURVEYOR.

20. THE GENERAL CONTRACTOR AND VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL BE RESPONSIBLE FOR NOTIFICATION OF ALL GOVERNING AGENCIES THAT REQUIRE SITE INSPECTION OF THE WORK AND/OR SIMPLY NOTIFICATION.

21. THE GENERAL CONTRACTOR AND VERIZON WIRELESS GENERAL CONTRACTOR (VZW GC) SHALL BE RESPONSIBLE FOR NOTIFICATION AND COORDINATION OF ALL TESTING AGENCIES THAT REQUIRE SITE INSPECTION OR TESTING OF THE WORK AS DIRECTED IN THESE PLANS, GOVERNING AGENCIES AND ALL APPLICABLE CODES.

22. PRIOR TO THE SUBMISSION OF BIDS, THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS SHALL VERIFY ALL DETAILS AND SCHEDULES ON THE DRAWINGS AND SPECIFICATIONS PROVIDED BY THE OWNER, FOR MEANING OF ABBREVIATIONS AND ADDITIONAL REQUIREMENTS AND INFORMATION. CHECK ALL CONSTRUCTION DOCUMENTS TO INCLUDE, BUT NOT LIMITED TO, GEOTECHNICAL REPORT, STRUCTURAL ANALYSIS, TOWER, MECHANICAL AND ELECTRICAL DRAWINGS, FOR SCALE, SPACE LIMITATIONS, DOOR SWINGS, ADJACENT CARRIER EQUIPMENT COORDINATION AND ADDITIONAL INFORMATION, ETC. REPORT ANY DISCREPANCIES, CONFLICTS, ETC. TO THE OWNER BEFORE SUBMITTING BIDS.

24. WORK SITE SAFETY:

A. CONSTRUCTION WORK PRESENTS UNIQUE THREATS TO HEALTH AND SAFETY. THE CONTRACTOR AND VERIZON WIRELESS CONTRACTOR (VZW GC) ARE RESPONSIBLE TO EDUCATE THEIR WORK FORCE OF THESE DANGERS AND LIMIT THEIR EXPOSURE TO HAZARDS. THIS EDUCATION SHALL INCLUDE BUT NOT BE LIMITED TO APPLICABLE TRAINING COURSES AND CERTIFICATIONS, PROPER PERSONAL PROTECTIVE EQUIPMENT USAGE, DAILY TAILGATE MEETINGS AND ANY OTHER PREVENTATIVE MEASURES WHICH MAY BE REASONABLY EXPECTED. THE CONTRACTOR, VERIZON WIRELESS CONTRACTOR (VZW GC) AND ALL SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND ANY PROPERTY OCCUPANTS WHO MAY BE AFFECTED BY THE WORK UNDER CONTRACT. ALL CONTRACTORS SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA, AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.

B. TOWER WORK PRESENTS ADDITIONAL THREATS TO HEALTH AND SAFETY. ALL TOWER WORKERS WORKING ON A TOWER MUST BE ADEQUATELY TRAINED AND MONITORED TO ENSURE THAT SAFE WORK PRACTICES ARE LEARNED AND FOLLOWED. AS REQUIRED BY OSHA, WHEN WORKING ON EXISTING COMMUNICATION TOWERS, EMPLOYEES MUST BE PROVIDED WITH APPROPRIATE FALL PROTECTION, TRAINED TO USE THIS FALL PROTECTION PROPERLY, AND THE USE OF FALL PROTECTION MUST BE CONSISTENTLY SUPERVISED AND ENFORCED BY THE CONTRACTOR.

C. ALL SAFETY EQUIPMENT SHALL BE INSPECTED ACCORDING TO ALL OSHA AND INDUSTRY SCHEDULED INTERVALS AND ALL INSPECTIONS SHALL BE DOCUMENTED PER APPLICABLE CODES AND STANDARDS.

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GENERAL SITE CONSTRUCTION NOTES

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TTP	SEK

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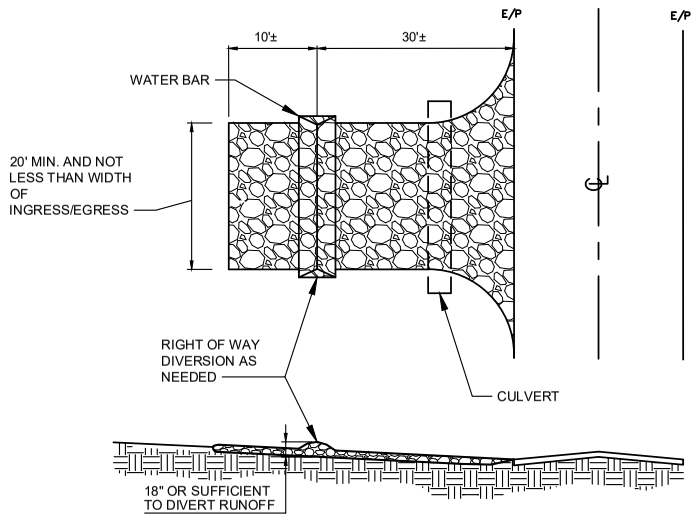


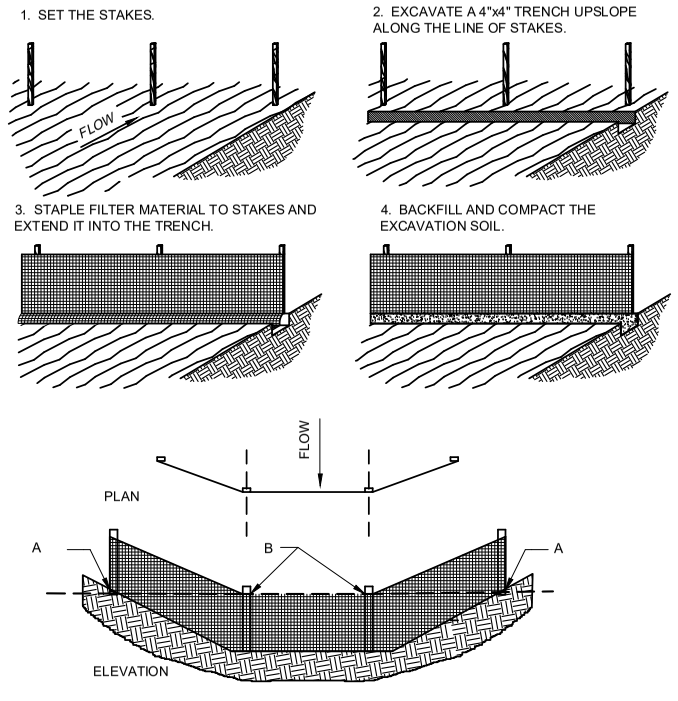
NOTES:

1. STONE SIZE - TWO INCH STONE SHALL BE USED, OR RECYCLED CONCRETE EQUIVALENT.
2. THE CONSTRUCTION ENTRANCE SHALL COINCIDE WITH THE PROPOSED DRIVE AS SHOWN ON THE PLAN.
3. PAVEMENT THICKNESS - STONE LAYER SHALL BE AT LEAST 6" THICK.
4. DRIVEWAY WIDTH - THE ENTRANCE SHALL BE AT LEAST 10' WIDE, BUT NOT LESS THAN FULL WIDTH AT POINTS WHERE INGRESS/EGRESS OCCURS.
5. BEDDING - A GEOTEXTILE SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE. IT SHALL HAVE A GRAB TENSILE STRENGTH OF AT LEAST 200 LBS. AND A MULLEN BURST STRENGTH OF AT LEAST 190 LBS.
6. CULVERT - A PIPE OR CULVERT SHALL BE CONSTRUCTED UNDER THE ENTRANCE IF NEEDED TO PREVENT SURFACE WATER FLOWING ACROSS THE ENTRANCE FROM BEING DIRECTED OUT ONTO PAVED SURFACES.
7. WATER BAR - A WATER BAR SHALL BE CONSTRUCTED AS PART OF THE CONSTRUCTION ENTRANCE IF NEEDED TO PREVENT SURFACE RUNOFF FROM FLOWING THE LENGTH OF THE CONSTRUCTION ENTRANCE AND OUT ONTO PAVED SURFACES.
8. MAINTENANCE - TOP DRESSING OF ADDITIONAL STONE SHALL BE APPLIED AS CONDITIONS DEMAND, MUD SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADS, OR ANY SURFACE WHERE RUNOFF OS NOT CHECKED BY SEDIMENT CONTROLS, SHALL BE REMOVED IMMEDIATELY, REMOVAL SHALL BE ACCOMPLISHED BY SCRAPING OR SWEEPING.
9. CONSTRUCTIONS ENTRANCES SHALL NOT BE RELIED UPON TO REMOVE MUD FROM VEHICLES AND PREVENT OFF SITE TRACKING. VEHICLES THAT ENTER AND LEAVE THE CONSTRUCTION SHALL BE RESTRICTED FROM MUDDY AREAS.

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE

SCALE: N.T.S.

1 / C-7



POINTS A SHOULD BE HIGHER THAN POINT B

SILT FENCE DETAIL

SCALE: N.T.S.

2 / C-7

EROSION & SEDIMENT CONTROL NOTES

1. ALL WORK SPECIFIED AS A/AN DOT ITEM SHALL BE GOVERNED BY THE STATE OF INDIANA OF DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATION HANDBOOK. IT IS CONTRACTORS RESPONSIBILITY TO POSSESS AND BE FAMILIAR WITH APPLICABLE SECTIONS.
2. THIS CONTRACT DRAWING SHALL BE MADE AVAILABLE ON SITE AT ALL TIMES AND PRESENTED UPON REQUEST. IF UNFORESEEN STORM WATER POLLUTION PREVENTION IS ENCOUNTERED, ADDITIONAL STORM WATER POLLUTION PREVENTION (SWPP) MEASURES MAY BE REQUESTED BY THE OWNER, COUNTY ENGINEER, PROJECT ENGINEER OR SOIL CONSERVATION SERVICE REPRESENTATIVE AT ANYTIME. SUCH REQUESTS SHALL BE IMPLEMENTED IMMEDIATELY AT CONTRACTOR'S EXPENSE.
3. ALL STORM WATER POLLUTION PREVENTION ITEMS SHALL BE INSTALLED AS SHOWN OR NOTED ON THIS SHEET.
4. PLANT TEMPORARY SEEDING AND MULCHING IN ALL AREAS THAT SHALL BE INACTIVE FOR 7 DAYS OR MORE. ALL DISTURBED AND ERODED EARTH SHALL BE REGRADED AND SEEDED WITHIN 14 DAYS WITH SEEDING, AS DEFINED ABOVE AND AS SHOWN ON THE TABLE BELOW. TO ESTABLISH STABILITY AND PROVIDE SEDIMENT CONTROL, WHERE POSSIBLE. TEMPORARY SEEDING GROWTH SHALL NOT BE MOWED UNTIL IT HAS GONE TO SEED FOR 1 YEAR.

	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
PERMANENT SEEDINGS			A			*	*		*			
DORMANT SEEDINGS	B									B		
TEMPORARY SEEDINGS			C			D						
SODDING			E**									
MULCHING	F											

A. KENTUCKY BLUEGRASS 90 LBS./AC/MIXED PERENNIAL RYEGRASS 30 LBS./ACRE

B. KENTUCKY BLUEGRASS 135 LBS./AC/MIXED PERENNIAL RYEGRASS 45 LBS./AC. 2 TON STRAW MULCH PER ACRE

C. SPRING OATS 100 LBS./ACRE

D. WHEAT OR CEREAL RYE 150 LBS./ACRE

E. SOD (NURSERY CROWN KENTUCKY BLUEGRASS) 150 LBS./ACRE

F. STRAW MULCH 2 TONS PER ACRE

* IRRIGATION NEEDED DURING JUNE, JULY & SEPTEMBER

** IRRIGATION NEEDED FOR 2-3 WEEKS AFTER SODDING

5. PERMANENT VEGETATION SHALL BE INSTALLED WITHIN 10 DAYS AT THE COMPLETION OF ANY GRADED AREAS, WEATHER PERMITTING. ALL PERMANENT VEGETATION SHALL CONSIST OF PLANTING AND SOD
6. AT SUCH TIME ROUGH GRADING OF THE SITE IS COMPLETE AND DRAINAGE DIVERTS TO INLETS, INLET SEDIMENT FILTERS SHALL BE INSTALLED AT ALL INLET STRUCTURES TO KEEP PIPING SYSTEMS FREE OF SILTATION.
7. SILT BARRIERS SHALL BE INSTALLED AROUND ALL EXISTING OR NEW STORM INLETS, CATCH BASINS, AND YARD DRAINS. INSTALL ROCK CHECK DAMS FOR HEADWALL INLETS FOR STORM WATER POLLUTION PREVENTION.
8. STORM WATER POLLUTION PREVENTION MEASURES SHALL BE INSTALLED OR TOPSOIL STOCKPILES AND OTHER TEMPORARILY DISTURBED AREAS AS SHOWN ON THESE PLANS AND AS DIRECTED BY THE ENGINEER.
9. CONTRACTOR SHALL INSPECT ALL SWPP MEASURES DAILY AND REPAIR AS NECESSARY TO PREVENT EROSION. SILTATION SHALL BE REMOVED FROM AREAS WHERE FAILURES HAVE OCCURRED AND CORRECTIVE ACTION TAKEN WITHIN 24 HOURS TO MAINTAIN ALL SWPP.
10. SILT BARRIERS, CONSTRUCTION ENTRANCES, AND SILT FENCES SHALL REMAIN IN PLACE UNTIL A GOOD STAND OF GRASS HAS BEEN OBTAINED AND/OR PAVING OPERATIONS ARE COMPLETE. CONTRACTOR SHALL KEEP SILT FROM ENTERING ANY STORM DRAINAGE SYSTEM. ONCE SITE HAS BEEN COMPLETELY STABILIZED, ANY SILT IN PIPES AND DRAINAGE SWALES SHALL BE REMOVED WITHIN 10 DAYS.
11. TEMPORARY SEDIMENTATION AND STORM WATER POLLUTION PREVENTION MEASURES MUST BE INSPECTED AND LOGGED BY THE CONTRACTOR FOR INSPECTION, LOGGING SHALL BE WEEKLY AND AFTER RAIN STORMS.
12. UTILITY COMPANIES MUST COMPLY WITH ALL STORM WATER POLLUTION PREVENTION MEASURES AS DEFINED ON THE STORM WATER PREVENTION PLANS, DETAILS AND NOTES.
13. THE TOTAL AREA OF DISTURBANCE FOR THIS PROJECT IS APPROXIMATELY 0.96 ACRES.
14. ALL EXISTING WATER COURSES WITHIN THE PROJECT LIMITS SHALL BE TEMPORARILY PROTECTED DURING LAND CLEARING AND GRADING OPERATIONS. SOILS WITHIN 50 FEET OF SAID WATER COURSES SHALL BE STABILIZED WITHIN 2 DAYS OF THE INITIAL CLEARING / GRADING OPERATION AS SHOWN ON PLANS.
15. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 7 DAYS OF FINAL GRADING.
16. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN ALL SEDIMENTATION AND STORM WATER POLLUTION PREVENTION ITEMS AT ALL TIMES.
17. ALL STORM WATER POLLUTION PREVENTION PRACTICES WILL BE INSTALLED BEFORE ANY OTHER EARTH MOVING OCCURS.
18. THE FOLLOWING STORM WATER POLLUTION PREVENTION AND SEDIMENT CONTROL MEASURES WILL BE USED ON THIS SITE:
    1. SILT BARRIERS
    2. SILT FENCE
    3. CONSTRUCTION ENTRANCE
    4. EROSION CONTROL SEED BLANKETS - SPEC FOR TEMPORARY EROSION CONTROL BLANKETS ON SLOPES/DITCHES

CONSTRUCTION SEQUENCE

1. STAKE AND/OR FLAG LIMITS OF CLEARING
2. DURING PRECONSTRUCTION MEETING ALL EROSION & SEDIMENT CONTROL FACILITIES & PROCEDURES SHALL BE DISCUSSED.
3. CLEARING & GRUBBING, AS NECESSARY, FOR INSTALLATION OF PERIMETER CONTROLS.
4. INSTALL SILT FENCE PERIMETER CONTROLS AS SHOWN ON PLANS.
5. INSTALL CONSTRUCTION ENTRANCE, IF CONDITIONS ARE SUCH THAT MUD IS COLLECTION ON VEHICLE TIRES, THE TIRES MUST BE CLEANED BEFORE THE VEHICLES ENTER THE PUBLIC ROADWAY. THE SITE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OR FLOW OF MUD INTO THE PUBLIC RIGHT-OF-WAY. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO THE ROADWAY MUST BE REMOVED PROMPTLY.
6. CLEARING & GRUBBING THE REMAINING SITE AS NECESSARY.
7. BEGIN FILLING & GRADING AS REQUIRED TO REACH SUBGRADE.
8. CONSTRUCT AND MAINTAIN TEMPORARY DRAINAGE SWALES DURING FILLING AND GRADING ACTIVITIES.
9. CONSTRUCT SITE WORK INCLUDING STORM DRAINAGE FACILITIES.
10. MAINTAIN EROSION & SEDIMENTATION CONTROL MEASURES UNTIL THE SITE HAS BEEN COMPLETELY STABILIZED.
11. REMOVE SEDIMENT CONTROLS.

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BEST MANAGEMENT PRACTICES & EROSION CONTROL DETAILS & NOTES

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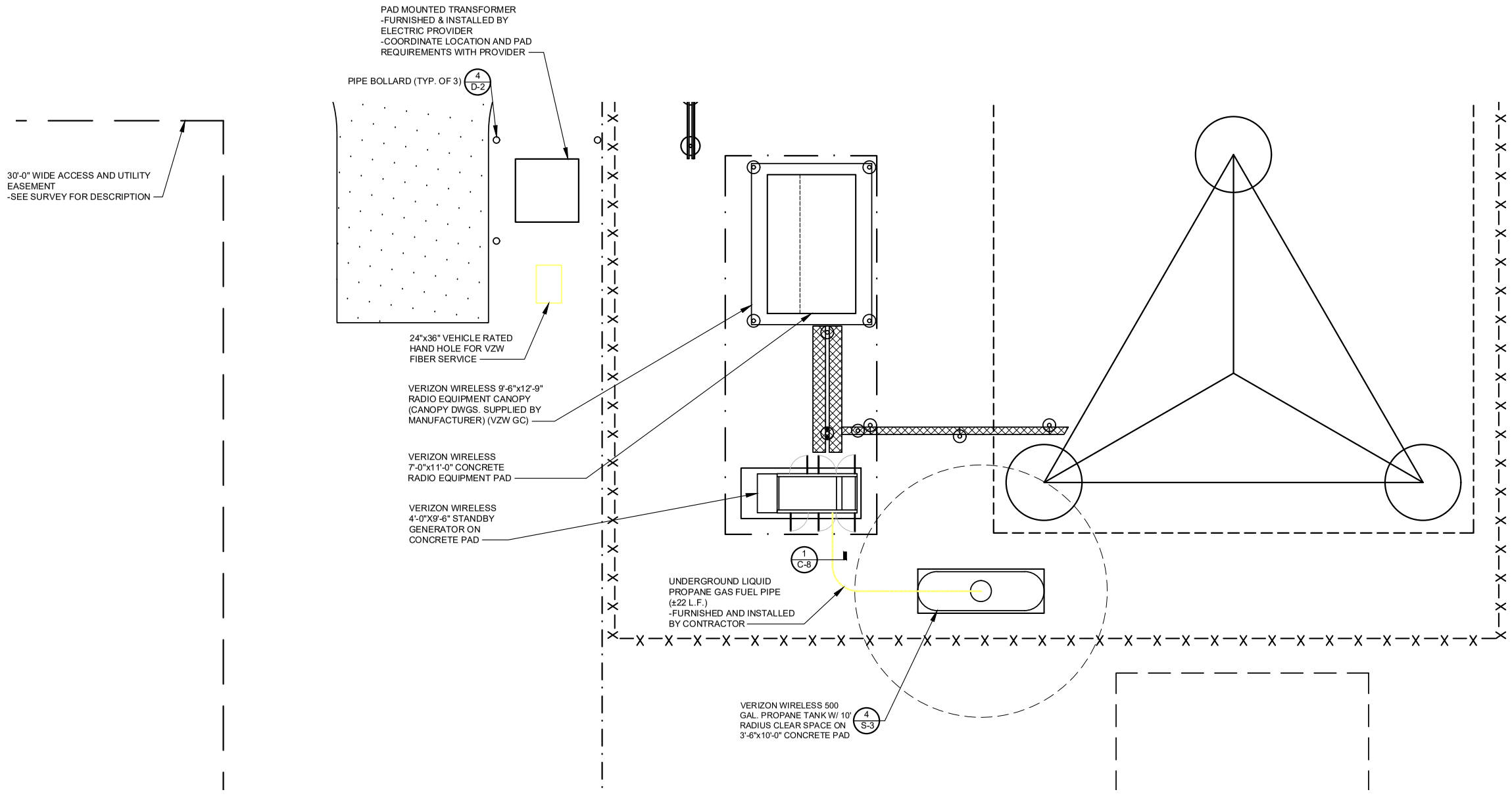


UNDERGROUND GAS PIPING PLAN AND NOTES

SCALE: 1" = 10'

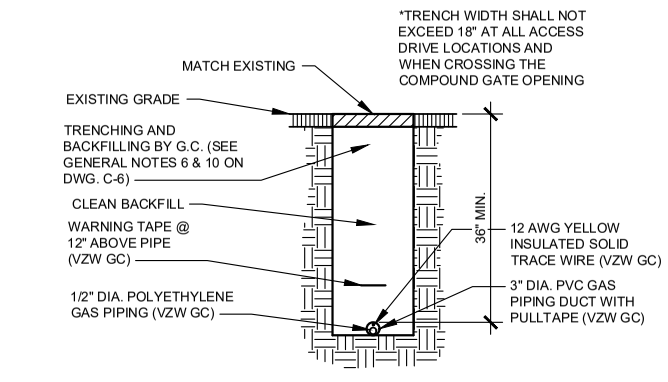
NORTH

GRAPHIC SCALE

10 0 5 10 20

UNDERGROUND NATURAL GAS NOTES

1. THE TOWER OWNER CONTRACTOR SHALL RUN A GAS TRENCH WITH (1) 3" DIA. PVC DUCT w/PULLTAPE FROM THE NEW STANDBY GENERATOR TO THE NEW GAS METER SET LOCATION. THE TOWER OWNER CONTRACTOR SHALL FURNISH & INSTALL PVC END CAPS. ALL DUCT ELBOWS SHALL BE 24" RADIUS MINIMUM.



GAS LINE TRENCH SECTION DETAIL

A
C-8

SCALE: N.T.S.

LEGEND

	IRON PIN
+XXX.XX	DRAINAGE LINE SPOT ELEVATION
	GRAVEL COMPOUND
	CENTER LINE
—X—X—X—X—X—	NEW FENCE LINE
	NEW SILT FENCE LINE
— DE — DE — DE —	POWER POLEw/OVERHEAD ELEC./TELE.
	EDGE OF NEW DRIVE
	UNDERGROUND ELECTRICAL CONDUIT
	UNDERGROUND TELEPHONE CONDUIT
	EXISTING CONTOURS
	NEW CONTOURS
	FENCED COMPOUND
	CONCRETE
	ACCESS DRIVE

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NOTICE TO CONTRACTOR

PER INDIANA STATE LAW IC-8-1-26-18, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

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UNDERGROUND GAS PIPING PLAN AND NOTES

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TTP	SEK

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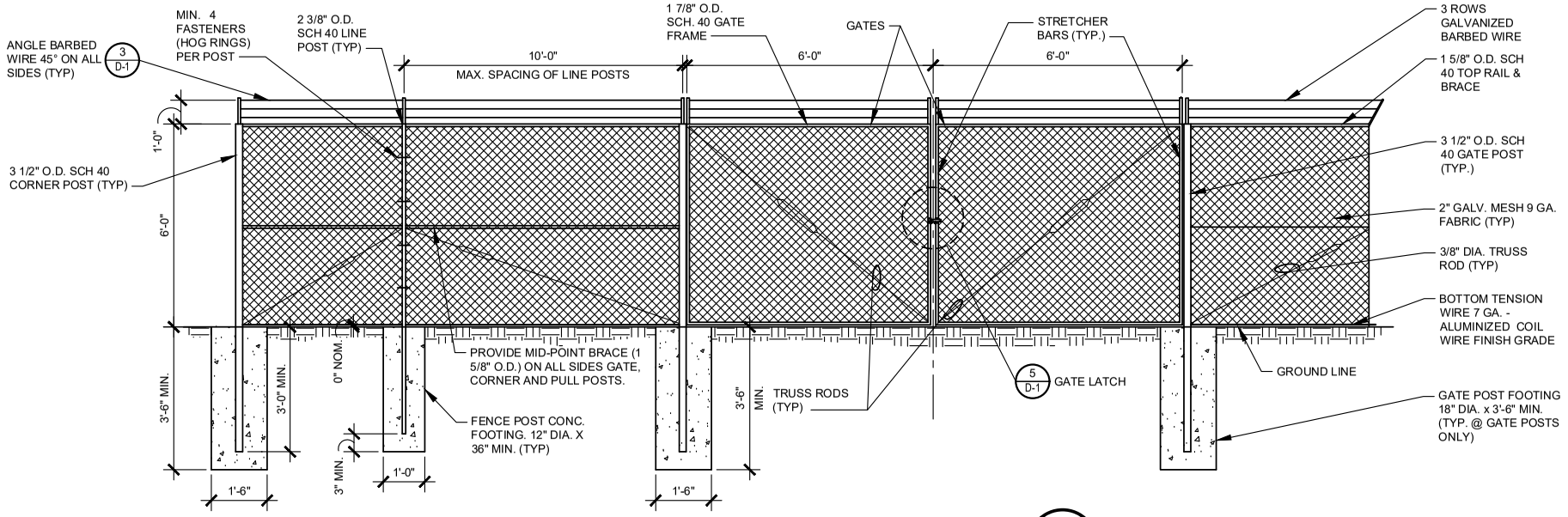
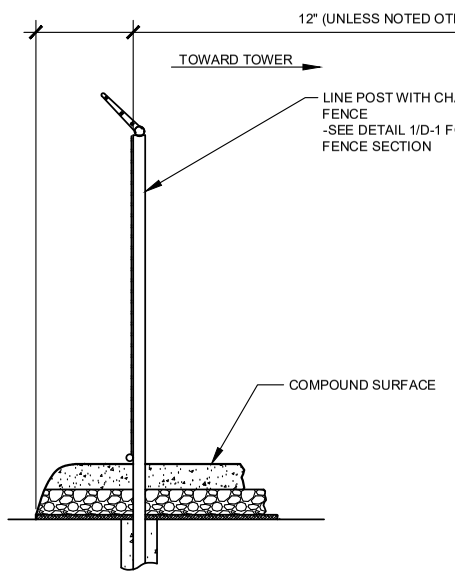


CHAIN LINK FENCE & POST DETAIL

1 D-1

SCALE: N.T.S.



SITE AREA SURFACING

2 D-1

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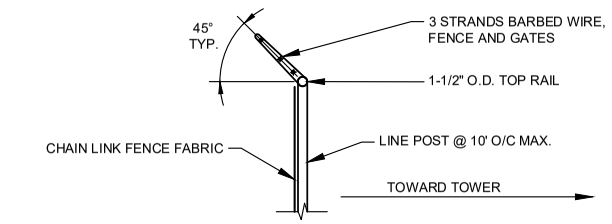

TYPICAL BARBED WIRE DETAIL

3 D-1

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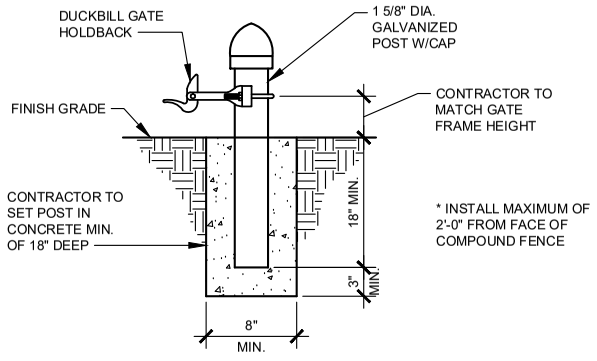

GATE KEEPER DETAIL

4 D-1

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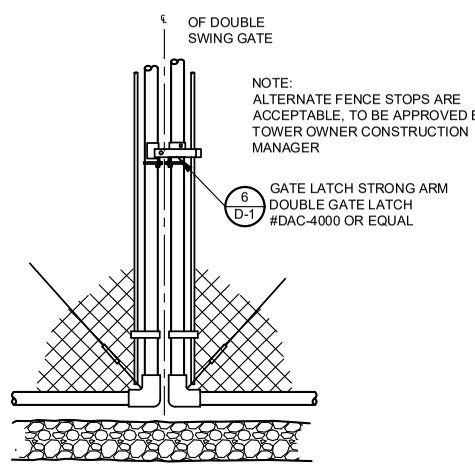
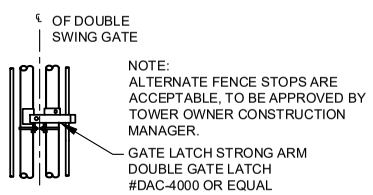


GATE LATCH DETAIL

5 D-1

SCALE: N.T.S.



GATE LATCH DETAIL

6 D-1

SCALE: N.T.S.

CHAIN LINK FENCING NOTES

1. ALL FENCE AND FABRIC SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM OF 2 OZ. PER SQUARE FOOT, 9 GAUGE WIRE (MIN. BREAKING STRENGTH OF 1,290 LBS) WITH 2" MESH. ALL BARBED WIRE SHALL BE ALUMINUM OR COATED PER NOTE #4.
2. BOTTOM EDGE OF FENCE FABRIC SHALL EXTEND TO FINISHED GRADE.
3. SITE FENCE SHALL BE 6'-0" FABRIC W/ 3 STRAND BARBED WIRE FOR TOTAL HEIGHT OF 7'-0".
4. BARBED WIRE SHALL MEET ASTM A 121, CLASS 3 GALV. OR ASTM A 585, TYPE I, CLASS 2 COATING (NOT LESS THAN 0.8 OZ. PER SQ. FT.) AND SHALL BE THREE STRAND 12.5 GAGE w/4 POINT BARBS AT 5" O/C.
5. BOTTOM OF CONCRETE BASE SHALL BE SET BELOW FROSTLINE (SEE LOCAL CODE). WHERE SOIL BEARING CAPACITY IS LESS THAN 2000 PSF, INCREASE CONCRETE SURROUNDING FENCE POST FOUNDATION DIAMETERS BY 8", PROVIDE CONCRETE WITH A 28 DAY STRENGTH OF 3000 PSI (MIN.)
6. PROVIDE A DIAGONAL BRACE ROD AND TURN BUCKLE ON BOTH GATE LEAFS.
7. ALL RAILS AND BRACES SHALL BE SCHEDULE 40 STEEL PIPE, AND ALL FENCE POSTS SHALL BE SCHEDULE 40 STEEL PIPE, AND BE 2 OZ. GALVANIZED COATED.
8. CONTRACTOR SHALL ENSURE ALL POSTS ARE PLUMB.
9. ALL FENCE SHALL BE FABRICATED AND INSTALLED PER ASTM F2611-15, ASTM F567-14a AND CHAIN LINK FENCE MANUFACTURES INSTITUTE CLFMI-PM 2445.
10. CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) MASTER LOCK LONG SHANK #175LH COMBINATION PADLOCK. COMBINATION TO BE SET AT 7011.

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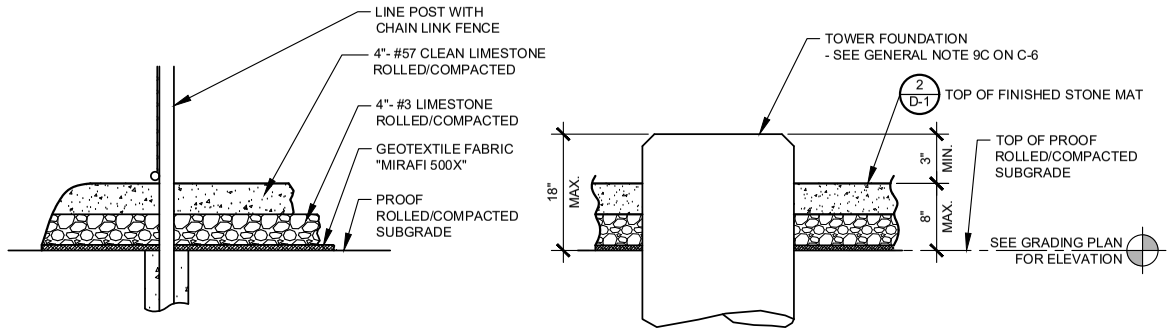

PARTIAL COMPOUND SECTION 1 D-2

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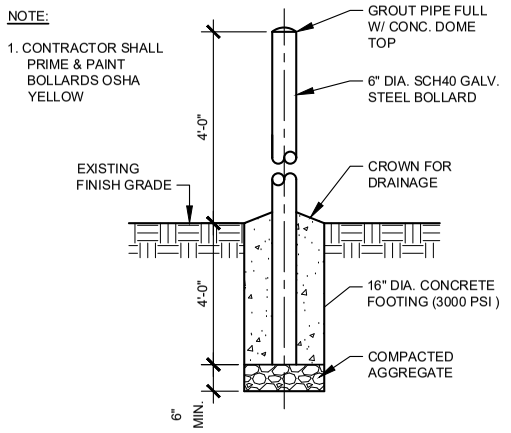

BOLLARD DETAIL 4 D-2

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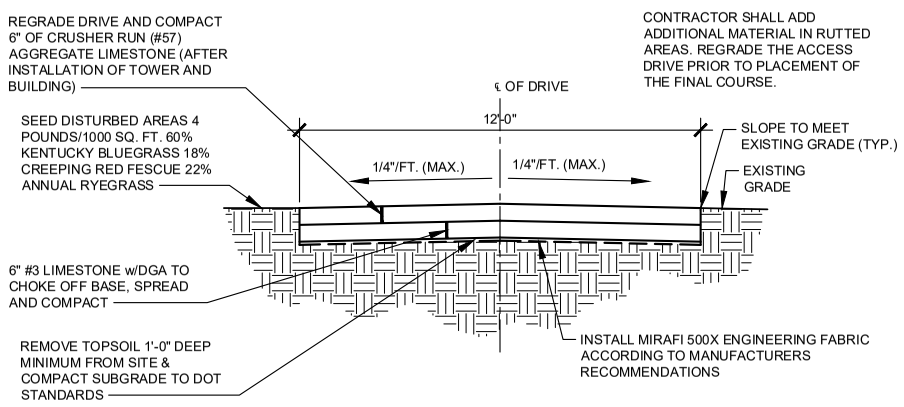
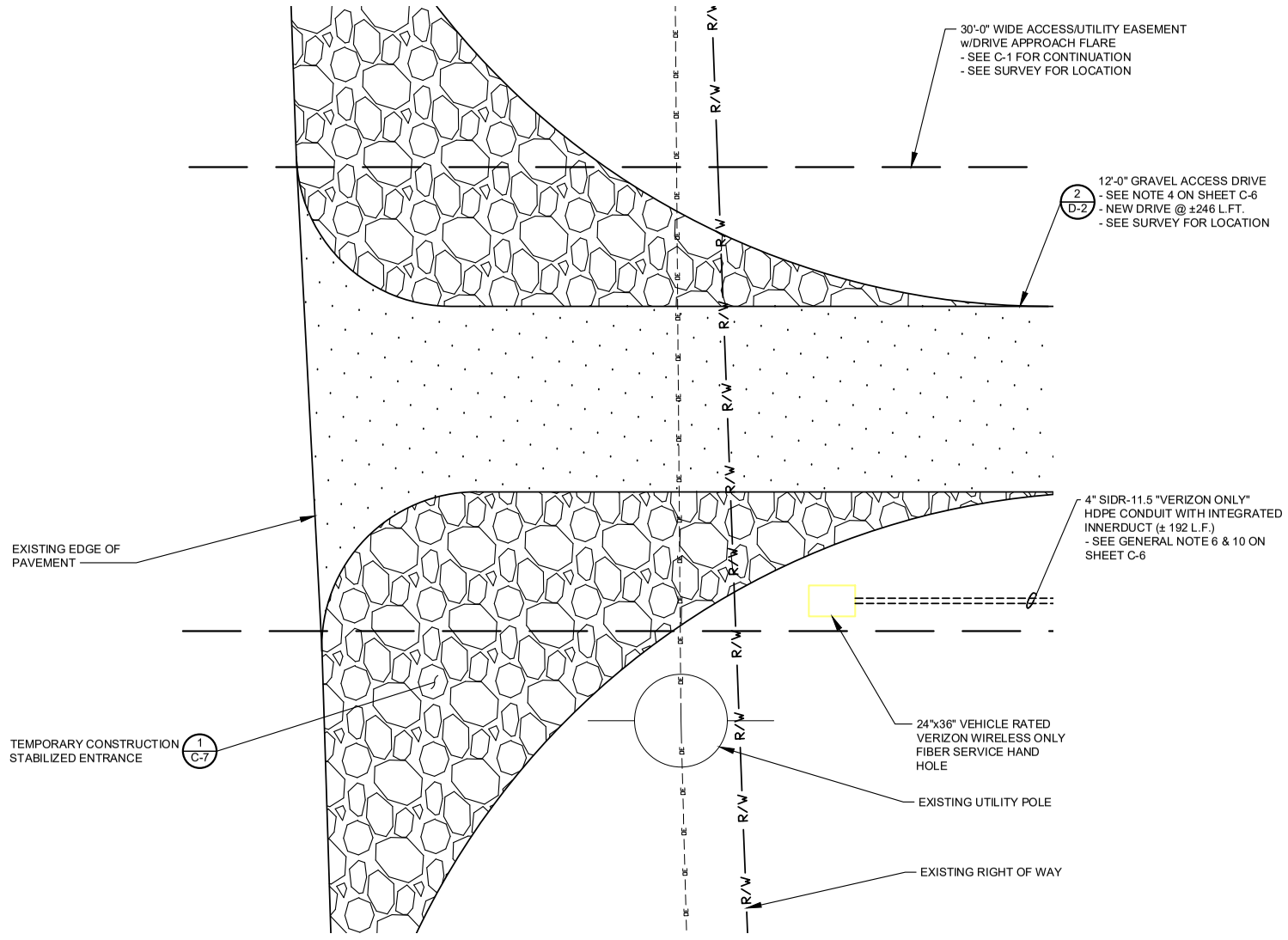


ACCESS DRIVE TYPICAL SECTION 2 D-2

SCALE: N.T.S.

DETAIL NOT USED 3 D-2

SCALE: N.T.S.



ENLARGED FIBER HAND HOLE PLAN AT R.O.W. 5 D-2

SCALE: 3/32" = 1'-0"

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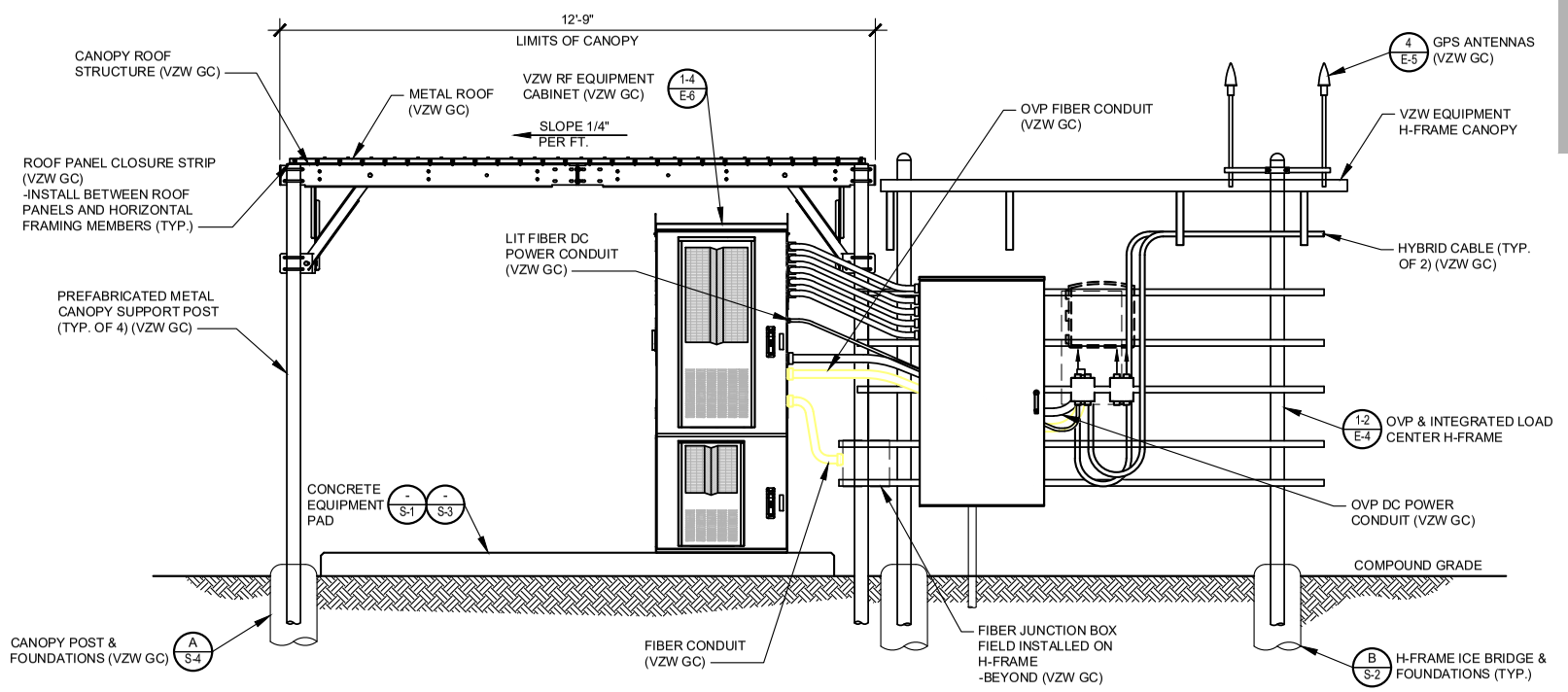
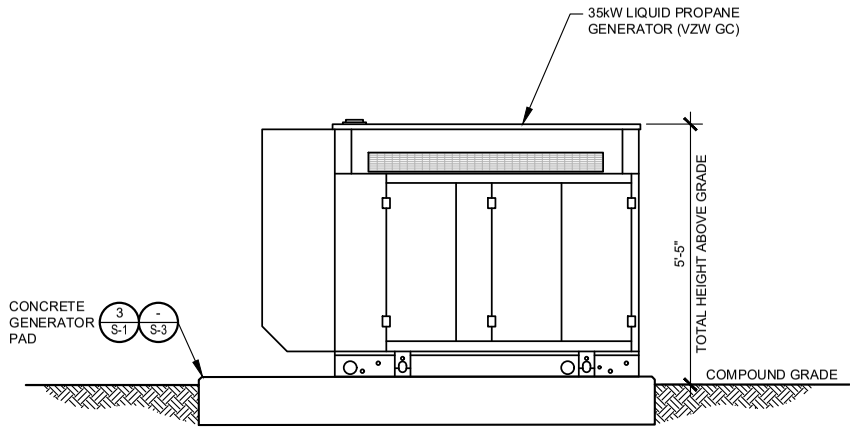


FRONT ELEVATION

SCALE: 1/4" = 1'-0"

NOTE:

CANOPY ROOF PANELS PROFILE R/PBR. PROVIDE 1.7lb DENSITY POLYETHYLENE FOAM PANEL CLOSURE STRIPS TO MATCH PROFILE. AS MANUFACTURED BY: SEALTITE BUILDING FASTENERS "ST CLOSURE" STRIPS OR EQUAL (VERIFY PROFILE WITH ROOF PANELS SUPPLIED WITH CANOPY)

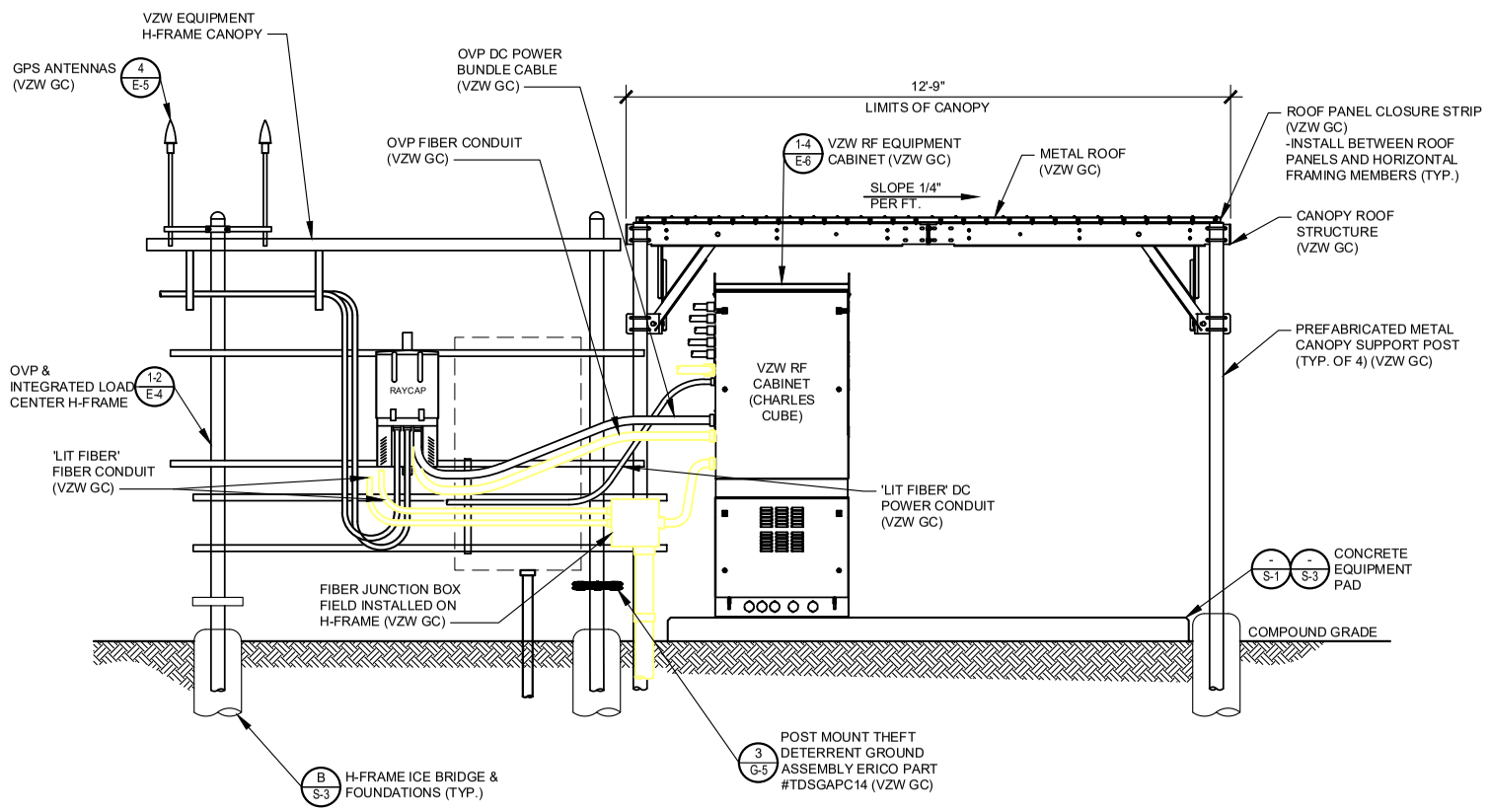


GENERATOR ELEVATION

SCALE: 1/4" = 1'-0"

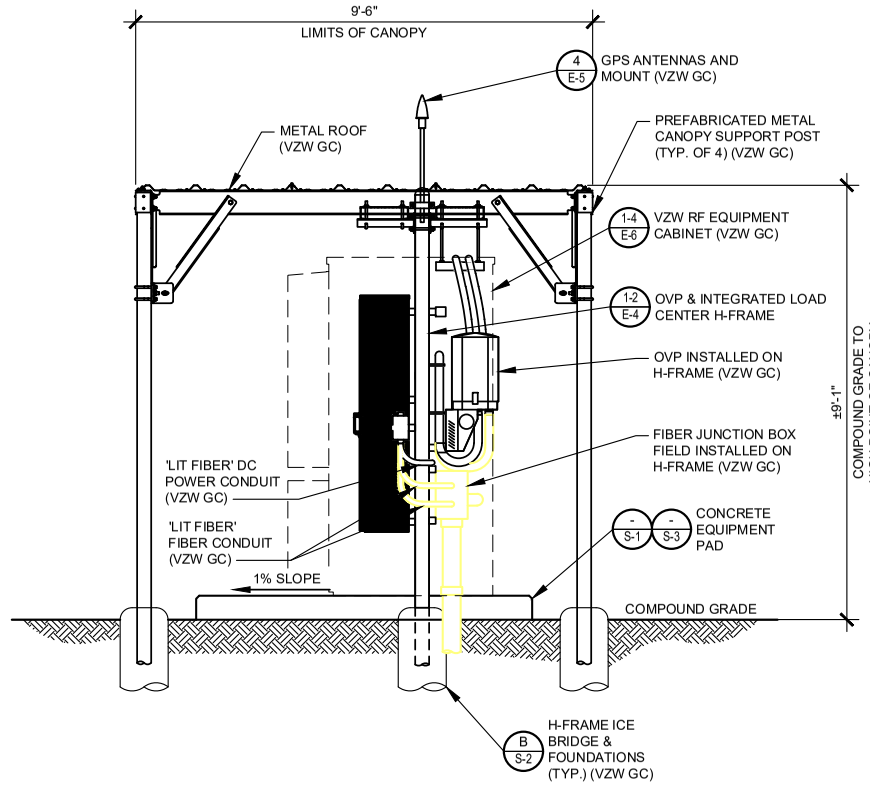
NOTE:

VERIZON WIRELESS 9'-6"x12'-9" RADIO EQUIPMENT CANOPY (CANOPY DWGS. SUPPLIED BY MANUFACTURER) (VZW GC) -COMMSCOPE P/N EQ-P0182-RC-B



REAR ELEVATION

SCALE: 1/4" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"

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CANOPY ELEVATIONS (REFERENCE ONLY)

ISSUED FOR:	
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PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
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D-3

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STANDARD SITE SIGNAGE:

	REQUIRED SIGNS:	LOCATIONS:
C1	• N.O.C. "IN CASE OF EMERGENCY"	FRONT ACCESS DOOR OF CABINET (SEE FIGURE 1)
C2	• NOTICE (CONTACT INFO)	
C3	• COMBINATION WARNING (SEE NOTE 2)	FRONT ACCESS DOOR OF EACH CABINET WITH BATTERIES (SEE FIGURE 1)
C4	• COMBINATION WARNING (SEE NOTE 2)	
C5	• S.D.S.	INSIDE FRONT ACCESS DOOR OF EACH CABINET WITH BATTERIES

-N.O.C. STANDS FOR "NETWORK OPERATIONS CENTER"
-S.D.S. STANDS FOR "SAFETY DATA SHEET"

NOTES:

1. CONTRACTOR SHALL INSTALL ALL SIGNS ON THE FRONT OF EACH CABINET. ALL SIGNS CAN BE PLACED ON ONLY THE UPPER DOOR, IF SPACE IS AVAILABLE.
2. CONTRACTOR SHALL INSTALL SIGN C3 OR C4 BASED ON THE TYPE OF BATTERY THAT IS BEING INSTALLED.

C1

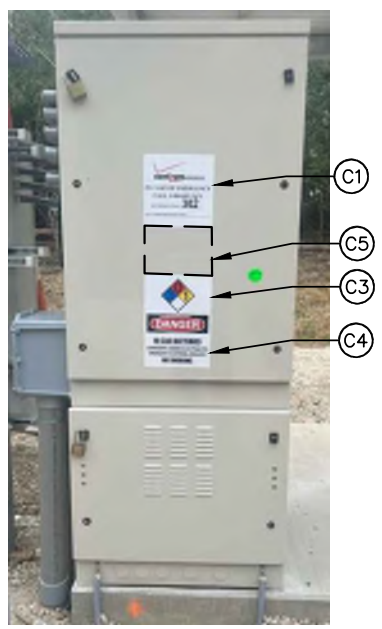
C2

C5

C3

C4

FRONT



REAR

FIGURE 1 - EQUIPMENT CABINET SIGNAGE

PROPANE GENERATOR

	REQUIRED SIGNS:	LOCATIONS:
P1	• "DANGER PROPANE"	INSTALL ON PROPANE TANK (SEE FIGURE 7)
P2	• HAZARD DIAMOND	
P3	• NOTICE SIGN	INSTALL ON GENERATOR

P1

P2

P3

FIGURE 7 - PROPANE TANK & GENERATOR SIGNAGE

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VERIZON WIRELESS
SIGNAGE
(REFERENCE ONLY)

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CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

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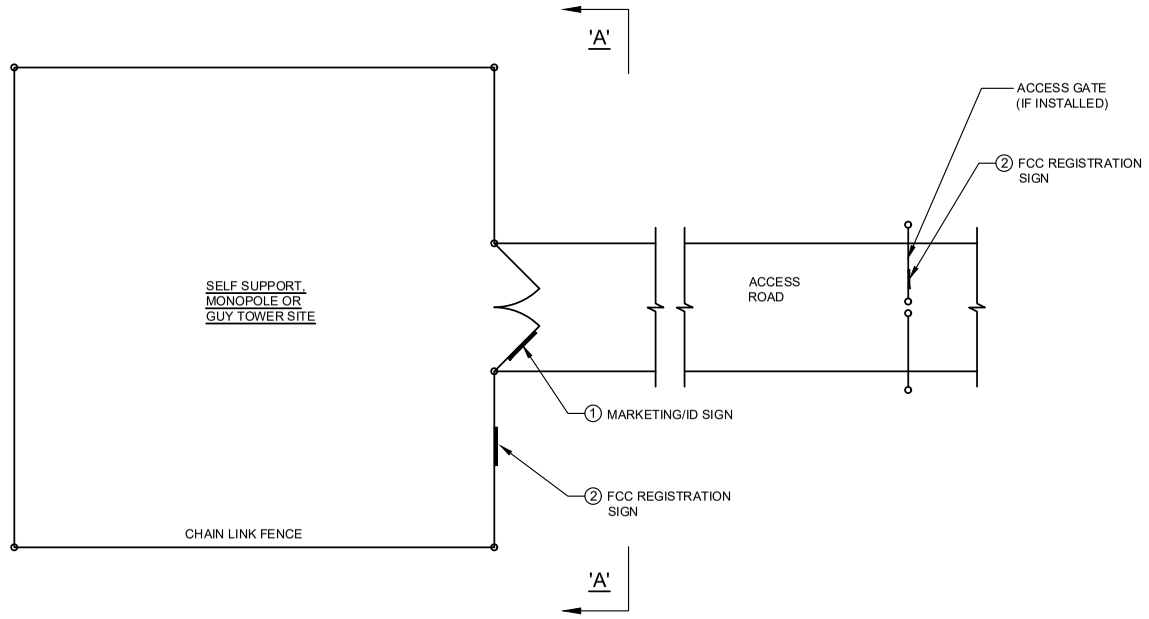
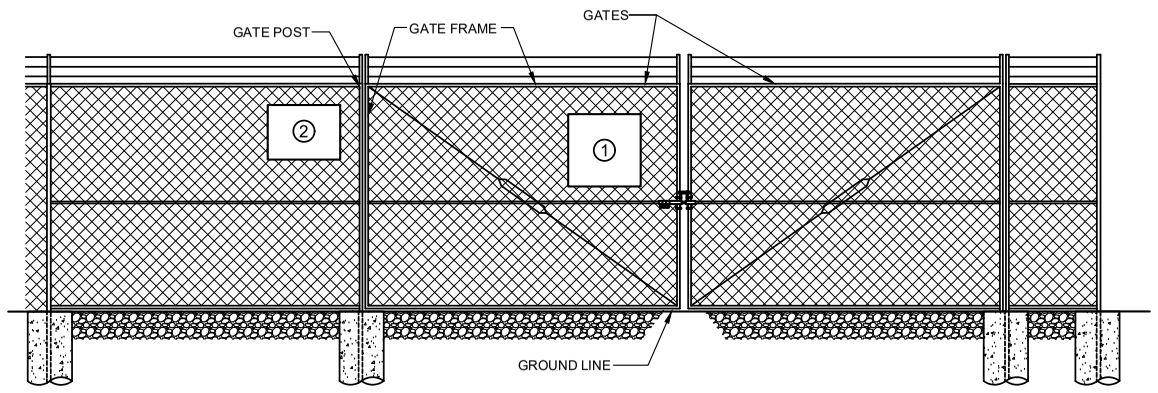
NOTES:

VERIZON WIRELESS SITE ID SIGN, RFE SIGNS, NOC INFORMATION SIGN AND ALL OTHER SIGNAGE NOT REFERENCED IN THIS DRAWING WILL BE FURNISHED AND INSTALLED BY VERIZON WIRELESS PERSONELL PER VERIZON WIRELESS RFC SIGNAGE & DEMARCATION POLICY.



TYPICAL SITE FENCE SIGNAGE PLAN

SCALE: N. T. S.



ELEVATION "A-A"

SCALE: N. T. S.

T.B.D.

MARKETING/ID SIGN 1

24" WIDE x 24" HIGH

FCC ANTENNA
STRUCTURE
REGISTRATION

WHITE BACKGROUND
w/BLACK LETTERING

FCC REGISTRATION SIGN 2

24" WIDE x 18" HIGH

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TOWER OWNER SITE
FENCE SIGNAGE
(REFERENCE ONLY)

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PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

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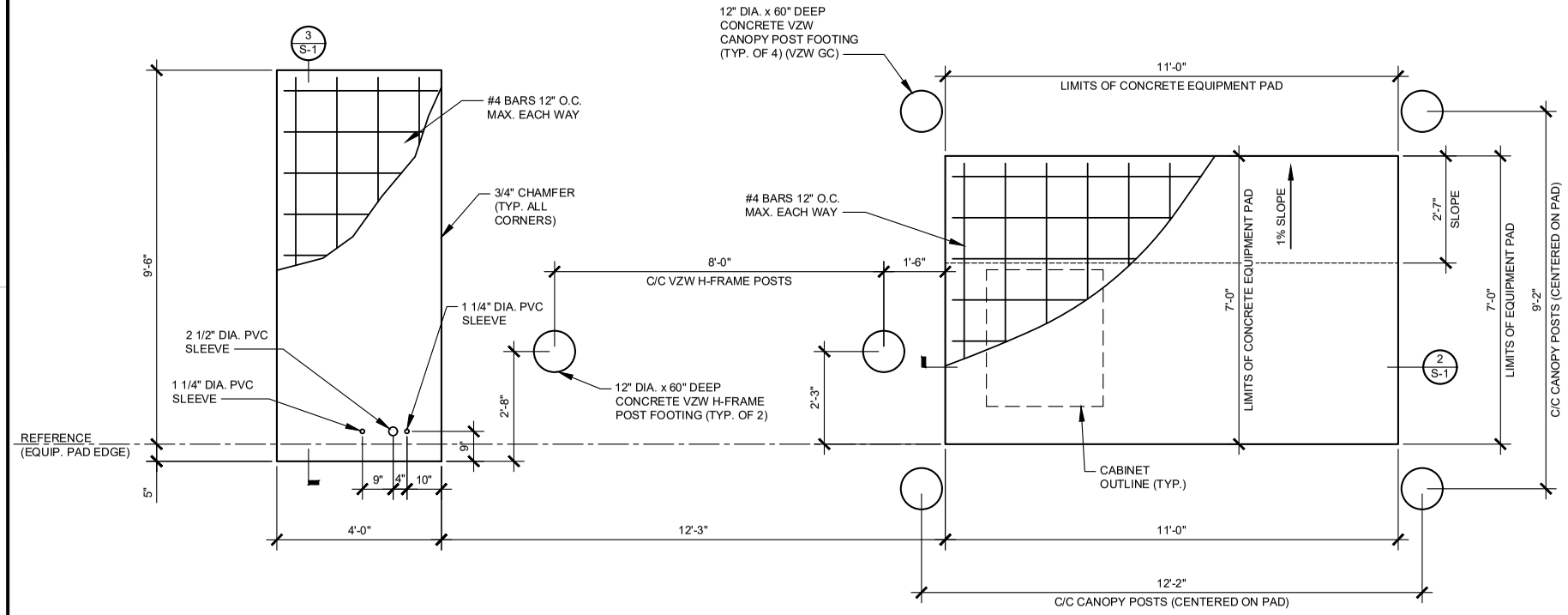
2023706.11

D-5

NOTE:

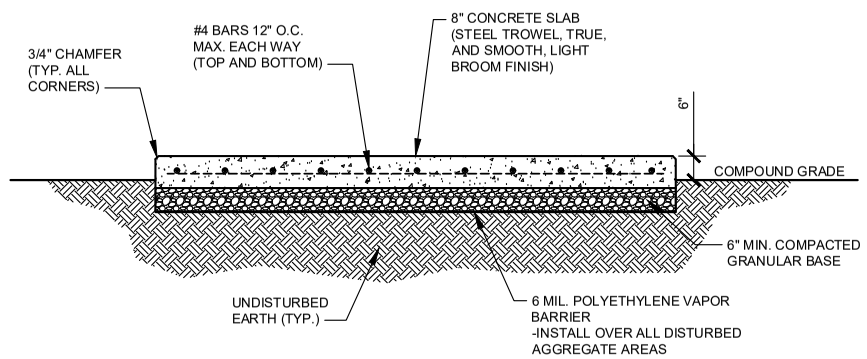
ALL GENERATOR CONDUITS SHALL BE INSTALLED AND CAPPED WEATHERTIGHT FOR FUTURE GENERATOR INSTALLATION IF REQUIRED



EQUIPMENT AND GENERATOR PAD FOUNDATIONS PLAN

1 S-1

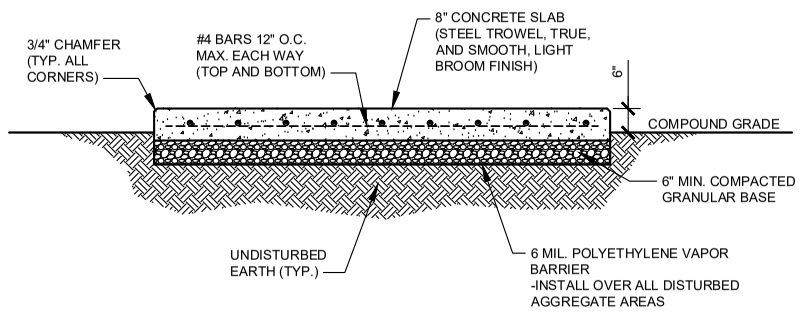
SCALE: 1/4" = 1'-0"



EQUIPMENT PAD FOUNDATION SECTION

2 S-1

SCALE: 1/4" = 1'-0"



GENERATOR PAD FOUNDATION SECTION

3 S-1

SCALE: 1/4" = 1'-0"

STRUCTURAL NOTES

1. CANOPY SYSTEM DESIGN LOADINGS:

ROOF SNOW LOAD	70 PSF
DEAD LOADS	ACTUAL MATERIAL WEIGHTS
BASIC WIND SPEED	120 MPH

DESIGN CODES
INTERNATIONAL BUILDING CODE (IBC) 2012
MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES ASCE7-10
OSHA REGULATIONS

2. STRUCTURAL STEEL:

PIPE - ASTM A53 TYPE E OR S GRADE B, OR ASTM A501.
STRUCTURE FINISH - AFTER FABRICATION ACCORDING TO ASTM A123.

3. BUILDING FOUNDATION SYSTEM:

THE SUBSURFACE REPORT WAS PROVIDED BY XYZ ENGINEERING, INC., DATED MONTH DAY, YEAR.

ALLOWABLE BEARING CAPACITY BLDG. FOOTINGS **** PSF

ALL CONTRACTORS SHALL EXERCISE GREAT CARE DURING EXCAVATION. ALL CONTRACTORS SHALL PREDETERMINE UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY IF DEVIATION FROM PLANS EXIST.

THE SUBSURFACE REPORT IS NOT TO BE CONSIDERED AS A COMPLETE RECORD OF THE EXISTING CONDITIONS AT THE SITE. THE CONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS, INCLUDING SUBSURFACE CONDITIONS. THE CONTRACTOR SHALL OBTAIN PERMISSION FROM THE OWNER PRIOR TO SITE ENTRY FOR THE PURPOSE OF CONDUCTING SOIL TESTING AND VERIFICATION OF EXISTING CONDITIONS.

FOUNDATION SUBGRADES SHALL BE HAND TRIMMED AND COMPACTED. ALL BACKFILL TO BE COMPACTED TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557.

4. CONCRETE WORK:

CONCRETE CYLINDERS SHALL BE TAKEN AND TESTED BY A QUALIFIED CONCRETE TESTING COMPANY. THE GENERAL CONTRACTOR SHALL PROVIDE ONE (1) CYLINDER SAMPLE TAKEN PER TRUCK OR FOUR (4) TOTAL FOR BUILDING FOUNDATION AND THE CONCRETE MUST MEET A 4" SLUMP. THE GENERAL CONTRACTOR SHALL PROVIDE THREE (3) COPIES OF TESTING RESULTS TO VERIZON WIRELESS AND TOWER OWNER CONSTRUCTION MANAGERS. FAILURE TO PROVIDE WRITTEN DOCUMENTATION WILL RESULT IN A DEDUCTION FROM THE CONTRACT. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY ADDITIONAL COSTS IN TESTING DUE TO DELAYS BY THE GENERAL CONTRACTOR OR HIS SUBCONTRACTORS. USE AIR ENTRAINMENT IN EXTERIOR SLABS.

SPECIFICATIONS	- LATEST EDITION OF ACI-318 AS ADOPTED BY THE STATE OF INDIANA	- BLDG. FOUNDATION F'c = 4000 PSI @ 28 DAYS
	2"-4" SLUMP	
MATERIALS	- REINFORCING	ASTM A615, GRADE 60
	- ANCHOR BOLTS	ASTM F1554 A36
REINFORCING COVERS	- FOOTINGS	
	TOP	2"
	BOTTOM/SIDES	3"

REINFORCING EMBEDMENT AND LAP SPLICES (INCHES) FOR 4000 PSI CONCRETE

BAR SIZE	ANCHORAGE	SPLICE (OTHER)	ANCHORAGE (TOP)	SPLICE (TOP)
#4	12"	25"	25"	33"

CHAMFER TOP CORNERS OF ALL FOUNDATIONS (3/4")

5. BURIED CABLE LOCATIONS INFORMATION

CONTACT INDIANA 811 48 HR. PRIOR TO DIGGING, GRADING, OR DRILLING 1-800-382-5544 OR 811

ADDITIONAL CONCRETE NOTES:

1. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO ACI"96, "STANDARD SPECIFICATION FOR STRUCTURAL CONCRETE" AND ACI 305, 306 AND 307 UNLESS NOTED OTHERWISE.
2. ALL DETAILING, FABRICATION AND PLACING OF CONCRETE SHALL CONFORM TO ACI 318-11.
3. ALL CONCRETE EXPOSED TO WEATHER SHALL CONTAIN 6% (±1%) AIR ENTRAINMENT.
4. PROVIDE CORNER BARS AT ALL LOCATIONS WHERE REINFORCEMENT CHANGES DIRECTION.

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

NOTICE TO CONTRACTOR
PER INDIANA STATE LAW IC-8-1-26-18, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

GPD GROUP, INC.
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519

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CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
STATE OF KENTUCKY
05/31/2024

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

EQUIPMENT PAD FOUNDATION PLAN, DETAILS & STRUCTURAL NOTES

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RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

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S-1

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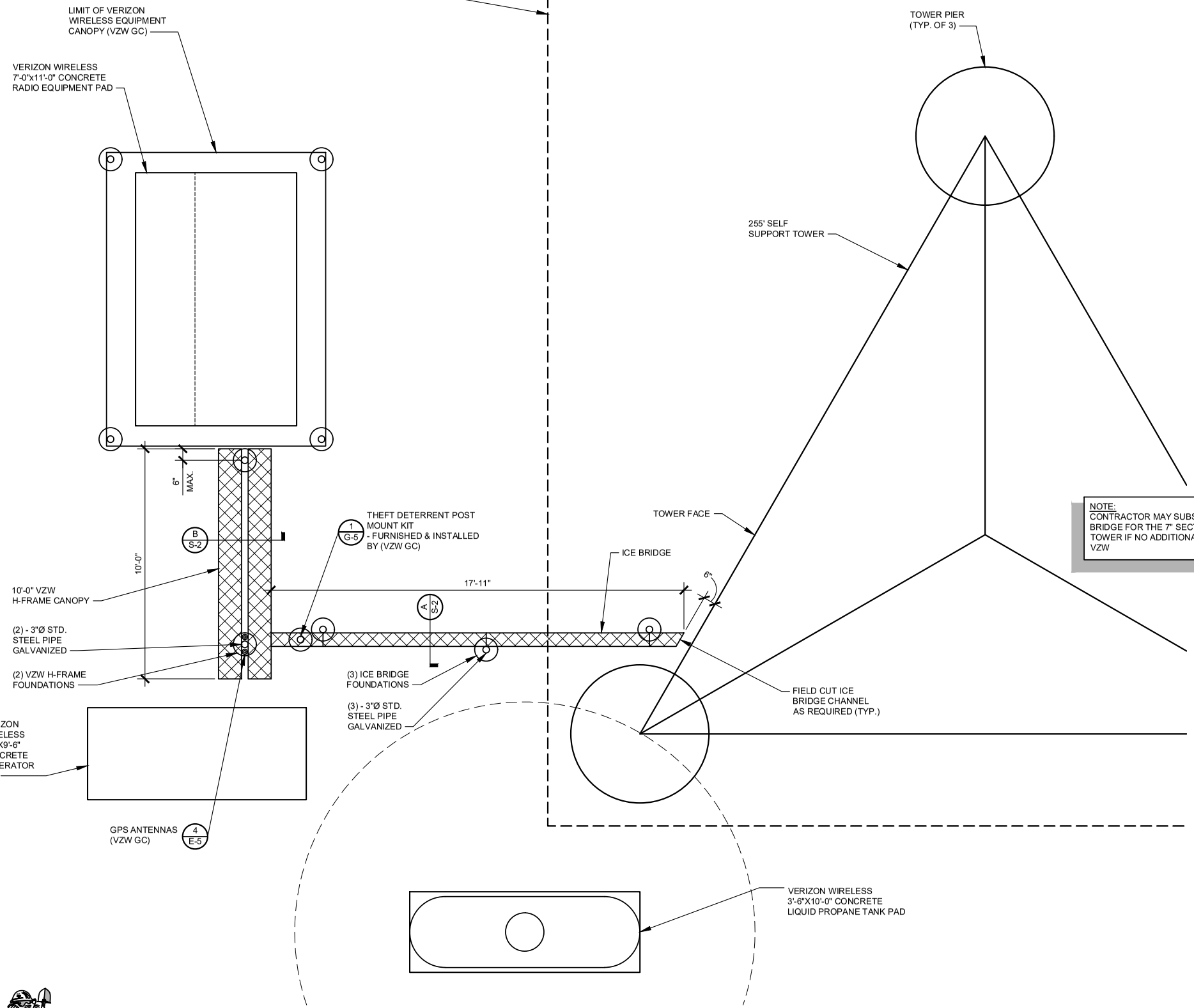
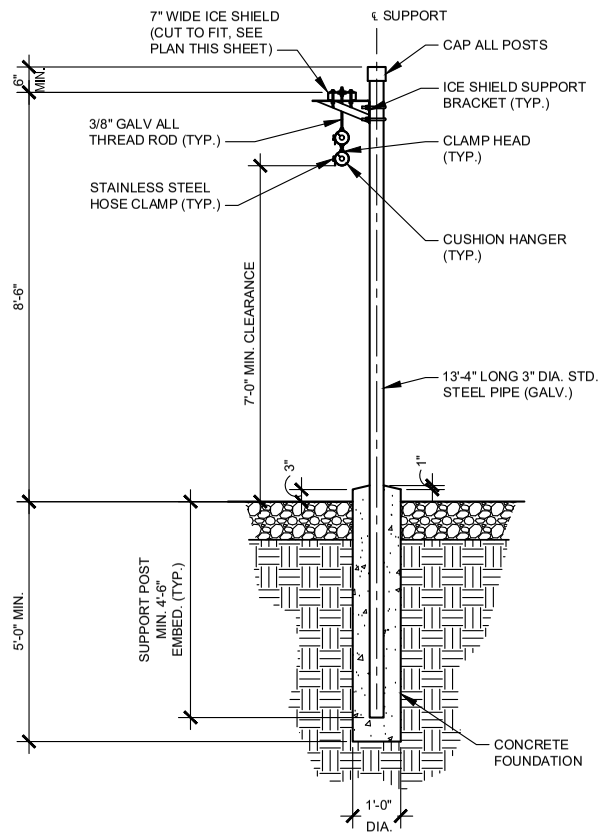


ICE BRIDGE PLAN

SCALE: 3/16" = 1'-0"

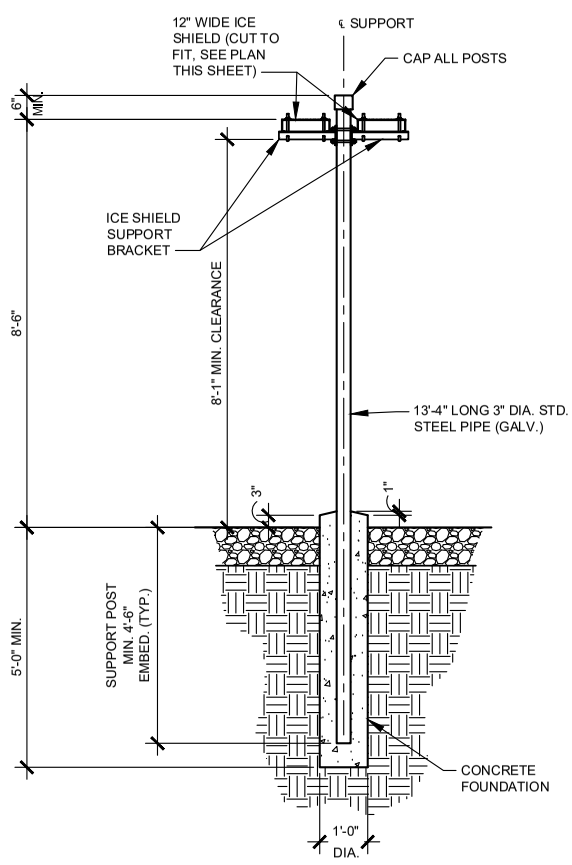
NOTE:
CONTRACTOR MAY SUBSTITUTE 12" ICE BRIDGE FOR THE 7" SECTION TO THE TOWER IF NO ADDITIONAL COST TO VZW



ICE BRIDGE SECTION

SCALE: 1/4" = 1'-0"

A S-2



VZW H-FRAME CANOPY SECTION

SCALE: 1/4" = 1'-0"

B S-2

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

NOTICE TO CONTRACTOR

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CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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FARMINGTON, KY 42020

ICE BRIDGE PLAN AND DETAILS

ISSUED FOR:	
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CONSTRUCTION	-/-/--
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PROJECT MANAGER	DESIGNER
TTP	SEK

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S-2

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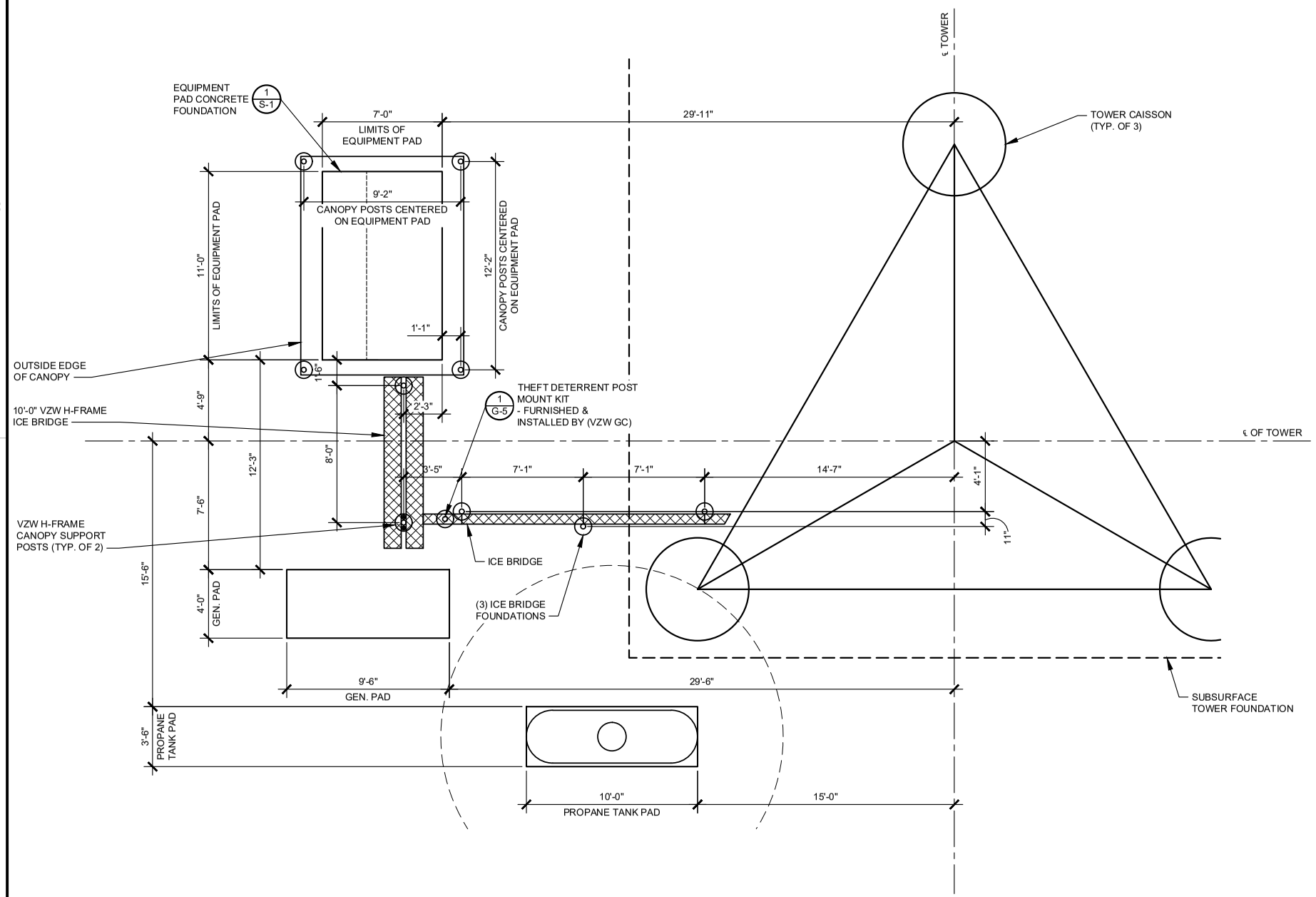
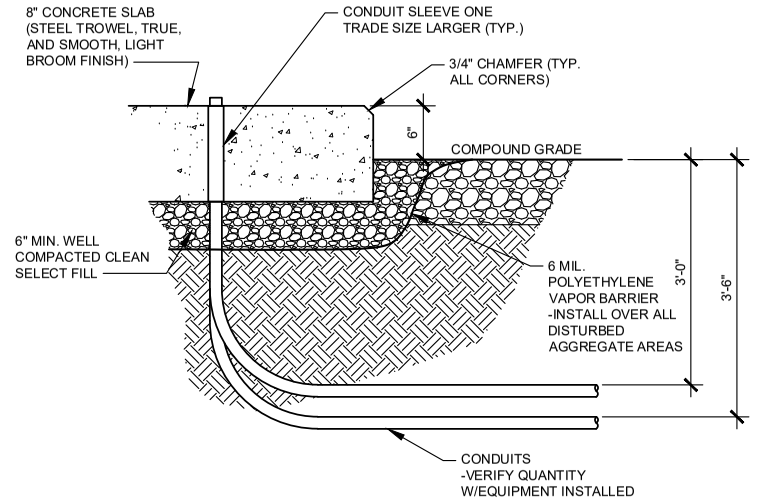


FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

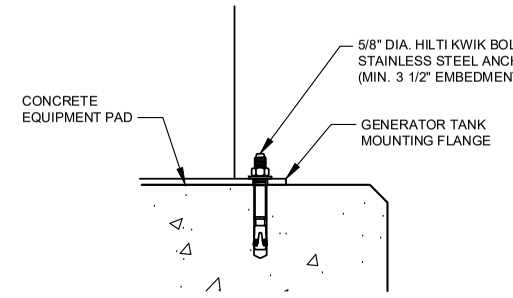
NORTH



CONDUIT PENETRATION DETAIL

1 S-3

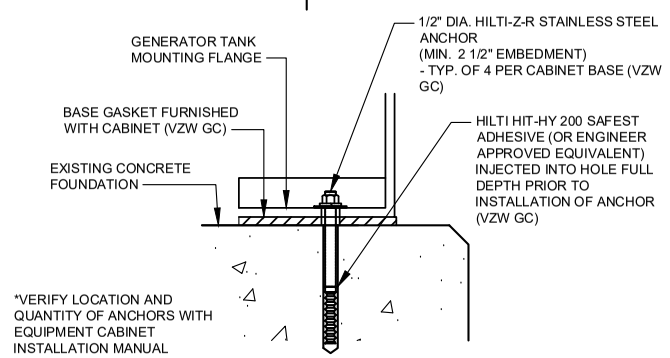
SCALE: N.T.S.



GENERATOR ANCHOR DETAIL

2 S-3

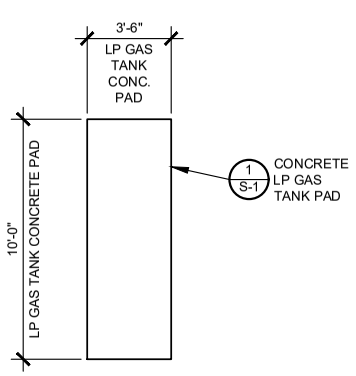
SCALE: N. T. S. (VZW GC)

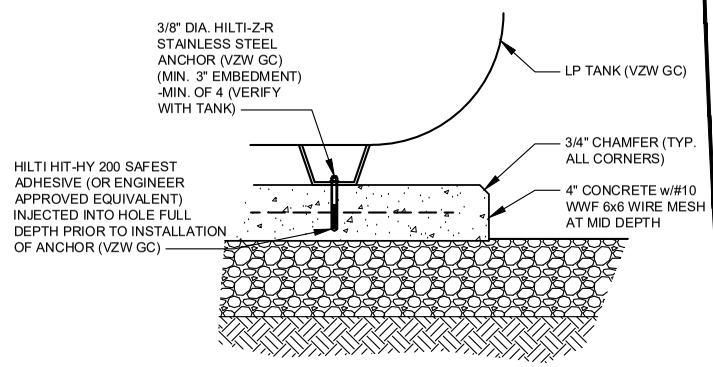


EQUIPMENT CABINET MOUNTING DETAIL

3 S-3

SCALE: N. T. S.





LP TANK PAD DETAIL

4 S-3

SCALE: N.T.S.

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CHRISTOPHER J. SCHEKS
29760
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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DOVE RD
FARMINGTON, KY 42020

FOUNDATION PLAN AND DETAILS

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TTP	SEK

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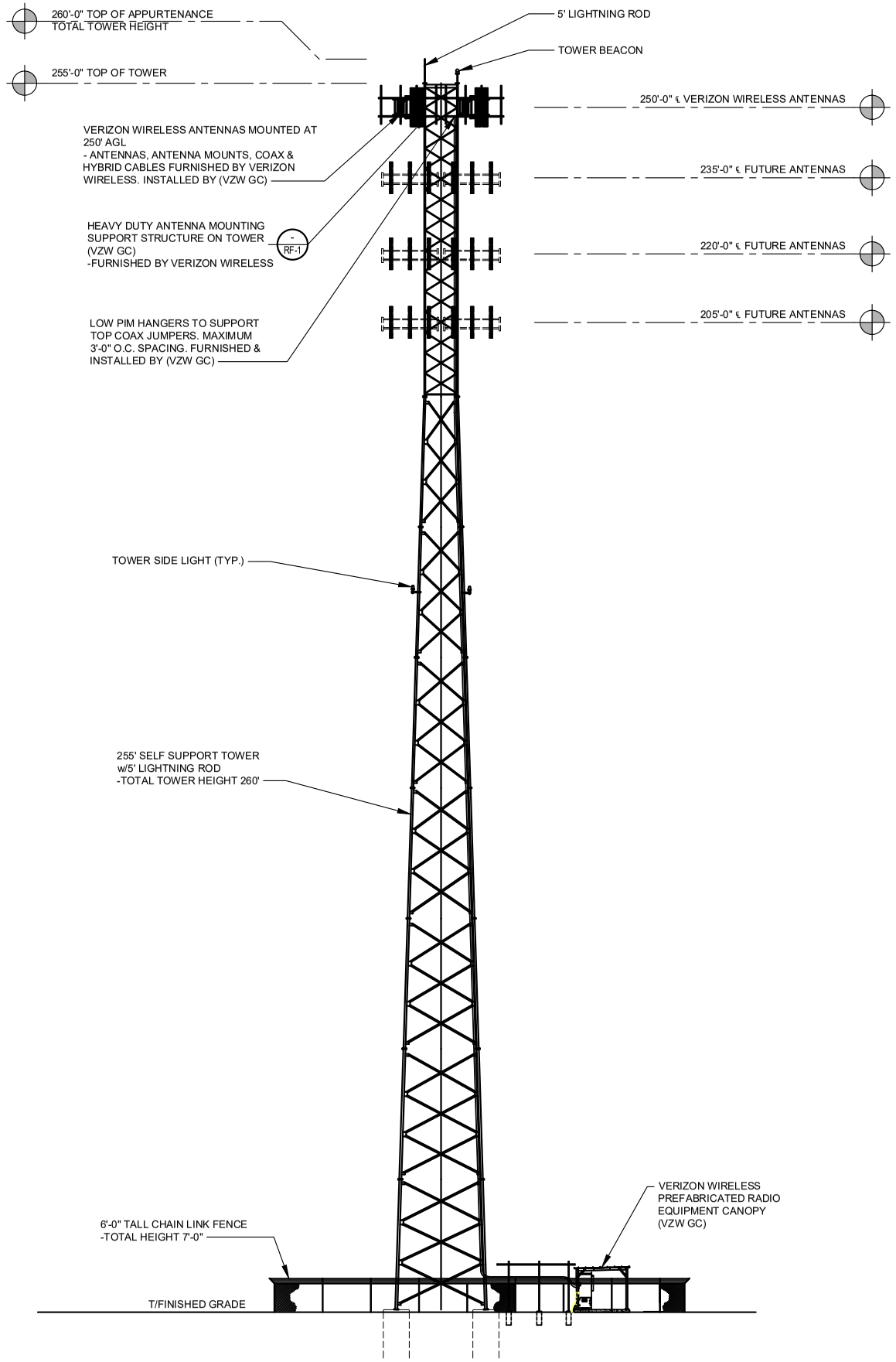


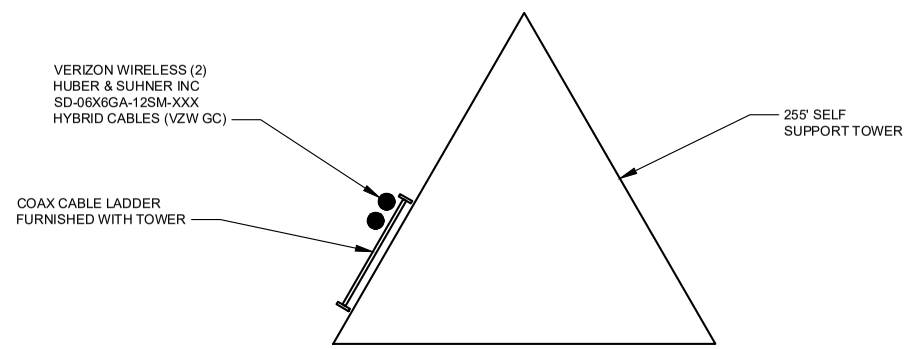
TOWER ELEVATION 1 TE-1

SCALE: N.T.S.

NOTE:

1. IT IS THE INSTALLING CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL ANTENNA INFORMATION AGAINST FINAL RADIO ENGINEERING PLAN PROVIDED BY KENTUCKY RSA 1 PSHP d/b/a VERIZON WIRELESS (VZW GC)

2. ALL TOWER LIGHTING SHALL BE INSTALLED AS REQUIRED BY THE FEDERAL AVIATION ADMINISTRATION AND RECOMMENDED BY THE USFWS INTERIM GUIDELINES (2000) FOR LIGHTING OF TOWERS OVER 200' IN HEIGHT.



COAX PLAN

SCALE: N.T.S.

NORTH

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CHRISTOPHER J. SCHEKS
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LICENSED PROFESSIONAL ENGINEER
05/31/2024

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TOWER ELEVATION

ISSUED FOR:	
REVIEW	--/--/--
PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

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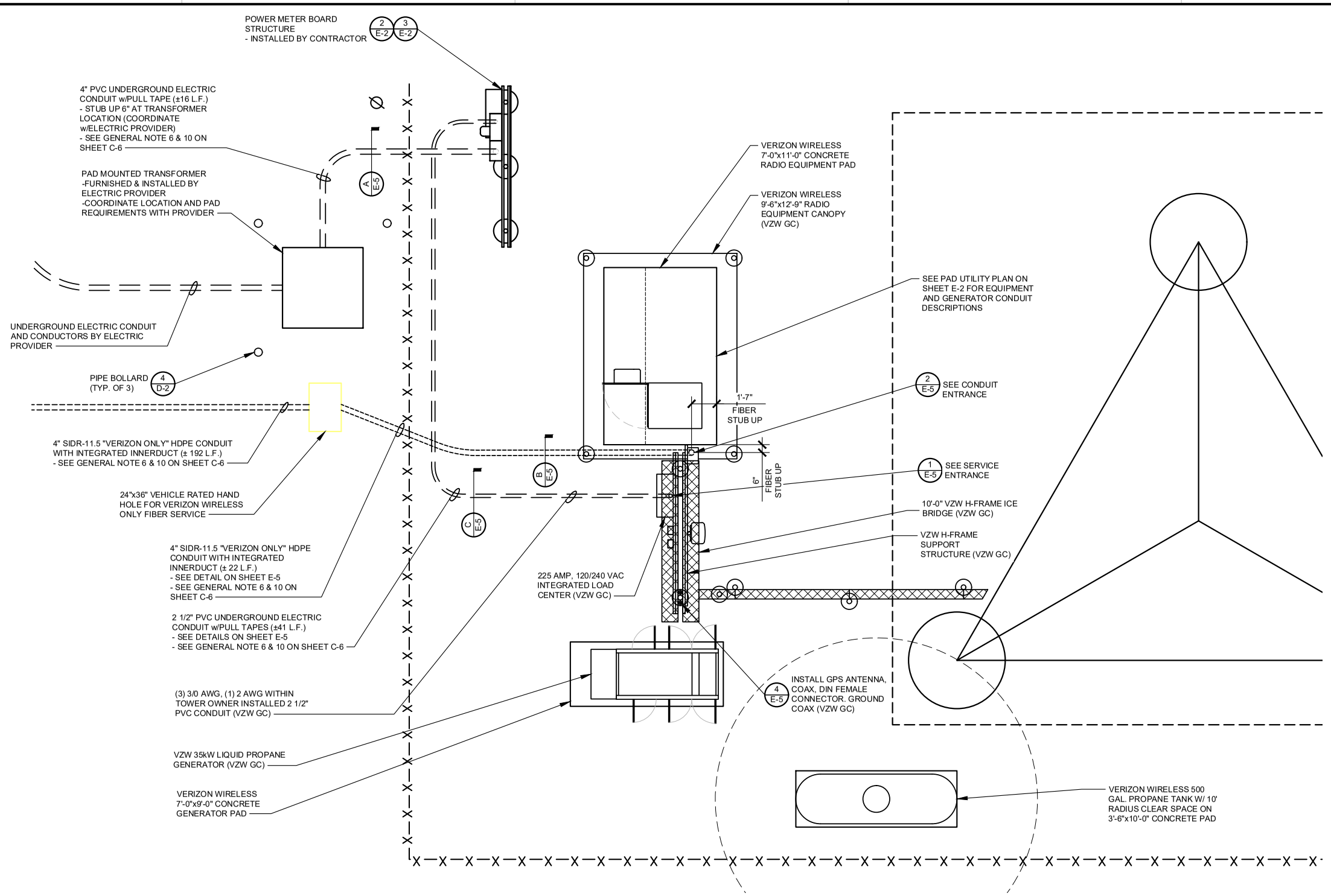

SITE UTILITY PLAN

SCALE: N.T.S.

NORTH

ELECTRICAL NOTES:

1. PROVIDE 6'-0" MAX. LIQUIDTIGHT FLEXIBLE METAL CONDUIT AT ALL EQUIPMENT CONNECTIONS.
2. ALL CONDUIT SHALL BE ROUTED WITHIN 2'-0" OF PERIMETER COMPOUND FENCE WHERE APPLICABLE.
3. CONDUIT TRENCH WIDTH SHALL NOT EXCEED 18" AT ALL ACCESS DRIVE LOCATIONS AND WHEN CROSSING THE COMPOUND GATE OPENING.
4. ALL CONDUIT RACEWAYS BETWEEN CABINETS ABOVE CONCRETE PAD SHALL BE 2" DIAMETER IMC WITH WEATHERPROOF FITTINGS.

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NOTICE TO CONTRACTOR

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STATE OF KENTUCKY
STEVEN P. SCHAUB
29008
LICENSED PROFESSIONAL ENGINEER

05/31/2024

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DOVE RD
FARMINGTON, KY 42020

SITE UTILITY PLAN

ISSUED FOR:	
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CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
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E-1

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
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VERIZON PANEL "A" SCHEDULE

MAIN: 225/2 VOLTAGE: 120/240 PHASE: 1 WIRE: 3

TO AUTOMATIC TRANSFER SWITCH — 225A — S/G A B S/N

DESCRIPTION	BRKR.	WATTS			WATTS	BRKR.	DESCRIPTION
RECTIFIER #1	30/2	1800 / 1800	1	2	1800 / 1800	30/2	RECTIFIER #2
			3	4			
RECTIFIER #3	30/2	1800 / 1800	5	6	1800 / 1800	30/2	RECTIFIER #4
			7	8			
RECTIFIER #5	30/2	1800 / 1800	9	10	1800 / 1800	30/2	RECTIFIER #6
			11	12			
RECTIFIER #7	30/2	1800 / 1800	13	14	1800 / 1800	30/2	RECTIFIER #8
			15	16			
SPACE			17	18			SPACE
SPACE			19	20			SPACE
SPACE			21	22			SPACE
SPACE			23	24			SPACE
SPACE			25	26			SPACE
SPACE			27	28			SPACE
SPACE			29	30			SPACE
GFCI RECEPTACLE (RF CABINET)	15/1	180	31	32			SPACE
GEN. BLOCK HEATER	20/1	1500	33	34	180	15/1	GFCI RECEPTACLE
CANOPY LIGHTS	15/1	126	35	36	250	20/1	GEN. BATTERY CHARGER

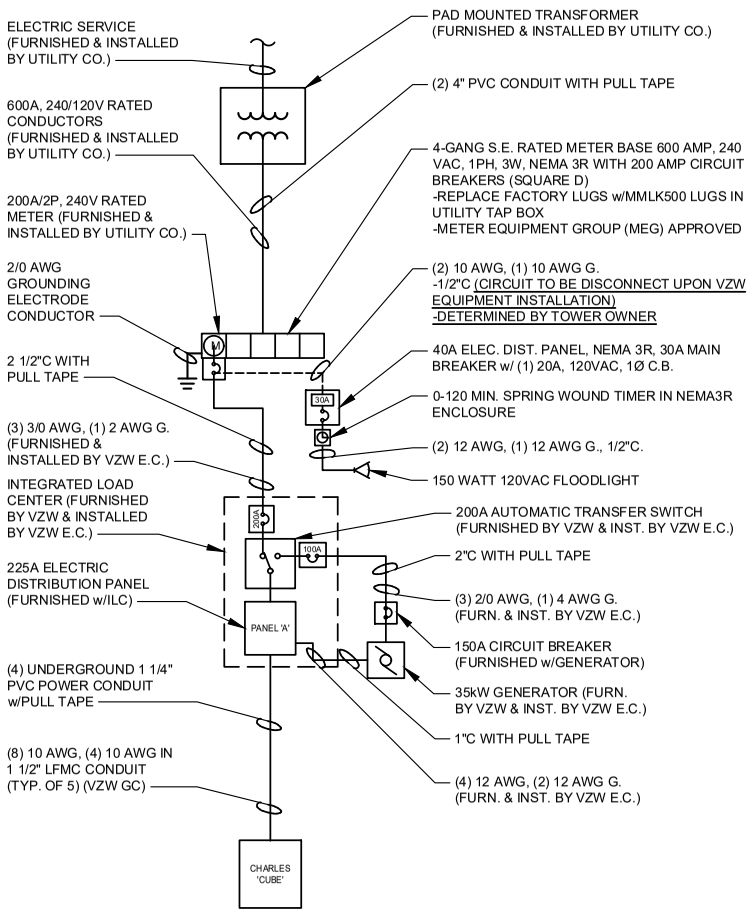
SURGE ARRESTOR

SURFACE MOUNTED NEMA 3R w/DOOR
22K AIC BREAKERS
(E.C. SHALL VERIFY AIC RATINGS W/LOCAL POWER CO.)

NON-CONTINUOUS LOAD = 0.00 KW, 00.00 AMPS
CONTINUOUS LOAD = 31.04 KW X 1.25 = 38.80 KW, 161.67 AMPS
TOTAL CONNECTED LOAD = 38.80 KW, 161.67 AMPS

PANEL SCHEDULE "A"

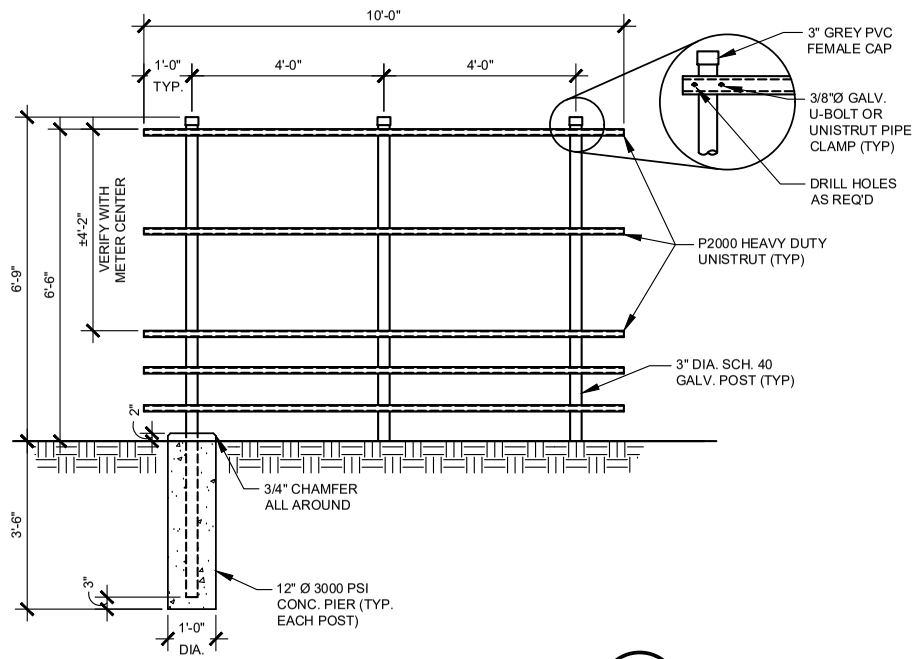
SCALE: N.T.S.



ONE LINE DIAGRAM

SCALE: N.T.S.

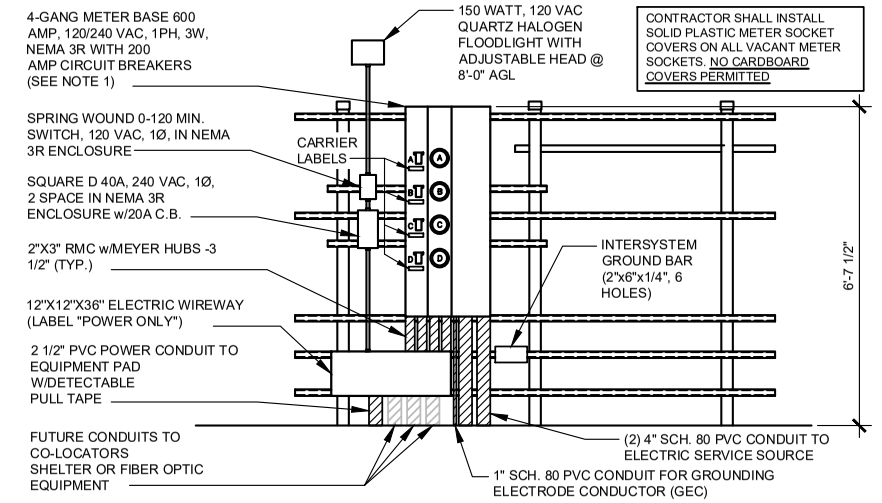
1 / E-2



METER BOARD STRUCTURE

SCALE: 1/4" = 1'-0"

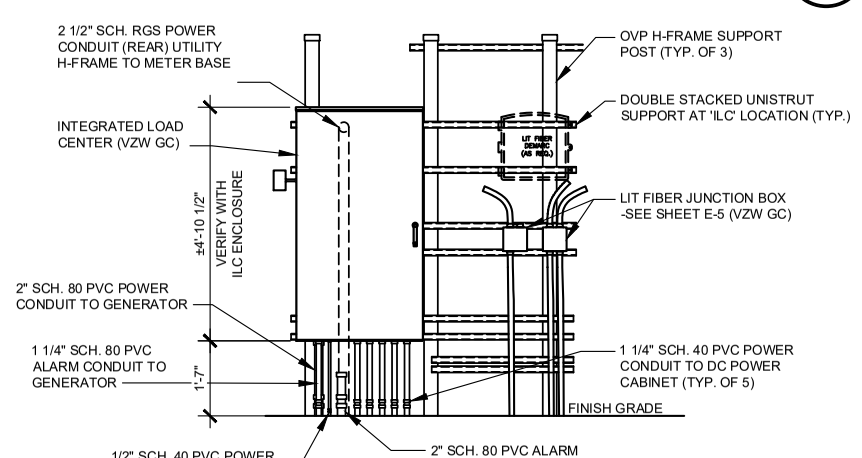
2 / E-2



METER BOARD STRUCTURE-ELECTRIC SIDE

SCALE: 1/4" = 1'-0"

3 / E-2



VZW ILC MOUNTING DETAIL

SCALE: 1/4" = 1'-0"

4 / E-2

GENERAL ELECTRICAL NOTES

1. UNLESS NOTED AS VERIZON WIRELESS GENERAL CONTRACTOR OR VZW GC, ALL WORK ITEMS ON ELECTRICAL "E" & GROUNDING "G" SHEETS SHALL BE PERFORMED BY THE GENERAL CONTRACTOR'S ELECTRICAL CONTRACTOR. ALL WORK SHOWN AS NEW UNLESS NOTED EXISTING.
2. THE GENERAL CONTRACTOR AND VERIZON WIRELESS ELECTRICAL CONTRACTORS SHALL BE LICENSED TO PERFORM WORK IN THE COUNTY OF THIS PROJECT AND SHALL BE RESPONSIBLE FOR OBTAINING AN ELECTRICAL PERMIT FROM THE COUNTY.
3. UNDERGROUND CONDUIT SHALL BE SCH. 40 (SCH. 80 UNDER ROADWAY) PVC PLASTIC DUCT WITH ALL BENDS MINIMUM 24" RADIUS 90° SWEEP SCH. 80 UNLESS OTHERWISE NOTED ON DRAWINGS. ELECTRICAL AND FIBER UTILITY LATERAL CONDUITS SHALL BE MINIMUM 36" RADIUS 90° SWEEP SCH. 80. ALL PVC SCH80 PIPING AND FITTINGS SHALL USE BELL END WHERE FEASIBLE.
4. ABOVE GRADE RISER CONDUIT SHALL BE RIGID SCH. 80 PVC WITH MATCHING FITTINGS UNLESS NOTED OTHERWISE.
5. ALL CONDUITS SHALL BE PLACED WITH 200 LB POLYETHYLENE PULL TAPES. PULL TAPES SHALL BE SECURELY FASTENED AT EACH END OF CONDUIT. (THIS SHALL ALSO APPLY FOR ALL FIBER CONDUITS).
6. PRIOR TO TRENCHING AND FOR COORDINATING OF THE FIBER AND ELECTRICAL SERVICES, SEE SHEET C-6 GENERAL NOTE #6 FOR UTILITY CONTACT NAMES & PHONE NUMBERS TO ALSO INCLUDE VERIZON WIRELESS CONSTRUCTION MANAGER.
7. ALL WORK SHALL BE IN ACCORDANCE WITH N.F.P.A. AND N.E.C. CODES, NEMA STANDARDS AND ALL LOCAL CODES.
8. ALL WIRE SHALL BE COPPER, 600V THHN-2/THWN-2 OR XHHW-2 90°C UNLESS NOTED OTHERWISE.
9. ALL ELECTRICAL CONTRACTORS SHALL ABIDE BY ALL GUIDELINES REQUIRED BY TOWER OWNER AND VERIZON WIRELESS, INCLUDING BUT NOT LIMITED TO, a) STAGE CONSTRUCTION AND REPORT WHEN ON AND OFF THE SITE. b) PROVIDE LOG BOOK RECORDS OF PERSONNEL ON TOWER. c) PROVIDE R.F. MONITORING DEVICES TO TOWER PERSONNEL. d) VERIZON WIRELESS TO INSPECT ALL TRENCHING BEFORE BACKFILLING.
10. THE ELECTRICAL CONTRACTOR SHALL INSTALL ALL UNDERGROUND CONDUITS SHOWN ON PLANS UNLESS NOTED OTHERWISE. ALL UNDERGROUND CONDUIT SHALL BE STUBBED-UP AND CAPPED AT THE LOCATION INDICATED ON PLANS. VZW CONTRACTOR SHALL COMPLETE ALL CONDUIT TERMINATIONS TO VZW ENCLOSURES SHOWN ON PLANS AND ELECTRICAL PROVIDER DESIGN .
11. THE VZW ELECTRICAL CONTRACTOR SHALL VERIFY ELECTRICAL SERVICE REQUIRED - 120/240V, SINGLE PHASE, 200 AMP BEFORE ROUGH IN.
12. GENERAL CONTRACTOR AND VZW ELECTRICAL CONTRACTORS SHALL PROVIDE FIRE WATCH DURING ALL WELDING OPERATIONS. TWO (2) HAND HELD 30 LB. FIRE EXTINGUISHERS & ADEQUATE WATER SUPPLY SHALL BE APPROVED BY THE CLIENT AND THE TOWNSHIP WATER AUTHORITY.
13. SEAL ALL PENETRATIONS WITH SILICONE SEALANT.
14. ELECTRICAL WORK PRESENTS SPECIFIC THREATS TO THE HEALTH AND SAFETY OF WORKERS ON SITE. SPECIFICALLY ELECTROCUTIONS ARE THE FOURTH LEADING CAUSE OF DEATH ON CONSTRUCTION SITES. ALL ELECTRICAL WORKERS SHALL HAVE CURRENT CERTIFICATIONS WHICH SATISFY ALL TRAINING REQUIREMENTS FOR THE ELECTRICAL WORK THEY ARE PERFORMING PER OSHA STANDARDS. ALL ELECTRICAL WORKERS SHALL ADHERE TO ALL SAFETY RULES AND REGULATIONS FOR WORKER AND PUBLIC SAFETY. ALL WORK SHALL BE PERFORMED BY QUALIFIED ELECTRICIANS TRAINED FOR THE TYPE OF WORK AND THE VOLTAGES PRESENT FOR EACH TASK. THE CONTRACTOR SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA, NFPA 70E, AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.
15. CONNECT NEUTRAL TERMINAL IN SERVICE DISCONNECTING DEVICE TO GROUNDING ELECTRODE. (2/0 AWG TINNED STRANDED COPPER GROUNDING ELECTRODE CONDUCTOR IN 1" PVC CONDUIT). CONNECT FIRST GROUNDING ELECTRODE TO SECOND GROUNDING ELECTRODE WITH 2/0 AWG TINNED STRANDED COPPER CONDUCTOR EXOTHERMICALLY WELDED TO ELECTRODES.
16. VZW E.C. SHALL VERIFY SUFFICIENT CAPACITY EXISTS AT EXISTING METER CENTER. NOTIFY ENGINEER IMMEDIATELY IF SERVICE IS NOT ADEQUATE.
17. REFER TO ELECTRICAL SITE PLAN FOR CONDUIT AND WIRE EQUIREMENTS.
18. ALL ELECTRICAL EQUIPMENT PLACARDS MUST BE ENGRAVED PLASTIC LABELS ONLY, NO P-TOUCH LABELS ARE TO BE USED. PLACARDS SHALL BE 1 1/2" x 5" IN SIZE AND PERMANENTLY AFFIXED TO THE ENCLOSURES EASILY VISIBLE LOCATIONS.
19. VERIZON WIRELESS ELECTRICAL PLACARD REQUIREMENTS:
    a) AVAILABLE FAULT CURRENT RATING FROM UTILITY PROVIDER WITH DATE.
    b) VERIZON WIRELESS SERVICE DISCONNECT AT METER BASE.
    c) VERIZON MAIN BREAKER AT INTEGRATED LOAD CENTER 'ILC'.
    d) GENERATOR NEUTRAL CONDUCTOR BONDED TO SERVICE GROUNDING ELECTRODE IN THIS ENCLOSURE AT METER CENTER AND AUTOMATIC TRANSFER SWITCH "ATS" NEUTRAL BAR.
    e) VERIZON WIRELESS GENERATOR
    f) 'ACCESS PROPERTY OF VERIZON WIRELESS' AT ALL VERIZON WIRELESS FIBER HAND HOLES FASTENED TO INSIDE WALL OF HAND HOLE.
20. ALL EQUIPMENT SHALL BE GROUNDED PER LATEST EDITION OF NEC AND AS INDICATED ON GROUNDING PLAN.
21. ELECTRICAL EQUIPMENT SHALL BE MIN 3'-0" FROM ANY STRUCTURE AND AS REQUIRED BY LOCAL UTILITY COMPANIES.
22. 2 AWG BARE SOLID TINNED COPPER WIRE LEADS FROM NEW H-FRAME STRUCTURE TO BE BONDED TO EXISTING GROUNDING SYSTEM (TYP)
23. ALL METALLIC CABINETS & ENCLOSURES MUST BE GROUNDED WITH 2 AWG TO GROUND RING.
24. ALL ABOVE GRADE GROUND VZW CONNECTIONS SHALL BE IN 1/2" FLEXIBLE PVC CONDUIT w/ANTI-THEFT COMPOUND. ALL OTHER LEADS SHALL BE IN 1/2" PVC CONDUIT.
25. ALL HARDWARE USED MUST BE GALVANIZED OR STAINLESS STEEL, NO ZINC OR OTHER MATERIAL IS TO BE USED.
26. VERIZON WIRELESS FURNISH & INSTALL ALL INNER CONNECTING CONDUITS BETWEEN CABINETS AND LAND ALL AC POWER TO VZW EQUIPMENT.
27. ALL CONDUIT RUNS SHALL HAVE A CONTINUOUS SLOPE DOWNWARD AND AWAY FROM THE METERBOARD SO THAT WATER WILL NOT FLOW FROM THE EQUIPMENT. TRENCHES SHALL BE EXCAVATED ALONG STRAIGHT LINES BEFORE CONDUIT ARE INSTALLED SO THE ELEVATION CAN BE ADJUSTED, IF NECESSARY, TO AVOID UNSEEN OBSTACLES.
28. PRIOR TO THE SUBMISSION OF BIDS, THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS SHALL VERIFY ALL DETAILS AND SCHEDULES ON THE DRAWINGS AND SPECIFICATIONS PROVIDED BY THE OWNER, FOR MEANING OF ABBREVIATIONS AND ADDITIONAL REQUIREMENTS AND INFORMATION. CHECK STRUCTURAL AND OTHER MECHANICAL AND ELECTRICAL DRAWINGS FOR SCALE, SPACE LIMITATIONS, DOOR SWINGS, ADJACENT CARRIER EQUIPMENT COORDINATION AND ADDITIONAL INFORMATION, ETC. REPORT ANY DISCREPANCIES, CONFLICTS, ETC. TO THE OWNER BEFORE SUBMITTING BIDS.

GPD GROUP, INC.
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519

REV.	DATE	DESCRIPTION
A	04/26/24	ISSUED FOR 90% REVIEW
0	05/31/24	FINAL CDs FOR PSC FILING

STATE OF KENTUCKY
STEVEN F. SCHAUB
29008
LICENSED PROFESSIONAL ENGINEER
05/31/2024

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

PANEL SCHEDULE, ONE LINE DIAGRAM, ELECTRICAL NOTES AND DETAILS

ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO. 2023706.11

E-2

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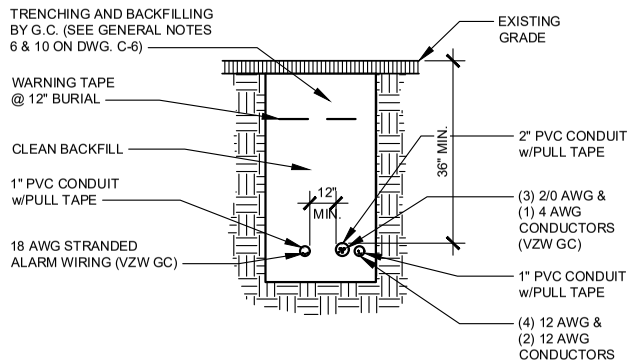
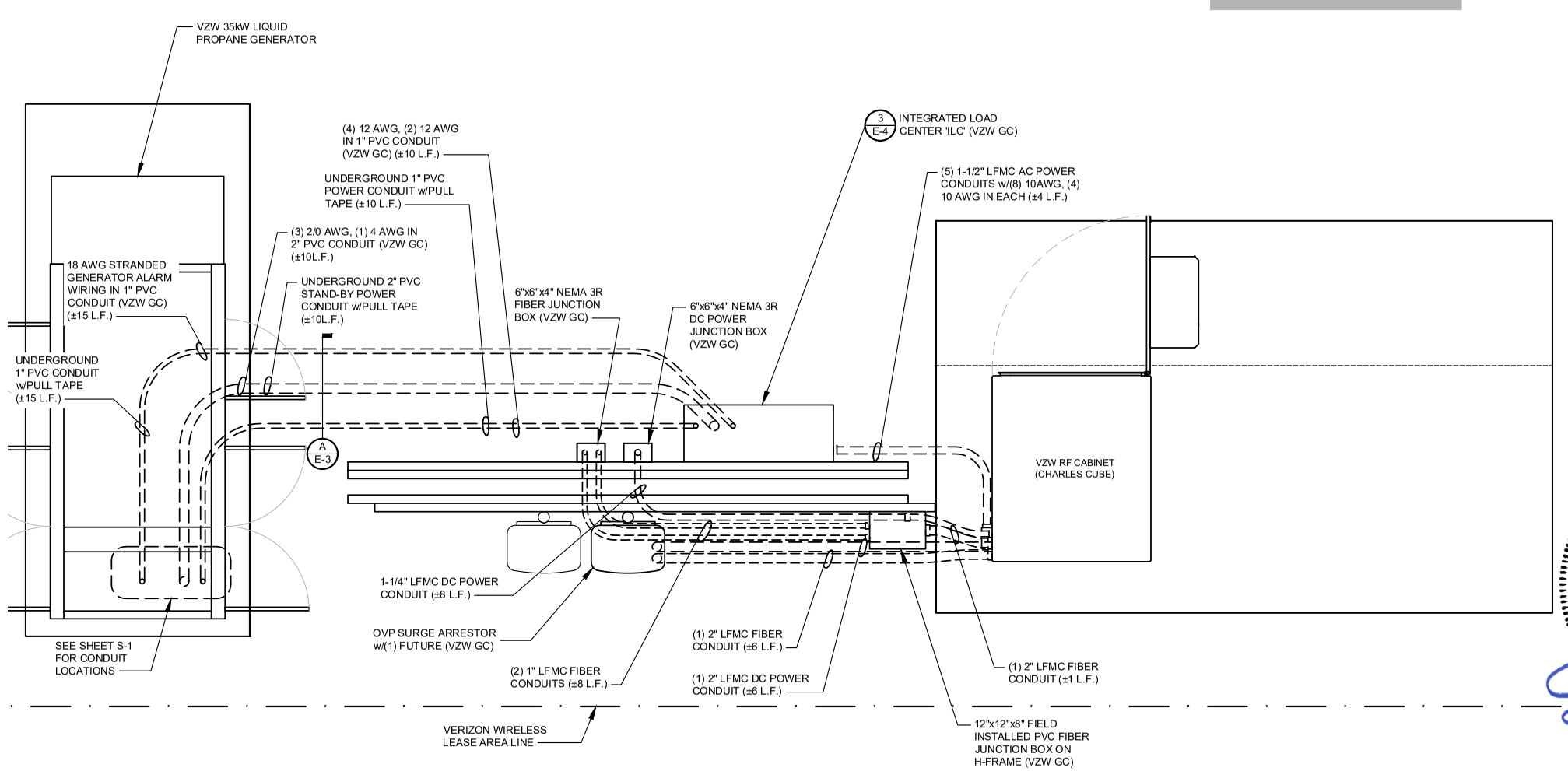
May 31, 2024 11:14 AM - skirschner



GENERATOR FEEDER TRENCH SECTION DETAIL

A / E-3

SCALE: N.T.S.



EQUIPMENT PAD UTILITY PLAN

SCALE: 3/8" = 1'-0"

NORTH

NOTE:

ALL GENERATOR CONDUITS SHALL BE INSTALLED AND CAPPED WEATHERTIGHT FOR FUTURE GENERATOR INSTALLATION IF REQUIRED

ELECTRICAL NOTES:

1. PROVIDE 6'-0" MAX. LIQUIDTIGHT FLEXIBLE METAL CONDUIT AT ALL EQUIPMENT AND GENERATOR CONNECTIONS.
2. ALL CONDUIT SHALL BE ROUTED WITHIN 2'-0" OF PERIMETER COMPOUND FENCE WHERE APPLICABLE.
3. CONDUIT TRENCH WIDTH SHALL NOT EXCEED 18" AT ALL ACCESS DRIVE LOCATIONS AND WHEN CROSSING THE COMPOUND GATE OPENING.
4. ALL CONDUIT RACEWAYS BETWEEN CABINETS ABOVE CONCRETE PAD SHALL BE 2" DIAMETER SCH40 PVC WITH WEATHERPROOF FITTINGS.
5. ALL GENERATOR CONDUITS SHALL BE INSTALLED REGARDLESS OF INITIAL GENERATOR INSTALLATION.

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LICENSED PROFESSIONAL ENGINEER
05/31/2024

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EQUIPMENT PAD UTILITY PLAN & EQUIPMENT PAD TRENCH SECTIONS

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REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

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E-3

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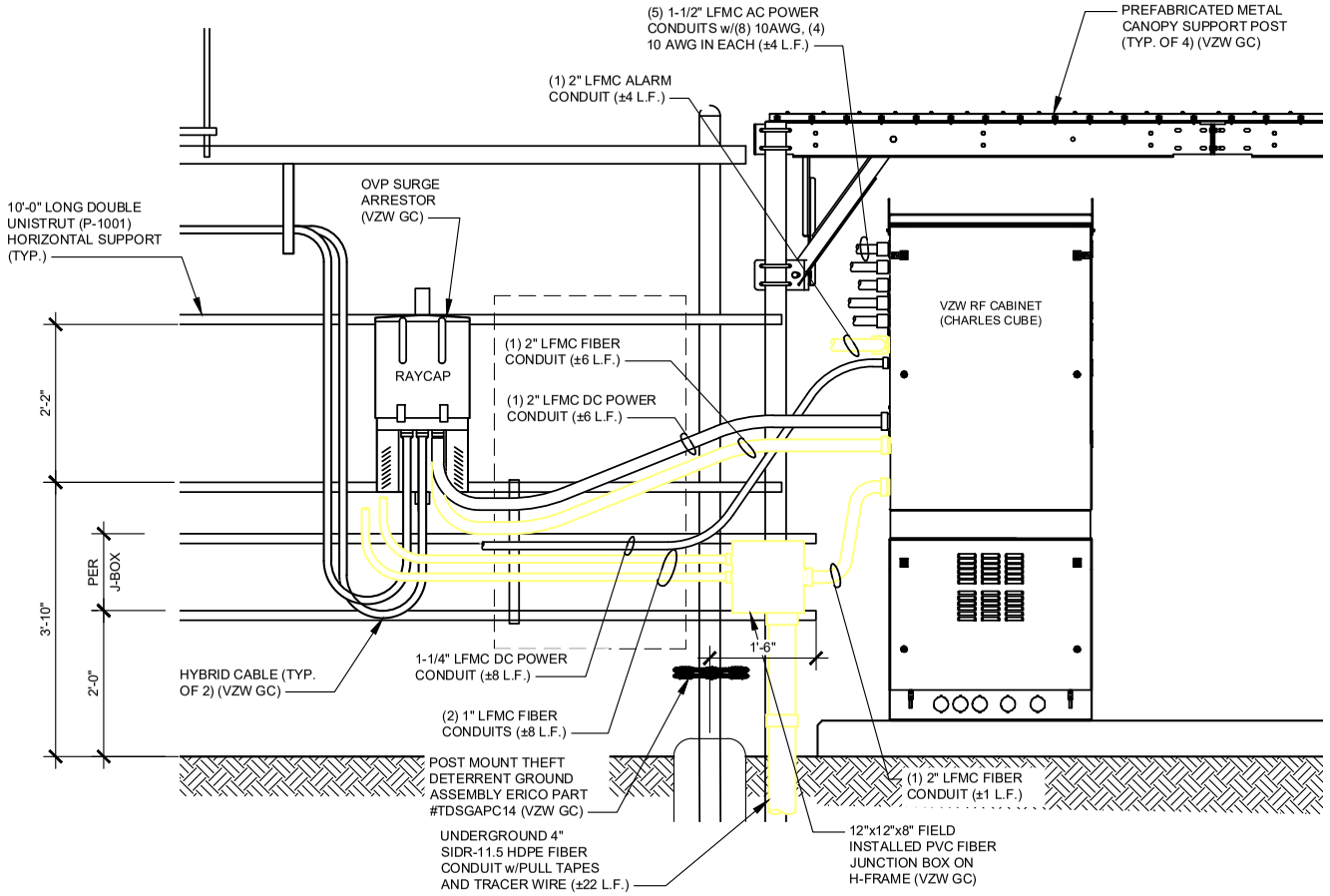
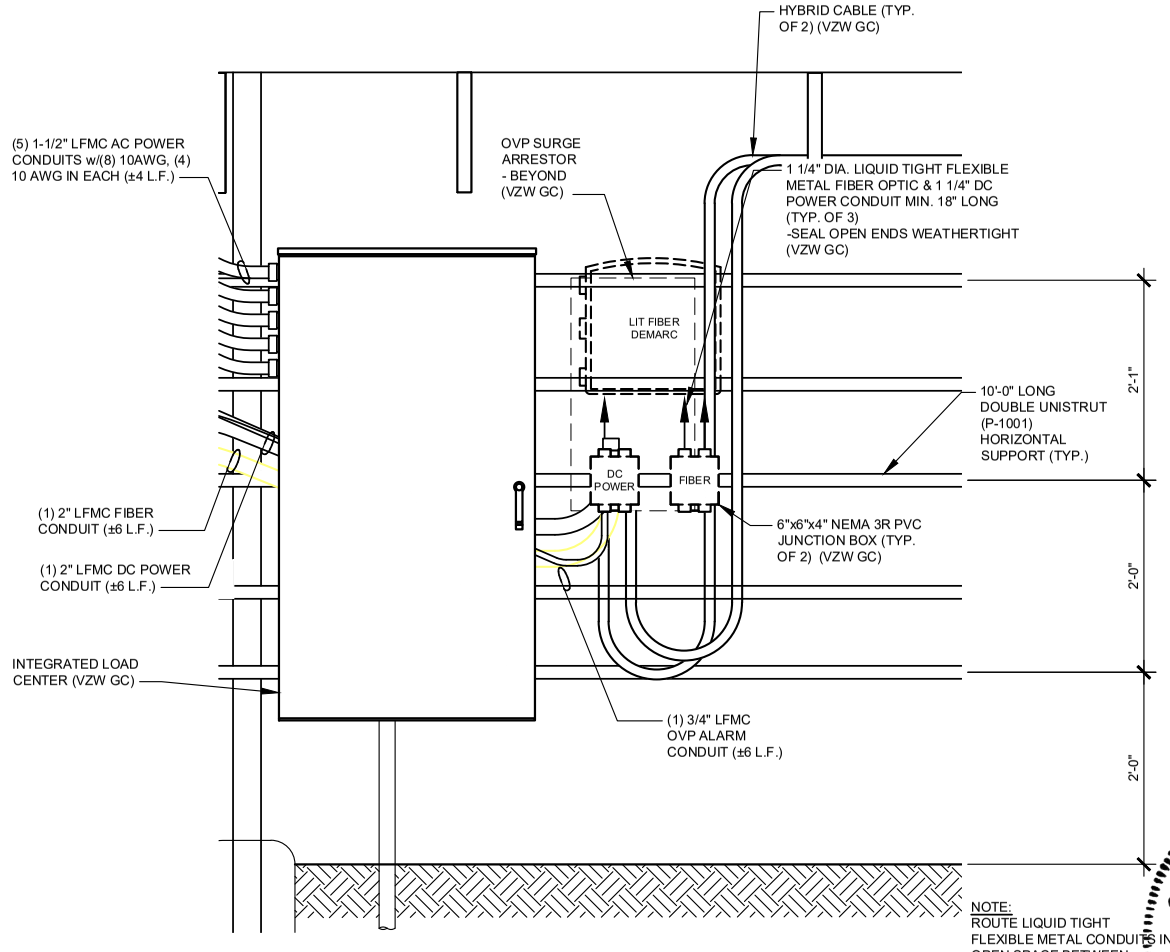


OUTDOOR OVP EQUIPMENT ELEVATION (OVP SIDE) - REAR

1 E-4

SCALE: 3/8" = 1'-0"

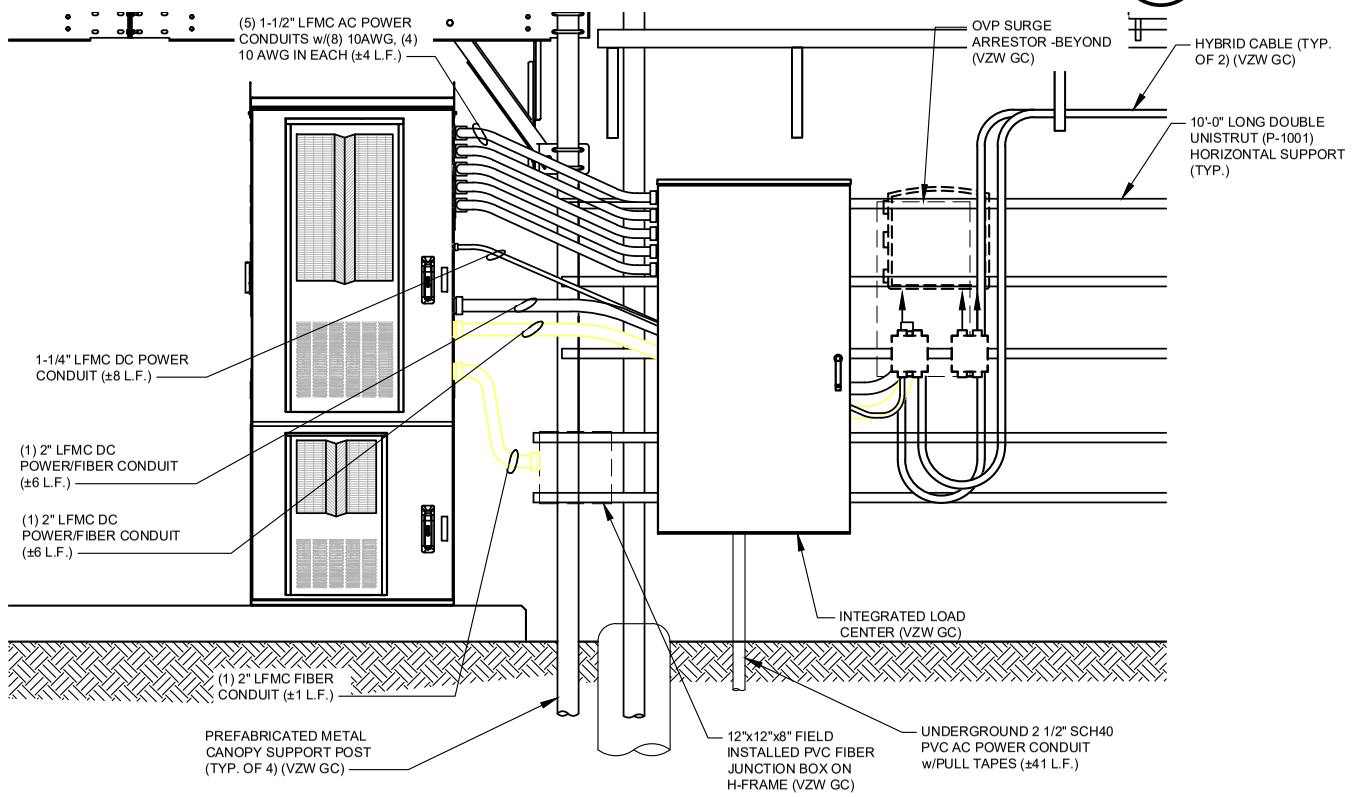


ENLARGERD OVP H-FRAME ELEVATION (LIT FIBER DEMARC)

3 E-4

SCALE: 1/2" = 1'-0"

NOTE:
ROUTE LIQUID TIGHT FLEXIBLE METAL CONDUIT IN OPEN SPACE BETWEEN UNISTRUT SUPPORTS TO PVC CONDUIT STUB-UPS



OUTDOOR OVP EQUIPMENT ELEVATION (ILC SIDE) - FRONT

2 E-4

SCALE: 3/8" = 1'-0"

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OVP & INTEGRATED LOAD CENTER H-FRAME ELEVATIONS AND DETAILS

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PROJECT MANAGER	DESIGNER
TTP	SEK

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E-4

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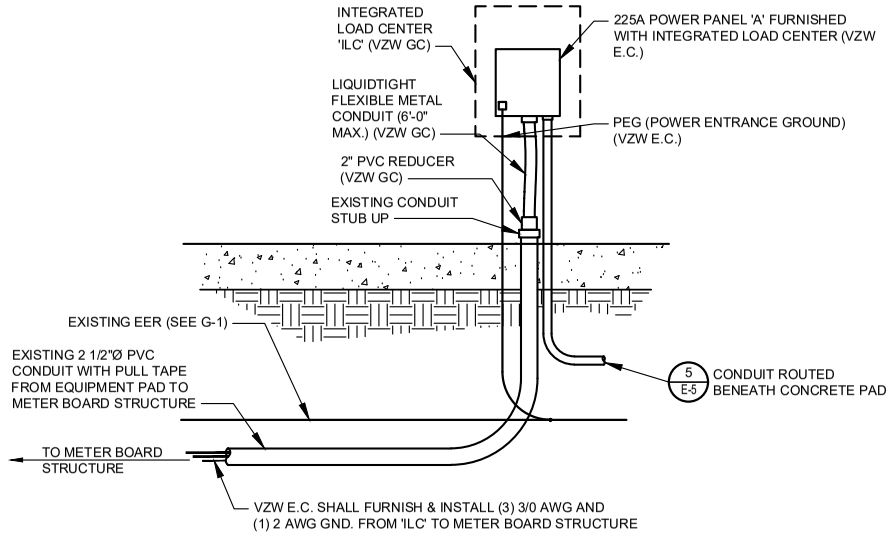
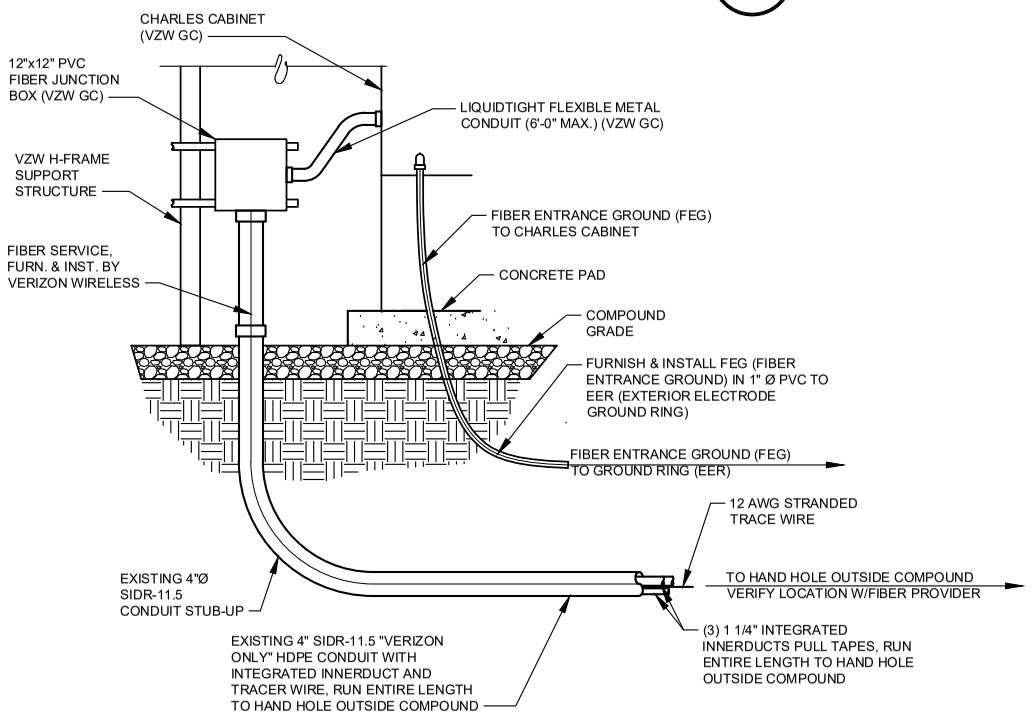


SERVICE ENTRANCE DETAIL

1 E-5

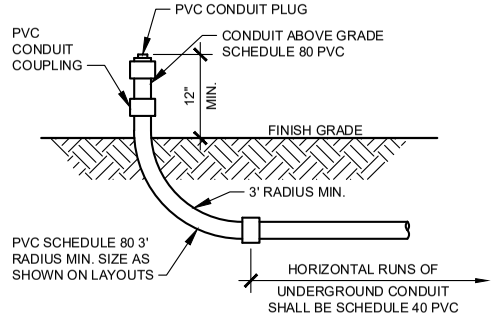
SCALE: N.T.S.



FIBER CONDUIT ENTRANCE DETAIL

2 E-5

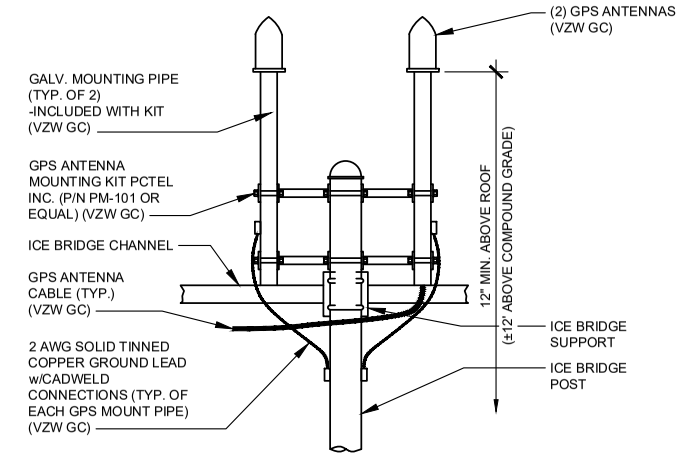
SCALE: N.T.S.



UNDERGROUND CONDUIT STUB-UP DETAIL

3 E-5

SCALE: N. T. S.



*ALL GPS ANTENNA INSTALLATION BY VZW GC

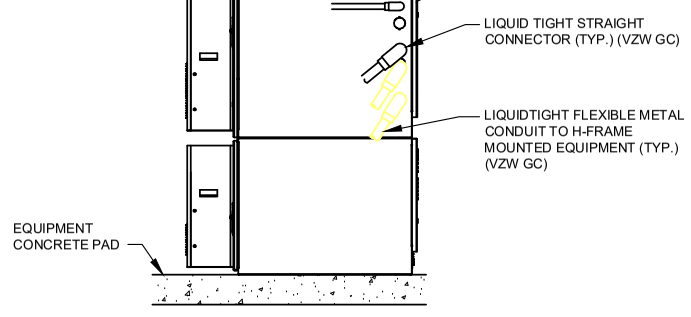
NOTE:

GPS ANTENNA MUST BE INSTALLED IN SUCH A MANNER AS TO PROVIDE A 360° CLEAR VIEW OF THE SKY AT IT'S LOWEST MOUNTING POINT

GPS MOUNT DETAIL

4 E-5

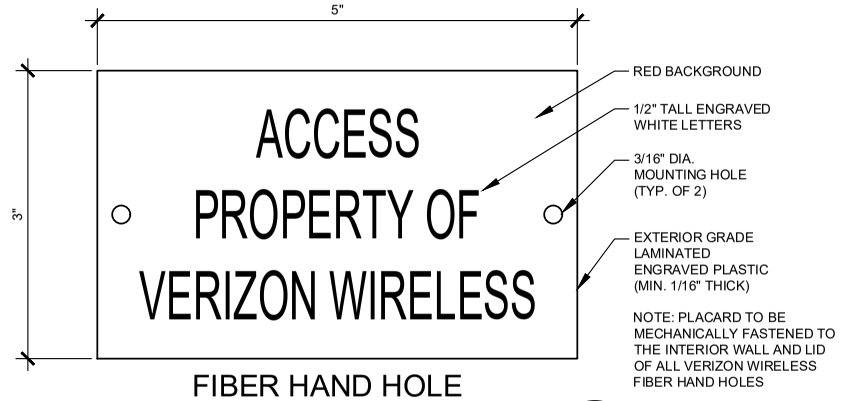
SCALE: N.T.S.
(BY VZW GC)



TYP. CABINET CONDUIT ENTRANCE DETAIL

5 E-5

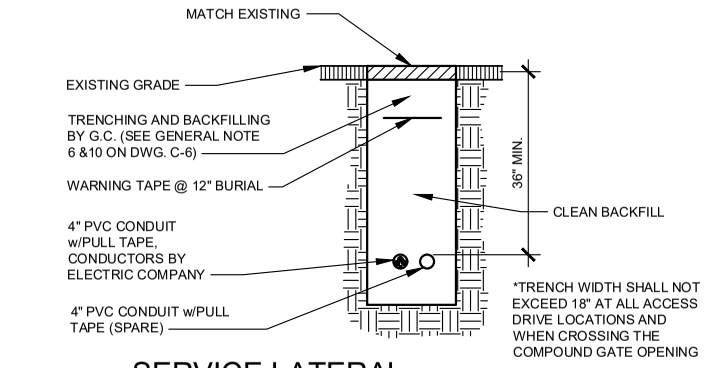
SCALE: N.T.S.
(BY VZW GC)



FIBER HAND HOLE PLACARD DETAIL

6 E-5

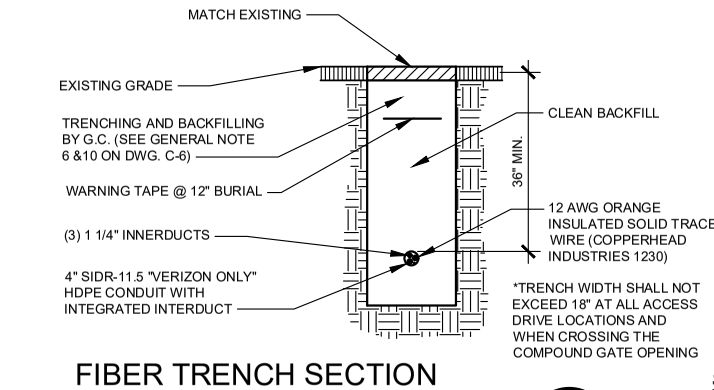
SCALE: N.T.S.



SERVICE LATERAL TRENCH SECTION DETAIL

A E-5

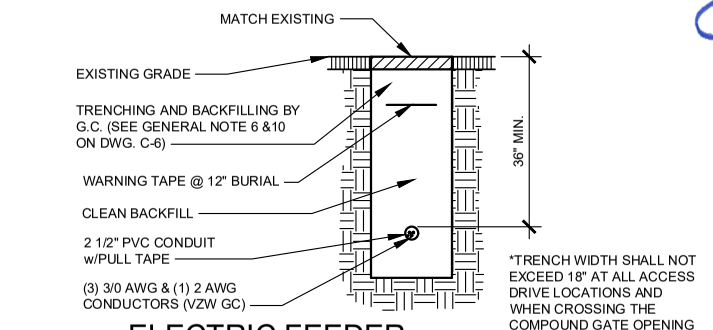
SCALE: N.T.S.



FIBER TRENCH SECTION DETAIL

B E-5

SCALE: N.T.S.



ELECTRIC FEEDER TRENCH SECTION DETAIL

C E-5

SCALE: N.T.S.

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STEVEN E. SCHAUB
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ELECTRICAL DETAILS

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CONSTRUCTION	-/-/--
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PROJECT MANAGER	DESIGNER
TTP	SEK

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E-5

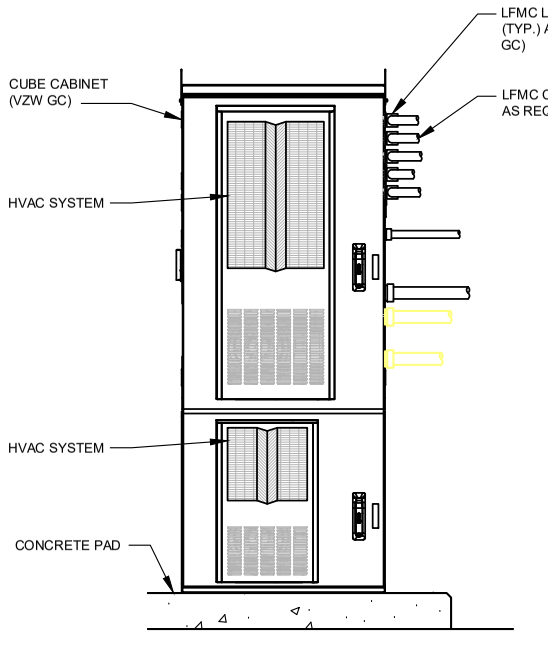
Drawing Name: C:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:15 AM - skirschner

NOTE:

FIBER OPTIC INNERDUCTS SHALL TERMINATE INSIDE CHARLES CABINET ONLY

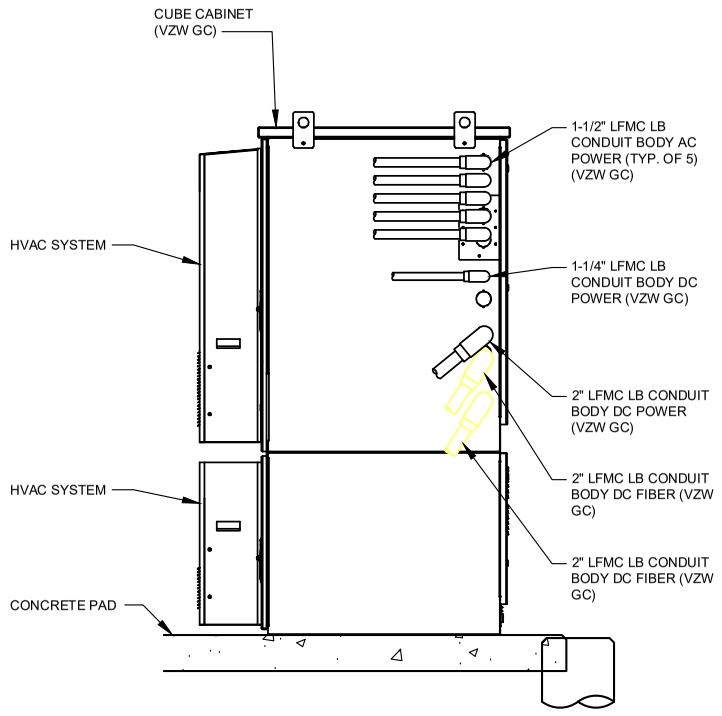
NOTE:

VERIFY INTERIOR EQUIPMENT LOCATION PRIOR TO JUNCTION BOX FASTENER INSTALLATION. NO SHARP FASTENER EDGES PERMITTED WITHIN CHARLES CABINET



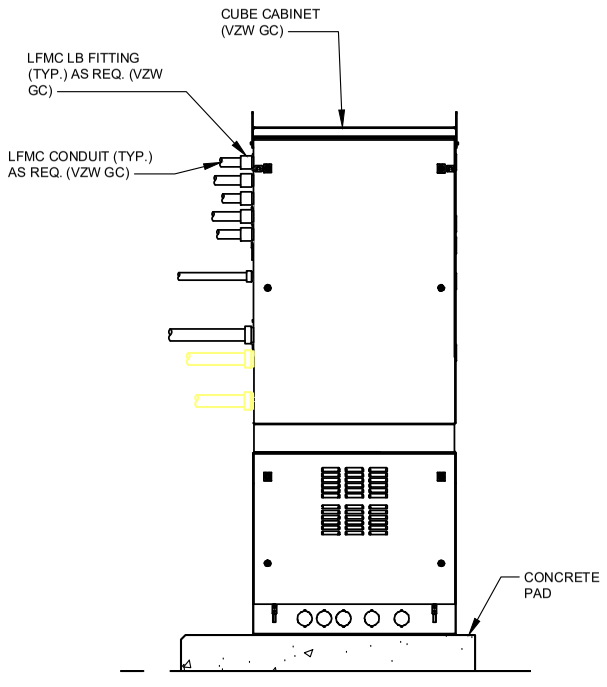
RF CABINET FRONT ELEVATION 1 E-6

SCALE: N.T.S.



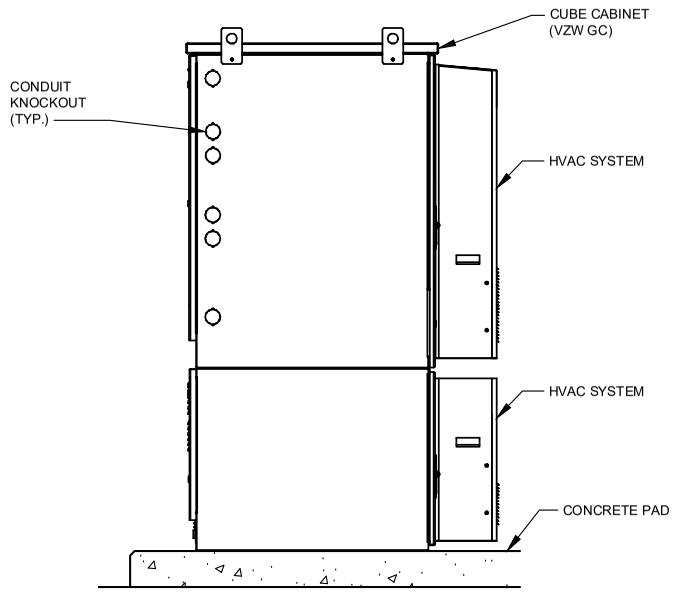
RF CABINET RIGHT ELEVATION 2 E-6

SCALE: N.T.S.



RF CABINET REAR ELEVATION 3 E-6

SCALE: N.T.S.



RF CABINET LEFT ELEVATION 4 E-6

SCALE: N.T.S.

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A	03/29/24	ISSUED FOR 90% REVIEW
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EQUIPMENT CABINET ELEVATIONS

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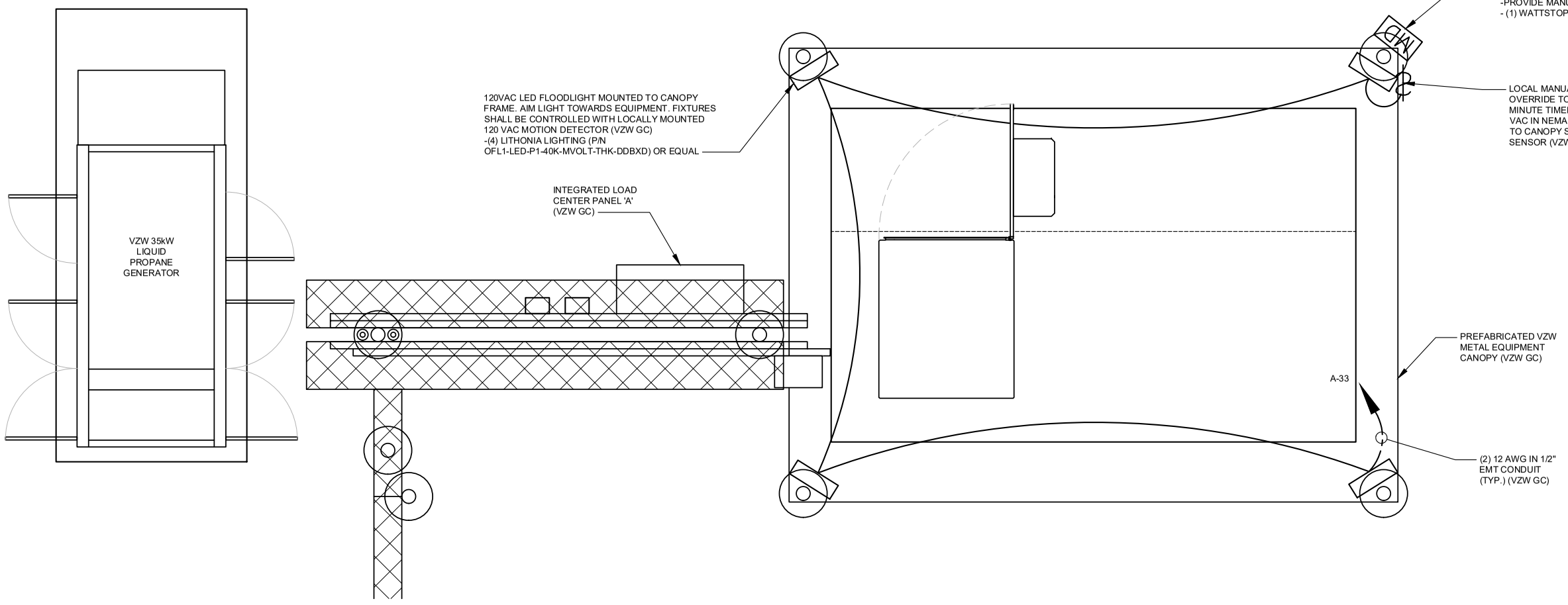
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

E-6



EQUIPMENT PAD LIGHTING PLAN

1 / E-7

SCALE: N.T.S.

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520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

TowerCo®

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STEVEN E. SCHAUB
29008
LICENSED PROFESSIONAL ENGINEER

05/31/2024

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EQUIPMENT PAD LIGHTING PLAN

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TTP	SEK

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E-7

Drawing Name: O:\2023\2023706111 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
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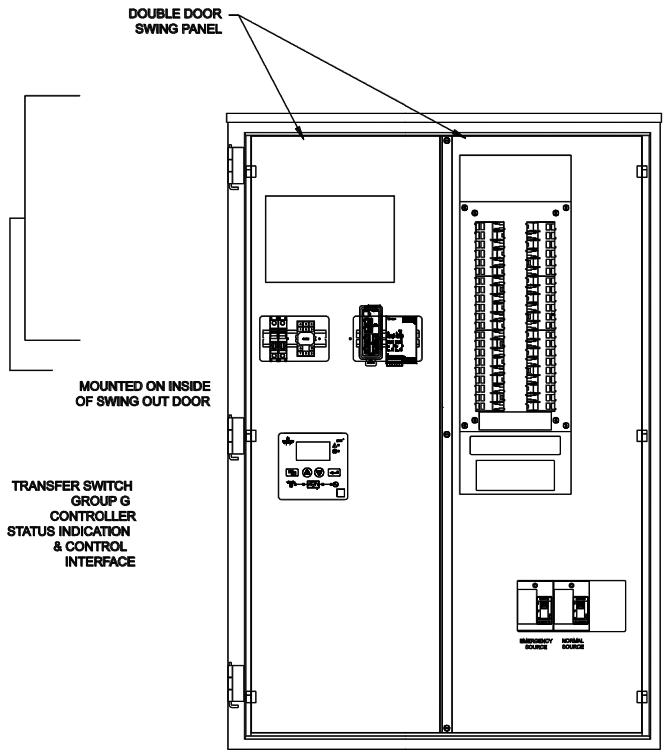
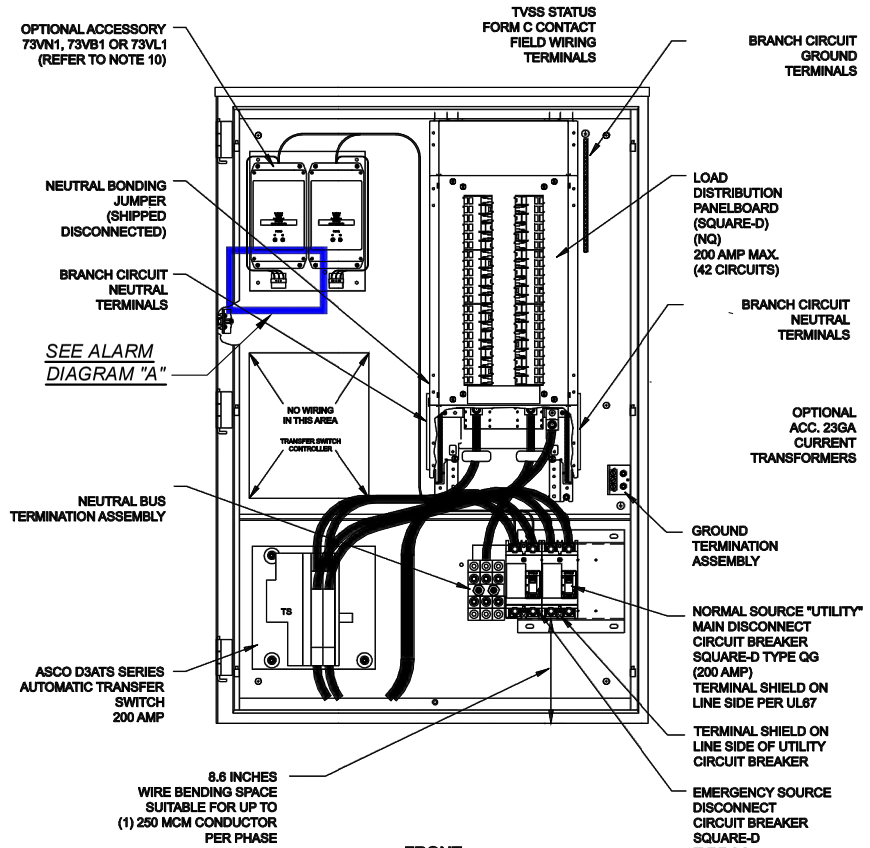
Alarm wiring table

	RMX - 4000 Wiring Install on right side of panel when facing front of panel				Misc Wiring - left side of panel		
Alarm block Pos	Wire color	Alarm	RMX-4000	Wire Color	Wire Color	Alarm	Conn/Pos
1	White/Orange	Door Intrusion	1-4	White or Blue	Orange	Intrusion Alarm	
2	Orange				White Orange		
3	White/Green	Commercial Power Failure	1-4	White or Blue	N/A	N/A	
4	Green				N/A		
5	White/Blue	Surge Suppressor Lightning Arrestor	1-4	White or Blue	N/A	N/A	
6	Blue				N/A		
7	White/Brown	Rectifier Failure	1-4	White or Blue	Green/White	Rectifier Failure	J4 Pos 8
8	Brown				Red/Green		J4 Pos 18
9	White/Orange	Multiple Rectifier Failure	5-8	Red or Blue	White/Red	Multiple Rectifier Failure	J4 Pos 9
10	Orange				Red/White		J4 Pos 19
11	White/Green	Battery Discharge	5-8	Red or Blue	White	Battery Discharge	J4 Pos 4
12	Green				White/Black		J4 Pos 14
13	White/Blue	Low Voltage	5-8	Red or Blue	Black	Low Voltage	J4 Pos 5
14	Blue				Black/White		J4 Pos 15
15	White/Brown	DC Power Failure	5-8	Red or Blue	Blue/White	Fuse	J4 Pos 6
16	Brown				Red/Black	High Voltage	J4 Pos 20
23	White/Brown	HVAC Failure	9-12	Black or Blue	Black	HVAC Failure	
24	Brown				White/Blue		
25	White/Orange	High Temp	13-16	Yellow or Blue	Green	Overheat Alarm	
26	Orange				White/Green		
27	White/Green	Low Temp	13-16	Yellow or Blue	N/A	N/A	
28	Green				N/A		
29	White/Blue	Tower Light	13-16	Yellow or Blue	N/A	N/A	
30	Blue				N/A		
31	White/Brown	Tower Light Side	13-16	Yellow or Blue	N/A	N/A	
32	Brown				N/A		
33	White/Orange	RRH Upconverter Failure	17-20	Violet or Blue	White/Blue	RRH Upconverter Failure	
34	Orange				Blue		
35	White/Green	RRH Power Failure	17-20	Violet or Blue	N/A	N/A	
36	Green				N/A		
37	White/Blue	RRH High Humidity	17-20	Violet or Blue	N/A	N/A	
38	Blue				N/A		
39	White/Brown	RRH Intrusion	17-20	Violet or Blue	N/A	N/A	
40	Brown				N/A		
41	White/Orange	Smoke Fire	21-24	Blue	N/A	N/A	
42	Orange				N/A		
43	White/Green	Bus Bar Theft	21-24	Blue	N/A	N/A	
44	Green				N/A		
45	White/Blue	N/A	21-24	Blue	N/A	N/A	
46	Blue				N/A		
47	White/Brown	N/A	21-24	Blue	N/A	N/A	
48	Brown				N/A		
49	White/Orange	Microwave Critical	25-28	Orange or Blue	N/A	N/A	
50	Orange				N/A		
51	White/Green	Microwave Major	25-28	Orange or Blue	N/A	N/A	
52	Green				N/A		
53	White/Blue	Dehydrator Alarm	25-28	Orange or Blue	N/A	N/A	
54	Blue				N/A		
55	White/Brown	Fire Suppression Discharge	25-28	Orange or Blue	N/A	N/A	
56	Brown				N/A		
57	White/Orange	Fire Suppression Trouble	29-32	Green or Blue	N/A	N/A	
58	Orange				N/A		
59	White/Green	Secondary HVAC Running	29-32	Green or Blue	N/A	N/A	
60	Green				N/A		
61	White/Blue	Explosive gas	29-32	Green or Blue	N/A	N/A	
62	Blue				N/A		
63	White/Brown	High Humidity	29-32	Green or Blue	N/A	N/A	
64	Brown				N/A		
65-84	N/A	N/A	N/A	N/A	N/A	N/A	

ALARM WIRING TABLE — SCALE: N.T.S. — 1 / E-8

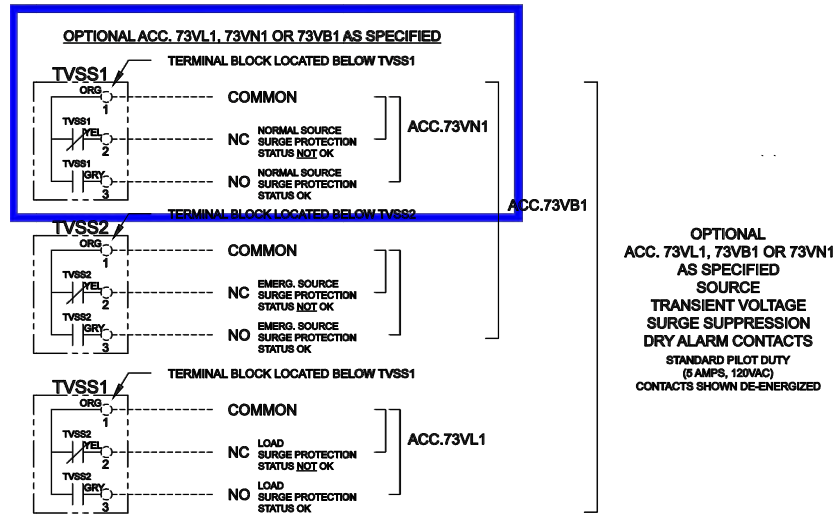


FRONT EXTERIOR DOORS REMOVED



FRONT EXTERIOR DOORS & DOUBLE DOOR SWING PANELS REMOVED

INTEGRATED LOAD CENTER DETAIL — SCALE: N.T.S. — 2 / E-8



NOTE:
1. VERIZON WIRELESS STANDARD ALARM CONTACT NORMALLY CLOSED

ALARM DIAGRAM "A" — SCALE: N.T.S. — A / E-8

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ALARMING TABLE AND DETAILS (REFERENCE ONLY)

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PROJECT MANAGER	DESIGNER
TTP	SEK

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E-8

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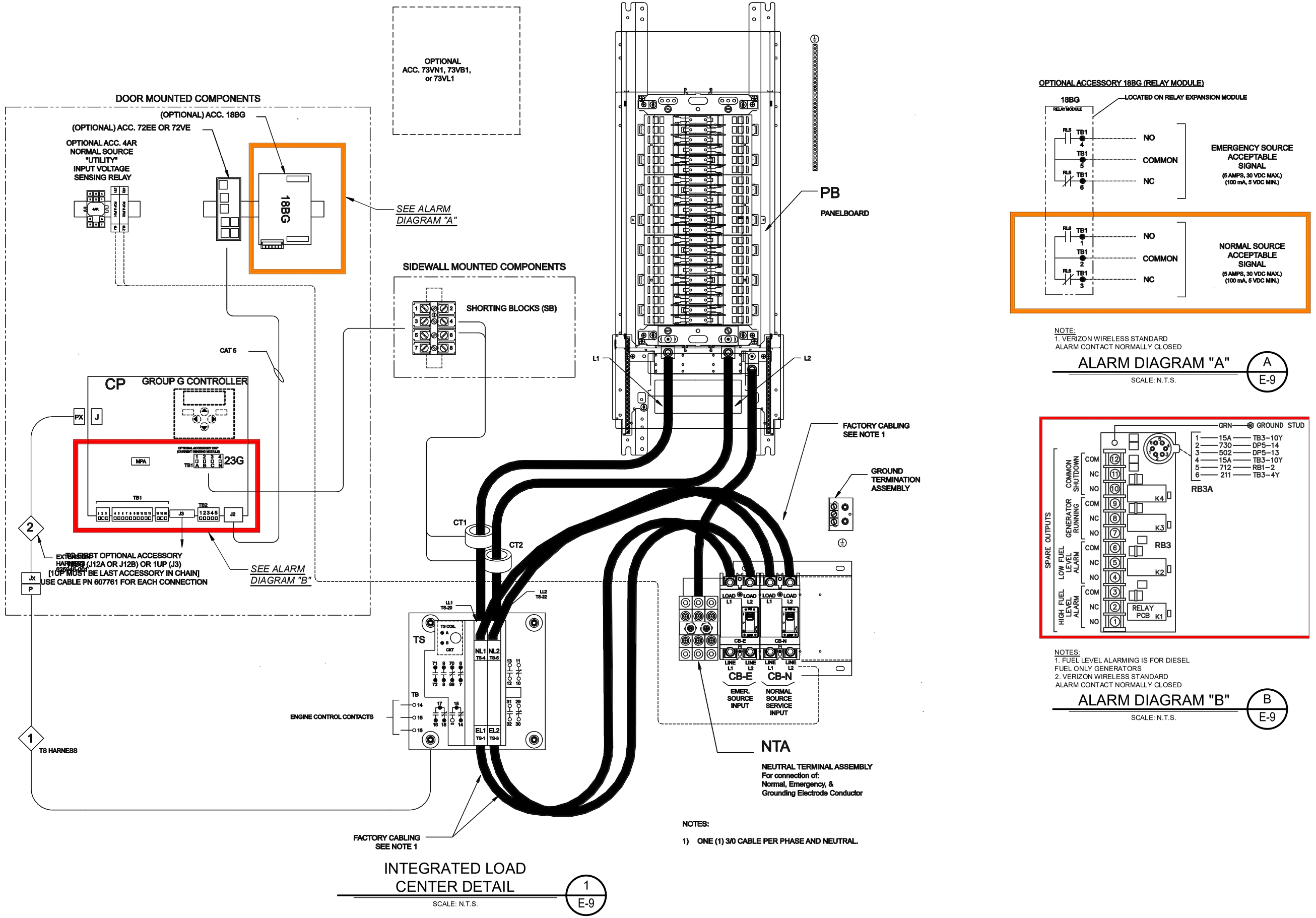

INTEGRATED LOAD CENTER DETAIL

SCALE: N.T.S.

1 / E-9

OPTIONAL ACCESSORY 18BG (RELAY MODULE)

NOTE:
1. VERIZON WIRELESS STANDARD
ALARM CONTACT NORMALLY CLOSED

ALARM DIAGRAM "A"

SCALE: N.T.S.

A / E-9

NOTES:
1. FUEL LEVEL ALARMING IS FOR DIESEL FUEL ONLY GENERATORS
2. VERIZON WIRELESS STANDARD ALARM CONTACT NORMALLY CLOSED

ALARM DIAGRAM "B"

SCALE: N.T.S.

B / E-9

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ALARMING DIAGRAMS AND DETAILS (REFERENCE ONLY)

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E-9

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Scope and test fibers.
Install fibers

Label each end of fibers per label template. Labels should be the same on each end of fiber. Labels should be installed 3-4 inches from end of fiber.

Route fibers out the backside of fiber tray. Separate fibers into Alpha, Beta, and Gamma. Route fibers out of fiber tray as shown.

Route fibers **UNDER** the 6630/6648 Shelf #1 to front side of the cabinet

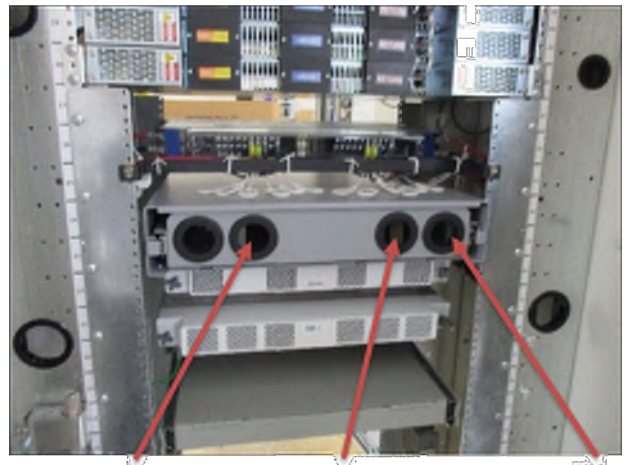
Note: Only install/label Module #4 if fibers are provided.

Note: Only install Aqua fibers if instructed by a supervisor. Otherwise ship loose

Label Template

Updated template

4449 ALPHA	4449 BETA	4449 GAMMA	8843 ALPHA	8843 BETA	8843 GAMMA
6449 ALPHA LINK 1	6449 ALPHA LINK 2	6449 BETA LINK 1	6449 BETA LINK 2	6449 GAMMA LINK 1	6449 GAMMA LINK 2
4408 ALPHA	4408 BETA	4408 GAMMA			



Gamma fibers | Beta fibers | Alpha fibers

Aqua Fibers if installed- label each end the same
Fiber 1
Fiber 2
Fiber 3

FIBER ROUTING DETAIL 1 / E-10
SCALE: N.T.S.

Alarm wiring for Cabinet

Remove old alarm block and install new panel DRP4722SW

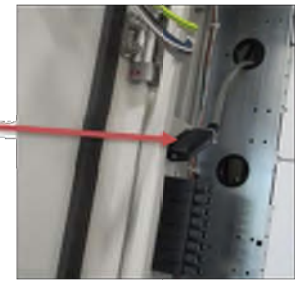
Route wiring from RMX4000 to alarm panel. Wiring will be various colors or all blue as shown

If connector is connected to old alarm block, remove connector and wire to alarm panel

Note: See wiring table on next page

Place alarm block label template on door

Jumper Office Alarm cable wires. Connector J4 position 16 (Blue/Red) and position 10 (Black/red)



ALARM WIRING CONNECTIONS 2 / E-10
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provi
visue

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ALARM AND FIBER CABLE ROUTING (REFERENCE ONLY)

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E-10

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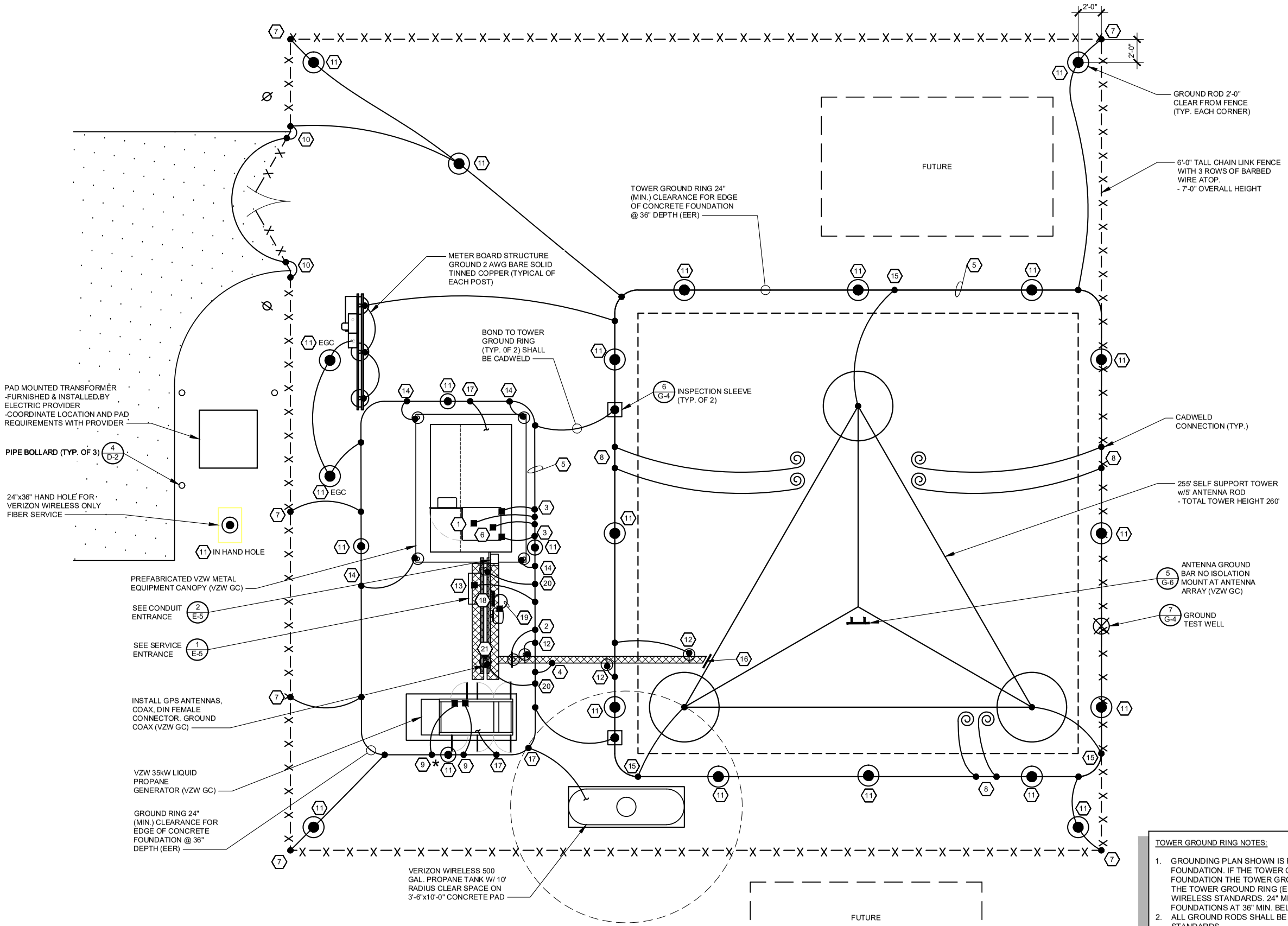

NOTES:
1. ALL ABOVE GRADE GROUND LEADS TO BE INSTALLED IN 1/2" NON-CONDUCTIVE FLEXIBLE PVC CONDUIT WITH ANTI-THEFT COMPOUND.
2. COORDINATE ICE BRIDGE POST GROUND LEAD INSTALLATION WITH ICE BRIDGE POST LOCATIONS ON SHEET S-1.
3. SEE SHEET G-2 FOR GROUNDING KEYED NOTES.

GROUNDING SITE PLAN

SCALE: N.T.S.

NORTH

TOWER GROUND RING NOTES:

1. GROUNDING PLAN SHOWN IS FOR A PAD AND PIER TOWER FOUNDATION. IF THE TOWER OWNER ELECTS TO INSTALL A CAISSON FOUNDATION THE TOWER GROUND RING (EER) WILL BE MODIFIED. THE TOWER GROUND RING (EER) SHALL BE INSTALLED PER VERIZON WIRELESS STANDARDS. 24" MIN. CLEARANCE FROM THE TOWER FOUNDATIONS AT 36" MIN. BELOW GRADE.
2. ALL GROUND RODS SHALL BE INSTALLED PER VERIZON WIRELESS STANDARDS.
3. ALL GROUND LEADS DEPICTED ON THIS PLAN SHALL BE MODIFIED TO CONNECT TO THE MODIFIED TOWER GROUND RING (EER) LOCATION.

GPD GROUP, INC.
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GROUNDING SITE PLAN

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G-1

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TOWER OWNER GROUNDING KEYED NOTES

1. BBG: FURN. & INST. 1 - 2/0 AWG INSULATED STRANDED COPPER GND. WIRE FOR BATTERY BAY GROUND (BBG) TO (EER). COIL UP 6' ABOVE GRADE. CONNECTION TO (EER) SHALL BE CADWELD.
2. CEPSG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR CEPSG POST TO (EER). CONNECTION (EER) SHALL BE CADWELD.
3. CG: FURN. & INST. 2 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR CABINET GROUND (CG) TO (EER). COIL UP 6' ABOVE GRADE. CONNECTION (EER) SHALL BE CADWELD.
4. CSG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND WIRE FOR ICE BRIDGE CHANNEL TO (EER). CONNECTION (EER) SHALL BE CADWELD.
5. EER: FURN. & INST. 2 AWG BARE SOLID TINNED COPPER BURIED EXTERIOR ELECTRODE GROUND RING (EER) AROUND RADIO EQUIPMENT PAD AND TOWER BURIED AT 36" OR 6" BELOW FROST LINE (WHICHEVER IS GREATER). MAINTAIN 24" FROM EQUIPMENT PAD AND TOWER FOUNDATIONS MINIMUM.
6. FEG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR FIBER ENTRANCE GROUND (FEG) TO (TGE). COIL UP 10' ABOVE GRADE. CONNECTION TO (EER) SHALL BE CADWELD.
7. FG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND WIRE FROM NEW FENCING TO GROUND RING (EER). CONNECTION TO FENCING SHALL BE AT THE BASE OF FENCE POST USING CADWELD AND WEAVE GND. WIRE THRU FABRIC AND ATTACH TO TOP RAIL WITH CADWELD. CONNECTION TO (EER) SHALL BE CADWELD.
8. FTWGL: FURN. & INST. FUTURE TOWER WAVEGUIDE GROUND BAR LEADS. CONTRACTOR SHALL COIL UP TEN (10') OF 2 AWG SOLID TINNED COPPER GROUND (TYP.)
9. GEG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR THE GENERATOR ENCLOSURE TO (EER). COIL UP 6' ABOVE GRADE. CONNECTION (EER) SHALL BE CADWELD. *GENERATOR SERVICE GROUND WHERE REQUIRED BY JURISDICTION HAVING AUTHORITY
10. GG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND WIRE AT EACH GATE POST AND PROVIDE GROUND WIRE TO BONDING JUMPER FROM GATE POST TO FENCE POST.
11. GRE: FURN. & INST. GROUND RODS TO 36" BELOW FINISH GRADE (OR 6" BELOW FROST LINE, WHICHEVER IS GREATER) AT A MINIMUM SPACING OF 10'-0" AT RADIO EQUIPMENT PAD, TOWER AND SITE EXTERIOR GROUND SYSTEM. CONNECTION TO (EER) SHALL BE CADWELD. REFER TO DETAIL 5 ON SHEET G-4.
12. IBSG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FROM ICE BRIDGE SUPPORT POST TO (EER). CONNECTION (EER) SHALL BE CADWELD. SEE SHEET S-1 FOR ICE BRIDGE POST LOCATIONS.
13. PEG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR THE 'ILC' GROUND BAR TO (EER). COIL UP 6' ABOVE GRADE. CONNECTION (EER) SHALL BE CADWELD.
14. PCSG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR EACH PAD CANOPY SUPPORT BASE TO (EER). COIL UP 6' ABOVE GRADE. CONNECTION TO (EER) SHALL BE CADWELD.
15. TBG: FURN. & INST. 1- 2 AWG BARE SOLID TINNED COPPER GND. WIRE FROM TOWER LEG BASE PLATE TO (EER). CONNECTION TO TOWER LEG BASE PLATE SHALL BE CADWELD OR MECHANICAL TO LEG AND (EER) SHALL BE CADWELD.
16. TWG: BY VZW E.C.
17. UG: FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE (UFER GROUND) FOR PAD FOUNDATION REINFORCEMENT STEEL CONNECTION TO (EER) SHALL BE CADWELD. PROVIDE HEAT SHRINK TUBING OR ELECTRICAL TAPE PROTECTION FOR CONDUCTOR AT TRANSITION BETWEEN CONCRETE AND SOIL.
18. OGA: BY VZW E.C.
19. OGL: BY VZW E.C.
20. OHG: FURN. & INST. 2 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR THE 'OVP' H-FRAME TO (EER). (TYP. OF 2 POSTS). CONNECTION (EER) SHALL BE CADWELD.
21. GPSG: BY VZW E.C.

TOWER OWNER GROUNDING NOTES

1. ALL UNDERGROUND CONNECTIONS ON THE LIGHTNING PROTECTION SYSTEM SHALL BE EXOTHERMIC WELDED USING THE CADWELD PROCESS. THE TOWER OWNER E.C. SHALL FURN. & INST. ALL THESE CONNECTIONS, INCLUDING WELD METALS, MOLDS AND TOOLS. THE TOWER OWNER E.C. SHALL FURN. & INST. 5/8" x 10' COPPER CLAD STEEL (COPPER JACKET 0.0012" MIN.) GROUND RODS, DRIVEN VERTICAL TO 36" BELOW FIN. GRADE (OR 6" BELOW FROSTLINE, WHICHEVER IS GREATER) @ 10'-0" O.C. MINIMUM.
2. THE TOWER OWNER E.C. SHALL FURN. & INST. 2 AWG BARE SOLID TINNED COPPER GND. WIRE AT A DEPTH OF 36" BELOW FIN. GRADE FOR THE EQUIPMENT PAD (EER) AND ICE BRIDGE (CSG).
3. ALL EXTERIOR GND. CONNECTIONS SHALL BE EXOTHERMIC CADWELD (U.N.O).
4. UPON COMPLETION OF THE EQUIPMENT PAD GROUNDING RING AND BEFORE BONDING TO THE TOWER GROUND RING, THE TOWER OWNER E.C. SHALL MEGGER TEST THIS GROUNDING FIELD. THE REQUIRED RESISTANCE LEVEL IS 5 OHMS OR LESS. THE TOWER OWNER E.C. SHALL NOTIFY THE ENGINEER IF THESE REQUIREMENTS ARE NOT ACHIEVED. THE TOWER OWNER E.C. SHALL SUBMIT PRICING TO TOWER OWNER FOR THE INSTALLATION OF ADDITIONAL GROUND RODS REQUIRED FOR PROPER RESISTANCE. UPON APPROVAL FROM TOWER OWNER, THE TOWER OWNER E.C. SHALL INSTALL ADDITIONAL GROUND RODS AS REQUIRED. AFTER PASSING TEST, THE TOWER OWNER E.C. SHALL BOND THE EQUIPMENT PAD RING TO THE TOWER RING. THE TOWER OWNER E.C. SHALL NOTIFY VERIZON WIRELESS CONSTRUCTION MANAGER AND TOWER OWNER CONSTRUCTION MANAGER 48 HOURS PRIOR TO BACKFILLING TRENCHES, POURING CONCRETE FOR FOUNDATIONS, TO INSPECT BONDS AND INSPECT ANY/ALL BREAKS AND REPAIRS TO THE GROUND RING.
5. GROUND SYSTEM SHALL BE VISUALLY INSPECTED BY A TOWER OWNER AND VERIZON WIRELESS CONSTRUCTION ENGINEER BEFORE BACKFILLING IF REQUESTED.
6. NO SHARP 90° BENDS SHALL BE USED. A LONG SWINGING RADIUS BEND REQUIRED.
7. ALL EQUIPMENT PAD AND EQUIPMENT GROUNDING SHALL BE IN ACCORDANCE WITH VERIZON WIRELESS SPECIFICATIONS.
8. ALL ABOVE GROUND BARE COPPER CONDUCTORS BELOW 10' ABOVE GRADE SHALL BE INSTALLED IN FLEXIBLE PVC CONDUIT. CONDUIT SHALL BE FILLED WITH THEFT DETERRENT COMPOUND (ELECTRIC MOTION COMPANY ANTI-THEFT COMPOUND EM-5101).
9. CONNECTION OF COPPER CONDUCTORS TO GALVANIZED METAL OR ALUMINUM SHALL BE AVOIDED. BRASS OR STAINLESS STEEL LUGS OR BARS SHALL BE USED FOR THESE CONNECTIONS.
10. BARE COPPER CONDUCTORS SHALL NOT BE INSTALLED WHERE THEY MAY BE IN CONTACT WITH GALVANIZED METALS. THE CONDUCTORS SHALL BE INSULATED OR ENCLOSED IN PVC CONDUIT, PLASTIC SEALTIGHT OR INSTALLED WITH STANDOFF SUCH THAT NO CONTACT BETWEEN DISSIMILAR METALS MAY TAKE PLACE.

LEGEND	
BBG	BATTERY BAY GROUND
CEPSG	COAX ENTRY PROTECTION SYSTEM GROUND
CG	CABINET GROUND
CSG	CABLE SUPPORT GROUND
EER	BURIED EXTERIOR ELECTRODE GROUND RING
EGC	EQUIPMENT GROUNDING CONDUCTOR (NEC DESIGNATION)
FEG	FIBER ENTRANCE GROUND
FG	FENCE GROUND
FTWGL	FUTURE TOWER WAVEGUIDE GROUND LEAD
GEC	GROUNDING ELECTRODE CONDUCTOR (NEC DESIGNATION)
GEG	GENERATOR ENCLOSURE GROUND
GES	GROUNDING ELECTRODE SYSTEM (NEC DESIGNATION)
GG	GATE GROUND
GRE	GROUND ROD ELECTRODE
IBSG	ICE BRIDGE SUPPORT GROUND
OGA	OVP GROUND ASSEMBLY
OGL	OVP GROUND LEAD
OHG	OVP H-FRAME SUPPORT GROUND
PEG	POWER ENTRANCE GROUND
PCSG	PAD CANOPY SUPPORT GROUND DOWN LEAD
TBG	TOWER BASE GROUND
TWG	TOWER WAVEGUIDE GROUND ASSEMBLY
UG	UFER GROUND (PIER FOUNDATION)
●	CABLE TO CABLE CADWELD CONNECTION
◉	CABLE TO GND. ROD CADWELD CONNECTION
⊠	TEST WELL
▣	INSPECTION PORT CABLE TO CABLE CADWELD CONNECTION

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GROUNDING NOTES

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PROJECT MANAGER	DESIGNER
TTP	SEK

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G-2

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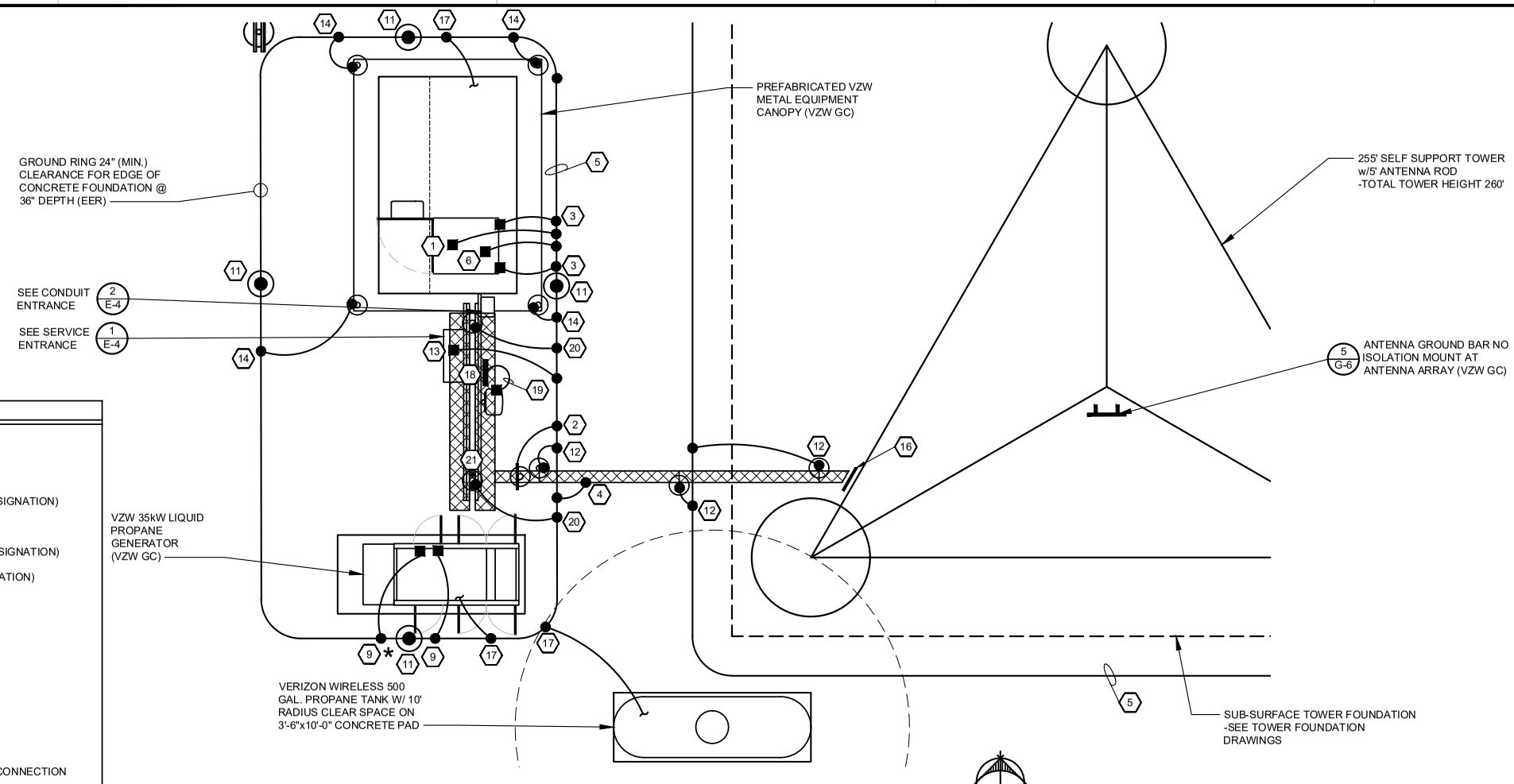

VERIZON WIRELESS GROUNDING PLAN

SCALE: N.T.S.

NORTH

LEGEND	
BBG	BATTERY BAY GROUND
CEPSG	COAX ENTRY PROTECTION SYSTEM GROUND
CG	CABINET GROUND
CSG	CABLE SUPPORT GROUND
EER	BURIED EXTERIOR ELECTRODE GROUND RING
EGC	EQUIPMENT GROUNDING CONDUCTOR (NEC DESIGNATION)
FEG	FIBER ENTRANCE GROUND
FG	FENCE GROUND
FTWGL	FUTURE TOWER WAVEGUIDE GROUND LEAD
GEC	GROUNDING ELECTRODE CONDUCTOR (NEC DESIGNATION)
GEG	GENERATOR ENCLOSURE GROUND
GES	GROUNDING ELECTRODE SYSTEM (NEC DESIGNATION)
GG	GATE GROUND
GRE	GROUND ROD ELECTRODE
IBSG	ICE BRIDGE SUPPORT GROUND
OGA	OVP GROUND ASSEMBLY
OGL	OVP GROUND LEAD
OHG	OVP H-FRAME SUPPORT GROUND
PEG	POWER ENTRANCE GROUND
PCSG	PAD CANOPY SUPPORT GROUND DOWN LEAD
TBG	TOWER BASE GROUND
TWG	TOWER WAVEGUIDE GROUND ASSEMBLY
UG	UFER GROUND (PIER FOUNDATION)
	CABLE TO CABLE CADWELD CONNECTION
	CABLE TO GND. ROD CADWELD CONNECTION
	TEST WELL
	INSPECTION PORT CABLE TO CABLE CADWELD CONNECTION

VERIZON WIRELESS GROUNDING KEYED NOTES

1. BBG: VZW E.C. SHALL CONNECT THE 1 - 2/0 AWG INSULATED STRANDED COPPER GND. WIRE COILED UP BY THE TOWER OWNER E.C. FOR THE BATTERY BAY GROUND (BBG). CONNECTION TO THE GROUND BAR IN THE BATTERY BAY SHALL BE MECHANICAL. ROUTE LEAD IN LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT w/ANTI-THEFT COMPOUND.
2. CEPSG: VZW E.C. SHALL FURNISH & INSTALL THE THEFT DETERRENT GROUND POST ASSEMBLY PART #TDSGAPC14 FOR THE COAX ENTRY PROTECTION SYSTEM (AS MFG'D. BY ERICO GROUNDING AND SUPPLIED BY VZW E.C.) TO THE POST. CONNECT THE 2 AWG BARE SOLID TINNED COPPER COILED UP BY TOWER OWNER E.C. TO THE POST. THE CONNECTION TO POST SHALL BE CADWELD. REFER TO THE GENERAL INSTALLATION GUIDE AS SUPPLIED WITH THEFT DETERRENT POST MOUNT GROUND ASSEMBLY. SEE DETAIL 1 ON SHEET G-5 FOR DETAILS.
3. CG: VZW E.C. SHALL FURNISH & INSTALL TWO HOLE LONG BARREL LUGS ON EXISTING 2 AWG BARE TINNED COPPER LEADS. VZW E.C. SHALL FURNISH & INSTALL DRAGON TOOTH WASHERS AND #8 STAINLESS STEEL FASTENERS ON ALL EQUIPMENT CABINET EXTERIOR GROUND LOCATIONS (TYP. 2 PER CABINET). REMOVE ALL SURFACE PAINT AND USE ANTIOXIDENT COMPOUND BETWEEN METAL AND WASHER. ALL LEADS SHALL BE DRESSED TO REDUCE TRIP HAZARDS. DETAIL 3 ON SHEET G-5 FOR DETAILS.
4. CSG: BY TOWER OWNER E.C.
5. EER: BY TOWER OWNER E.C.
6. FEG: VZW E.C. SHALL BRING THE 2 AWG BARE SOLID TINNED COPPER GND. WIRE COILED UP BY TOWER OWNER E.C. FOR (FIBER ENTRANCE GROUND) INTO THE POWER PLANT CABINET AND MAKE A MECHANICAL CONNECTION TO THE FIBER SERVICE GROUND POINT. ROUTE LEAD IN FLEXIBLE NONMETALLIC CONDUIT w/ANTI-THEFT COMPOUND.
7. FG: BY TOWER OWNER E.C.
8. FTWGL: BY TOWER OWNER E.C.
9. GEG: VZW E.C. SHALL CONNECT THE 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE COILED UP BY TOWER OWNER E.C. FOR THE GENERATOR ENCLOSURE. CONNECTION TO GENERATOR ENCLOSURE SHALL BE MECHANICAL. ROUTE LEAD IN FLEXIBLE NONMETALLIC CONDUIT w/ANTI-THEFT COMPOUND. *GENERATOR SERVICE GROUND WHERE REQUIRED BY JURISDICTION HAVING AUTHORITY
10. GG: BY TOWER OWNER E.C.
11. GRE: BY TOWER OWNER E.C.
12. IBSG: BY TOWER OWNER E.C.
13. PEG: VZW E.C. SHALL CONNECT 1 - 2 AWG BARE SOLID TINNED COPPER GND WIRE FOR THE POWER ENTRANCE GROUND (PEG) COILED UP BY TOWER OWNER E.C. CONNECTION OF THE COILED WIRE TO THE INTEGRATED LOAD CENTER GROUND BAR SHALL BE MECHANICAL. ROUTE LEAD IN FLEXIBLE NONMETALLIC CONDUIT w/ANTI-THEFT COMPOUND.
14. PCSG: VZW E.C. SHALL CONNECT SOLID TINNED COPPER ONE HOLE GROUND TAB TO COILED UP GROUND WIRE BY TOWER OWNER E.C. WITH AN EXOTHERMIC CONNECTION. THE CONNECTION OF THE COILED GROUND WIRE AND LUG TO THE CANOPY SUPPORT BASE SHALL BE MECHANICAL. SEE DETAIL 3 ON SHEET G-5. ROUTE LEAD IN FLEXIBLE NONMETALLIC CONDUIT w/ANTI-THEFT COMPOUND.
15. TBG: BY TOWER OWNER E.C.
16. TWG: VZW E.C. SHALL FURN. & INST. THEFT DETERRENT GROUND ASSEMBLY KIT PART #TDSGABC14 FOR THE TOWER WAVEGUIDE GROUND (TWG) DIRECTLY TO THE TOWER (SEE SITE SPECIFIC GROUNDING PLAN OF DESIGN DRAWINGS).
17. UG: BY TOWER OWNER E.C.
18. OGA: VZW E.C. SHALL FURN. & INST. THE THEFT DETERRENT GROUND ASSEMBLY KIT PART #TDSGAPC14 FOR THE OVP GROUND (OGL) DIRECTLY TO THE OVP H-FRAME POST. SEE DETAIL 4 ON SHEET G-5.
19. OGL: VZW E.C. SHALL FURN. & INST. 1 - 6 AWG GREEN INSULATED STRANDED COPPER GND. WIRE FROM OVP GROUND POINT TO OVP GROUND ASSEMBLY (OGA). CONNECTION TO GROUND BAR SHALL BE MECHANICAL.
20. OHG: BY TOWER OWNER E.C.
21. GPSG: VZW E.C. SHALL FURN. & INST. 1 - 2 AWG BARE SOLID TINNED COPPER GND. WIRE FOR GPS ANTENNA MOUNT PIPE TO H-FRAME SUPPORT POST (TYP. OF 2). CONNECTION TO PIPE AND POST SHALL BE CADWELD.

VERIZON WIRELESS GROUNDING NOTES

1. ALL UNDERGROUND CONNECTIONS ON THE LIGHTNING PROTECTION SYSTEM SHALL BE EXOTHERMIC WELDED USING THE CADWELD PROCESS. THE VZW E.C. AND GENERAL CONTRACTOR E.C. SHALL FURN. & INST. ALL THESE CONNECTIONS, INCLUDING WELD METALS, MOLDS AND TOOLS. THE E.C. SHALL FURN. & INST. 5/8" x 10' COPPER CLAD STEEL (COPPER JACKET 0.0012" MIN.) GROUND RODS, DRIVEN VERTICAL TO 36" BELOW FIN. GRADE (OR 6" BELOW FROSTLINE, WHICHEVER IS GREATER) @ 10'-0" O.C. MINIMUM.
2. THE VZW E.C. SHALL FURN. & INST. 2 AWG BARE SOLID TINNED COPPER GND. WIRE AT A DEPTH OF 36" BELOW FIN. GRADE FOR THE EQUIPMENT PAD (EER) AND ICE BRIDGE (CSG).
3. THE GENERAL CONTRACTOR E.C. SHALL FURN. & INST. 2 AWG BARE SOLID TINNED COPPER GND. WIRE AT A DEPTH OF 36" BELOW FIN. GRADE FOR THE TOWER (EER), FUTURE TOWER WAVEGUIDE GROUND LEADS (FTWGL), GATE GROUND (GG), FENCE (FG), TOWER BASE GROUND (TBG) AND TOWER WAVEGUIDE GROUND (TWG).
4. ALL EXTERIOR GND. CONNECTIONS SHALL BE EXOTHERMIC CADWELD (U.N.O.).
5. ALL CRIMP LUG CONNECTIONS TO ALL GROUND BARS SHALL BE LUBRICATED WITH A CORROSION INHIBITER ("OXY-GREASE") OR APPROVED EQUAL.
6. UPON COMPLETION OF THE TOWER GROUNDING RING, THE GENERAL CONTRACTOR E.C. SHALL MEGGER TEST THE COUMPOUND GROUNDING FIELD. THE REQUIRED RESISTANCE LEVEL IS 5 OHMS OR LESS. THE GENERAL CONTRACTOR E.C. SHALL NOTIFY THE ENGINEER IF THESE REQUIREMENTS ARE NOT ACHIEVED. THE GENERAL CONTRACTOR E.C. SHALL SUBMIT PRICING TO TOWER OWNER FOR THE INSTALLATION OF ADDITIONAL GROUND RODS REQUIRED FOR PROPER RESISTANCE. UPON APPROVAL FROM TOWER OWNER, THE GENERAL CONTRACTOR E.C. SHALL INSTALL ADDITIONAL GROUND RODS AS REQUIRED. AFTER PASSING TEST, THE GENERAL CONTRACTOR E.C. SHALL NOTIFY TOWER OWNER 48 HOURS PRIOR TO BACKFILLING TRENCHES, POURING CONCRETE FOR FOUNDATIONS, TO INSPECT BONDS AND INSPECT ANY/ALL BREAKS AND REPAIRS TO THE GROUND RING.
7. UPON COMPLETION OF THE RADIO EQUIPMENT PAD GROUNDING RING AND BEFORE BONDING TO THE TOWER GROUNDING RING, THE VZW E.C. SHALL MEGGER TEST THE EQUIPMENT PAD GROUNDING FIELD. THE REQUIRED RESISTANCE LEVEL IS 5 OHMS OR LESS. THE VZW E.C. SHALL NOTIFY THE ENGINEER IF THESE REQUIREMENTS ARE NOT ACHIEVED. THE VZW E.C. SHALL SUBMIT PRICING TO VERIZON WIRELESS FOR THE INSTALLATION OF ADDITIONAL GROUND RODS REQUIRED FOR PROPER RESISTANCE. UPON APPROVAL FROM VERIZON WIRELESS, THE VZW E.C. SHALL INSTALL ADDITIONAL GROUND RODS AS REQUIRED. AFTER PASSING TEST, THEN THE VZW E.C. SHALL BOND THE RADIO EQUIPMENT PAD GROUND RING TO THE TOWER GROUND RING. THE VZW E.C. SHALL NOTIFY VERIZON WIRELESS 48 HOURS PRIOR TO BACKFILLING TRENCHES, POURING CONCRETE FOR FOUNDATIONS, TO INSPECT BONDS AND INSPECT ANY/ALL BREAKS AND REPAIRS TO THE GROUND RING.
8. GROUND SYSTEM SHALL BE VISUALLY INSPECTED BY A TOWER OWNER AND VERIZON WIRELESS CONSTRUCTION ENGINEER BEFORE BACKFILLING IF REQUESTED.
9. GROUND ASSEMBLIES SHALL BE THEFT DETERRENT DESIGN AS MANUFACTURED BY ERICO INC. AND FURNISHED BY VERIZON WIRELESS. PROVIDE TWO (2) LUG HOLES PER VERIZON WIRELESS STANDARDS. UNLESS NOTED OTERWISE.
10. ALL ABOVE GROUND BARE COPPER CONDUCTORS BELOW 10' ABOVE GRADE SHALL BE INSTALLED IN FLEXIBLE PVC CONDUIT. CONDUIT SHALL BE FILLED WITH THEFT DETERRENT COMPOUND (ELECTRIC MOTION COMPANY ANTI-THEFT COMPOUND EM-5101).
11. BARE COPPER CONDUCTORS SHALL NOT BE INSTALLED WHERE THEY MAY BE IN CONTACT WITH GALVANIZED METALS. THE CONDUCTORS SHALL BE INSULATED OR ENCLOSED IN PVC CONDUIT, PLASTIC SEALTIGHT OR INSTALLED WITH STANDOFF SUCH THAT NO CONTACT BETWEEN DISSIMILAR METALS MAY TAKE PLACE.
12. CONNECTION OF COPPER CONDUCTORS TO GALVANIZED METAL OR ALUMINUM SHALL BE AVOIDED. BRASS OR STAINLESS STEEL LUGS OR BARS SHALL BE USED FOR THESE CONNECTIONS.
13. NO SHARP 90° BENDS SHALL BE USED. A LONG SWINGING RADIUS BEND REQUIRED.
14. ALL GROUNDING SHALL BE IN ACCORDANCE WITH VERIZON WIRELESS SPECIFICATIONS.

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29008
LICENSED PROFESSIONAL ENGINEER
05/31/2024

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VERIZON WIRELESS GROUNDING PLAN AND NOTES

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PROJECT MANAGER	DESIGNER
TTP	SEK

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G-3

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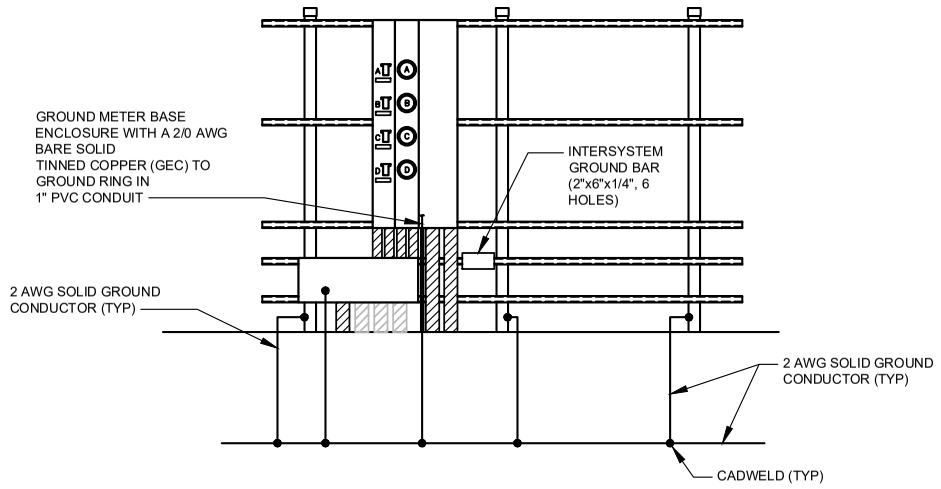
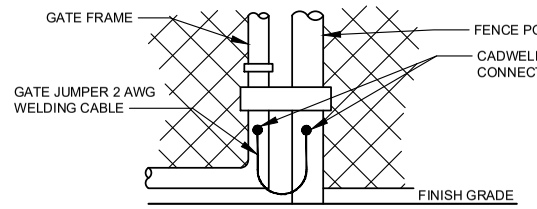


METER BOARD STRUCTURE GROUNDING

1 G-4

SCALE: 1/4" = 1'-0"



GATE GROUNDING DETAIL

4 G-4

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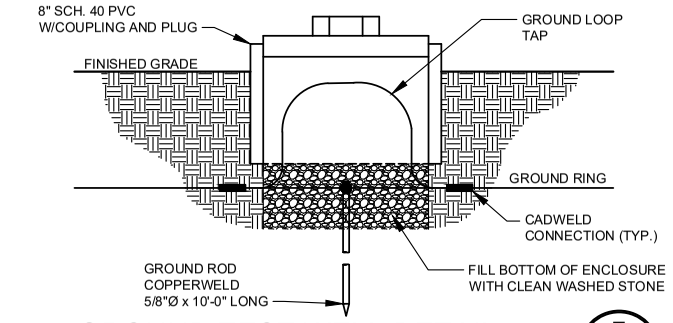

GROUND TEST WELL DETAIL

7 G-4

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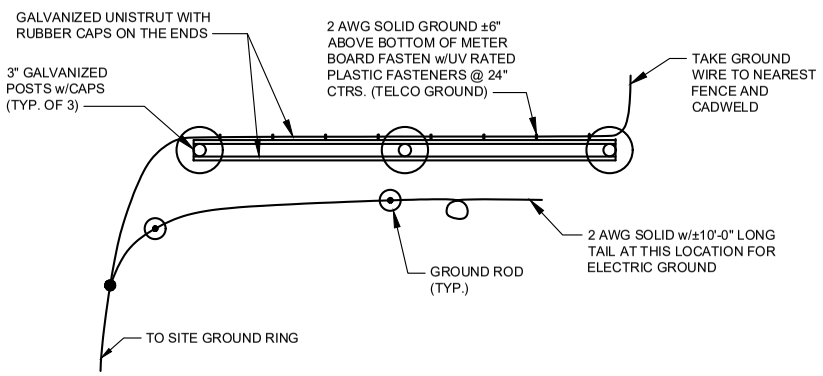

METER BOARD STRUCTURE GROUND PLAN

2 G-4

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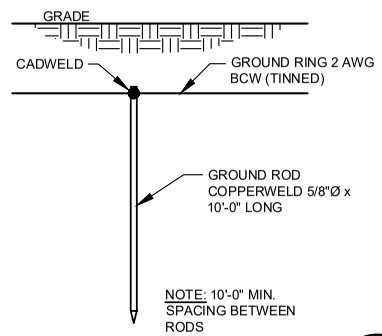
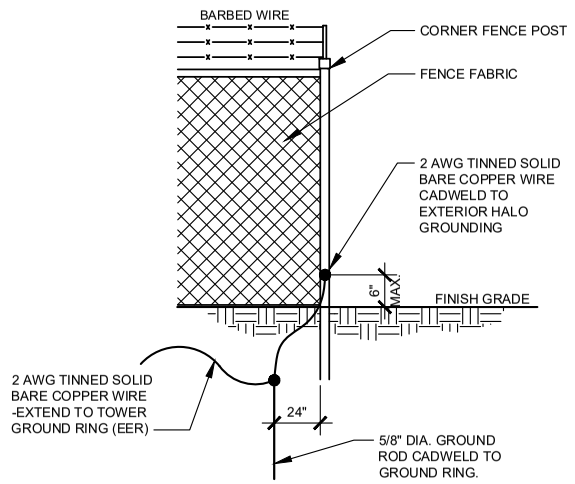


GROUND ROD DETAIL

5 G-4

SCALE: N.T.S.
(TYP. FOR CONTRACTOR AND VZW GC)



FENCE GROUNDING DETAIL

3 G-4

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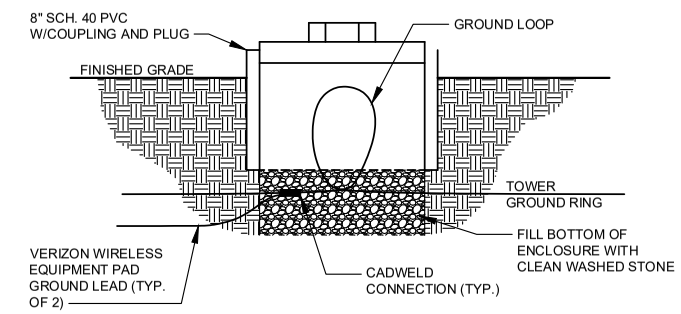

INSPECTION SLEEVE DETAIL

6 G-4

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TTP	SEK

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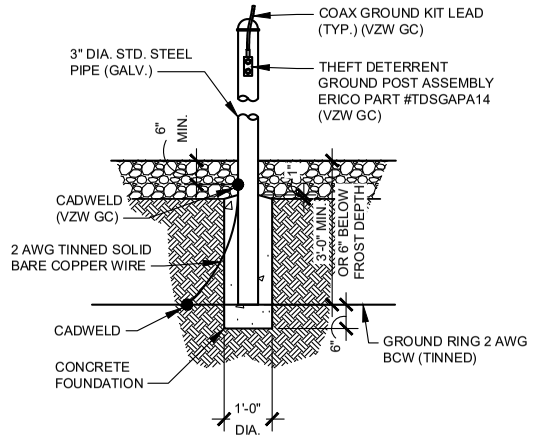
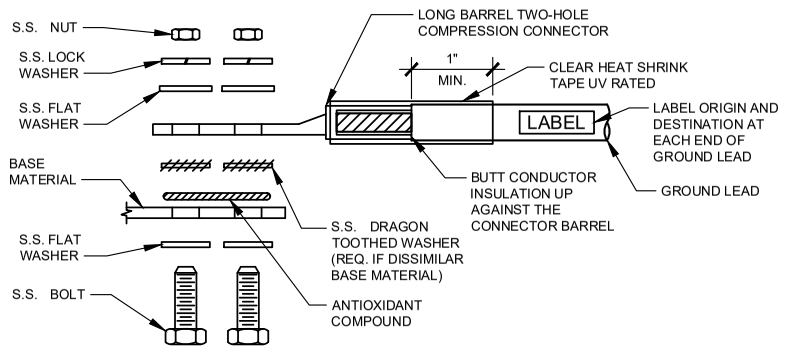


THEFT DETERRENT POST MOUNT GROUND DETAIL (CEPSG)

1 / G-5

SCALE: N.T.S.
(BY VZW GC)

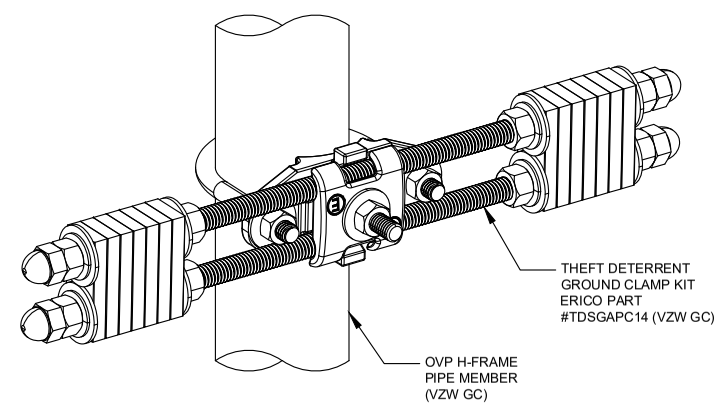


1. ALL HARDWARE SHALL BE 18-8 STAINLESS STEEL.
2. CHOOSE BOLT LENGTH TO ALLOW EXPOSURE OF AT LEAST TWO THREADS.
3. BACK TO BACK LUG CONNECTIONS ARE ACCEPTABLE WHEN BONDED TO A GROUND BAR OR STEEL OBJECT.
4. AT CONNECTIONS MADE TO STEEL OR ANY OTHER DISSIMILAR METALS, A DRAGON TOOTH WASHER SHALL BE USED BETWEEN THE CONNECTOR AND METAL.
5. IF NO DRAGON TOOTH WASHER IS USED, THOROUGHLY REMOVE A SECTION OF THE COATING APPROXIMATELY THE SIZE OF THE CONNECTOR WITH AND ABRASIVE STYLE TOOL.
6. No-Ox-ID ANTI-OXIDATION COMPOUND (SANCHEM) SHALL BE USED AT ALL COPPER TO COPPER CONNECTIONS.
7. A ZINC BASED (GRAY COLORED) ANTI-OXIDATION COMPOUND SHALL BE USED AT ALL COPPER TO STEEL CONNECTIONS.
8. PENTROX OR EQUAL ANTI-OXIDATION COMPOUND SHALL BE USED AT ALL COPPER TO ALUMINUM CONNECTIONS.

GROUND LUG INSTALLATION DETAIL

2 / G-5

SCALE: N.T.S.



OVP GROUND ASSEMBLY (OGA)

3 / G-5

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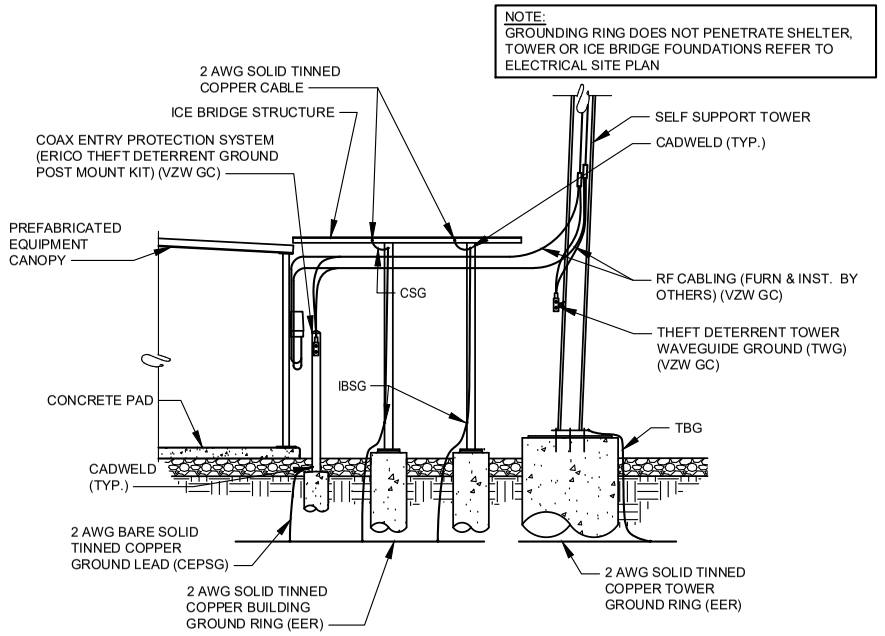
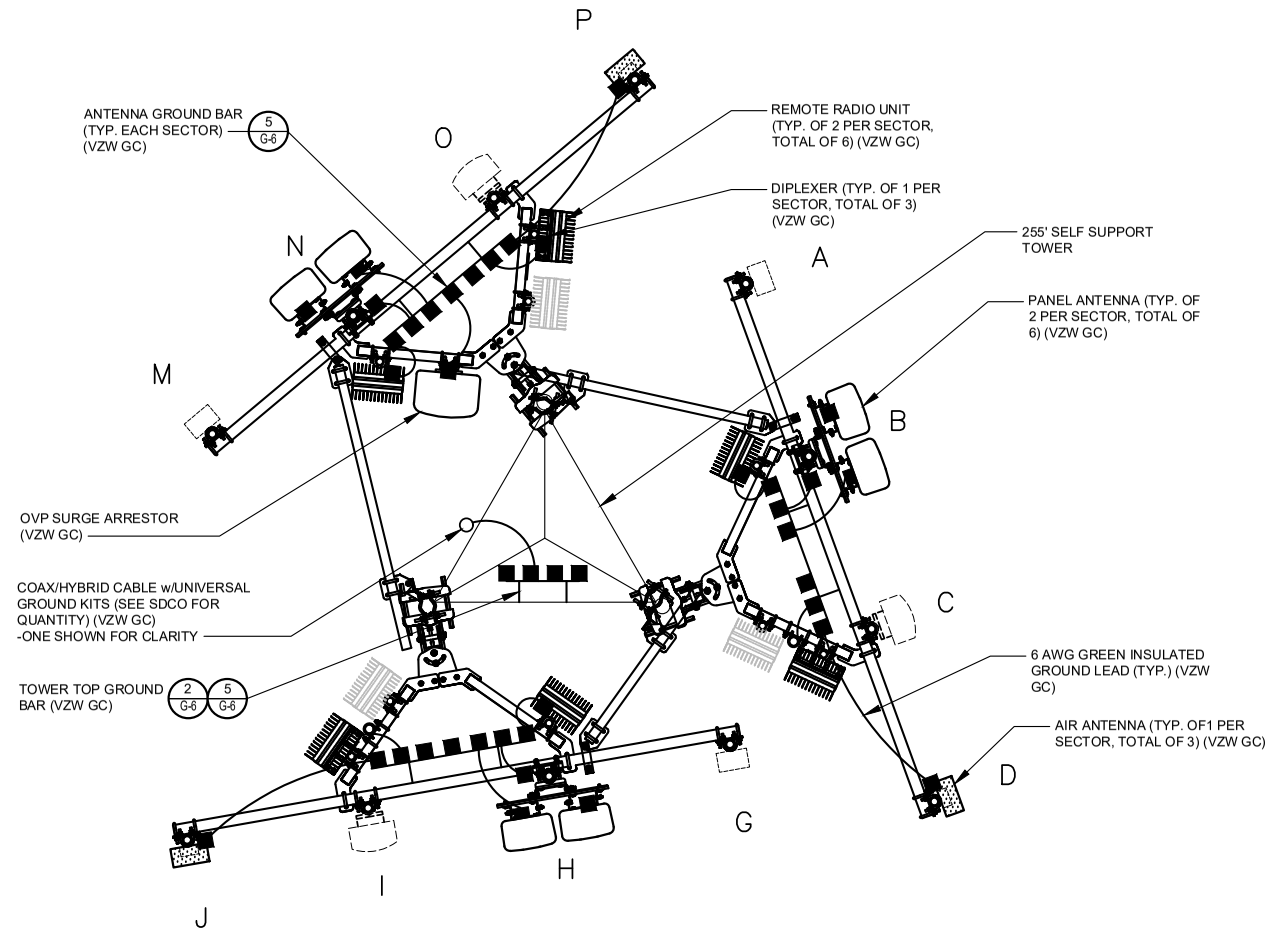


INTERIOR/EXTERIOR GROUNDING DETAIL

1 G-6

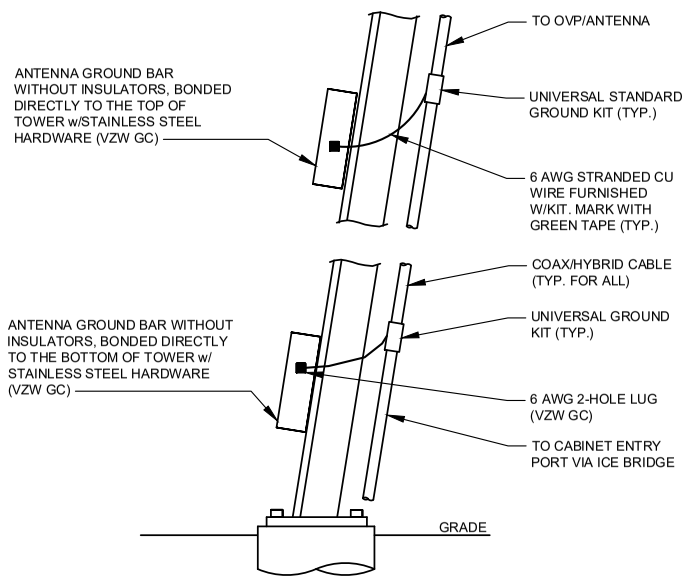
SCALE: N.T.S.



ANTENNA LEVEL GROUNDING PLAN

3 G-6

SCALE: N.T.S.

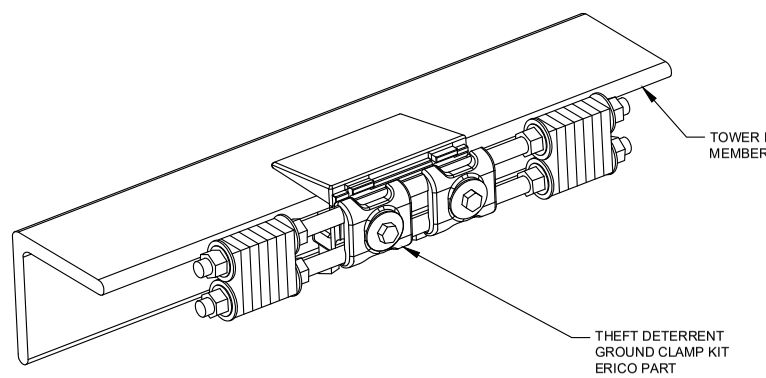


NOTE:
1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED (VZW GC)
2. INSTALL UNIVERSAL GROUND KITS AT ALL GROUND BAR LOCATIONS. (VZW GC)

ANTENNA CABLE GROUNDING INSTALLATION DETAIL

2 G-6

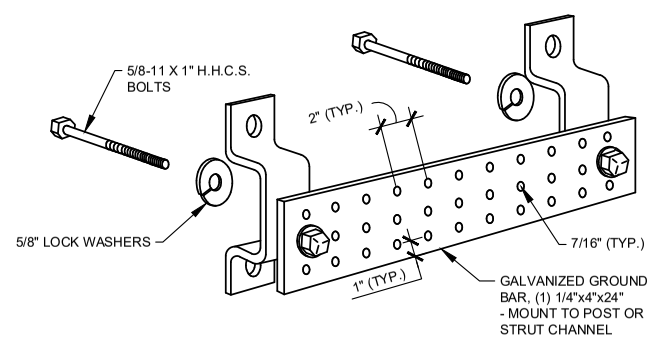
SCALE: N.T.S.



TOWER BOTTOM GROUND ASSEMBLY

4 G-6

SCALE: N.T.S.
(BY VZW GC)



ANTENNA & TOWER TOP GROUND BAR

5 G-6

SCALE: N.T.S.
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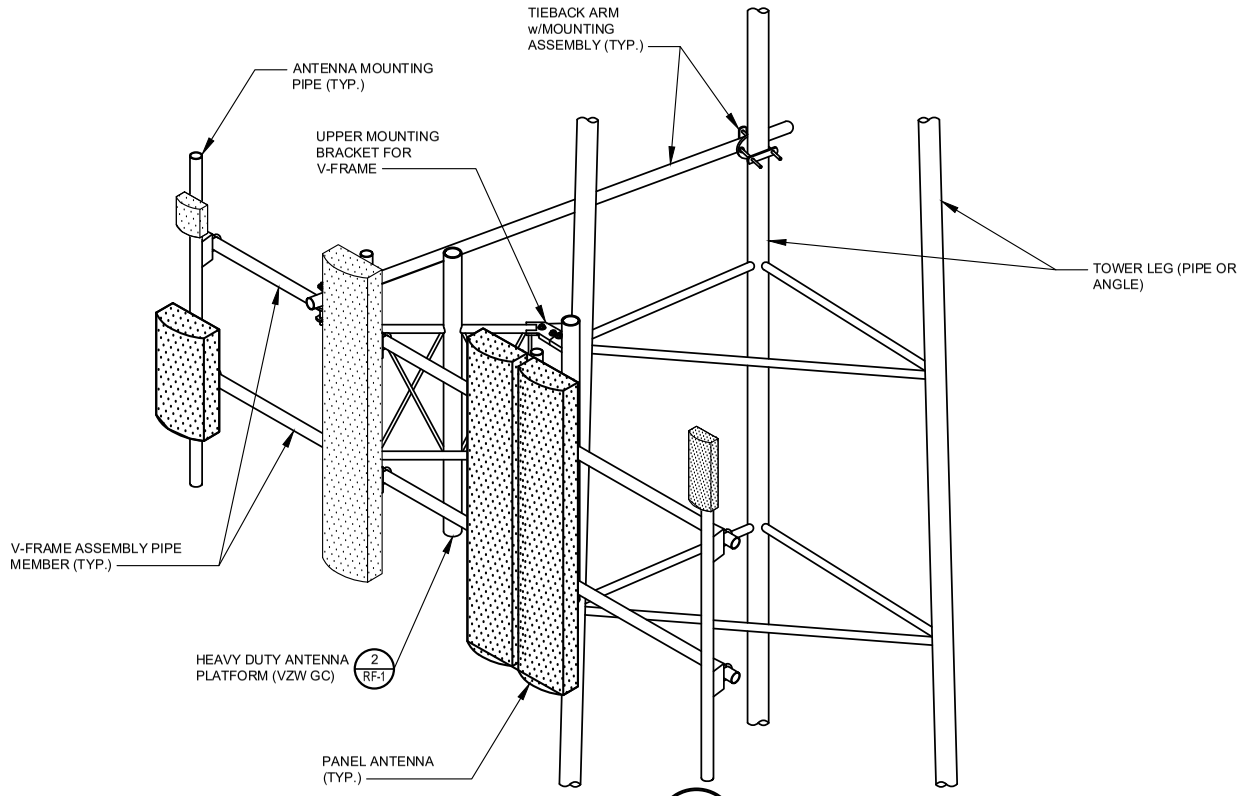


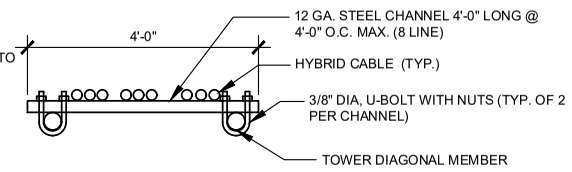
ANTENNA MOUNT 1 RF-1

SCALE: N.T.S.
(BY VZW GC)

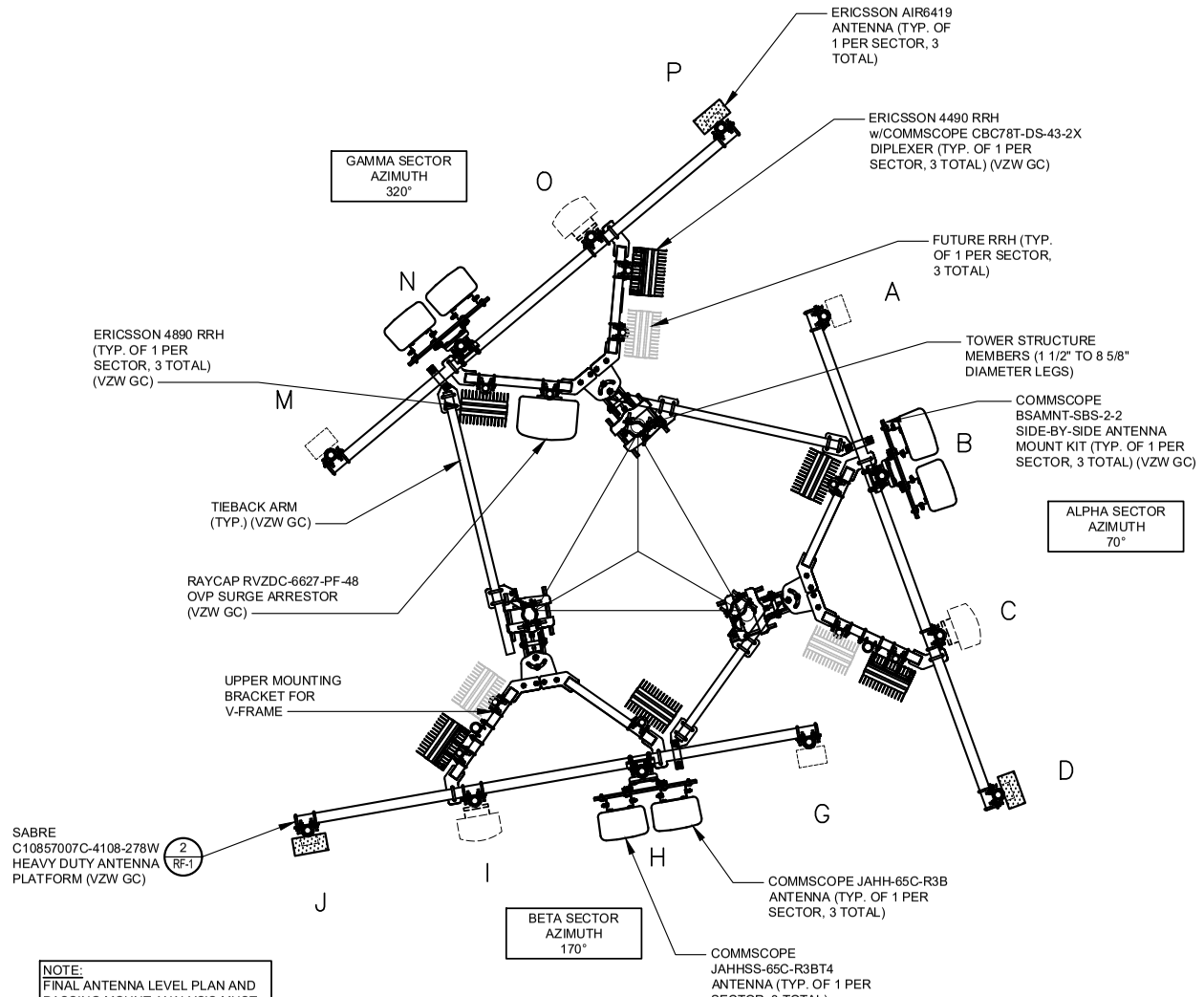
ANTENNA AND HYBRID CABLES

CONTRACTOR MAY SUBSTITUTE AN ALTERNATE METHOD TO SUPPORT THE HYBRID CABLES, BUT SHALL SUBMIT DETAILING OF THE ALTERNATE METHOD TO STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO PROCEEDING WITH THE INSTALLATION OF THE CABLES.

THE CONTRACTOR IS RESPONSIBLE TO REVIEW THE STRUCTURAL ANALYSIS FOR REQUIRED HYBRID CABLE SUPPORT CONFIGURATIONS NOT INDICATED ON THE DETAIL. I.E. BUNDLED CABLES.



HYBRID CABLE SUPPORT DETAIL



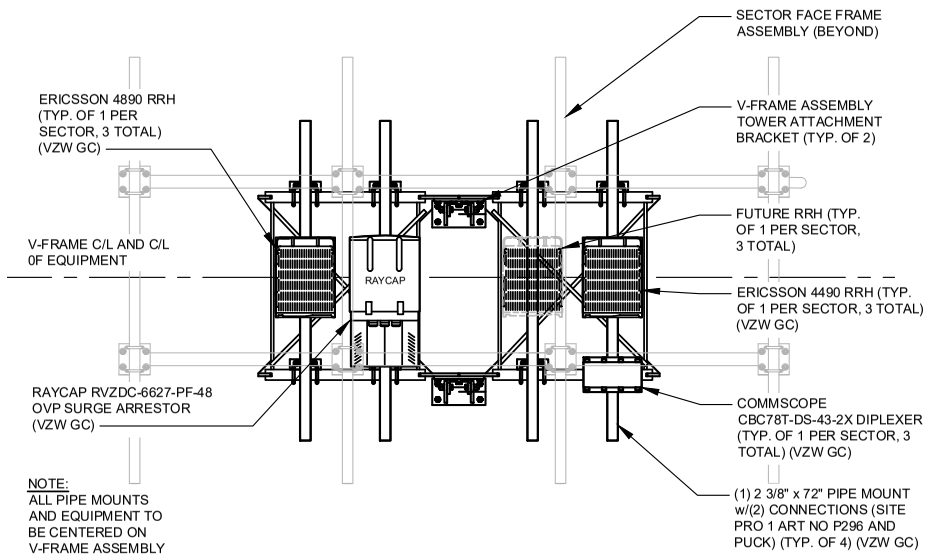
NOTE:
FINAL ANTENNA LEVEL PLAN AND PASSING MOUNT ANALYSIS MUST MATCH. NOTIFY VZW CONSTRUCTION MANAGER IF DISCREPANCY EXISTS.

ANTENNA LAYOUT - PLAN VIEW 2 RF-1

SCALE: N.T.S.
(BY VZW GC)

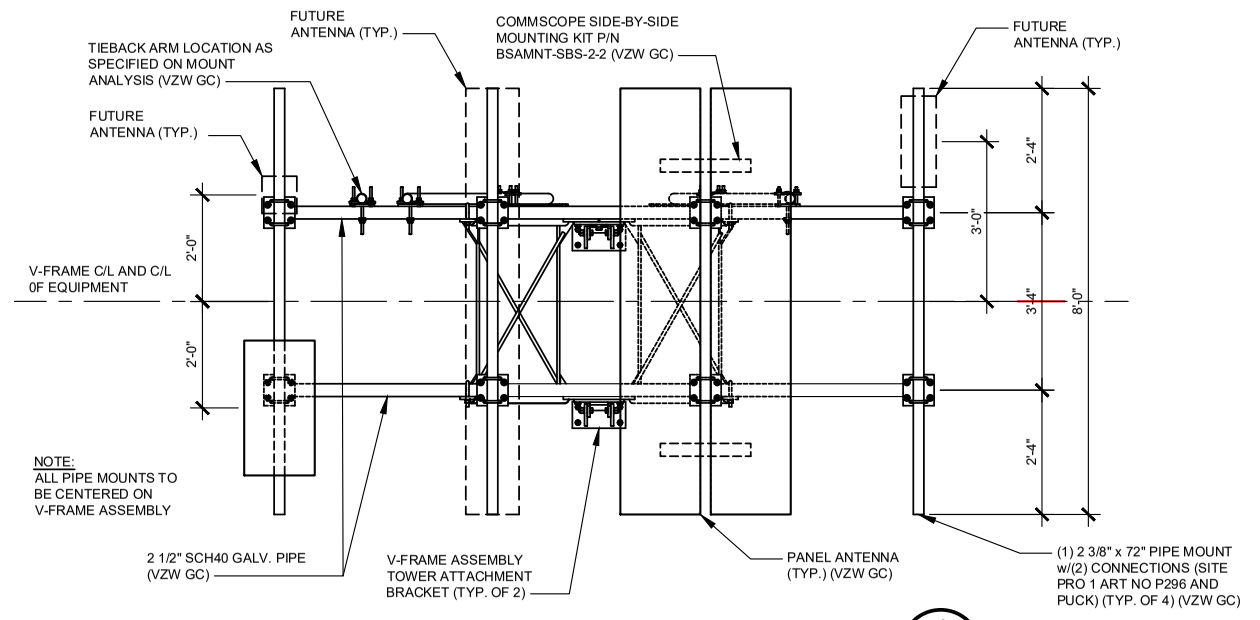
GENERAL NOTES:

1. VERIFY EACH HYBRID CABLE LENGTH, DIAMETER, ROUTING, AND ALL MOUNTING APPURTENANCES WITH OWNER PRIOR TO ORDER.
2. THE MAXIMUM HYBRID CABLE LENGTH HAS BEEN ESTIMATED AT ___ FEET, APPROXIMATELY. ACTUAL ANTENNA CABLE LENGTH MAY VARY FROM ESTIMATED MAXIMUM LENGTH AND MUST BE VERIFIED.
3. TAG ALL MAIN CABLES AT TWO (2) LOCATIONS. 1) AT ANTENNAS 2) OUTSIDE EQUIPMENT CABINET NEAR THE WAVEGUIDE ENTRY PORT.
4. EACH CABLE SHALL BE GROUNDED AT (3) THREE LOCATIONS. ANTENNA LEVEL ON TOWER, TOWER BASE, AND EQUIPMENT H-FRAME.
5. HYBRID CABLES TO BE SUPPORTED EVERY 36" OFF MOUNTING FRAMES WITH STAINLESS STEEL HANGERS.
6. JUMPER CABLES TO BE SUPPORTED EVERY 18" WITH STAINLESS STEEL HANGERS.



ANTENNA MOUNT - REAR VIEW (FLATTENED) 3 RF-1

SCALE: N.T.S.
(BY VZW GC)



ANTENNA MOUNT - FRONT VIEW 4 RF-1

SCALE: N.T.S.
(BY VZW GC)

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CARY, NC 27519

REV.	DATE	DESCRIPTION
A	03/29/24	ISSUED FOR 90% REVIEW
0	05/31/24	FINAL CDs FOR PSC FILING

REFERENCE ONLY

EV FARMINGTON
DOVE RD
FARMINGTON, KY 42020

ANTENNA PLAN AND DETAILS (REFERENCE ONLY)

ISSUED FOR:	
REVIEW	-/-/--
PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

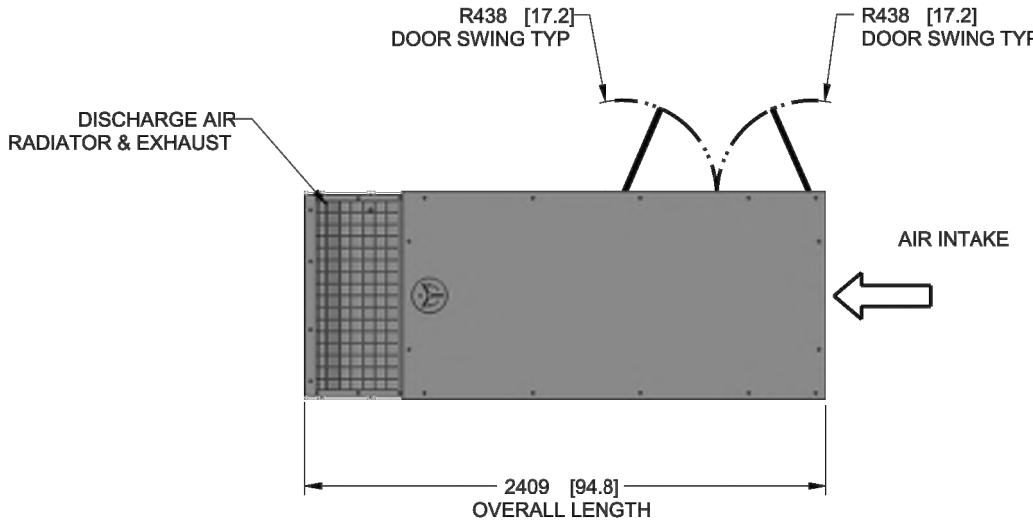
PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

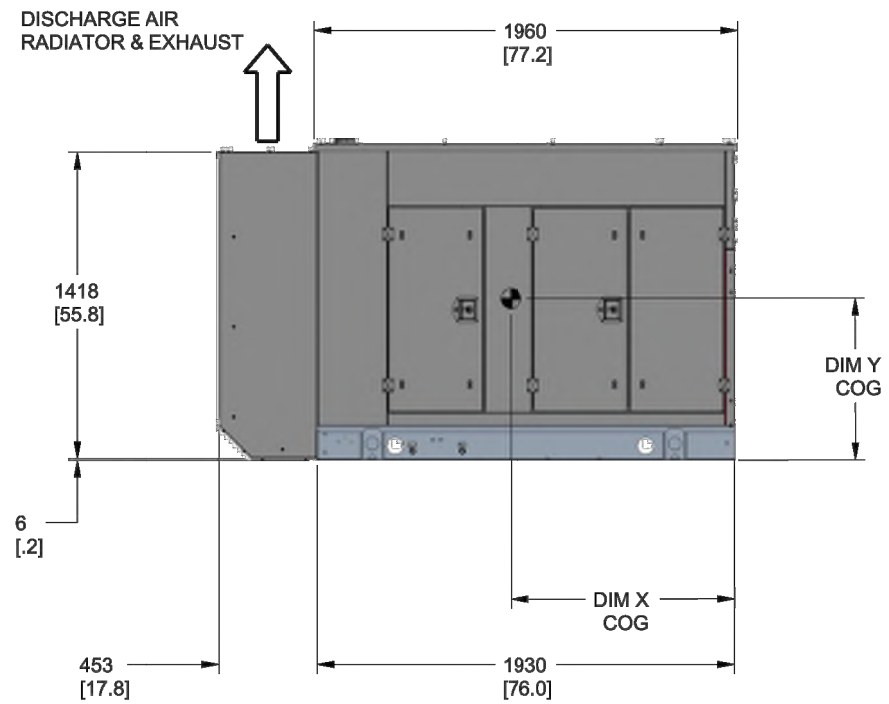
RF-1

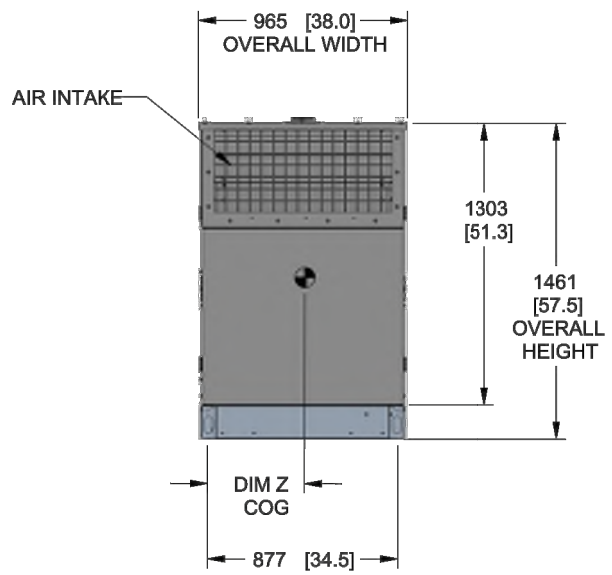
Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:20 AM - skirschner

SH 1/1 | REV A | WINDCHILL VERSION A.2



FOR ALL STUB-UP, WEIGHT AND COG DETAILS, SEE
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.





DRAWING CREATED FROM PRO/ENGINEER
3D FILE. ECO MODIFICATION TO BE
APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE
INSTALL A-GRP ENCLOSED
G4.5L 50&60Hz

ISSUE DATE:

SIZE	CAGE NO	DWG NO	REV
B	N/A	A0000335178	A

SCALE 0.035 | WT-KG N/A | SHEET 1 of 1

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PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

REF-1

Drawing Name: O:\2023\2023706111 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:20 AM - skirschner

VERIZON WIRELESS

SITE NAME: THIS SITE NAME

SITE ADDRESS: 1234 STREET NAME
CITY, STATE ZIP

SITE EMIS#: #####

SITE COORDINATES: 00°00'00.00" N, 00°00'00.00" W

VERIZON WIRELESS TIER II SITE MAP

SCALE: N.T.S.

NORTH

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EMERGENCY RESPONSE
TIER II MAP
(REFERENCE ONLY)

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CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

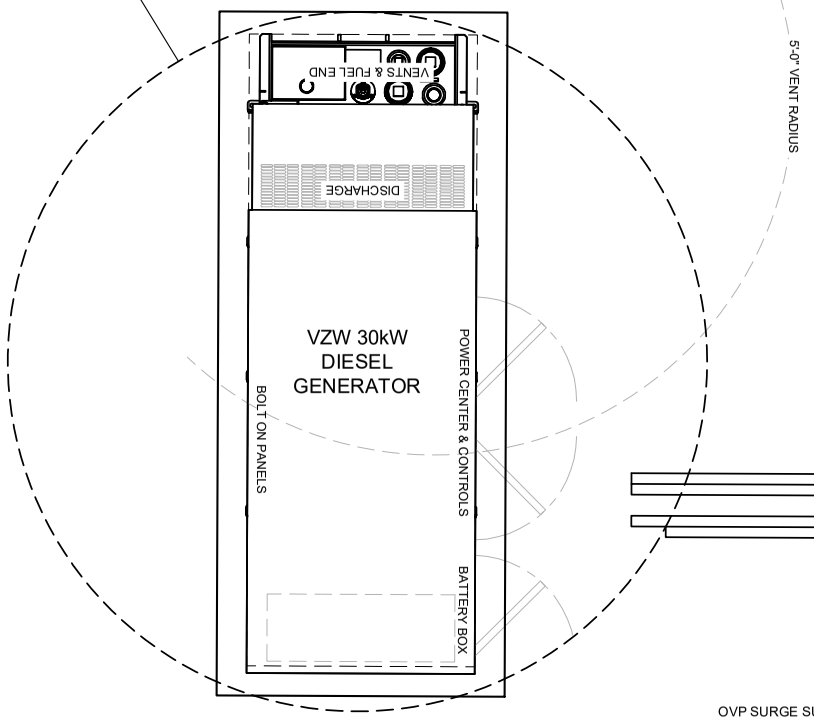
ER-1

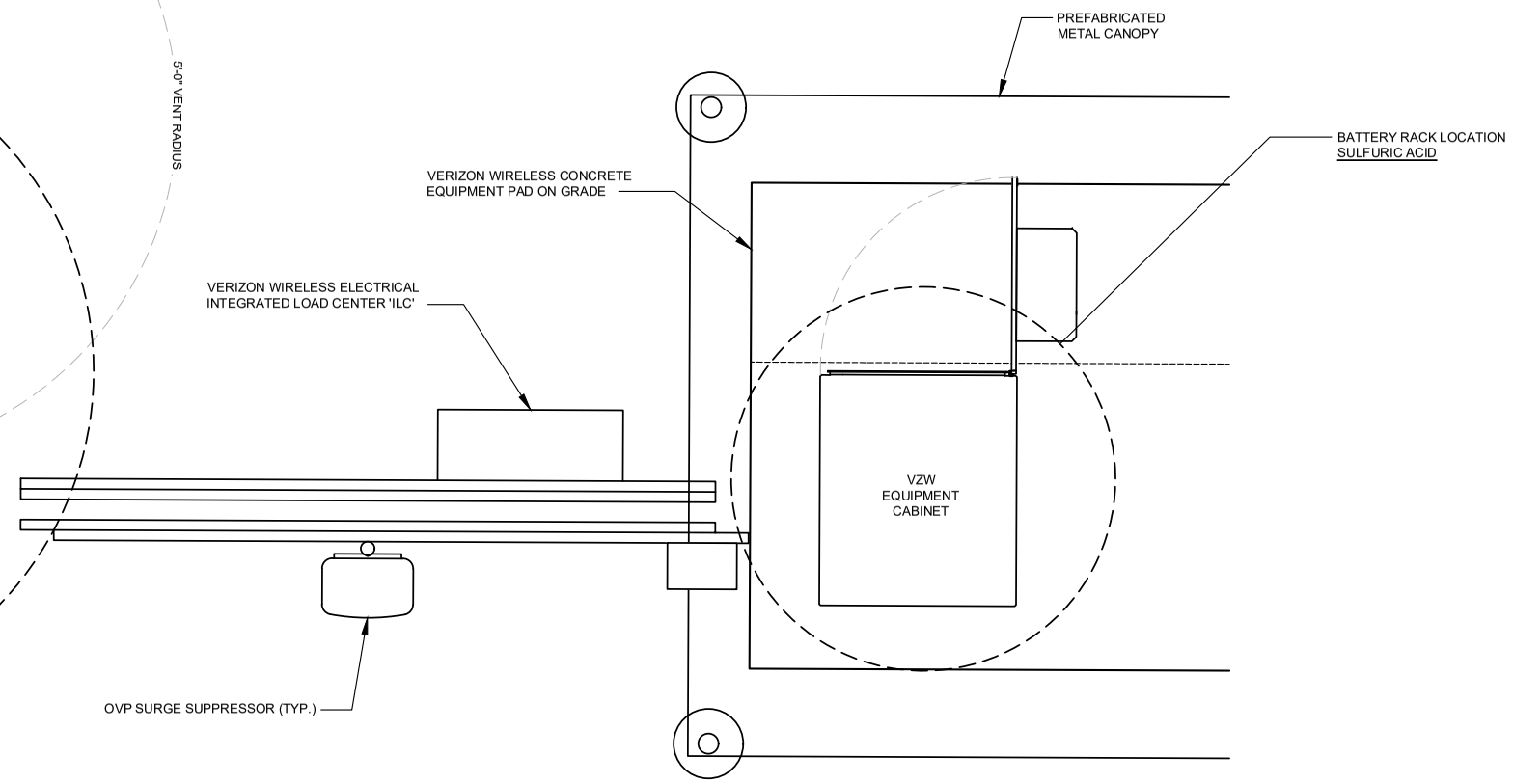
Drawing Name: O:\2023\2023706111 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:20 AM - skirschner

DOVE ROAD

KY-121

GENERATOR
LOCATION
DIESEL FUEL





VERIZON WIRELESS

SITE NAME: THIS SITE NAME

SITE ADDRESS: 1234 STREET NAME
CITY, STATE ZIP

SITE EMIS#: #####

SITE COORDINATES: 00°00'00.00" N, 00°00'00.00" W

NOTE:
LOCATION OF VERIZON WIRELESS EQUIPMENT PAD IN RELATION TO PUBLIC RIGHTS OF WAY ARE FOR REFERENCE ONLY. DISTANCE TO RIGHTS OF WAY VARIES.

VERIZON WIRELESS TIER II EQUIPMENT PLAN

SCALE: N.T.S.

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EMERGENCY RESPONSE TIER II
VERIZON WIRELESS EQUIPMENT PLAN
(REFERENCE ONLY)

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REVIEW	--/--/--
PERMIT	--/--/--
CONSTRUCTION	--/--/--
RECORD	--/--/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

ER-2

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
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TOWER ELEVATION

1 / TW-1

SCALE: N.T.S.

CAISSON FOUNDATION

2 / TW-1

SCALE: N.T.S.

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DOVE RD
FARMINGTON, KY 42020

TOWER DETAILS
(REFERENCE ONLY)

ISSUED FOR:	
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PERMIT	-/-/--
CONSTRUCTION	-/-/--
RECORD	-/-/--

PROJECT MANAGER	DESIGNER
TTP	SEK

JOB NO.
2023706.11

TW-1

Drawing Name: O:\2023\2023706.11 EV Farmington TowerCo\4_AE\01_Dwg\EV Farmington CD.dwg
May 31, 2024 11:21 AM - sakisclmer

TowerCo

March 20, 2024

Stephen Rambeau
Vice President of Engineering
TowerCo
5000 Valleystone Drive
Cary, NC 27519

Subject	**Foundation Design Calculations**
TowerCo Designation	**Site Number: KY0104** **Site Name: EV Farmington** **JIRA Ticket: ENG-38643**
Engineering Firm Designation	**Delta Oaks Group Project: STR24-21135-08** **Delta Oaks Group Site Number: 17-00296**
Site Data	**Dove Road, Farmington, Graves County, KY 42020** **Latitude: 36.6680°± Longitude: -88.5319°±** **Elevation: 522-ft±, Topography Category 1** **Exposure Category "C"; Structure Class/Risk Category II;** **255-ft Self-Supporting Latticed Structure**

Dear Stephen Rambeau,

To your request, we present our foundation design calculations. Our work is in conformance ANSI/TIA-222-G and *2018 Kentucky Building Code* (2015 IBC) / ASCE 7-10 for:

- V_{ult} = 115-mph / V =89-mph three-second gust basic wind speed [per Eqn. 16-33 of the 2015 IBC]
- 30-mph three-second gust basic wind speed with 1-in radial ice
- Earthquake design parameters and loading including:
  - S_s = 0.987 g, S_1 = 0.334 g
- Seismic Design Category D

Delta Oaks Group appreciates the opportunity to be of service to TowerCo. Please do not hesitate to contact us if you have any questions or require any additional information.

Sincerely,

Yamini Rajakumar

Yamini Rajakumar
Structural Engineer I

Reviewed by: MLL

Digitally signed by Michael L. Lassiter
Date: 2024.03.20 12:01:06 -04'00'

COMMONWEALTH OF KENTUCKY
MICHAEL L. LASSITER
24895
LICENSED PROFESSIONAL ENGINEER

Michael L. Lassiter

Michael L. Lassiter, SE, PE
VP | Chief Structural Engineer
KY PE License 24895

Attachments:
Foundation design calculations

DELTA OAKS GROUP

MAT FOUNDATION DESIGN
SSLT
ANSI/TIA-222-G-2-2009 & ACI 318-05

Design
Analysis

Job No.: 24-21135-08
Date: 03/19/24
Calculated by: YRK
Checked by: M Lassiter

Inputs

- Reactions:

$M_{u\_tower} := 13139 \cdot kip \cdot ft$ = tower overturning moment reaction
$V_{u\_tower} := 82 \cdot kip$ = tower shear reaction
$P_{u\_tower} := 96 \cdot kip$ = tower axial compression reaction

$P_{u\_leg} := 664 \cdot kip$ = leg axial compression reaction at top of pier
$V_{u\_leg\_P} := 49 \cdot kip$ = leg shear reaction at top of pier acting w/ axial compression

$U_{u\_leg} := 580 \cdot kip$ = leg uplift (axial tension) reaction at top of pier
$V_{u\_leg\_U} := 45 \cdot kip$ = leg shear reaction at top of pier acting w/ uplift (axial tension)

- Concrete:

$B_{mat} := 36.5 \cdot ft$ = mat width (and length)
$B_{pier} := 4 \cdot ft$ = pier diameter
Pier_Shape := Circular / Square
$H := 6.0 \cdot in$ = distance from top of pier to top of grade
$z_{mat} := 6 \cdot ft$ = mat depth (grade to bottom of mat)
$t_{mat} := 2.25 \cdot ft$ = mat thickness

$f'_{c\_design} := 4000 \cdot psi$ = design compressive strength of concrete
$f'_{c\_spec} := 4000 \cdot psi$ = specified compressive strength of concrete
$L_{pier} := z_{mat} + H - t_{mat} = 4.25\ ft$
$\gamma_c := 150 \cdot pcf$ = unit weight of concrete

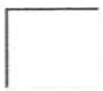
- Rebar:

$f_y := 60 \cdot ksi$ = specified minimum yield strength of rebar

Tie := "#5" = size of tie rebar in pier
$s_{tie} := 6 \cdot in$ = spacing of tie rebar in pier

Vert := "#9" = size of vertical rebar in pier
$n_{vert} := 13$ = number of vertical rebar in pier
$L_{vert\_ext} := 21 \cdot in$ = length of vertical rebar extension in mat

$cover_{top} := 3.0 \cdot in$ = cover from top edge of vertical to top of concrete in pier
$cover_{side} := 3.0 \cdot in$ = cover from outside edge of tie to edge of concrete in pier

Top_Horiz := 
$s_{h\_top} := 6 \cdot in$ = size / max spacing of horizontal rebar in top of pad

Bot_Horiz := 
$s_{h\_bot} := 6 \cdot in$ = size / max spacing of horizontal rebar in bottom of pad

$cover_{tb\_mat} := 3.0 \cdot in$ = cover from outside edge of outside top/bottom horizontal to edge of concrete in mat
$cover_{end\_mat} := 3.0 \cdot in$ = cover from outside end of horizontal and required cover from outside edge of vertical bar extension to edge of concrete in mat

- Tower / Anchor Rods:

$FW := 24 \cdot ft$ = tower face width at base

- Anchor Rods (design case only):

$d_{AR} := 1.5 \cdot in$ = diameter of anchor rod
$BC := 16 \cdot in$ = anchor rods bolt-circle diameter
$d_{template} := 4 \cdot in$ = anchor rod template width (assumed)
$L_{AR} := 82 \cdot in$ = total length of anchor rod
$proj_{AR} := 10 \cdot in$ = projection of anchor rod above top of concrete

- Pier Strength [see PIER.lpd]:

$\phi_{pier} := 0.9$ = strength reduction factor for pier flexure & compression (see 9.3.2, ACI 318-05)

$\phi M_{n\_pier\_P} := \phi_{pier} \cdot (25308.582 \cdot kip \cdot in)$ = design flexural strength of pier - with max compression on section [PIER.lpd]
$\phi M_{n\_pier} := \phi_{pier} \cdot (15194.883 \cdot kip \cdot in)$ = design flexural strength of pier - pure flexure [PIER.lpd]
$\phi M_{n\_pier\_T} := \phi_{pier} \cdot (4349.351 \cdot kip \cdot in)$ = design flexural strength of pier - with max tension on section [PIER.lpd]

- Soil:

$\gamma_s := 110 \cdot pcf$ = density of soil
$GW := 4 \cdot ft$ = ground water depth
$q'_{all} := \left(\frac{9880}{3}\right) \cdot psf$ = net allowable bearing pressure
$\psi_{input} := 0.35$ = coefficient of friction per GEO (-or- for clay: assumed per TBL 8.3; for sand: = 0 if to be calc'd)
$\phi := 0 \cdot deg$ = friction angle of soil (= 0 if ψ is input or if soil is clay)

- Constants:

$\gamma_w = 62.4 \cdot pcf$ = unit weight of water
$E = 29000 \cdot ksi$ = modulus of elasticity of rebar steel
$\varepsilon_{cu} = 0.003 \cdot \frac{in}{in}$ = maximum usable strain at extreme concrete compression fiber
$\phi_s = 0.75$ = resistance factor for soil strength
$\phi_v = 0.75$ = strength reduction factor for shear
$\phi_t = 0.90$ = strength reduction factor for tension

GEOMETRY, DEAD LOADS & REBAR

Output - Mat Geometry:

$Y_{1\_mat} := \frac{B_{mat}}{2} - \left(\frac{1}{2}\cdot FW\cdot\sec\left(\frac{\pi}{6}\right)\right)$ $Y_{1\_mat} = 4.39\cdot ft$

$Y_{2\_mat} := \frac{B_{mat}}{2} - \left(\frac{1}{2}\cdot FW\cdot\tan\left(\frac{\pi}{6}\right)\right)$ $Y_{2\_mat} = 11.32\cdot ft$

$X_{mat} := \frac{B_{mat} - FW}{2}$ $X_{mat} = 6.25\cdot ft$

$A_{g\_pier} := \begin{cases} \left(\frac{\pi\cdot B_{pier}^{2}}{4}\right) & \text{if Pier\_Shape = "Circular"} \\ \left(B_{pier}^{2}\right) & \text{if Pier\_Shape = "Square"} \end{cases}$ $A_{g\_pier} = 12.6\cdot ft^2$

$L_{pier} := z_{mat} - t_{mat} + H$ $L_{pier} = 4.25\,ft$

$V_{pier} := A_{g\_pier}\cdot L_{pier}$ $V_{pier} = 53.4\cdot ft^3$

$A_{g\_mat} := B_{mat}^{2}$ $A_{g\_mat} = 1332.3\cdot ft^2$

$V_{mat} := A_{g\_mat}\cdot t_{mat}$ $V_{mat} = 2997.6\cdot ft^3$

$Vol_{conc} := 3\cdot V_{pier} + V_{mat}$ $Vol_{conc} = 117.0\cdot yd^3$

$V_{soil} := A_{g\_mat}\cdot\left(z_{mat} - t_{mat}\right) - 3\cdot\left[V_{pier}\cdot\left(\frac{L_{pier} - H}{L_{pier}}\right)\right]$ $V_{soil} = 4854.6\cdot ft^3$

Output - Dead Loads:

$\gamma'_{c\_pier} := \begin{cases} \gamma_c & \text{if } GW \ge \left(z_{mat} - t_{mat}\right) \\ \gamma_c\cdot\left(\frac{GW}{L_{pier}}\right) + \left(\gamma_c - \gamma_w\right)\cdot\left[\frac{\left(z_{mat} - t_{mat}\right) - GW}{L_{pier} - H}\right] & \text{if } (0\cdot ft) \le GW < \left(z_{mat} - t_{mat}\right) \end{cases}$ $\gamma'_{c\_pier} = 150.0\cdot pcf$

$D_{pier} := 3\cdot\left(V_{pier}\cdot\gamma'_{c\_pier}\right)$ $D_{pier} = 24.0\cdot kip$

$\gamma'_{c\_mat} := \begin{cases} \gamma_c & \text{if } GW \ge z_{mat} \\ \left(\gamma_c - \gamma_w\right) & \text{if } GW \le \left(z_{mat} - t_{mat}\right) \\ \gamma_c\left[\frac{t_{mat} - \left(z_{mat} - GW\right)}{t_{mat}}\right] + \left(\gamma_c - \gamma_w\right)\left(\frac{z_{mat} - GW}{t_{mat}}\right) & \text{if } \left(z_{mat} - t_{mat}\right) < GW < z_{mat} \end{cases}$ $\gamma'_{c\_mat} = 94.5\cdot pcf$

$D_{mat} := V_{mat}\cdot\gamma'_{c\_mat}$ $D_{mat} = 283.4\cdot kip$

$\gamma'_s := \begin{cases} \gamma_s & \text{if } GW \ge \left(z_{mat} - t_{mat}\right) \\ \gamma_s\left[\frac{GW}{\left(z_{mat} - t_{mat}\right)}\right] + \left(\gamma_s - \gamma_w\right)\left[\frac{\left(z_{mat} - t_{mat}\right) - GW}{\left(z_{mat} - t_{mat}\right)}\right] & \text{if } (0\cdot ft) < GW < \left(z_{mat} - t_{mat}\right) \end{cases}$ $\gamma'_s = 110.0\cdot pcf$

$D_{soil} := V_{soil}\cdot\gamma'_s$ $D_{soil} = 534.0\cdot kip$

Output - Rebar Properties:

CALCS.

- Pier:

$d_{vert} = 1.128\cdot in$ $A_{vert} = 1.00\cdot in^2$

$d_{tie} = 0.625\cdot in$ $A_{tr} = 0.31\cdot in^2$

- Mat Top:

$d_{h\_top} = 1.128\cdot in$ $d_{top} = 22.31\cdot in$

$A_{b\_top} = 1.00\cdot in^2$

- Mat Bottom:

$d_{h\_bot} = 1.128\cdot in$ $d_{bot} = 22.31\cdot in$

$A_{b\_bot} = 1.00\cdot in^2$

SOIL RESISTANCE

Output - Unfactored Reactions:

$M_{tower} := \frac{M_{u\_tower}}{1.6}$ $M_{tower} = 8211.9\cdot kip\cdot ft$

$V_{tower} := \frac{V_{u\_tower}}{1.6}$ $V_{tower} = 51.2\cdot kip$

$P_{tower} := \frac{P_{u\_tower}}{1.2}$ $P_{tower} = 80.0\cdot kip$

$P_{leg} := \frac{P_{u\_leg}}{1.6}$ $P_{leg} = 415.0\cdot kip$

$V_{leg\_P} := \frac{V_{u\_leg\_P}}{1.6}$ $V_{leg\_P} = 30.6\cdot kip$

$U_{leg} := \frac{U_{u\_leg}}{1.6}$ $U_{leg} = 362.5\cdot kip$

$V_{leg\_U} := \frac{V_{u\_leg\_U}}{1.6}$ $V_{leg\_U} = 28.1\cdot kip$

Output - Eccentricity (Factored Forces):

$P_{total} := \left(D_{pier} + D_{mat} + D_{soil}\right) + P_{tower}$ $P_{total} = 921.4\cdot kip$

$M_{total} := M_{tower} + V_{tower}\cdot\left(L_{pier} + t_{mat}\right)$ $M_{total} = 8545\cdot kip\cdot ft$

$ecc := \frac{M_{total}}{P_{total}}$ $ecc = 9.27\,ft$

$limit := \frac{B_{mat}}{6}$ $limit = 6.08\,ft$

$X := 3\cdot\left(\frac{B_{mat}}{2} - ecc\right)$ $X = 323.14\cdot in$

Output - Unfactored Bearing Pressure (BOTTOM):

$$q_{max} := \begin{cases} \frac{P_{total}}{B_{mat}^2} + \frac{M_{total}}{\left(\frac{B_{mat}^3}{6}\right)} & \text{if } ecc \le \frac{B_{mat}}{6} \\ \frac{2 \cdot P_{total}}{3 \cdot B_{mat}^2 \cdot \left(0.5 - \frac{ecc}{B_{mat}}\right)} & \text{if } ecc > \frac{B_{mat}}{6} \end{cases}$$

$q_{max} = 1875 \cdot psf$

$q'_{max} := q_{max} - \gamma'_s \cdot (z_{mat} - t_{mat})$ $q'_{max} = 1462 \cdot psf$

$r_{q'} := \frac{q'_{max}}{q'_{all}}$ $r_{q'} = 44 \cdot \%$

Output - Overturning Stability (Limit States):

$OTM_u := M_{u\_tower} + V_{u\_tower} \cdot (L_{pier} + t_{mat})$ $OTM_u = 13672 \cdot kip \cdot ft$

$OTM_n := \left[0.9 \cdot (P_{total})\right] \cdot \frac{B_{mat}}{2}$ $OTM_n = 15134 \cdot kip \cdot ft$

$r_{OTM} := \frac{OTM_u}{OTM_n}$ $r_{OTM} = 90 \cdot \%$

Output - Sliding Stability (Limit States):

$H_u := V_{u\_tower}$ $H_u = 82.0 \cdot kip$

$\psi_{calc} := \tan(0.7 \cdot \phi)$ $\psi_{calc} = 0.00$

$\psi := \begin{cases} \psi_{input} & \text{if } \psi_{input} \neq 0 \\ \psi_{calc} & \text{otherwise} \end{cases}$ $\psi = 0.35$

$\phi H_n := \phi_s \left[0.9 \cdot (P_{total})\right] \cdot \psi$ $\phi H_n = 217.7 \cdot kip$

$r_H := \frac{H_u}{\phi H_n}$ $r_H = 38 \cdot \%$

SOIL RESISTANCE - ABOUT DIAGONAL

Output - Unfactored Bearing Pressure (BOTTOM):

$A_F := B_{mat}^2$ $A_F = 1332\,ft^2$

$q_p := \frac{P_{total}}{A_F}$ $q_p = 691.6 \cdot psf$

$ratio := \frac{ecc}{\sqrt{2} \cdot B_{mat}}$ $ratio = 0.180$

$C_1 = 0.65$ $C_2 = 3.6$

$X_{diag} := \begin{cases} C_1 \cdot (B_{mat} \sqrt{2}) & \text{if } C_1 \neq \text{"-"} \\ (\sqrt{2} \cdot B_{mat}) & \text{if } C_1 = \text{"-"} \end{cases}$ $X_{diag} = 33.80\,ft$

$q_{max\_diag} := C_2 \cdot q_p$ $q_{max\_diag} = 2491 \cdot psf$

$q'_{max\_diag} := q_{max\_diag} - \gamma'_s \cdot (z_{mat} - t_{mat})$ $q'_{max\_diag} = 2079 \cdot psf$

$r_{q'\_diag} := \frac{q'_{max\_diag}}{q'_{all}}$ $r_{q'\_diag} = 63 \cdot \%$

Output - Overturning Stability (Limit States):

$OTM_{n\_diag} := \left[0.9 \cdot (P_{total})\right] \cdot \frac{(\sqrt{2} \cdot B_{mat})}{2}$ $OTM_{n\_diag} = 21403 \cdot kip \cdot ft$

$r_{OTM\_diag} := \frac{OTM_u}{OTM_{n\_diag}}$ $r_{OTM\_diag} = 64 \cdot \%$

MAT STRUCTURE FORCES

Output - Factored Bearing Pressure (TOP):

- Pressure From Weight of Soil & Concrete on Top:

$q_{u\_top\_1.2} := 1.2 \cdot \left[\gamma'_{c\_mat} \cdot t_{mat} + \gamma'_s \cdot (z_{mat} - t_{mat})\right]$ $q_{u\_top\_1.2} = 750 \cdot psf$

$q_{u\_top\_0.9} := 0.9 \cdot \left[\gamma'_{c\_mat} \cdot t_{mat} + \gamma'_s \cdot (z_{mat} - t_{mat})\right]$ $q_{u\_top\_0.9} = 563 \cdot psf$

Output - Eccentricity (Factored Forces):

$P_{u\_total} := 1.2 \cdot (D_{pier} + D_{mat} + D_{soil}) + P_{u\_tower}$ $P_{u\_total} = 1105.7 \cdot kip$

$M_{u\_total} := M_{u\_tower} + V_{u\_tower} \cdot (L_{pier} + t_{mat})$ $M_{u\_total} = 13672 \cdot kip \cdot ft$

$ecc_u := \frac{M_{u\_total}}{P_{u\_total}}$ $ecc_u = 12.37\,ft$

$limit = 6.08\,ft$

$X_u := 3 \cdot \left(\frac{B_{mat}}{2} - ecc_u\right)$ $X_u = 211.85 \cdot in$

Output - Factored Bearing Pressure (BOTTOM):

- Maximum Bearing Pressure:

$$q_{u\_max} := \begin{cases} \frac{P_{u\_total}}{B_{mat}^2} + \frac{M_{u\_total}}{\left(\frac{B_{mat}^3}{6}\right)} & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \frac{2 \cdot P_{u\_total}}{3 \cdot B_{mat}^2 \cdot \left(0.5 - \frac{ecc_u}{B_{mat}}\right)} & \text{if } \frac{B_{mat}}{6} < ecc_u \le \frac{B_{mat}}{2} \\ 0 & \text{otherwise} \end{cases}$$

$q_{u\_max} = 3432 \cdot psf$

- Minimum Bearing Pressure:

$$q_{u\_min} := \begin{cases} \frac{P_{u\_total}}{B_{mat}^2} - \frac{M_{u\_total}}{\left(\frac{B_{mat}^3}{6}\right)} & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ 0 \cdot psf & \text{if } ecc_u > \frac{B_{mat}}{6} \end{cases} \qquad q_{u\_min} = 0 \cdot psf$$

- @ Cantilever Edge of Pier:

$$B_{cant} := Y_{2\_mat} - \frac{B_{pier}}{2} \qquad B_{cant} = 111.86 \cdot in$$

$$q_{u\_pier\_cant} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - B_{cant}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - B_{cant}}{X_u}\right)\right] & \text{if } X_u \ge B_{cant} \\ 0 \cdot psf & \text{if } X_u < B_{cant} \end{cases} & \end{cases} \qquad q_{u\_pier\_cant} = 1620 \cdot psf$$

- @ Distance 'd' Away From Cantilever Edge of Pier:

$$B_{cant\_d} := Y_{2\_mat} - \left(\frac{B_{pier}}{2} + d_{bot}\right) \qquad B_{cant\_d} = 89.55 \cdot in$$

$$q_{u\_pier\_cant\_d} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - B_{cant\_d}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - B_{cant\_d}}{X_u}\right)\right] & \text{if } X_u \ge B_{cant\_d} \\ 0 \cdot psf & \text{if } X_u < B_{cant\_d} \end{cases} & \end{cases} \qquad q_{u\_pier\_cant\_d} = 1981 \cdot psf$$

- @ Center Simple Span Edge of Pier (MAX):

$$Y_{pier\_max} := X_{mat} + \frac{B_{pier}}{2} \qquad Y_{pier\_max} = 99.00 \cdot in$$

$$q_{u\_pier\_simple\_max} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - Y_{pier\_max}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - Y_{pier\_max}}{X_u}\right)\right] & \text{if } X_u \ge Y_{pier\_max} \\ 0 \cdot psf & \text{if } X_u < Y_{pier\_max} \end{cases} & \end{cases} \qquad q_{u\_pier\_simple\_max} = 1828 \cdot psf$$

- @ Distance 'd' Away From Center Simple Span Edge of Pier (MAX):

$$Y_{pier\_max\_d} := X_{mat} + \frac{B_{pier}}{2} + d_{top} \qquad Y_{pier\_max\_d} = 121.31 \cdot in$$

$$q_{u\_pier\_simple\_max\_d} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - Y_{pier\_max\_d}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - Y_{pier\_max\_d}}{X_u}\right)\right] & \text{if } X_u \ge Y_{pier\_max\_d} \\ 0 \cdot psf & \text{if } X_u < Y_{pier\_max\_d} \end{cases} & \end{cases} \qquad q_{u\_pier\_simple\_max\_d} = 1467 \cdot psf$$

- @ Center Simple Span Edge of Pier (MIN):

$$Y_{pier\_min} := Y_{pier\_max} + \left(FW - B_{pier}\right) \qquad Y_{pier\_min} = 339.00 \cdot in$$

$$q_{u\_pier\_simple\_min} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - Y_{pier\_min}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - Y_{pier\_min}}{X_u}\right)\right] & \text{if } X_u \ge Y_{pier\_min} \\ 0 \cdot psf & \text{if } X_u < Y_{pier\_min} \end{cases} & \end{cases} \qquad q_{u\_pier\_simple\_min} = 0 \cdot psf$$

- @ Distance 'd' Away From Center Simple Span Edge of Pier (MIN):

$$Y_{pier\_min\_d} := Y_{pier\_min} - d_{top} \qquad Y_{pier\_min\_d} = 316.69 \cdot in$$

$$q_{u\_pier\_simple\_min\_d} := \begin{cases} q_{u\_min} + \left(q_{u\_max} - q_{u\_min}\right) \cdot \left(\frac{B_{mat} - Y_{pier\_min\_d}}{B_{mat}}\right) & \text{if } ecc_u \le \frac{B_{mat}}{6} \\ \text{if } ecc_u > \frac{B_{mat}}{6} & \\ \quad \begin{cases} \left[q_{u\_max} \cdot \left(\frac{X_u - Y_{pier\_min\_d}}{X_u}\right)\right] & \text{if } X_u \ge Y_{pier\_min\_d} \\ 0 \cdot psf & \text{if } X_u < Y_{pier\_min\_d} \end{cases} & \end{cases} \qquad q_{u\_pier\_simple\_min\_d} = 0 \cdot psf$$

Output - Effective Factored Bearing Pressure, (BOTTOM):

$$q'_{u\_max} := \begin{cases} \left(q_{u\_max} - q_{u\_top\_0.9}\right) & \text{if } ecc_u < \frac{B_{mat}}{2} \\ 0 & \text{otherwise} \end{cases} \qquad q'_{u\_max} = 2869 \cdot psf$$

$$q'_{u\_pier\_cant} := \begin{cases} q_{u\_pier\_cant} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_cant} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases} \qquad q'_{u\_pier\_cant} = 1057 \cdot psf$$

$$q'_{u\_pier\_cant\_d} := \begin{cases} q_{u\_pier\_cant\_d} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_cant\_d} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases} \qquad q'_{u\_pier\_cant\_d} = 1418 \cdot psf$$

$q'_{u\_pier\_simple\_max} := \begin{cases} q_{u\_pier\_simple\_max} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_simple\_max} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases}$ $q'_{u\_pier\_simple\_max} = 1265 \cdot psf$

$q'_{u\_pier\_simple\_max\_d} := \begin{cases} q_{u\_pier\_simple\_max\_d} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_simple\_max\_d} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases}$ $q'_{u\_pier\_simple\_max\_d} = 904 \cdot psf$

$q'_{u\_pier\_simple\_min} := \begin{cases} q_{u\_pier\_simple\_min} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_simple\_min} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases}$ $q'_{u\_pier\_simple\_min} = 0 \cdot psf$

$q'_{u\_pier\_simple\_min\_d} := \begin{cases} q_{u\_pier\_simple\_min\_d} - q_{u\_top\_0.9} & \text{if } q_{u\_pier\_simple\_min\_d} > q_{u\_top\_0.9} \\ 0 \cdot psf & \text{otherwise} \end{cases}$ $q'_{u\_pier\_simple\_min\_d} = 0 \cdot psf$

Output - Factored Forces In Mat, Positive (BOTTOM):

- Cantilever Shear & Moment (from bearing pressure):

$R_{r\_d} := \begin{cases} \left(q'_{u\_pier\_cant\_d} \cdot B_{mat}\right) \cdot B_{cant\_d} & \text{if } X_u \geq B_{cant\_d} \\ 0 \cdot psf & \text{if } X_u < B_{cant\_d} \end{cases}$ $R_{r\_d} = 386.4 \cdot kip$

$R_{t\_d} := \begin{cases} \frac{1}{2} \cdot \left[\left(q'_{u\_max} - q'_{u\_pier\_cant\_d}\right) \cdot B_{mat}\right] \cdot B_{cant\_d} & \text{if } X_u \geq B_{cant\_d} \\ \frac{1}{2} \cdot \left(q'_{u\_max} \cdot B_{mat}\right) \cdot X_u & \text{if } X_u < B_{cant\_d} \end{cases}$ $R_{t\_d} = 197.6 \cdot kip$

$V_{u\_bot\_cant\_d} := \begin{cases} R_{r\_d} + R_{t\_d} & \text{if } ecc_u < \frac{B_{mat}}{2} \\ P_{u\_total} & \text{otherwise} \end{cases}$ $V_{u\_bot\_cant\_d} = 583.9 \cdot kip$

$R_r := \begin{cases} \left(q'_{u\_pier\_cant} \cdot B_{mat}\right) \cdot B_{cant} & \text{if } X_u \geq B_{cant} \\ 0 \cdot psf & \text{if } X_u < B_{cant} \end{cases}$ $R_r = 359.7 \cdot kip$

$M_{u\_r} := R_r \cdot \left(\frac{B_{cant}}{2}\right)$ $M_{u\_r} = 1676.3 \cdot kip \cdot ft$

$R_t := \begin{cases} \frac{1}{2} \cdot \left[\left(q'_{u\_max} - q'_{u\_pier\_cant}\right) \cdot B_{mat}\right] \cdot B_{cant} & \text{if } X_u \geq B_{cant} \\ \frac{1}{2} \cdot \left(q'_{u\_max} \cdot B_{mat}\right) \cdot X_u & \text{if } X_u < B_{cant} \end{cases}$ $R_t = 308.3 \cdot kip$

$M_{u\_t} := \begin{cases} R_t \cdot \left(\frac{2}{3} \cdot B_{cant}\right) & \text{if } X_u \geq B_{cant} \\ R_t \cdot \left(B_{cant} - \frac{X_u}{3}\right) & \text{if } X_u < B_{cant} \end{cases}$ $M_{u\_t} = 1915.7 \cdot kip \cdot ft$

$M_{u\_bot\_cant} := \begin{cases} M_{u\_r} + M_{u\_t} & \text{if } ecc_u < \frac{B_{mat}}{2} \\ P_{u\_total} \left[ecc_u - \left(\frac{B_{mat}}{2} - B_{cant}\right)\right] & \text{otherwise} \end{cases}$ $M_{u\_bot\_cant} = 3592.0 \cdot kip \cdot ft$

- Simple Span Shear & Moment (from concrete & soil above):

$L_{simple\_v} := FW - \left(B_{pier} + 2 \cdot d_{top}\right)$ $L_{simple\_v} = 195.38 \cdot in$

$V_{u\_bot\_simple\_cs\_d} := \frac{\left(q_{u\_top\_1.2} \cdot B_{mat}\right) \cdot L_{simple\_v}}{2}$ $V_{u\_bot\_simple\_cs\_d} = 222.9 \cdot kip$

$L_{simple\_f} := FW - B_{pier}$ $L_{simple\_f} = 240.00 \cdot in$

$M_{u\_bot\_simple\_cs} := \frac{\left(q_{u\_top\_1.2} \cdot B_{mat}\right) \cdot L_{simple\_f}^2}{8}$ (conservative) $M_{u\_bot\_simple\_cs} = 1369.2 \cdot kip \cdot ft$

Output - Factored Forces In Mat, Negative (TOP):

- Cantilever Shear & Moment (from concrete & soil above):

$V_{u\_top\_cant\_cs\_d} := \left(q_{u\_top\_1.2} \cdot B_{mat}\right) \cdot B_{cant\_d}$ $V_{u\_top\_cant\_cs\_d} = 204.4 \cdot kip$

$M_{u\_top\_cant\_cs} := \frac{\left(q_{u\_top\_1.2} \cdot B_{mat}\right) \cdot B_{cant}^2}{2}$ $M_{u\_top\_cant\_cs} = 1189.8 \cdot kip \cdot ft$

- Simple Span Shear & Moment (from bearing pressure):

$R_{r\_simple\_d} := \left(q'_{u\_pier\_simple\_min\_d} \cdot B_{mat}\right) \cdot L_{simple\_v}$ $R_{r\_simple\_d} = 0.0 \cdot kip$

$R_{t\_simple\_d} := \frac{1}{2} \cdot \left[\left(q'_{u\_pier\_simple\_max\_d} - q'_{u\_pier\_simple\_min\_d}\right) \cdot B_{mat}\right] \cdot L_{simple\_v}$ $R_{t\_simple\_d} = 268.6 \cdot kip$

$V_{u\_top\_simple\_d} := \frac{R_{r\_simple\_d}}{2} + R_{t\_simple\_d}$ (conservative) $V_{u\_top\_simple\_d} = 268.6 \cdot kip$

$M_{u\_top\_simple} := \frac{\left(q'_{u\_pier\_simple\_max} \cdot B_{mat}\right) \cdot L_{simple\_f}^2}{8}$ (conservative) $M_{u\_top\_simple} = 2309.3 \cdot kip \cdot ft$

Output - Factored Unbalanced Moment & Shear From Pier:

- Unbalanced Moment (13.5.3.2, Code):

$V_{u\_pier} := \begin{pmatrix} V_{u\_leg\_P} \\ V_{u\_leg\_U} \end{pmatrix}$ $V_{u\_pier} = \begin{pmatrix} 49.0 \\ 45.0 \end{pmatrix} \cdot kip$

$M_{u\_pier} := V_{u\_pier} \cdot L_{pier}$ $M_{u\_pier} = \begin{pmatrix} 208.3 \\ 191.3 \end{pmatrix} \cdot kip \cdot ft$

$P_{ut\_2way} := P_{u\_leg} + 1.2 \cdot \left(\frac{D_{pier}}{3}\right)$ $P_{ut\_2way} = 673.61 \cdot kip$

$B'_{pier} := \begin{cases} \left(0.89 \cdot B_{pier}\right) & \text{if Pier\_Shape = "Circular"} \quad \text{(R11.11.7.1 / Fig. R13.6.2.5)} \\ \left(B_{pier}\right) & \text{if Pier\_Shape = "Square"} \end{cases}$ $B'_{pier} = 3.56 \cdot ft$

$c_1 := B'_{pier}$ $c_2 := B'_{pier}$ $c_1 = 42.72 \cdot in$

$b_1 := \left(c_1 + d_{bot}\right)$ $b_2 := \left(c_2 + d_{bot}\right)$ $b_1 = 65.03 \cdot in$

$\gamma_f := \frac{1}{1 + \left(\frac{2}{3}\right) \cdot \sqrt{\frac{b_1}{b_2}}}$ $\gamma_f = 0.60$

$\gamma M_u := \gamma_f \cdot \max\left(M_{u\_pier}\right)$ $\gamma M_u = 125.0 \cdot kip \cdot ft$

- 2-Way Shear Including Unbalanced Shear (11.11.7 Code):

$\gamma_v := (1 - \gamma_f)$ $\gamma_v = 0.40$

$A_c := 2 \cdot d_{bot} \cdot (c_1 + c_2 + 2 \cdot d_{bot})$ $A_c = 40.30 \cdot ft^2$

$J_c := \frac{d_{bot} \cdot (c_1 + d_{bot})^3}{6} + \frac{(c_1 + d_{bot}) \cdot d_{bot}^3}{6} + \frac{d_{bot} \cdot (c_2 + d_{bot}) \cdot (c_1 + d_{bot})^2}{2}$ $J_c = 203.0 \cdot ft^4$

$c_{AB} := \frac{b_1}{2}$ $c_{CD} := \frac{b_1}{2}$ $c_{AB} = 2.71\,ft$ $c_{CD} = 2.71\,ft$

$ratio_{2way} := \left[\frac{B_{mat}^2 - 3 \cdot (B'_{pier} + d_{bot})^2}{B_{mat}^2} \right]$ $ratio_{2way} = 0.93$

$v_{u\_AB} := \frac{P_{ut\_2way} \cdot ratio_{2way}}{A_c} + \frac{(\gamma_v \cdot M_{u\_picr}) \cdot c_{AB}}{J_c}$ $v_{u\_AB} = \begin{pmatrix} 116.1 \\ 115.5 \end{pmatrix} \cdot psi$

$v_{u\_CD\_M} := \frac{P_{ut\_2way} \cdot ratio_{2way}}{A_c} - \frac{(\gamma_v \cdot M_{u\_pier}) \cdot c_{CD}}{J_c}$ $v_{u\_CD\_M} = \begin{pmatrix} 100.7 \\ 101.3 \end{pmatrix} \cdot psi$

$v_{u\_CD\_V} := \left[\frac{\sqrt{\left(\frac{P_{ut\_2way}}{2} \right)^2 + V_{u\_pier}^2}}{\frac{A_c}{2}} \right] \cdot ratio_{2way}$ $v_{u\_CD\_V} = \begin{pmatrix} 109.6 \\ 109.4 \end{pmatrix} \cdot psi$

$v_{u\_CD} := \max(v_{u\_CD\_M}, v_{u\_CD\_V})$ $v_{u\_CD} = 109.6 \cdot psi$

MAT STRUCTURE STRENGTH

Output - Req'd Flexural Area of Steel:

- Top:

$n_{h\_top} := ceil\left[\frac{B_{mat} - (2 \cdot cover_{end\_mat} + d_{h\_top})}{s_{h\_top}} + 1 \right]$ $n_{h\_top} = 73$

$M_{u\_top} := \max(M_{u\_top\_cant\_cs}, M_{u\_top\_simple}, \gamma M_u)$ $M_{u\_top} = 2309.3 \cdot kip \cdot ft$

$A_{top} := -\left(\frac{f_y^2}{1.7 \cdot B_{mat} \cdot f'_{c\_design}} \right)$ $B_{top} := f_y \cdot d_{top}$ $C_{top} := -\left(\frac{M_{u\_top}}{0.90} \right)$

(assumes tension controlled section, i.e. $\phi = 0.90$)

$A_{s\_top\_REQD\_flexure} := \frac{-B_{top} + \sqrt{B_{top}^2 - 4 \cdot A_{top} \cdot C_{top}}}{2 \cdot A_{top}}$ $A_{s\_top\_REQD\_flexure} = 23.50 \cdot in^2$

$A_{s\_top} := n_{h\_top} \cdot A_{b\_top}$ $A_{s\_top} = 73.00 \cdot in^2$

spacing req'd for current bar size = $s_{h\_top\_req'd} = 19.20 \cdot in$

size of rebar req'd for current #/spacing = Top_Horiz_Req'd = "#6"

- Bottom:

$n_{h\_bot} := ceil\left[\frac{B_{mat} - (2 \cdot cover_{end\_mat} + d_{h\_bot})}{s_{h\_bot}} + 1 \right]$ $n_{h\_bot} = 73$

$M_{u\_bot} := \max(M_{u\_bot\_cant}, M_{u\_bot\_simple\_cs}, \gamma M_u)$ $M_{u\_bot} = 3592.0 \cdot kip \cdot ft$

$A_{bot} := -\left(\frac{f_y^2}{1.7 \cdot B_{mat} \cdot f'_{c\_design}} \right)$ $B_{bot} := f_y \cdot d_{bot}$ $C_{bot} := -\left(\frac{M_{u\_bot}}{0.90} \right)$

(assumes tension controlled section, i.e. $\phi = 0.90$)

$A_{s\_bot\_REQD\_flexure} := \frac{-B_{bot} + \sqrt{B_{bot}^2 - 4 \cdot A_{bot} \cdot C_{bot}}}{2 \cdot A_{bot}}$ $A_{s\_bot\_REQD\_flexure} = 37.02 \cdot in^2$

$A_{s\_bot} := n_{h\_bot} \cdot A_{b\_bot}$ $A_{s\_bot} = 73.00 \cdot in^2$

spacing req'd for current bar size = $s_{h\_bot\_req'd} = 11.99 \cdot in$

size of rebar req'd for current #/spacing = Bot_Horiz_Req'd = "#7"

Output - Flexural Strength:

$\beta_1 := \begin{cases} 0.85 & \text{if } f'_{c\_design} \le 4000 \cdot psi \\ \left(1.05 - 0.005 \cdot \frac{f'_{c\_design}}{ksi} \right) & \text{if } 4000 \cdot psi < f'_{c\_design} \le 8000 \cdot psi \\ 0.65 & \text{if } f'_{c\_design} \ge 8000 \cdot psi \end{cases}$ $\beta_1 = 0.85$

- Top:

$c'_{top} := 1.0 \cdot in$

$\varepsilon'_{t\_top} := \varepsilon_{cu} \left(\frac{d_{top} - c'_{top}}{c'_{top}} \right)$ $\varepsilon'_{t\_top} = 0.0639$

$f'_{s\_top} := \begin{cases} E \cdot \varepsilon'_{t\_top} & \text{if } \varepsilon'_{t\_top} \le \frac{f_y}{E} \\ f_y & \text{if } \varepsilon'_{t\_top} > \frac{f_y}{E} \end{cases}$ $f'_{s\_top} = 60.0 \cdot ksi$

Given

$f'_{s\_top} \cdot A_{s\_top} = (0.85 \cdot f'_{c\_design}) \cdot B_{mat} \cdot (\beta_1 \cdot c'_{top})$

$c_{top} := Find(c'_{top})$ $c_{top} = 3.46 \cdot in$

$a_{top} := \beta_1 \cdot c_{top}$ $a_{top} = 2.94 \cdot in$

$\varepsilon_{t\_top} := \varepsilon_{cu} \left(\frac{d_{top} - c_{top}}{c_{top}} \right)$ $\varepsilon_{t\_top} = 0.0163$

$f_{s\_top} := \begin{cases} E \cdot \varepsilon_{t\_top} & \text{if } \varepsilon_{t\_top} \le \frac{f_y}{E} \\ f_y & \text{if } \varepsilon_{t\_top} > \frac{f_y}{E} \end{cases}$ $f_{s\_top} = 60.0 \cdot ksi$

$P_{s\_top} := f_{s\_top} \cdot A_{s\_top}$ $P_{s\_top} = 4380.0 \cdot kip$

$C_{c\_top} := (0.85 \cdot f'_{c\_design}) \cdot B_{mat} \cdot a_{top}$ $C_{c\_top} = 4380.0 \cdot kip$

$\Sigma Forces_{top} := \begin{cases} \text{"OK"} & \text{if } P_{s\_top} = C_{c\_top} \\ \text{"Check c'.top Input"} & \text{otherwise} \end{cases}$ $\Sigma Forces_{top} = \text{"OK"}$

$M_{n\_top} := C_{c\_top} \cdot \left(\frac{a_{top}}{2}\right) + P_{s\_top} \cdot (d_{top} - a_{top})$ $M_{n\_top} = 7605.7 \cdot kip \cdot ft$

$\phi_{f\_top} := \begin{cases} 0.65 & \text{if } \varepsilon_{t\_top} \le 0.002 \\ 0.48 + 83 \cdot \varepsilon_{t\_top} & \text{if } 0.002 < \varepsilon_{t\_top} < 0.005 \\ 0.9 & \text{if } \varepsilon_{t\_top} \ge 0.005 \end{cases}$ [9.3.1-2, 10.3.3, ACI 318-05] $\phi_{f\_top} = 0.90$

$\phi M_{n\_top} := \phi_{f\_top} \cdot M_{n\_top}$ $\phi M_{n\_top} = 6845.1 \cdot kip \cdot ft$

$r_{f\_top} := \frac{M_{u\_top}}{\phi M_{n\_top}}$ $r_{f\_top} = 34 \cdot \%$

$Check_{As\_max\_top} := \begin{cases} \text{"OK"} & \text{if } \varepsilon_{t\_top} \ge 0.004 \\ \text{"NG"} & \text{if } \varepsilon_{t\_top} < 0.004 \end{cases}$ [10.3.5, ACI 318-05] $Check_{As\_max\_top} = \text{"OK"}$

- Bottom:

$c'_{bot} := 1.0 \cdot in$

$\varepsilon'_{t\_bot} := \varepsilon_{cu} \cdot \left(\frac{d_{bot} - c'_{bot}}{c'_{bot}}\right)$ $\varepsilon'_{t\_bot} = 0.0639$

$f'_{s\_bot} := \begin{cases} E \cdot \varepsilon'_{t\_bot} & \text{if } \varepsilon'_{t\_bot} \le \frac{f_y}{E} \\ f_y & \text{if } \varepsilon'_{t\_bot} > \frac{f_y}{E} \end{cases}$ $f'_{s\_bot} = 60.0 \cdot ksi$

Given

$f'_{s\_bot} \cdot A_{s\_bot} = (0.85 \cdot f'_{c\_design}) \cdot B_{mat} \cdot (\beta_1 \cdot c'_{bot})$

$c_{bot} := \text{Find}(c'_{bot})$ $c_{bot} = 3.46 \cdot in$

$a_{bot} := \beta_1 \cdot c_{bot}$ $a_{bot} = 2.94 \cdot in$

$\varepsilon_{t\_bot} := \varepsilon_{cu} \cdot \left(\frac{d_{bot} - c_{bot}}{c_{bot}}\right)$ $\varepsilon_{t\_bot} = 0.0163$

$f_{s\_bot} := \begin{cases} E \cdot \varepsilon_{t\_bot} & \text{if } \varepsilon_{t\_bot} \le \frac{f_y}{E} \\ f_y & \text{if } \varepsilon_{t\_bot} > \frac{f_y}{E} \end{cases}$ $f_{s\_bot} = 60.0 \cdot ksi$

$P_{s\_bot} := f_{s\_bot} \cdot A_{s\_bot}$ $P_{s\_bot} = 4380.0 \cdot kip$

$C_{c\_bot} := (0.85 \cdot f'_{c\_design}) \cdot B_{mat} \cdot a_{bot}$ $C_{c\_bot} = 4380.0 \cdot kip$

$\Sigma Forces_{bot} := \begin{cases} \text{"OK"} & \text{if } P_{s\_bot} = C_{c\_bot} \\ \text{"Check c'.top Input"} & \text{otherwise} \end{cases}$ $\Sigma Forces_{bot} = \text{"OK"}$

$M_{n\_bot} := C_{c\_bot} \cdot \left(\frac{a_{bot}}{2}\right) + P_{s\_bot} \cdot (d_{bot} - a_{bot})$ $M_{n\_bot} = 7605.7 \cdot kip \cdot ft$

$\phi_{f\_bot} := \begin{cases} 0.65 & \text{if } \varepsilon_{t\_bot} \le 0.002 \\ 0.48 + 83 \cdot \varepsilon_{t\_bot} & \text{if } 0.002 < \varepsilon_{t\_bot} < 0.005 \\ 0.9 & \text{if } \varepsilon_{t\_bot} \ge 0.005 \end{cases}$ [9.3.1-2, 10.3.3, ACI 318-05] $\phi_{f\_bot} = 0.90$

$\phi M_{n\_bot} := \phi_{f\_bot} \cdot M_{n\_bot}$ $\phi M_{n\_bot} = 6845.1 \cdot kip \cdot ft$

$r_{f\_bot} := \frac{M_{u\_bot}}{\phi M_{n\_bot}}$ $r_{f\_bot} = 52 \cdot \%$

$Check_{As\_max\_bot} := \begin{cases} \text{"OK"} & \text{if } \varepsilon_{t\_bot} \ge 0.004 \\ \text{"NG"} & \text{if } \varepsilon_{t\_bot} < 0.004 \end{cases}$ [10.3.5, ACI 318-05] $Check_{As\_max\_bot} = \text{"OK"}$

Output - Mat Shear Strength:

- 1-Way Shear in BOTTOM of Mat (positive moment):

$V_{u\_bot} := \max(V_{u\_bot\_cant\_d}, V_{u\_bot\_simple\_cs\_d})$ $V_{u\_bot} = 583.9 \cdot kip$

$\phi V_{c\_mat\_bot} := \phi_v \cdot \left[2 \cdot \sqrt{\frac{f'_{c\_design}}{psi}} \cdot \left(\frac{B_{mat}}{in} \cdot \frac{d_{bot}}{in}\right)\right] \cdot lbf$ $\phi V_{c\_mat\_bot} = 926.9 \cdot kip$

$r_{v\_bot} := \frac{V_{u\_bot}}{\phi V_{c\_mat\_bot}}$ $r_{v\_bot} = 63 \cdot \%$

- 2-Way Shear in BOTTOM of Mat:

$b_o := 2 \cdot b_1 + 2 \cdot b_2$ $b_o = 260.11 \cdot in$

$\phi V_{c\_mat\_bot\_2way} := \phi_v \cdot \left[4 \cdot \sqrt{\frac{f'_{c\_design}}{psi}} \cdot \left(\frac{b_o}{in} \cdot \frac{d_{bot}}{in}\right)\right] \cdot lbf$ [11.11.2.1 (c)] $\phi V_{c\_mat\_bot\_2way} = 1100.96 \cdot kip$

$\phi v_{n\_mat\_bot\_2way} := \frac{\phi V_{c\_mat\_bot\_2way}}{b_o \cdot d_{bot}}$ $\phi v_{n\_mat\_bot\_2way} = 189.74 \cdot psi$

$r_{v\_bot\_2way} := \frac{\max(v_{u\_AB}, v_{u\_CD})}{\phi v_{n\_mat\_bot\_2way}}$ $r_{v\_bot\_2way} = 61 \cdot \%$

- 1-Way Shear in TOP of Mat (negative moment):

$V_{u\_top} := \max(V_{u\_top\_cant\_cs\_d}, V_{u\_top\_simple\_d})$ $V_{u\_top} = 268.6 \cdot kip$

$\phi V_{c\_mat\_top} := \phi_v \cdot \left[2 \cdot \sqrt{\frac{f'_{c\_design}}{psi}} \cdot \left(\frac{B_{mat}}{in} \cdot \frac{d_{top}}{in}\right)\right] \cdot lbf$ $\phi V_{c\_mat\_top} = 926.9 \cdot kip$

$r_{v\_top} := \frac{V_{u\_top}}{\phi V_{c\_mat\_top}}$ $r_{v\_top} = 29 \cdot \%$

PIER STRUCTURE STRENGTH

Output - Pier Capacity Utilization:

$$r_{f\_pier} := \frac{\max(M_{u\_pier})}{\phi M_{n\_pier}}$$ $r_{f\_pier} = 18\cdot\%$

Output - Pier Shear Design Strength:

- Concrete:

$$d_{v\_pier} := \begin{cases} 0.8\cdot B_{pier} & \text{if Pier\_Shape = "Circular"} \\ B_{pier} - \left(cover_{side} + d_{tie} + \frac{d_{vert}}{2}\right) & \text{if Pier\_Shape = "Square"} \end{cases}$$ $d_{v\_pier} = 38.40\cdot in$

$$b_w := B_{pier}$$ $b_w = 48.00\cdot in$

$$A_{pier} := \begin{cases} \text{if Pier\_Shape = "Circular"} & \\ \quad \begin{cases} \left(\frac{\pi\cdot B_{pier}^2}{4}\right)\cdot 0.7 & \text{if D\_A = "Design"} \\ \left(b_w\cdot d_{v\_pier}\right) & \text{if D\_A = "Analysis"} \end{cases} & \\ b_w\cdot d_{v\_pier} & \text{if Pier\_Shape = "Square"} \end{cases}$$ $A_{pier} = 1267\cdot in^2$

$$V_{c\_pier\_P} := \left[2\cdot\left(1 + \frac{P_{u\_leg}}{2000\cdot A_{g\_pier}}\cdot\frac{1}{psi}\right)\cdot\sqrt{\frac{f'_{c\_design}}{psi}}\cdot\frac{A_{pier}}{in^2}\right]\cdot lbf$$ $V_{c\_pier\_P} = 189.6\cdot kip$

$$V_{c\_pier\_U} := \left[2\cdot\left(1 + \frac{-U_{u\_leg}}{500\cdot A_{g\_pier}}\cdot\frac{1}{psi}\right)\cdot\sqrt{\frac{f'_{c\_design}}{psi}}\cdot\frac{A_{pier}}{in^2}\right]\cdot lbf$$ $V_{c\_pier\_U} = 57.5\cdot kip$

- Shear Reinforcement (Ties):

$$A_{v\_pier} := 2\cdot A_{tr}$$ $A_{v\_pier} = 0.62\cdot in^2$

$$V_{s\_pier} := \min\left[\frac{A_{v\_pier}\cdot f_y\cdot d_{v\_pier}}{s_{tie}}, \left(8\cdot\sqrt{\frac{f'_{c\_design}}{psi}}\cdot\frac{A_{pier}}{in^2}\right)\cdot lbf\right]$$ $V_{s\_pier} = 238.1\cdot kip$

- Spacing Limits:

$$s_{tie\_max\_7.10.5.2} := \min\left(16\cdot d_{vert}, 48\cdot d_{tie}, b_w\right)$$ $s_{tie\_max\_7.10.5.2} = 18.05\cdot in$

$$s_{tie\_max\_11.5.5.1} := \min\left(\frac{d_{v\_pier}}{2}, 24\cdot in\right)$$ $s_{tie\_max\_11.5.5.1} = 19.20\cdot in$

$$s_{tie\_max\_11.5.5.3} := \begin{cases} s_{tie\_max\_11.5.5.1} & \text{if } V_{s\_pier} \le \left(4\cdot\sqrt{\frac{f'_{c\_design}}{psi}}\cdot\frac{b_w}{in}\cdot\frac{d_{v\_pier}}{in}\right)\cdot lbf \\ \frac{s_{tie\_max\_11.5.5.1}}{2} & \text{if } V_{s\_pier} > \left(4\cdot\sqrt{\frac{f'_{c\_design}}{psi}}\cdot\frac{b_w}{in}\cdot\frac{d_{v\_pier}}{in}\right)\cdot lbf \end{cases}$$ $s_{tie\_max\_11.5.5.3} = 19.20\cdot in$

- Minimum Area:

$$Min\_Tie\_Req'd := \begin{cases} \text{"YES"} & \text{if } V_{u\_leg\_P} \ge 0.5\cdot\phi_v\cdot V_{c\_pier\_P} \vee V_{u\_leg\_U} \ge 0.5\cdot\phi_v\cdot V_{c\_pier\_U} \\ \text{"NO"} & \text{otherwise} \end{cases}$$ Min_Tie_Req'd = "YES"

[11.5.6.1, ACI 318-05]

$$s_{tie\_max\_11.5.6.3} := \begin{cases} \min\left[\frac{\left(\frac{f_y}{psi}\right)\cdot\left(\frac{A_{v\_pier}}{in^2}\right)}{\left(0.75\cdot\sqrt{\frac{\max\left(f'_{c\_design}, f'_{c\_spec}\right)}{psi}}\right)\cdot\left(\frac{b_w}{in}\right)}, \frac{\left(\frac{f_y}{psi}\right)\cdot\left(\frac{A_{v\_pier}}{in^2}\right)}{(50)\cdot\left(\frac{b_w}{in}\right)}\right]\cdot in & \text{if Min\_Tie\_Req'd = "YES"} \\ \text{"N/A"} & \text{if Min\_Tie\_Req'd = "NO"} \end{cases}$$ $s_{tie\_max\_11.5.6.3} = 15.50\cdot in$

$$s_{tie\_max} := \begin{cases} \min\left(s_{tie\_max\_7.10.5.2}, s_{tie\_max\_11.5.5.1}, s_{tie\_max\_11.5.5.3}, s_{tie\_max\_11.5.6.3}\right) & \text{if Min\_Tie\_Req'd = "YES"} \\ \min\left(s_{tie\_max\_7.10.5.2}, s_{tie\_max\_11.5.5.1}, s_{tie\_max\_11.5.5.3}\right) & \text{if Min\_Tie\_Req'd = "NO"} \end{cases}$$ $s_{tie\_max} = 15.5\cdot in$

$$r_{s\_tie} := \begin{cases} \text{"OK"} & \text{if } s_{tie} \le s_{tie\_max} \\ \text{"NG"} & \text{otherwise} \end{cases}$$ $r_{s\_tie} = \text{"OK"}$

$$s_{tie\_max\_Vs\_P} := \begin{cases} \frac{A_{v\_pier}\cdot f_y\cdot d_{v\_pier}}{\left(\frac{V_{u\_leg\_P}}{\phi_v} - V_{c\_pier\_P}\right)} & \text{if } \left(\frac{V_{u\_leg\_P}}{\phi_v} - V_{c\_pier\_P}\right) > 0 \\ \text{"N/A"} & \text{if } \left(\frac{V_{u\_leg\_P}}{\phi_v} - V_{c\_pier\_P}\right) \le 0 \end{cases}$$ $s_{tie\_max\_Vs\_P} = \text{"N/A"}\cdot in$

$$s_{tie\_max\_Vs\_U} := \begin{cases} \frac{A_{v\_pier}\cdot f_y\cdot d_{v\_pier}}{\left(\frac{V_{u\_leg\_U}}{\phi_v} - V_{c\_pier\_U}\right)} & \text{if } \left(\frac{V_{u\_leg\_U}}{\phi_v} - V_{c\_pier\_U}\right) > 0 \\ \text{"N/A"} & \text{if } \left(\frac{V_{u\_leg\_U}}{\phi_v} - V_{c\_pier\_U}\right) \le 0 \end{cases}$$ $s_{tie\_max\_Vs\_U} = 574.67\cdot in$

$$\phi V_{n\_pier\_P} := \phi_v\cdot\left(V_{c\_pier\_P} + V_{s\_pier}\right)$$ $\phi V_{n\_pier\_P} = 320.8\cdot kip$

$$r_{v\_pier\_P} := \frac{V_{u\_leg\_P}}{\phi V_{n\_pier\_P}}$$ $r_{v\_pier\_P} = 15\cdot\%$

$$\phi V_{n\_pier\_U} := \phi_v\cdot\left(V_{c\_pier\_U} + V_{s\_pier}\right)$$ $\phi V_{n\_pier\_U} = 221.7\cdot kip$

$$r_{v\_pier\_U} := \frac{V_{u\_leg\_U}}{\phi V_{n\_pier\_U}}$$ $r_{v\_pier\_U} = 20\cdot\%$

Output - Pier Axial Compressive Design Strength:

$$A_{st} := n_{vert}\cdot A_{vert}$$ $A_{st} = 13.00\cdot in^2$

$$\phi P_{n\_pier} := 0.8\cdot\phi_{pier}\left[0.85\cdot f'_{c\_design}\cdot\left(A_{g\_pier} - A_{st}\right) + f_y\cdot A_{st}\right]$$ $\phi P_{n\_pier} = 4959.6\cdot kip$

$$r_{c\_pier} := \frac{P_{u\_leg}}{\phi P_{n\_pier}}$$ $r_{c\_pier} = 13\cdot\%$

Output - Combined Pier Flexure & Axial Compression Design Capacity:

$r_{cf\_pier} := \frac{M_{u\_pier_0}}{\phi M_{n\_pier\_P}}$ $r_{cf\_pier} = 11 \cdot \%$

Output - Pier Axial Tension Design Strength:

$T_{n\_pier} := f_y \cdot A_{st}$ $T_{n\_pier} = 780.0 \cdot kip$

$\phi T_{n\_pier} := \phi_t \cdot T_{n\_pier}$ $\phi T_{n\_pier} = 702.0 \cdot kip$

$r_{t\_pier} := \frac{U_{u\_leg}}{\phi T_{n\_pier}}$ $r_{t\_pier} = 83 \cdot \%$

Output - Combined Pier Flexure & Axial Tension Design Capacity:

$r_{tf\_pier} := \frac{M_{u\_pier_1}}{\phi M_{n\_pier\_T}}$ $r_{tf\_pier} = 59 \cdot \%$

MAT & PIER STRUCTURE DETAILING

Output - Pier Vertical Rebar Geometry:

- Spacing / Clear Distance in Pier:

$clr_{vert} := cover_{side} + d_{tie} + \left(\frac{d_{vert}}{2}\right)$ = clear distance from center of vert. to edge of concrete $clr_{vert} = 4.19 \cdot in$

$cc_{vert} := \left(B_{pier} - 2 \cdot clr_{vert}\right) \cdot \sin\left(\frac{\pi}{n_{vert}}\right)$ = center to center spacing of vertical rebar $cc_{vert} = 9.48 \cdot in$

- Spacing / Clear Distance In Mat:

$clr_{hook} := cover_{tb\_mat} + 2 \cdot d_{h\_bot}$ = clear distance from edge of concrete to outside edge of hooked vertical bar $clr_{hook} = 5.26 \cdot in$

- Extension In Mat:

$BR_{vert} := \begin{cases} 4 \cdot d_{vert} & \text{if Vert = "\#3" } \vee \text{ Vert = "\#4" } \vee \text{ Vert = "\#5" } \vee \text{ Vert = "\#6" } \vee \text{ Vert = "\#7" } \vee \text{ Vert = "\#8"} \\ 5 \cdot d_{vert} & \text{if Vert = "\#9" } \vee \text{ Vert = "\#10" } \vee \text{ Vert = "\#11"} \\ 6 \cdot d_{vert} & \text{if Vert = "\#14" } \vee \text{ Vert = "\#18"} \end{cases}$ $BR_{vert} = 5.640 \cdot in$

$L_{vert\_ext\_reqd} := 12 \cdot d_{vert} + BR_{vert}$ $L_{vert\_ext\_reqd} = 19.18 \cdot in$

$r_{Lvert\_ext} := \frac{L_{vert\_ext\_reqd}}{L_{vert\_ext}}$ $r_{Lvert\_ext} = 91 \cdot \%$

$result_{Lvert\_ext} := \begin{cases} \text{"OK"} & \text{if } L_{vert\_ext} \geq L_{vert\_ext\_reqd} \\ \text{"NG"} & \text{if } L_{vert\_ext} < L_{vert\_ext\_reqd} \end{cases}$ $result_{Lvert\_ext} = \text{"OK"}$

Output - Minimum Mat Width (and Length) Dimension:

- Based on Minimum Y_1 Dimension:

$Y_{1\_mat\_MIN} := \left[\left(L_{vert\_ext} + cover_{end\_mat}\right) - \left(\frac{d_{vert}}{2} + clr_{vert}\right)\right] + \left(\frac{B_{pier}}{2}\right)$ $Y_{1\_mat\_MIN} = 43.24700 \cdot in$

$B_{mat\_MIN\_Y1} := 2 \cdot \left[Y_{1\_mat\_MIN} + \left(\frac{1}{2} \cdot FW \cdot \sec\left(\frac{\pi}{6}\right)\right)\right]$ $B_{mat\_MIN\_Y1} = 34.92 \text{ ft}$

- Based on Minimum Cover Dimension:

$cover_{end\_mat\_vert\_actual} := \frac{B_{mat}}{2} - \left[\frac{1}{2} \cdot FW \cdot \sec\left(\frac{\pi}{6}\right) + \left(\frac{B_{pier}}{2} - clr_{vert} - \frac{d_{vert}}{2}\right) + L_{vert\_ext}\right]$ $cover_{end\_mat\_vert\_actual} = 12.48 \cdot in$

$B_{mat\_MIN\_cover} := 2 \cdot \left[\left(\frac{1}{2} \cdot FW \cdot \sec\left(\frac{\pi}{6}\right)\right) + \left(\frac{B_{pier}}{2} - clr_{vert} - \frac{d_{vert}}{2}\right) + L_{vert\_ext}\right]$ $B_{mat\_MIN\_cover} = 34.42 \text{ ft}$

$B_{mat\_MIN} := \max\left(B_{mat\_MIN\_Y1}, B_{mat\_MIN\_cover}\right)$ $B_{mat\_MIN} = 34.921 \text{ ft}$

$result_{B.mat\_MIN} := \begin{cases} \text{"OK"} & \text{if } B_{mat} \geq B_{mat\_MIN} \\ \text{"NG"} & \text{if } B_{mat} < B_{mat\_MIN} \end{cases}$ $result_{B.mat\_MIN} = \text{"OK"}$

Output - Minimum Mat Depth:

$embed := L_{AR} - proj_{AR}$ $embed = 72.00 \cdot in$

$z_{mat\_MIN} := embed - H + cover_{tb\_mat} + 2 \cdot d_{h\_bot}$ $z_{mat\_MIN} = 5.938 \text{ ft}$

$result_{z.mat\_MIN} := \begin{cases} \text{"OK"} & \text{if } z_{mat} \geq z_{mat\_MIN} \\ \text{"NG"} & \text{if } z_{mat} < z_{mat\_MIN} \end{cases}$ $result_{z.mat\_MIN} = \text{"OK"}$

Output - Determine if AR Shear Plane is In Mat or Req'd. Vert. Rebar Development for AR Pull-out:

$d_{AR\_mat} := \begin{cases} embed - L_{pier} & \text{if } embed > L_{pier} \\ \text{"Not In Mat"} & \text{if } embed \leq L_{pier} \end{cases}$ $d_{AR\_mat} = 21.00 \cdot in$

$Shear_{Plane\_45} := \begin{cases} \text{"In Pier"} & \text{if } d_{AR\_mat} = \text{"Not In Mat"} \\ & \text{if } d_{AR\_mat} \neq \text{"Not In Mat"} \\ & \quad \begin{cases} \text{"In Mat"} & \text{if } BC + d_{AR} + 2 \cdot d_{AR\_mat} > B_{pier} \\ \text{"In Pier"} & \text{if } BC + d_{AR} + 2 \cdot d_{AR\_mat} \leq B_{pier} \end{cases} \end{cases}$ $Shear_{Plane\_45} = \text{"In Mat"}$

Output - Req'd Development Length of Pier Vertical Rebar - Deformed Bars in Tension [12.2.3, Spec.]:

$\psi_{t\_vert} := 1.0$ [Sec. 12.2.4 (a), Specification]

$\psi_e := 1.0$ [Sec. 12.2.4 (b), Specification]

$\psi_{s\_vert} := \begin{cases} 0.8 & \text{if } d_{vert} \leq 0.75 \cdot in \\ 1.0 & \text{otherwise} \end{cases}$ [Sec. 12.2.4 (c), Specification] $\psi_{s\_vert} = 1.0$

$\lambda := 1.0$ [Sec. 12.2.4 (d), Specification]

$c_b := \min\left(clr_{vert}, \frac{cc_{vert}}{2}\right)$ $c_b = 4.19 \cdot in$

$K_{tr} := \left(\frac{\frac{A_{tr} \cdot f_y}{in^2 \cdot ksi}}{1500 \cdot \frac{s_{tie}}{in} \cdot n_{vert}}\right) \cdot in$ $K_{tr} = 0.000159 \cdot in$

$term := \begin{cases} \left(\frac{c_b + K_{tr}}{d_{vert}}\right) & \text{if } \left(\frac{c_b + K_{tr}}{d_{vert}}\right) \leq 2.5 \\ 2.5 & \text{otherwise} \end{cases}$ $term = 2.50$

$$l_{d\_reqd} := \left[\frac{3}{40}\cdot\frac{\frac{f_y}{psi}}{\sqrt{\left(\frac{f'_{c\_design}}{psi}\right)}}\cdot\frac{\psi_{t\_vert}\cdot\psi_e\cdot\psi_{s\_vert}\cdot\lambda}{term}\right]\cdot d_{vert} \qquad l_{d\_reqd} = 32.1\cdot in$$

Output - Req'd Development Length of Pier Vertical Rebar - Standard Hooks in Tension [12.5, Spec.]:

$$l_{dh\_reqd} := \left[0.02\cdot\psi_e\cdot\lambda\cdot\frac{\left(\frac{f_y}{psi}\right)}{\sqrt{\frac{f'_{c\_design}}{psi}}}\right]\cdot d_{vert} \qquad l_{dh\_reqd} = 21.40\cdot in$$

$$x_{mat\_vert} := \frac{B_{mat}}{2} - \left[\left[\left(\frac{B_{pier}}{2}\right) - \left(clr_{vert} + \frac{d_{vert}}{2}\right)\right] + L_{vert\_ext}\right] \qquad x_{mat\_vert} = 178.75\cdot in$$

$$B_{mat\_reqd\_vert\_ext} := \begin{cases} \text{"OK"} & \text{if } x_{mat\_vert} \geq cover_{end\_mat} \\ \text{"NG"} & \text{if } x_{mat\_vert} < cover_{end\_mat} \end{cases} \qquad B_{mat\_reqd\_vert\_ext} = \text{"OK"}$$

$$l_{dh'\_reqd} := \begin{cases} (0.7)\cdot l_{dh\_reqd} & \text{if } Vert \neq \text{"\#14"} \wedge Vert \neq \text{"\#18"} \wedge cover_{tb\_mat} \geq 2.5\cdot in \wedge x_{mat\_vert} \geq 2.0\cdot in \\ l_{dh\_reqd} & \text{otherwise} \end{cases} \qquad l_{dh'\_reqd} = 14.98\cdot in$$

Output - Actual Development Length of Hooked Vertical Rebar:

$$l_{dh\_actual} := t_{mat} - clr_{hook} \qquad l_{dh\_actual} = 21.74\cdot in$$

$$r_{ldh} := \frac{l_{dh'\_reqd}}{l_{dh\_actual}} \qquad r_{ldh} = 69\cdot\%$$

$$result_{ldh} := \begin{cases} \text{"OK"} & \text{if } l_{dh\_actual} \geq l_{dh'\_reqd} \\ \text{"NG"} & \text{otherwise} \end{cases} \qquad result_{ldh} = \text{"OK"}$$

Output - Actual Development Length (Top) of Vertical Rebar for Anchor Rods:

$$l_{d\_actual\_AR} := embed - cover_{top} - \left[\left(\frac{B_{pier} - BC}{2}\right) - \left(clr_{vert} + \frac{d_{vert}}{2} + \frac{d_{AR}}{2}\right)\right] \qquad l_{d\_actual\_AR} = 58.50\cdot in$$

$$r_{ld\_AR} := \begin{cases} \frac{l_{d\_reqd}}{l_{d\_actual\_AR}} & \text{if } Shear_{Plane\_45} = \text{"In Pier"} \\ \text{"N/A"} & \text{if } Shear_{Plane\_45} = \text{"In Mat"} \end{cases} \qquad r_{ld\_AR} = \text{"N/A"}\cdot\%$$

$$result_{ld\_AR} := \begin{cases} \text{if } Shear_{Plane\_45} = \text{"In Pier"} \\ \quad \begin{cases} \text{"OK"} & \text{if } l_{d\_actual\_AR} \geq l_{d\_reqd} \\ \text{"NG"} & \text{if } l_{d\_actual\_AR} < l_{d\_reqd} \end{cases} \\ \text{"N/A"} \quad \text{if } Shear_{Plane\_45} = \text{"In Mat"} \end{cases} \qquad result_{ld\_AR} = \text{"N/A"}$$

Output - Actual Development Length (Bottom) of Vertical Rebar for Anchor Rods:

$$l_{dh\_actual\_AR} := \left[\left(L_{pier} + t_{mat}\right) - cover_{top} - cover_{tb\_mat} - 2\cdot d_{h\_bot}\right] - l_{d\_actual\_AR} \qquad l_{dh\_actual\_AR} = 11.24\cdot in$$

$$r_{ldh\_AR} := \begin{cases} \frac{l_{dh'\_reqd}}{l_{dh\_actual\_AR}} & \text{if } Shear_{Plane\_45} = \text{"In Pier"} \\ \text{"N/A"} & \text{if } Shear_{Plane\_45} = \text{"In Mat"} \end{cases} \qquad r_{ldh\_AR} = \text{"N/A"}\cdot\%$$

$$result_{ldh\_AR} := \begin{cases} \text{if } Shear_{Plane\_45} = \text{"In Pier"} \\ \quad \begin{cases} \text{"OK"} & \text{if } l_{dh\_actual\_AR} \geq l_{dh'\_reqd} \\ \text{"NG"} & \text{if } l_{dh\_actual\_AR} < l_{dh'\_reqd} \end{cases} \\ \text{"N/A"} \quad \text{if } Shear_{Plane\_45} = \text{"In Mat"} \end{cases} \qquad result_{ldh\_AR} = \text{"N/A"}$$

Output - Req'd Development Length of mat Horizontal Rebar - Deformed Bars in Tension [12.2.3, Spec.]:

$$d'_{top} := cover_{tb\_mat} + 2\cdot d_{h\_top} \qquad d'_{top} = 5.26\cdot in$$

$$\psi_{t\_horiz} := \begin{cases} 1.3 & \text{if } \left(t_{mat} - d'_{top}\right) > 12\cdot in \\ 1.0 & \text{if } \left(t_{mat} - d'_{top}\right) \leq 12\cdot in \end{cases} \quad \text{[Sec. 12.2.4 (a), Specification]} \qquad \psi_{t\_horiz} = 1.3$$

$$\psi_{s\_horiz} := \begin{cases} 0.8 & \text{if } d_{h\_top} \leq 0.75\cdot in \\ 1.0 & \text{otherwise} \end{cases} \quad \text{[Sec. 12.2.4 (c), Specification]} \qquad \psi_{s\_horiz} = 1.0$$

$$c_{b\_horiz} := \min\left(cover_{tb\_mat}, cover_{end\_mat}\right) \qquad c_{b\_horiz} = 3.00\cdot in$$

$$K_{tr\_horiz} := 0\cdot in \qquad K_{tr\_horiz} = 0.00\cdot in$$

$$term_{horiz} := \begin{cases} \left(\frac{c_{b\_horiz} + K_{tr\_horiz}}{d_{h\_top}}\right) & \text{if } \left(\frac{c_{b\_horiz} + K_{tr\_horiz}}{d_{h\_top}}\right) \leq 2.5 \\ 2.5 & \text{otherwise} \end{cases} \qquad term_{horiz} = 2.50$$

$$l_{d\_reqd\_horiz} := \left[\frac{3}{40}\cdot\frac{\frac{f_y}{psi}}{\sqrt{\left(\frac{f'_{c\_design}}{psi}\right)}}\cdot\frac{\psi_{t\_horiz}\cdot\psi_e\cdot\psi_{s\_horiz}\cdot\lambda}{term_{horiz}}\right]\cdot d_{h\_top} \qquad l_{d\_reqd\_horiz} = 41.7\cdot in$$

Output - Actual Development Length of Mat Top Horizontal Rebar for Anchor Rod Pull-Out:

$$l_{d\_actual\_horiz} := \begin{cases} \frac{B_{mat} - BC - d_{AR}}{2} - cover_{end\_mat} - \left(d_{AR\_mat} - cover_{tb\_mat} - 2\cdot d_{h\_top}\right) & \text{if } Shear_{Plane\_45} = \text{"In Mat"} \\ \text{"N/A"} & \text{if } Shear_{Plane\_45} = \text{"In Pier"} \end{cases} \qquad l_{d\_actual\_horiz} = 191.51\cdot in$$

$$r_{ld\_horiz} := \begin{cases} \frac{l_{d\_reqd\_horiz}}{l_{d\_actual\_horiz}} & \text{if } Shear_{Plane\_45} = \text{"In Mat"} \\ \text{"N/A"} & \text{if } Shear_{Plane\_45} = \text{"In Pier"} \end{cases} \qquad r_{ld\_horiz} = 22\cdot\%$$

$$result_{ld\_horiz} := \begin{cases} \text{if } Shear_{Plane\_45} = \text{"In Mat"} \\ \quad \begin{cases} \text{"OK"} & \text{if } l_{d\_actual\_horiz} \geq l_{d\_reqd\_horiz} \\ \text{"NG"} & \text{if } l_{d\_actual\_horiz} < l_{d\_reqd\_horiz} \end{cases} \\ \text{"N/A"} \quad \text{if } Shear_{Plane\_45} = \text{"In Pier"} \end{cases} \qquad result_{ld\_horiz} = \text{"OK"}$$

Output - Pier Req'd Area of Steel:

$A_{s\_ratio} := \frac{A_{st}}{A_{g\_pier}}$ $A_{s\_ratio} = 0.72 \cdot \%$

$r_{As\_pier} := \begin{cases} \text{"OK"} & \text{if } \frac{A_{st}}{A_{g\_pier}} \geq 0.5 \cdot \% \\ \text{"NG"} & \text{if } \frac{A_{st}}{A_{g\_pier}} < 0.5 \cdot \% \end{cases}$ $r_{As\_pier} = \text{"OK"}$

Output - Pier Flowable Concrete:

$s_{ARtemplate\_vert} := \frac{B_{pier} - BC}{2} - \frac{d_{template}}{2} - cover_{side} - d_{tie} - d_{vert}$ $s_{ARtemplate\_vert} = 9.25 \cdot in$

$r_{conc\_pier} := \begin{cases} \text{"OK"} & \text{if } s_{ARtemplate\_vert} \geq 3 \cdot in \\ \text{"NG"} & \text{if } s_{ARtemplate\_vert} < 3 \cdot in \end{cases}$ $r_{conc\_pier} = \text{"OK"}$

Output - Mat T&S Steel:

$A_{s\_min\_TS\_mat} := 0.0018 \cdot (B_{mat} \cdot t_{mat})$ $A_{s\_min\_TS\_mat} = 21.29 \cdot in^2$

$Check_{As\_min\_mat} := \begin{cases} \text{"OK"} & \text{if } (A_{s\_top} + A_{s\_bot}) \geq A_{s\_min\_TS\_mat} \\ \text{"NG"} & \text{if } (A_{s\_top} + A_{s\_bot}) < A_{s\_min\_TS\_mat} \end{cases}$ $Check_{As\_min\_mat} = \text{"OK"}$

$s_{h\_min} := \min(18 \cdot in, 2 \cdot t_{mat})$ $s_{h\_min} = 18.0 \cdot in$

$Check_{As\_TS\_spacing\_top} := \begin{cases} \text{"OK"} & \text{if } s_{h\_min} \geq s_{h\_top} \\ \text{"NG"} & \text{if } s_{h\_min} < s_{h\_top} \end{cases}$ $Check_{As\_TS\_spacing\_top} = \text{"OK"}$

$Check_{As\_TS\_spacing\_bot} := \begin{cases} \text{"OK"} & \text{if } s_{h\_min} \geq s_{h\_bot} \\ \text{"NG"} & \text{if } s_{h\_min} < s_{h\_bot} \end{cases}$ $Check_{As\_TS\_spacing\_bot} = \text{"OK"}$

RESULTS

- Soil:

$result_{Soil} := \begin{pmatrix} r_{q'} \\ r_{OTM} \\ r_{II} \end{pmatrix}$ $result_{Soil} = \begin{pmatrix} 44 \\ 90 \\ 38 \end{pmatrix} \cdot \%$

$result_{Soil\_About\_Diag} := \begin{pmatrix} r_{q'\_diag} \\ r_{OTM\_diag} \end{pmatrix}$ $result_{Soil\_About\_Diag} = \begin{pmatrix} 63 \\ 64 \end{pmatrix} \cdot \%$

- Structure:

$result_{mat\_Top\_Str\_Strength} := \begin{pmatrix} r_{f\_top} \\ r_{v\_top} \end{pmatrix}$ $result_{mat\_Top\_Str\_Strength} = \begin{pmatrix} 34 \\ 29 \end{pmatrix} \cdot \%$

$result_{As\_Max\_Top} := Check_{As\_max\_top}$ $result_{As\_Max\_Top} = \text{"OK"}$

$result_{As\_Min\_Mat} := Check_{As\_min\_mat}$ $result_{As\_Min\_Mat} = \text{"OK"}$

$result_{Mat\_Bot\_Str\_Strength} := \begin{pmatrix} r_{f\_bot} \\ r_{v\_bot} \\ r_{v\_bot\_2way} \end{pmatrix}$ $result_{Mat\_Bot\_Str\_Strength} = \begin{pmatrix} 52 \\ 63 \\ 61 \end{pmatrix} \cdot \%$

$result_{As\_Max\_Bot} := Check_{As\_max\_bot}$ $result_{As\_Max\_Bot} = \text{"OK"}$

$result_{Pier\_Str\_Strength} := \begin{pmatrix} r_{f\_pier} \\ r_{v\_pier\_P} \\ r_{v\_pier\_U} \\ r_{c\_pier} \\ r_{cf\_pier} \\ r_{t\_pier} \\ r_{tf\_pier} \end{pmatrix}$ $result_{Pier\_Str\_Strength} = \begin{pmatrix} 18 \\ 15 \\ 20 \\ 13 \\ 11 \\ 83 \\ 59 \end{pmatrix} \cdot \%$

$result_{As\_Min\_Pier} := r_{As\_pier}$ $result_{As\_Min\_Pier} = \text{"OK"}$

$result_{Av\_Min\_Pier} := r_{s\_tie}$ $result_{Av\_Min\_Pier} = \text{"OK"}$

- Detailing:

$result_{Size} := \begin{pmatrix} result_{B.mat\_MIN} \\ result_{z.mat\_MIN} \end{pmatrix}$ $result_{Size} = \begin{pmatrix} \text{"OK"} \\ \text{"OK"} \end{pmatrix}$

$result_{Detailing\_AR\_PullOut} := \begin{cases} \begin{pmatrix} result_{ld\_AR} \\ result_{ldh\_AR} \end{pmatrix} & \text{if } Shear_{Plane\_45} = \text{"In Pier"} \\ result_{ld\_horiz} & \text{if } Shear_{Plane\_45} = \text{"In Mat"} \end{cases}$ $result_{Detailing\_AR\_PullOut} = \text{"OK"}$

$result_{Vert} := \begin{pmatrix} result_{Lvert\_ext} \\ result_{ldh} \end{pmatrix}$ $result_{Vert} = \begin{pmatrix} \text{"OK"} \\ \text{"OK"} \end{pmatrix}$

$result_{Flowable\_Concrete} := r_{conc\_pier}$ $result_{Flowable\_Concrete} = \text{"OK"}$

$result_{As\_TS\_spacing} := \begin{pmatrix} Check_{As\_TS\_spacing\_top} \\ Check_{As\_TS\_spacing\_bot} \end{pmatrix}$ $result_{As\_TS\_spacing} = \begin{pmatrix} \text{"OK"} \\ \text{"OK"} \end{pmatrix}$

$Max\_Utilization\_Soil = 90 \cdot \%$ $Max\_Utilization\_Strength = 83 \cdot \%$ $Detailing\_Checks = \text{"OK"}$ $Volume\_Concrete\_Reqd = 117.0 \cdot yd^3$

```
================================================================================

                LPile for Windows(Beta), Version 2018-10.009

              Analysis of Individual Piles and Drilled Shafts
             Subjected to Lateral Loading Using the p-y Method
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================================================================================

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--------------------------------------------------------------------------------
                            Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\2024 Projects\24-21135 EV Farmington KY0104\STR\Additional Calculations\PrFDD\SSLT Mat Foundation\L-Pile\

Name of input data file:
KY0104_LPile.lp10

Name of output report file:
KY0104_LPile.lp10

Name of plot output file:
KY0104_LPile.lp10

Name of runtime message file:
KY0104_LPile.lp10


--------------------------------------------------------------------------------
```

```
                            Date and Time of Analysis
--------------------------------------------------------------------------------

               Date:  March 20, 2024             Time:  11:50:02


--------------------------------------------------------------------------------
                                  Problem Title
--------------------------------------------------------------------------------

Project Name:  EV Farmington KY0104

Job Number: 24-21135-08

Client: TowerCo

Engineer: Yamini Rajakumar

Description: Pier Capacity



--------------------------------------------------------------------------------
                          Program Options and Settings
--------------------------------------------------------------------------------

Computational Options:
 - Compute nonlinear bending properties of pile only
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Print using wide report formats



--------------------------------------------------------------------------------
                      Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                 =           1
Total length of pile                            =       4.250 ft
Depth of ground surface below top of pile       =      0.0000 ft
```

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	48.0000
2	4.250	48.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 4.250000 ft
Shaft Diameter = 48.000000 in
Shear capacity of section = 0.0000 lbs

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from input values

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 4.250000 ft
Shaft Diameter = 48.000000 in
Concrete Cover Thickness (to edge of long. rebar) = 3.625000 in
Number of Reinforcing Bars = 13 bars
Yield Stress of Reinforcing Bars = 60000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi

Gross Area of Shaft = 1810. sq. in.
Total Area of Reinforcing Steel = 13.000000 sq. in.
Area Ratio of Steel Reinforcement = 0.72 percent
Edge-to-Edge Bar Spacing = 8.354165 in
Maximum Concrete Aggregate Size = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 11.14
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 6888.295 kips
Tensile Load for Cracking of Concrete = -790.700 kips
Nominal Axial Tensile Capacity = -780.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	19.811000	0.00000
2	1.128000	1.000000	17.541769	9.206631
3	1.128000	1.000000	11.253931	16.304133
4	1.128000	1.000000	2.387952	19.666556
5	1.128000	1.000000	-7.025077	18.523607
6	1.128000	1.000000	-14.828746	13.137123
7	1.128000	1.000000	-19.235328	4.741083
8	1.128000	1.000000	-19.235328	-4.741083
9	1.128000	1.000000	-14.828746	-13.137123
10	1.128000	1.000000	-7.025077	-18.523607
11	1.128000	1.000000	2.387952	-19.666556
12	1.128000	1.000000	11.253931	-16.304133
13	1.128000	1.000000	17.541769	-9.206631

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 8.354 inches
between bars 12 and 13.

Ratio of bar spacing to maximum aggregate size = 11.14

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.341649 psi
Compression Strain at Peak Stress = 0.001886
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.750000 in

Input Axial Thrust Forces:

Number of Axial Thrust Force Values Determined from Input Data = 3

Number	Axial Thrust Force kips
1	-580.000
2	0.000
3	664.000

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = -580.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	703.4903538	1125584566.	-94.2818591	-0.00005893	-0.00008893	-0.2466287	-2.5745087	
0.00000125	1407.	1125555213.	-35.1762575	-0.00004397	-0.0001040	-0.1855547	-3.0064393	
0.00000188	1407.	750370142.	-796.5126250	-0.0014935	-0.0015835	0.00000	-45.9073240	C
0.00000250	1407.	562777607.	-591.3844199	-0.0014785	-0.0015985	0.00000	-46.3379704	C
0.00000313	1407.	450222085.	-468.3074968	-0.0014635	-0.0016135	0.00000	-46.7686169	C
0.00000375	1407.	375185071.	-386.2562148	-0.0014485	-0.0016285	0.00000	-47.1992633	C
0.00000438	1407.	321587204.	-327.6481562	-0.0014335	-0.0016435	0.00000	-47.6299098	C
0.00000500	1407.	281388803.	-283.6921122	-0.0014185	-0.0016585	0.00000	-48.0605563	C
0.00000563	1407.	250123381.	-249.5040780	-0.0014035	-0.0016735	0.00000	-48.4912027	C
0.00000625	1407.	225111043.	-222.1536507	-0.0013885	-0.0016885	0.00000	-48.9218492	C
0.00000688	1407.	204646402.	-199.7760283	-0.0013735	-0.0017035	0.00000	-49.3524956	C
0.00000750	1407.	187592536.	-181.1280097	-0.0013585	-0.0017185	0.00000	-49.7831421	C
0.00000813	1407.	173162341.	-165.3489170	-0.0013435	-0.0017335	0.00000	-50.2137885	C
0.00000875	1407.	160793602.	-151.8239804	-0.0013285	-0.0017485	0.00000	-50.6444350	C
0.00000938	1407.	150074028.	-140.1023686	-0.0013135	-0.0017635	0.00000	-51.0750814	C
0.00001000	1407.	140694402.	-129.8459584	-0.0012985	-0.0017785	0.00000	-51.5057279	C
0.00001063	1407.	132418260.	-120.7961846	-0.0012835	-0.0017935	0.00000	-51.9363744	C
0.00001125	1407.	125061690.	-112.7519413	-0.0012685	-0.0018085	0.00000	-52.3670207	C
0.00001188	1407.	118479496.	-105.5544604	-0.0012535	-0.0018235	0.00000	-52.7976670	C
0.00001250	1407.	112555521.	-99.0767276	-0.0012385	-0.0018385	0.00000	-53.2283137	C
0.00001313	1407.	107195735.	-93.2159217	-0.0012235	-0.0018535	0.00000	-53.6589602	C
0.00001375	1407.	102323201.	-87.8879164	-0.0012085	-0.0018685	0.00000	-54.0896066	C
0.00001438	1407.	97874366.	-83.0232159	-0.0011935	-0.0018835	0.00000	-54.5202531	C
0.00001500	1407.	93796268.	-78.5639071	-0.0011785	-0.0018985	0.00000	-54.9508999	C
0.00001563	1407.	90044417.	-74.4613430	-0.0011635	-0.0019135	0.00000	-55.3815460	C
0.00001625	1407.	86581170.	-70.6743607	-0.0011485	-0.0019285	0.00000	-55.8121925	C
0.00001688	1407.	83374460.	-67.1678957	-0.0011335	-0.0019435	0.00000	-56.2428387	C
0.00001750	1407.	80396801.	-63.9118924	-0.0011185	-0.0019585	0.00000	-56.6734854	C
0.00001813	1407.	77624497.	-60.8804411	-0.0011035	-0.0019735	0.00000	-57.1041318	C
0.00001875	1407.	75037014.	-58.0510866	-0.0010885	-0.0019885	0.00000	-57.5347783	C
0.00001938	1434.	74020173.	-55.4042710	-0.0010735	-0.0020035	0.00000	-57.9654247	C
0.00002000	1480.	74019990.	-52.9228815	-0.0010585	-0.0020185	0.00000	-58.3960716	C
0.00002063	1527.	74019818.	-50.5918791	-0.0010435	-0.0020335	0.00000	-58.8267179	C
0.00002125	1573.	74019656.	-48.3979946	-0.0010285	-0.0020485	0.00000	-59.2573642	C
0.00002188	1619.	74019504.	-46.3294749	-0.0010135	-0.0020635	0.00000	-59.6880104	C
0.00002250	1665.	74019360.	-44.3758729	-0.0009985	-0.0020785	0.00000	-60.0000000	CY
0.00002313	1712.	74019224.	-42.5278711	-0.0009835	-0.0020935	0.00000	-60.0000000	CY
0.00002375	1758.	74019095.	-40.7771325	-0.0009685	-0.0021085	0.00000	-60.0000000	CY
0.00002438	1804.	74018972.	-39.1161753	-0.0009535	-0.0021235	0.00000	-60.0000000	CY
0.00002563	1897.	74018745.	-36.0373280	-0.0009235	-0.0021535	0.00000	-60.0000000	CY
0.00002688	1988.	73958310.	-33.2528727	-0.0008937	-0.0021837	0.00000	-60.0000000	CY
0.00002813	2067.	73491375.	-30.7715244	-0.0008654	-0.0022154	0.00000	-60.0000000	CY
0.00002938	2134.	72640023.	-28.5609947	-0.0008390	-0.0022490	0.00000	-60.0000000	CY
0.00003063	2195.	71674526.	-26.5574278	-0.0008133	-0.0022833	0.00000	-60.0000000	CY
0.00003188	2253.	70672197.	-24.7285751	-0.0007882	-0.0023182	0.00000	-60.0000000	CY
0.00003313	2300.	69426929.	-23.0883792	-0.0007648	-0.0023548	0.00000	-60.0000000	CY
0.00003438	2345.	68230451.	-21.5742134	-0.0007416	-0.0023916	0.00000	-60.0000000	CY
0.00003563	2391.	67117936.	-20.1663049	-0.0007184	-0.0024284	0.00000	-60.0000000	CY
0.00003688	2435.	66038569.	-18.8614690	-0.0006955	-0.0024655	0.00000	-60.0000000	CY
0.00003813	2471.	64810260.	-17.6828135	-0.0006742	-0.0025042	0.00000	-60.0000000	CY

0.00003938	2503.	63558759.	-16.5980926	-0.0006535	-0.0025435	0.00000	-60.0000000 CY
0.00004063	2534.	62384274.	-15.5801238	-0.0006329	-0.0025829	0.00000	-60.0000000 CY
0.00004188	2566.	61279908.	-14.6229292	-0.0006123	-0.0026223	0.00000	-60.0000000 CY
0.00004313	2598.	60239563.	-13.7212242	-0.0005917	-0.0026617	0.00000	-60.0000000 CY
0.00004438	2629.	59253665.	-12.8712388	-0.0005712	-0.0027012	0.00000	-60.0000000 CY
0.00004563	2659.	58280412.	-12.0771016	-0.0005510	-0.0027410	0.00000	-60.0000000 CY
0.00004688	2683.	57241704.	-11.3520784	-0.0005321	-0.0027821	0.00000	-60.0000000 CY
0.00004813	2704.	56177175.	-10.6833219	-0.0005141	-0.0028241	0.00000	-60.0000000 CY
0.00004938	2724.	55166545.	-10.0484264	-0.0004961	-0.0028661	0.00000	-60.0000000 CY
0.00005063	2744.	54205824.	-9.4448839	-0.0004781	-0.0029081	0.00000	-60.0000000 CY
0.00005188	2764.	53291402.	-8.8704277	-0.0004602	-0.0029502	0.00000	-60.0000000 CY
0.00005313	2785.	52420012.	-8.3230047	-0.0004422	-0.0029922	0.00000	-60.0000000 CY
0.00005438	2805.	51588686.	-7.8007506	-0.0004242	-0.0030342	0.00000	-60.0000000 CY
0.00005563	2825.	50794723.	-7.3019686	-0.0004062	-0.0030762	0.00000	-60.0000000 CY
0.00005688	2846.	50035659.	-6.8251111	-0.0003882	-0.0031182	0.00000	-60.0000000 CY
0.00005813	2866.	49308506.	-6.3689735	-0.0003702	-0.0031602	0.00000	-60.0000000 CY
0.00005938	2885.	48587605.	-5.9392123	-0.0003526	-0.0032026	0.00000	-60.0000000 CY
0.00006063	2902.	47862121.	-5.5372714	-0.0003357	-0.0032457	0.00000	-60.0000000 CY
0.00006188	2915.	47103185.	-5.1706339	-0.0003199	-0.0032899	0.00000	-60.0000000 CY
0.00006313	2927.	46363512.	-4.8218344	-0.0003044	-0.0033344	0.00000	-60.0000000 CY
0.00006438	2938.	45646526.	-4.4884710	-0.0002889	-0.0033789	0.00000	-60.0000000 CY
0.00006563	2950.	44956854.	-4.1678070	-0.0002735	-0.0034235	0.00000	-60.0000000 CY
0.00006688	2962.	44292964.	-3.8591305	-0.0002581	-0.0034681	0.00000	-60.0000000 CY
0.00006813	2974.	43653438.	-3.5617816	-0.0002426	-0.0035126	0.00000	-60.0000000 CY
0.00006938	2986.	43036957.	-3.2751480	-0.0002272	-0.0035572	0.00000	-60.0000000 CY
0.00007063	2997.	42442298.	-2.9986607	-0.0002118	-0.0036018	0.00000	-60.0000000 CY
0.00007188	3009.	41868324.	-2.7317903	-0.0001963	-0.0036463	0.00000	-60.0000000 CY
0.00007313	3021.	41313972.	-2.4740438	-0.0001809	-0.0036909	0.00000	-60.0000000 CY
0.00007438	3033.	40778254.	-2.2249609	-0.0001655	-0.0037355	0.00000	-60.0000000 CY
0.00007938	3080.	38804112.	-1.3070809	-0.0001037	-0.0039137	0.00000	-60.0000000 CY
0.00008438	3123.	37017251.	-0.5171853	-0.00004364	-0.0040936	0.00000	-60.0000000 CY
0.00008938	3152.	35267357.	0.1155185	0.00001032	-0.0042797	0.00000	-60.0000000 CY
0.00009438	3181.	33706580.	0.6316559	0.00005961	-0.0044704	0.1552285	-60.0000000 CY
0.00009938	3218.	32384348.	1.0476948	0.0001041	-0.0046659	0.3331737	-60.0000000 CY
0.0001044	3261.	31244617.	1.3889602	0.0001450	-0.0048650	0.4924450	-60.0000000 CY
0.0001094	3307.	30234708.	1.6826661	0.0001840	-0.0050660	0.6412304	-60.0000000 CY
0.0001144	3358.	29361672.	1.9173377	0.0002193	-0.0052707	0.7722732	-60.0000000 CY
0.0001194	3408.	28546761.	2.1302134	0.0002543	-0.0054757	0.8997560	-60.0000000 CY
0.0001244	3447.	27715934.	2.2784931	0.0002834	-0.0056866	1.0030302	-60.0000000 CY
0.0001294	3476.	26868156.	2.3906737	0.0003093	-0.0059007	1.0930418	-60.0000000 CY
0.0001344	3505.	26081786.	2.4950109	0.0003353	-0.0061147	1.1819225	-60.0000000 CY
0.0001394	3533.	25351040.	2.5925834	0.0003613	-0.0063287	1.2697755	-60.0000000 CY
0.0001444	3562.	24674519.	2.6779590	0.0003866	-0.0065434	1.3535289	-60.0000000 CY
0.0001494	3592.	24047067.	2.7520192	0.0004111	-0.0067589	1.4331373	-60.0000000 CY
0.0001544	3622.	23459644.	2.8218266	0.0004356	-0.0069744	1.5118108	-60.0000000 CY
0.0001594	3651.	22908478.	2.8877895	0.0004602	-0.0071898	1.5895408	-60.0000000 CY
0.0001644	3680.	22390251.	2.9502668	0.0004850	-0.0074050	1.6663182	-60.0000000 CY

0.0001694	3710.	21902039.	3.0095749	0.0005097	-0.0076203	1.7421333	-60.0000000 CY
0.0001744	3735.	21418001.	3.0585830	0.0005333	-0.0078367	1.8129255	-60.0000000 CY
0.0001794	3757.	20947686.	3.1011849	0.0005563	-0.0080537	1.8805561	-60.0000000 CY
0.0001844	3773.	20461697.	3.1268174	0.0005765	-0.0082735	1.9389045	-60.0000000 CY
0.0001894	3787.	19999434.	3.1479935	0.0005962	-0.0084938	1.9946743	-60.0000000 CY
0.0001944	3801.	19555698.	3.1667808	0.0006155	-0.0087145	2.0489312	-60.0000000 CY
0.0001994	3815.	19134041.	3.1848349	0.0006350	-0.0089350	2.1025658	-60.0000000 CY
0.0002044	3829.	18732842.	3.2022120	0.0006545	-0.0091555	2.1555743	-60.0000000 CY
0.0002094	3842.	18350633.	3.2189628	0.0006740	-0.0093760	2.2079530	-60.0000000 CY
0.0002144	3856.	17986084.	3.2351333	0.0006935	-0.0095965	2.2596977	-60.0000000 CY
0.0002194	3869.	17637985.	3.2507655	0.0007131	-0.0098169	2.3108046	-60.0000000 CY
0.0002244	3883.	17305235.	3.2658976	0.0007328	-0.0100372	2.3612696	-60.0000000 CY
0.0002294	3896.	16986829.	3.2805644	0.0007525	-0.0102575	2.4110885	-60.0000000 CY
0.0002344	3910.	16681847.	3.2947980	0.0007722	-0.0104778	2.4602572	-60.0000000 CY
0.0002394	3923.	16389446.	3.3086277	0.0007920	-0.0106980	2.5087713	-60.0000000 CY
0.0002444	3937.	16108853.	3.3220804	0.0008118	-0.0109182	2.5566265	-60.0000000 CY
0.0002494	3950.	15839355.	3.3351812	0.0008317	-0.0111383	2.6038184	-60.0000000 CY
0.0002544	3963.	15580297.	3.3479529	0.0008516	-0.0113584	2.6503425	-60.0000000 CY
0.0002594	3976.	15331073.	3.3604167	0.0008716	-0.0115784	2.6961942	-60.0000000 CY
0.0002644	3988.	15085749.	3.3701826	0.0008910	-0.0117990	2.7398526	-60.0000000 CY
0.0002694	3999.	14845781.	3.3781215	0.0009100	-0.0120200	2.7818445	-60.0000000 CY
0.0002744	4010.	14614443.	3.3859254	0.0009290	-0.0122410	2.8232222	-60.0000000 CY
0.0003044	4053.	13316049.	3.3965325	0.0010338	-0.0135762	3.0370452	-60.0000000 CY
0.0003344	4086.	12219188.	3.3935649	0.0011347	-0.0149153	3.2221651	-60.0000000 CY
0.0003644	4118.	11301070.	3.3942180	0.0012368	-0.0162532	3.3894362	-60.0000000 CY
0.0003944	4149.	10520801.	3.3978453	0.0013400	-0.0175900	3.5382292	-60.0000000 CY
0.0004244	4179.	9848303.	3.4033840	0.0014443	-0.0189257	3.6675350	-60.0000000 CY
0.0004544	4208.	9261557.	3.4101060	0.0015495	-0.0202605	3.7765208	-60.0000000 CY
0.0004844	4229.	8731211.	3.4047936	0.0016492	-0.0216008	3.8596547	-60.0000000 CY
0.0005144	4248.	8258053.	3.3990774	0.0017484	-0.0229416	3.9232288	-60.0000000 CY
0.0005444	4259.	7823970.	3.3826382	0.0018414	-0.0242886	3.9653748	-60.0000000 CY
0.0005744	4270.	7434401.	3.3698957	0.0019356	-0.0256344	3.9911875	-60.0000000 CY
0.0006044	4280.	7082195.	3.3597644	0.0020306	-0.0269794	3.9999993	-60.0000000 CY
0.0006344	4290.	6762172.	3.3530645	0.0021271	-0.0283229	3.9722282	-60.0000000 CY
0.0006644	4299.	6470451.	3.3486190	0.0022247	-0.0296653	3.9780024	-60.0000000 CY
0.0006944	4307.	6203333.	3.3462385	0.0023235	-0.0310065	3.9955837	60.0000000 CY
0.0007244	4316.	5957631.	3.3459928	0.0024238	-0.0323462	3.9950047	60.0000000 CY
0.0007544	4323.	5730629.	3.3480185	0.0025257	-0.0336843	3.9698265	60.0000000 CY
0.0007844	4330.	5520456.	3.3507652	0.0026283	-0.0350217	3.9553614	60.0000000 CY
0.0008144	4336.	5324169.	3.3516049	0.0027295	-0.0363605	3.9797961	60.0000000 CY
0.0008444	4341.	5141496.	3.3536238	0.0028317	-0.0376983	3.9948314	60.0000000 CY
0.0008744	4347.	4971011.	3.3567885	0.0029351	-0.0390349	3.9999998	60.0000000 CY
0.0009044	4351.	4811182.	3.3619764	0.0030405	-0.0403695	3.9783773	60.0000000 CYT
0.0009344	4356.	4661428.	3.3676978	0.0031467	-0.0417033	3.9563663	60.0000000 CYT
0.0009644	4360.	4520780.	3.3738676	0.0032537	-0.0430363	3.9341121	60.0000000 CYT
0.0009944	4362.	4386554.	3.3732967	0.0033543	-0.0443757	3.9539003	60.0000000 CYT
0.0010244	4364.	4260068.	3.3734896	0.0034557	-0.0457143	3.9741958	60.0000000 CYT

0.0010544	4366.	4140654.	3.3744270	0.0035579	-0.0470521	3.9888230	60.0000000	CYT
0.0010844	4368.	4027721.	3.3760973	0.0036610	-0.0483890	3.9975097	60.0000000	CYT
0.0011144	4369.	3920706.	3.3786376	0.0037651	-0.0497249	3.9979155	60.0000000	CYT
0.0011444	4370.	3819011.	3.3826796	0.0038711	-0.0510589	3.9804884	60.0000000	CYT

Axial Thrust Force = 0.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	728.4476921	1165516307.	24.0000079	0.00001500	-0.00001500	0.0627335	0.4306501	
0.00000125	1453.	1162561911.	24.0000079	0.00003000	-0.00003000	0.1249712	0.8613003	
0.00000188	2174.	1159607514.	24.0000080	0.00004500	-0.00004500	0.1867130	1.2919504	
0.00000250	2892.	1156653117.	24.0000080	0.00006000	-0.00006000	0.2479591	1.7226006	
0.00000313	3605.	1153698720.	24.0000080	0.00007500	-0.00007500	0.3087092	2.1532507	
0.00000375	4315.	1150744324.	24.0000081	0.00009000	-0.00009000	0.3689636	2.5839009	
0.00000438	5022.	1147789927.	24.0000081	0.0001050	-0.0001050	0.4287221	3.0145510	
0.00000500	5022.	1004316186.	10.4133222	0.00005207	-0.0001879	0.2128252	-5.4152683	C
0.00000563	5022.	892725499.	10.4165473	0.00005859	-0.0002114	0.2390940	-6.0916507	C
0.00000625	5022.	803452949.	10.4197794	0.00006512	-0.0002349	0.2652879	-6.7679150	C
0.00000688	5022.	730411772.	10.4230184	0.00007166	-0.0002583	0.2914071	-7.4440607	C
0.00000750	5022.	669544124.	10.4262644	0.00007820	-0.0002818	0.3174513	-8.1200875	C
0.00000813	5022.	618040730.	10.4295175	0.00008474	-0.0003053	0.3434204	-8.7959949	C
0.00000875	5022.	573894963.	10.4327776	0.00009129	-0.0003287	0.3693142	-9.4717827	C
0.00000938	5022.	535635299.	10.4360448	0.00009784	-0.0003522	0.3951328	-10.1474503	C
0.00001000	5022.	502158093.	10.4393191	0.0001044	-0.0003756	0.4208759	-10.8229974	C
0.00001063	5022.	472619382.	10.4426005	0.0001110	-0.0003990	0.4465434	-11.4984237	C
0.00001125	5022.	446362749.	10.4458892	0.0001175	-0.0004225	0.4721352	-12.1737286	C
0.00001188	5022.	422869973.	10.4491850	0.0001241	-0.0004459	0.4976511	-12.8489119	C
0.00001250	5022.	401726474.	10.4524882	0.0001307	-0.0004693	0.5230911	-13.5239730	C
0.00001313	5022.	382596642.	10.4557986	0.0001372	-0.0004928	0.5484550	-14.1989116	C
0.00001375	5022.	365205886.	10.4591163	0.0001438	-0.0005162	0.5737427	-14.8737274	C
0.00001438	5022.	349327369.	10.4624413	0.0001504	-0.0005396	0.5989541	-15.5484197	C
0.00001500	5022.	334772062.	10.4657738	0.0001570	-0.0005630	0.6240890	-16.2229884	C
0.00001563	5022.	321381180.	10.4691136	0.0001636	-0.0005864	0.6491473	-16.8974329	C
0.00001625	5022.	309020365.	10.4724609	0.0001702	-0.0006098	0.6741288	-17.5717528	C
0.00001688	5022.	297575166.	10.4758157	0.0001768	-0.0006332	0.6990335	-18.2459477	C
0.00001750	5022.	286947482.	10.4791780	0.0001834	-0.0006566	0.7238612	-18.9200171	C
0.00001813	5022.	277052741.	10.4825478	0.0001900	-0.0006800	0.7486117	-19.5939608	C
0.00001875	5022.	267817650.	10.4859253	0.0001966	-0.0007034	0.7732850	-20.2677781	C
0.00001938	5022.	259178371.	10.4893103	0.0002032	-0.0007268	0.7978809	-20.9414687	C
0.00002000	5022.	251079046.	10.4927030	0.0002099	-0.0007501	0.8223993	-21.6150322	C
0.00002063	5022.	243470591.	10.4961034	0.0002165	-0.0007735	0.8468400	-22.2884681	C
0.00002125	5022.	236309691.	10.4995116	0.0002231	-0.0007969	0.8712029	-22.9617760	C
0.00002188	5022.	229557985.	10.5029275	0.0002298	-0.0008202	0.8954879	-23.6349554	C
0.00002250	5022.	223181375.	10.5063511	0.0002364	-0.0008436	0.9196948	-24.3080058	C
0.00002313	5022.	217149446.	10.5097827	0.0002430	-0.0008670	0.9438235	-24.9809270	C
0.00002375	5022.	211434987.	10.5132221	0.0002497	-0.0008903	0.9678739	-25.6537183	C
0.00002438	5022.	206013577.	10.5166694	0.0002563	-0.0009137	0.9918458	-26.3263793	C
0.00002563	5022.	195964134.	10.5235879	0.0002697	-0.0009603	1.0395535	-27.6713089	C
0.00002688	5022.	186849523.	10.5305384	0.0002830	-0.0010070	1.0869456	-29.0157118	C
0.00002813	5022.	178545100.	10.5375214	0.0002964	-0.0010536	1.1340210	-30.3595843	C
0.00002938	5082.	172998018.	10.5445370	0.0003097	-0.0011003	1.1807785	-31.7029227	C
0.00003063	5296.	172919574.	10.5515857	0.0003231	-0.0011469	1.2272169	-33.0457231	C
0.00003188	5509.	172840810.	10.5586677	0.0003366	-0.0011934	1.2733351	-34.3879817	C
0.00003313	5723.	172761726.	10.5657834	0.0003500	-0.0012400	1.3191318	-35.7296946	C
0.00003438	5936.	172682317.	10.5729330	0.0003634	-0.0012866	1.3646060	-37.0708576	C
0.00003563	6149.	172602581.	10.5801170	0.0003769	-0.0013331	1.4097564	-38.4114669	C
0.00003688	6362.	172522515.	10.5873356	0.0003904	-0.0013796	1.4545817	-39.7515183	C
0.00003813	6574.	172442116.	10.5945893	0.0004039	-0.0014261	1.4990808	-41.0910076	C
0.00003938	6787.	172361381.	10.6018782	0.0004174	-0.0014726	1.5432524	-42.4299307	C
0.00004063	6999.	172280306.	10.6092029	0.0004310	-0.0015190	1.5870952	-43.7682833	C
0.00004188	7211.	172198889.	10.6165636	0.0004446	-0.0015654	1.6306080	-45.1060611	C
0.00004313	7423.	172117127.	10.6239607	0.0004582	-0.0016118	1.6737895	-46.4432596	C
0.00004438	7634.	172035015.	10.6313947	0.0004718	-0.0016582	1.7166383	-47.7798745	C
0.00004563	7845.	171952551.	10.6388658	0.0004854	-0.0017046	1.7591532	-49.1159013	C
0.00004688	8056.	171869732.	10.6463744	0.0004990	-0.0017510	1.8013329	-50.4513354	C
0.00004813	8267.	171786554.	10.6539210	0.0005127	-0.0017973	1.8431759	-51.7861722	C
0.00004938	8478.	171703013.	10.6615059	0.0005264	-0.0018436	1.8846809	-53.1204070	C
0.00005063	8688.	171619106.	10.6691295	0.0005401	-0.0018899	1.9258467	-54.4540350	C
0.00005188	8898.	171534830.	10.6767923	0.0005539	-0.0019361	1.9666716	-55.7870515	C
0.00005313	9108.	171450181.	10.6844946	0.0005676	-0.0019824	2.0071545	-57.1194514	C
0.00005438	9318.	171365155.	10.6922369	0.0005814	-0.0020286	2.0472938	-58.4512300	C
0.00005563	9527.	171279748.	10.7000195	0.0005952	-0.0020748	2.0870880	-59.7823821	C
0.00005688	9737.	171193957.	10.7078430	0.0006090	-0.0021210	2.1265359	-60.0000000	CY
0.00005813	9946.	171107778.	10.7157077	0.0006229	-0.0021671	2.1656358	-60.0000000	CY
0.00005938	10154.	171021207.	10.7236142	0.0006367	-0.0022133	2.2043862	-60.0000000	CY
0.00006063	10363.	170934240.	10.7315628	0.0006506	-0.0022594	2.2427858	-60.0000000	CY
0.00006188	10571.	170841234.	10.7394357	0.0006645	-0.0023055	2.2808125	-60.0000000	CY
0.00006313	10767.	170562038.	10.7433857	0.0006782	-0.0023518	2.3177965	-60.0000000	CY
0.00006438	10938.	169905630.	10.7391844	0.0006913	-0.0023987	2.3529773	-60.0000000	CY
0.00006563	11088.	168961931.	10.7285662	0.0007041	-0.0024459	2.3866241	-60.0000000	CY
0.00006688	11222.	167799153.	10.7129130	0.0007164	-0.0024936	2.4189551	-60.0000000	CY
0.00006813	11352.	166632444.	10.6970484	0.0007287	-0.0025413	2.4508175	-60.0000000	CY
0.00006938	11480.	165470893.	10.6811489	0.0007410	-0.0025890	2.4822457	-60.0000000	CY
0.00007063	11589.	164094320.	10.6598881	0.0007529	-0.0026371	2.5122699	-60.0000000	CY
0.00007188	11686.	162583642.	10.6351361	0.0007644	-0.0026856	2.5412154	-60.0000000	CY
0.00007313	11781.	161110033.	10.6110802	0.0007759	-0.0027341	2.5698486	-60.0000000	CY
0.00007438	11877.	159684536.	10.5880077	0.0007875	-0.0027825	2.5982308	-60.0000000	CY
0.00007938	12219.	153945436.	10.4917392	0.0008328	-0.0029772	2.7067630	-60.0000000	CY
0.00008438	12483.	147950306.	10.3837658	0.0008761	-0.0031739	2.8064086	-60.0000000	CY
0.00008938	12743.	142579299.	10.2868851	0.0009194	-0.0033706	2.9018636	-60.0000000	CY

0.00009438	12930.	137011299.	10.1726275	0.0009600	-0.0035700	2.9877829	-60.0000000 CY
0.00009938	13100.	131824022.	10.0654698	0.0010003	-0.0037697	3.0693088	-60.0000000 CY
0.0001044	13269.	127124974.	9.9700583	0.0010406	-0.0039694	3.1477147	-60.0000000 CY
0.0001094	13429.	122781706.	9.8820387	0.0010808	-0.0041692	3.2223987	-60.0000000 CY
0.0001144	13543.	118408495.	9.7819684	0.0011188	-0.0043712	3.2896279	-60.0000000 CY
0.0001194	13644.	114293945.	9.6839892	0.0011560	-0.0045740	3.3525371	-60.0000000 CY
0.0001244	13744.	110505045.	9.5949791	0.0011934	-0.0047766	3.4127508	-60.0000000 CY
0.0001294	13844.	107003960.	9.5139145	0.0012309	-0.0049791	3.4702389	-60.0000000 CY
0.0001344	13943.	103758475.	9.4399244	0.0012685	-0.0051815	3.5249711	-60.0000000 CY
0.0001394	14039.	100727088.	9.3714341	0.0013061	-0.0053839	3.5767564	-60.0000000 CY
0.0001444	14110.	97731897.	9.2936230	0.0013418	-0.0055882	3.6229143	-60.0000000 CY
0.0001494	14165.	94831681.	9.2141500	0.0013764	-0.0057936	3.6651496	-60.0000000 CY
0.0001544	14220.	92111226.	9.1402661	0.0014110	-0.0059990	3.7049555	-60.0000000 CY
0.0001594	14273.	89558553.	9.0718034	0.0014458	-0.0062042	3.7423781	-60.0000000 CY
0.0001644	14327.	87158301.	9.0082782	0.0014807	-0.0064093	3.7773909	-60.0000000 CY
0.0001694	14379.	84896923.	8.9492642	0.0015158	-0.0066142	3.8099667	-60.0000000 CY
0.0001744	14432.	82762421.	8.8943845	0.0015510	-0.0068190	3.8400777	-60.0000000 CY
0.0001794	14482.	80738596.	8.8396914	0.0015856	-0.0070244	3.8671950	-60.0000000 CY
0.0001844	14532.	78820007.	8.7873589	0.0016202	-0.0072298	3.8917171	-60.0000000 CY
0.0001894	14581.	76993133.	8.7377847	0.0016547	-0.0074353	3.9137378	-60.0000000 CY
0.0001944	14624.	75236481.	8.6892131	0.0016890	-0.0076410	3.9330930	-60.0000000 CY
0.0001994	14660.	73527300.	8.6396639	0.0017225	-0.0078475	3.9496692	-60.0000000 CY
0.0002044	14687.	71862257.	8.5889927	0.0017554	-0.0080546	3.9635973	-60.0000000 CY
0.0002094	14712.	70266566.	8.5403899	0.0017881	-0.0082619	3.9752495	-60.0000000 CY
0.0002144	14737.	68743199.	8.4945862	0.0018210	-0.0084690	3.9846909	-60.0000000 CY
0.0002194	14761.	67287600.	8.4514475	0.0018540	-0.0086760	3.9918995	-60.0000000 CY
0.0002244	14785.	65895206.	8.4108043	0.0018872	-0.0088828	3.9968484	-60.0000000 CY
0.0002294	14808.	64557892.	8.3692644	0.0019197	-0.0090903	3.9994745	-60.0000000 CY
0.0002344	14830.	63274459.	8.3289077	0.0019521	-0.0092979	3.9970086	-60.0000000 CY
0.0002394	14851.	62042769.	8.2908998	0.0019846	-0.0095054	3.9938460	-60.0000000 CY
0.0002444	14873.	60860199.	8.2549598	0.0020173	-0.0097127	3.9977320	-60.0000000 CY
0.0002494	14894.	59723772.	8.2209721	0.0020501	-0.0099199	3.9997223	-60.0000000 CY
0.0002544	14914.	58630219.	8.1889769	0.0020831	-0.0101269	3.9957204	-60.0000000 CY
0.0002594	14934.	57577125.	8.1588436	0.0021162	-0.0103338	3.9925654	-60.0000000 CY
0.0002644	14954.	56562821.	8.1302952	0.0021494	-0.0105406	3.9967128	60.0000000 CY
0.0002694	14973.	55585128.	8.1032509	0.0021828	-0.0107472	3.9991981	60.0000000 CY
0.0002744	14992.	54641991.	8.0776474	0.0022163	-0.0109537	3.9997543	60.0000000 CY
0.0003044	15089.	49573128.	7.9438947	0.0024179	-0.0121921	3.9936348	60.0000000 CY
0.0003344	15134.	45261732.	7.8048432	0.0026097	-0.0134403	3.9996164	60.0000000 CY
0.0003644	15166.	41622985.	7.6898151	0.0028020	-0.0146880	3.9975958	60.0000000 CY
0.0003944	15195.	38528099.	7.5997458	0.0029971	-0.0159329	3.9839267	60.0000000 CY
0.0004244	15220.	35863851.	7.5281972	0.0031948	-0.0171752	3.9997284	60.0000000 CYT
0.0004544	15242.	33544301.	7.4721551	0.0033952	-0.0184148	3.9819073	60.0000000 CYT
0.0004844	15261.	31507535.	7.4240879	0.0035960	-0.0196540	3.9987021	60.0000000 CYT
0.0005144	15278.	29702705.	7.3806193	0.0037964	-0.0208936	3.9816948	60.0000000 CYT
0.0005444	15278.	28065816.	7.4056833	0.0040315	-0.0220985	3.9935318	60.0000000 CYT

Axial Thrust Force = 664.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	699.5117806	1119218849.	159.7914852	0.00009987	0.00006987	0.4117491	2.8918707	
0.00000125	1399.	1119197357.	91.9312829	0.0001149	0.00005491	0.4713300	3.3238090	
0.00000188	2098.	1119155823.	69.3270105	0.0001300	0.00003999	0.5305290	3.7566062	
0.00000250	2798.	1119096389.	58.0367221	0.0001451	0.00002509	0.5893433	4.1902624	
0.00000313	3497.	1119019481.	51.2720287	0.0001602	0.00001023	0.6477698	4.6247776	
0.00000375	4196.	1118924361.	46.7701296	0.0001754	-0.00000461	0.7058055	5.0601516	
0.00000438	4894.	1118729765.	43.5607761	0.0001906	-0.00001942	0.7634394	5.4963235	
0.00000500	5591.	1118271486.	41.1580231	0.0002058	-0.00003421	0.8206453	5.9331134	
0.00000563	6286.	1117501016.	39.2920504	0.0002210	-0.00004898	0.8774008	6.3703657	
0.00000625	6978.	1116436197.	37.8012238	0.0002363	-0.00006374	0.9336905	6.8079718	
0.00000688	7666.	1115114665.	36.5828538	0.0002515	-0.00007849	0.9895036	7.2458565	
0.00000750	8352.	1113576063.	35.5685871	0.0002668	-0.00009324	1.0448325	7.6839677	
0.00000813	9034.	1111855669.	34.7111654	0.0002820	-0.0001080	1.0996718	8.1222684	
0.00000875	9034.	1032437407.	32.1062183	0.0002809	-0.0001391	1.0951601	8.0860529	C
0.00000938	9034.	963608247.	31.2049787	0.0002925	-0.0001575	1.1364577	8.4186035	C
0.00001000	9034.	903382731.	30.3930654	0.0003039	-0.0001761	1.1766284	8.7443889	C
0.00001063	9034.	850242571.	29.6557060	0.0003151	-0.0001949	1.2157273	9.0637144	C
0.00001125	9034.	803006872.	28.9834829	0.0003261	-0.0002139	1.2538897	9.3775612	C
0.00001188	9034.	760743353.	28.3660878	0.0003368	-0.0002332	1.2911285	9.6859215	C
0.00001250	9034.	722706185.	27.7980046	0.0003475	-0.0002525	1.3275745	9.9897767	C
0.00001313	9213.	701922246.	27.2726151	0.0003580	-0.0002720	1.3632581	10.2892891	C
0.00001375	9401.	683696366.	26.7847065	0.0003683	-0.0002917	1.3982183	10.5847017	C
0.00001438	9582.	666589996.	26.3300596	0.0003785	-0.0003115	1.4324976	10.8762936	C
0.00001500	9758.	650515581.	25.9052324	0.0003886	-0.0003314	1.4661410	11.1643761	C
0.00001563	9928.	635397726.	25.5074112	0.0003986	-0.0003514	1.4991969	11.4492957	C
0.00001625	10094.	621170735.	25.1342961	0.0004084	-0.0003716	1.5317165	11.7314371	C
0.00001688	10255.	607719953.	24.7824534	0.0004182	-0.0003918	1.5636677	12.0104632	C
0.00001750	10412.	594979386.	24.4496850	0.0004279	-0.0004121	1.5950623	12.2864151	C
0.00001813	10566.	582966924.	24.1363725	0.0004375	-0.0004325	1.6260463	12.5605309	C
0.00001875	10717.	571576478.	23.8395023	0.0004470	-0.0004530	1.6565589	-13.0067706	C
0.00001938	10864.	560745932.	23.5571280	0.0004564	-0.0004736	1.6865831	-13.5989887	C
0.00002000	11010.	550521071.	23.2909032	0.0004658	-0.0004942	1.7163177	-14.1920761	C
0.00002063	11152.	540710310.	23.0347625	0.0004751	-0.0005149	1.7454626	-14.7887828	C
0.00002125	11293.	531455188.	22.7936239	0.0004844	-0.0005356	1.7744160	-15.3855292	C
0.00002188	11431.	522544827.	22.5604820	0.0004935	-0.0005565	1.8027846	-15.9859442	C
0.00002250	11568.	514122144.	22.3406439	0.0005027	-0.0005773	1.8309960	-16.5861298	C
0.00002313	11701.	506003876.	22.1276754	0.0005117	-0.0005983	1.8586653	-17.1896778	C
0.00002375	11834.	498291166.	21.9256786	0.0005207	-0.0006193	1.8861397	-17.7933888	C
0.00002438	11965.	490889353.	21.7312427	0.0005297	-0.0006403	1.9132277	-18.3990778	C
0.00002563	12224.	477033607.	21.3670217	0.0005475	-0.0006825	1.9665851	-19.6132819	C

0.00002688	12476.	464215552.	21.0279875	0.0005651	-0.0007249	2.0185539	-20.8342627 C
0.00002813	12724.	452402824.	20.7149097	0.0005826	-0.0007674	2.0695038	-22.0586518 C
0.00002938	12969.	441484241.	20.4252048	0.0006000	-0.0008100	2.1195105	-23.2858286 C
0.00003063	13208.	431283300.	20.1523089	0.0006172	-0.0008528	2.1682599	-24.5190809 C
0.00003188	13446.	421838508.	19.9002882	0.0006343	-0.0008957	2.2163213	-25.7528210 C
0.00003313	13679.	412959077.	19.6609877	0.0006513	-0.0009387	2.2631606	-26.9926136 C
0.00003438	13912.	404709876.	19.4398568	0.0006682	-0.0009818	2.3094493	-28.2316427 C
0.00003563	14140.	396908519.	19.2280876	0.0006850	-0.0010250	2.3545163	-29.4770319 C
0.00003688	14367.	389622140.	19.0313779	0.0007018	-0.0010682	2.3990440	-30.7216702 C
0.00003813	14592.	382740239.	18.8443467	0.0007184	-0.0011116	2.4426359	-31.9698692 C
0.00003938	14815.	376246918.	18.6675085	0.0007350	-0.0011550	2.4854533	-33.2199886 C
0.00004063	15037.	370140882.	18.5021803	0.0007517	-0.0011983	2.5277395	-34.4693687 C
0.00004188	15256.	364319822.	18.3424355	0.0007681	-0.0012419	2.5689717	-35.7239550 C
0.00004313	15474.	358814410.	18.1917632	0.0007845	-0.0012855	2.6095979	-36.9787760 C
0.00004438	15691.	353608221.	18.0501468	0.0008010	-0.0013290	2.6497012	-38.2328672 C
0.00004563	15907.	348637283.	17.9136572	0.0008173	-0.0013727	2.6889260	-39.4904423 C
0.00004688	16120.	343899010.	17.7831630	0.0008336	-0.0014164	2.7274286	-40.7497627 C
0.00004813	16333.	339397093.	17.6599661	0.0008499	-0.0014601	2.7654162	-42.0083597 C
0.00004938	16546.	335113507.	17.5435151	0.0008662	-0.0015038	2.8028864	-43.2662291 C
0.00005063	16757.	330994386.	17.4298509	0.0008824	-0.0015476	2.8394364	-44.5284502 C
0.00005188	16966.	327055231.	17.3212526	0.0008985	-0.0015915	2.8753718	-45.7912905 C
0.00005313	17175.	323292772.	17.2182351	0.0009147	-0.0016353	2.9107973	-47.0534064 C
0.00005438	17383.	319694761.	17.1204164	0.0009309	-0.0016791	2.9457106	-48.3147933 C
0.00005563	17591.	316245100.	17.0269260	0.0009471	-0.0017229	2.9800471	-49.5762898 C
0.00005688	17797.	312908787.	16.9347952	0.0009632	-0.0017668	3.0134858	-50.8423220 C
0.00005813	18002.	309708212.	16.8470604	0.0009792	-0.0018108	3.0464193	-52.1076237 C
0.00005938	18206.	306634744.	16.7634465	0.0009953	-0.0018547	3.0788453	-53.3721904 C
0.00006063	18411.	303680463.	16.6837014	0.0010114	-0.0018986	3.1107615	-54.6360173 C
0.00006188	18614.	300838089.	16.6075933	0.0010276	-0.0019424	3.1421653	-55.8990996 C
0.00006313	18817.	298092125.	16.5338112	0.0010437	-0.0019863	3.1729209	-57.1634417 C
0.00006438	19018.	295429776.	16.4613006	0.0010597	-0.0020303	3.2029208	-58.4307593 C
0.00006563	19219.	292862005.	16.3919473	0.0010757	-0.0020743	3.2324147	-59.6973251 C
0.00006688	19419.	290383457.	16.3255771	0.0010918	-0.0021182	3.2614001	-60.0000000 CY
0.00006813	19619.	287989171.	16.2620285	0.0011079	-0.0021621	3.2898747	-60.0000000 CY
0.00006938	19819.	285674540.	16.2011516	0.0011240	-0.0022060	3.3178359	-60.0000000 CY
0.00007063	20018.	283435285.	16.1428073	0.0011401	-0.0022499	3.3452813	-60.0000000 CY
0.00007188	20216.	281267422.	16.0868661	0.0011562	-0.0022938	3.3722084	-60.0000000 CY
0.00007313	20413.	279151315.	16.0310105	0.0011723	-0.0023377	3.3983502	-60.0000000 CY
0.00007438	20604.	277035184.	15.9760735	0.0011882	-0.0023818	3.4238214	-60.0000000 CY
0.00007938	21210.	267212759.	15.7441983	0.0012497	-0.0025603	3.5167598	-60.0000000 CY
0.00008438	21691.	257075458.	15.5163451	0.0013092	-0.0027408	3.5988752	-60.0000000 CY
0.00008938	22065.	246883580.	15.2902678	0.0013666	-0.0029234	3.6707754	-60.0000000 CY
0.00009438	22418.	237537603.	15.0863290	0.0014238	-0.0031062	3.7353929	-60.0000000 CY
0.00009938	22685.	228275448.	14.8802816	0.0014787	-0.0032913	3.7907826	-60.0000000 CY
0.0001044	22942.	219807363.	14.6957927	0.0015339	-0.0034761	3.8398360	-60.0000000 CY
0.0001094	23190.	212019104.	14.5242279	0.0015886	-0.0036614	3.8820322	-60.0000000 CY
0.0001144	23380.	204414522.	14.3542265	0.0016418	-0.0038482	3.9168524	-60.0000000 CY

0.0001194	23548.	197263592.	14.1964126	0.0016947	-0.0040353	3.9454768	-60.0000000 CY
0.0001244	23709.	190628249.	14.0470029	0.0017471	-0.0042229	3.9678817	-60.0000000 CY
0.0001294	23866.	184472433.	13.9095393	0.0017995	-0.0044105	3.9844062	-60.0000000 CY
0.0001344	24020.	178751674.	13.7848059	0.0018523	-0.0045977	3.9950750	-60.0000000 CY
0.0001394	24151.	173280441.	13.6649597	0.0019046	-0.0047854	3.9997414	-60.0000000 CY
0.0001444	24247.	167945022.	13.5402992	0.0019549	-0.0049751	3.9985959	-60.0000000 CY
0.0001494	24338.	162933960.	13.4256106	0.0020055	-0.0051645	3.9963538	-60.0000000 CY
0.0001544	24427.	158229741.	13.3207099	0.0020564	-0.0053536	3.9997424	-60.0000000 CY
0.0001594	24512.	153803704.	13.2246836	0.0021077	-0.0055423	3.9975862	60.0000000 CY
0.0001644	24593.	149616033.	13.1312564	0.0021585	-0.0057315	3.9999823	60.0000000 CY
0.0001694	24670.	145654227.	13.0436994	0.0022093	-0.0059207	3.9979363	60.0000000 CY
0.0001744	24746.	141910070.	12.9627869	0.0022604	-0.0061096	3.9999928	60.0000000 CY
0.0001794	24818.	138356906.	12.8881937	0.0023118	-0.0062982	3.9974097	60.0000000 CY
0.0001844	24881.	134949202.	12.8162996	0.0023630	-0.0064870	3.9998872	60.0000000 CY
0.0001894	24934.	131662242.	12.7464640	0.0024139	-0.0066761	3.9955012	60.0000000 CY
0.0001944	24973.	128478779.	12.6738432	0.0024635	-0.0068665	3.9990386	60.0000000 CY
0.0001994	25010.	125439950.	12.6032755	0.0025128	-0.0070572	3.9986026	60.0000000 CY
0.0002044	25045.	122542186.	12.5376516	0.0025624	-0.0072476	3.9960014	60.0000000 CY
0.0002094	25079.	119779464.	12.4760557	0.0026122	-0.0074378	3.9991282	60.0000000 CY
0.0002144	25112.	117141783.	12.4183072	0.0026622	-0.0076278	3.9986977	60.0000000 CY
0.0002194	25144.	114618328.	12.3645532	0.0027125	-0.0078175	3.9946713	60.0000000 CY
0.0002244	25176.	112204720.	12.3139436	0.0027629	-0.0080071	3.9983093	60.0000000 CY
0.0002294	25207.	109893711.	12.2662866	0.0028136	-0.0081964	3.9999180	60.0000000 CY
0.0002344	25236.	107673104.	12.2197444	0.0028640	-0.0083860	3.9932650	60.0000000 CY
0.0002394	25263.	105537785.	12.1731094	0.0029139	-0.0085761	3.9954120	60.0000000 CY
0.0002444	25290.	103487802.	12.1290485	0.0029640	-0.0087660	3.9984953	60.0000000 CY
0.0002494	25316.	101517951.	12.0874266	0.0030143	-0.0089557	3.9999065	60.0000000 CYT
0.0002544	25341.	99622242.	12.0484260	0.0030648	-0.0091452	3.9941692	60.0000000 CYT
0.0002594	25366.	97797488.	12.0116265	0.0031155	-0.0093345	3.9931593	60.0000000 CYT
0.0002644	25389.	96032189.	11.9776945	0.0031666	-0.0095234	3.9969463	60.0000000 CYT
0.0002694	25409.	94326094.	11.9461647	0.0032180	-0.0097120	3.9992445	60.0000000 CYT
0.0002744	25429.	92680729.	11.9163210	0.0032695	-0.0099005	3.9998684	60.0000000 CYT
0.0003044	25482.	83719121.	11.7500101	0.0035764	-0.0110336	3.9968684	60.0000000 CYT
0.0003344	25482.	76207872.	11.6723361	0.0039029	-0.0121471	3.9967342	60.0000000 CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	-580.000	4349.351	0.00300000

2	0.000	15194.883	0.00300000
3	664.000	25308.582	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	4349.	-377.000000	2827.	50734138.
2	0.65	15195.	0.0000	9877.	171136218.
3	0.65	25309.	431.600000	16451.	337039428.
1	0.70	4349.	-406.000000	3045.	40290369.
2	0.70	15195.	0.0000	10636.	170747730.
3	0.70	25309.	464.800000	17716.	314218287.
1	0.75	4349.	-435.000000	3262.	31225713.
2	0.75	15195.	0.0000	11396.	166229276.
3	0.75	25309.	498.000000	18981.	295917391.

The analysis ended normally.

SITE OVERVIEW	
TYPE OF OCCUPANCY:	TELECOMMUNICATIONS
TOWER TYPE:	SELF SUPPORTING TOWER
FOUNDATION DESIGN:	MAT
TOWER HEIGHT:	255-FT +/-
TOWER LATITUDE:	36.6680°±
TOWER LONGITUDE:	-88.5319°±
RISK CATEGORY/ STRUCTURE CLASS:	II

PROJECT CONTACT DIRECTORY	
TOWER OWNER:	TOWERCO 5000 VALLEYSTONE DR. CARY, NC 27519 OFFICE: (919) 653-5700 WWW.TOWERCO.COM
ENGINEER:	DELTA OAKS GROUP CONTACT: YAMINI RAJAKUMAR 4904 PROFESSIONAL COURT, 2ND FLOOR RALEIGH, NC 27609 (919) 342-8247 ENG-STRUCTURAL@DELTAOAKSGROUP.COM

KENTUCKY
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CALL 48 HOURS BEFORE YOU DIG

ALL DIMENSIONS, MEASUREMENTS, QUANTITIES, AND PART NUMBERS TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO MATERIAL ORDERS AND CONSTRUCTION

CONSTRUCTION SHALL BE PER STANDARDS TIA-322-2016: LOADING, ANALYSIS, AND DESIGN CRITERIA RELATED TO THE INSTALLATION, ALTERATION AND MAINTENANCE OF COMMUNICATION STRUCTURES AND ASSP A10.48-2016: CRITERIA FOR SAFETY PRACTICES WITH THE CONSTRUCTION , DEMOLITION, MODIFICATION AND MAINTENANCE OF COMMUNICATION STRUCTURES.

SHEET INDEX

FOUNDATION DESIGN DRAWINGS

255-FT SELF SUPPORTING TOWER

SITE NAME

EV FARMINGTON

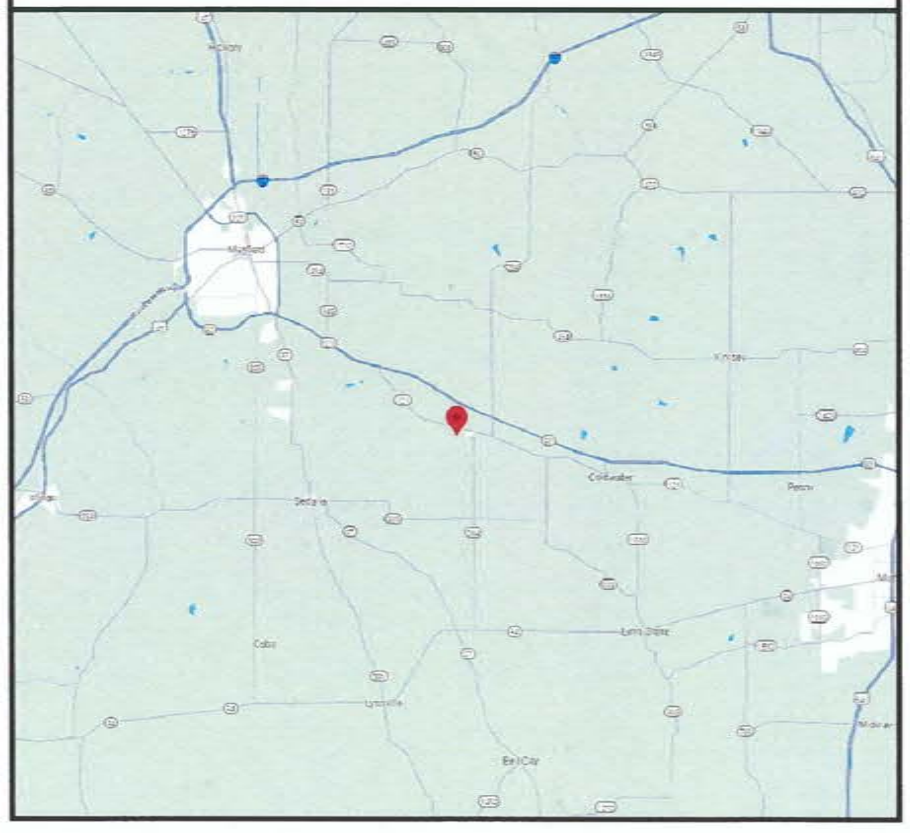
SITE ID

KY0104

SITE ADDRESS

DOVE RD
FARMINGTON, KY 42020

SITE LOCATION



PREPARED FOR:

TowerCo

5000 VALLEYSTONE DR.
CARY, NC 27519
OFFICE: (919) 653-5700
WWW.TOWERCO.COM

PREPARED BY:

DELTA OAKS

DELTA OAKS GROUP
4904 PROFESSIONAL COURT, SECOND FLOOR
RALEIGH, NC 27609
PHONE: (919) 342-8247
www.deltaoaksgroup.com

Digitally signed by Michael Lassiter
Date: 2024.03.20 11:59:48 -04:00

KENTUCKY
LASSITER
24895
LICENSED PROFESSIONAL ENGINEER

MICHAEL LASSITER, SE, PE
KENTUCKY LICENSE NO. 24895
3/20/24

DRAWN BY:	MEA
CHECKED BY:	YR
APPV'D:	MLL
PROJECT NO:	STR24-21135-08

SUBMITTALS			
DATE	DESCRIPTION	REV	ISSUED BY
3/20/24	REVIEW	0	MEA

SITE NAME:
EV FARMINGTON

SITE ADDRESS:
DOVE RD
FARMINGTON, KY 42020

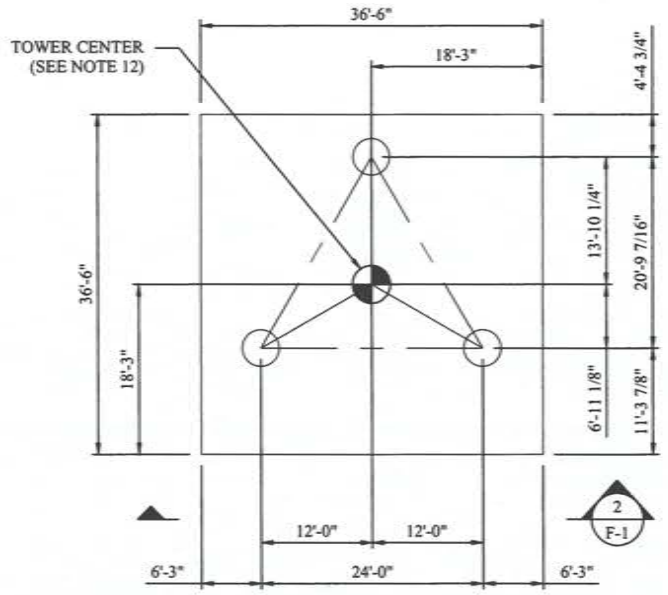
SITE ID:
KY0104

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

NOTES:

1. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4500-PSI.
2. REBAR SHALL CONFORM TO ASTM SPECIFICATION A615.
3. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 1 INCH.
4. SEE GEOTECHNICAL REPORT(s) FOR INSTALLATION REQUIREMENTS
5. REINFORCEMENT SHALL BE 3 INCHES CLEAR FROM EDGES OF CONCRETE.
6. REFER TO CONCRETE AIR CONTENT TABLE FOR TARGET AIR CONTENT PER MAXIMUM AGGREGATE SIZE.
7. IF REQUIRED, HORIZONTAL BARS MAY BE SPLICED. REFER TO HORIZONTAL REBAR SPLICE LENGTH TABLE. SPLICES SHALL BE STAGGERED FOR ADJACENT BARS TO ALLOW CONCRETE FLOW ABOUT REBAR CAGE.
8. TOP TIES TO BE DOUBLE TIES, HOOKED ON EACH END.
9. WATER ENCOUNTERED AT 4'-0"±.
10. ROCK NOT ENCOUNTERED..
11. HORIZ-01 SHALL BE HOOKED 90° EACH END. SEE TYPICAL 90° HOOK DETAILS ON SHEET F-2.
12. FOUNDATION ORIENTATION RELATIVE TO NORTH TO BE PROVIDED BY OTHERS.
13. FOUNDATION DESIGN(S) ARE BASED ON:
    - 13.1. TOWER DESIGN CALCULATIONS BY ARCOSA DATED MARCH 07, 2024, PROJECT: ATS# A816 WITH DESIGN CRITERIA:
      - 13.1.1. DESIGN STANDARD / CODE(s):
        - 13.1.1.1. ANSI/TIA-222-G
        - 13.1.1.2. 2015 INTERNATIONAL BUILDING CODE
        - 13.1.1.3. 2018 KENTUCKY BUILDING CODE
      - 13.1.2. BASIC WIND SPEED V(ULT) OF 115 MPH / V(3s) OF 89 MPH, NO ICE
      - 13.1.3. BASIC WIND SPEED V(I) OF 30 MPH, 1.00-in RADIAL ICE
      - 13.1.4. STRUCTURE CLASSIFICATION AND RISK CATEGORY "II"
      - 13.1.5. EXPOSURE CATEGORY "C"
      - 13.1.6. TOPOGRAPHY CATEGORY "1"
    - 13.2. REACTIONS AND ANCHOR BOLT LAYOUT FROM DESIGN DRAWINGS:
      - 13.2.1. MOMENT (TOTAL) = 13,139.0 KIP-FT (FACTORED, DESIGN)
      - 13.2.2. SHEAR (TOTAL) = 82.0 KIP (FACTORED, DESIGN)
      - 13.2.3. AXIAL (TOTAL) = 96.0 KIP (FACTORED, DESIGN)
      - 13.2.1. DOWNLOAD (PER LEG) = 664.0 KIP (FACTORED, DESIGN)
      - 13.2.2. UPLIFT (PER LEG) = 580.0 KIP (FACTORED, DESIGN)
      - 13.2.3. SHEAR (PER LEG) = 49.0 KIP (FACTORED, DESIGN)
      - 13.2.4. (6) 1 1/2"Ø X 82" (GRADE F1554-105) ANCHOR RODS EQUALLY SPACED ON 16"Ø B.C. WITH MINIMUM EMBEDMENT OF 72", PER LEG.
    - 13.3. GEOTECHNICAL INVESTIGATION BY TOWER ENGINEERED SOLUTIONS DATED JANUARY 31, 2024, PROJECT NO.: 24124186.
    - 13.4. SUPPLEMENTAL GEOTECHNICAL REPORT BY DELTA OAKS GROUP DATED MARCH 13, 2024, PROJECT NO.: GEO24-21135-05.
    - 13.5. 1.50" DEFLECTION LIMIT CRITERIA AT UNFACTORED DESIGN REACTIONS.
    - 13.6. 0.75" DEFLECTION LIMIT CRITERIA AT UNFACTORED SERVICE REACTIONS.
14. SEISMIC DESIGN PARAMETERS:
    - 14.1. ASCE 7-10 DESIGN STANDARD
    - 14.2. SITE CLASS "D"
    - 14.3. SEISMIC DESIGN CATEGORY "D"



1 / F-1 FOUNDATION LAYOUT

SCALE: N.T.S.

PARTS LIST - MAT

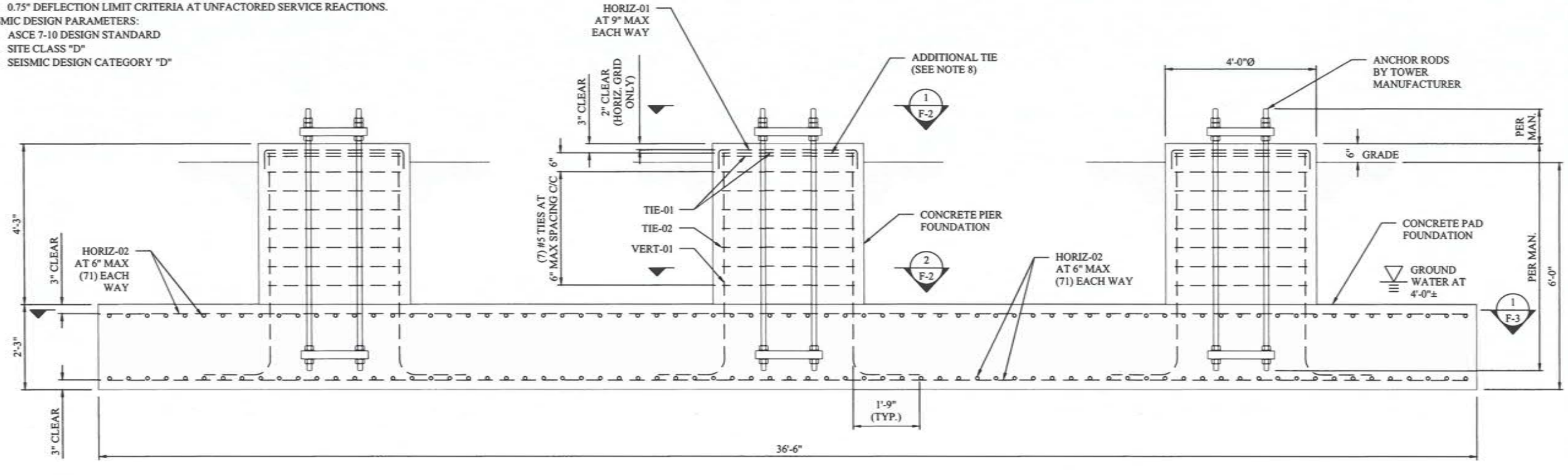
MARK NO.	DESCRIPTION	SIZE	QTY.
CONCRETE	4500-PSI MIX - LARGEST COURSE AGGREGATE SHALL BE 3/4-IN OR LESS	117.0 CY	1
VERT-01	VERTICAL REBAR	#9 ASTM A615-60 X 7'-8"	39
TIE-01	REBAR TIE	#5 ASTM A615-60 X 12'-8"	6
TIE-02	REBAR TIE	#5 ASTM A615-60 X 12'-8"	21
HORIZ-01	HORIZONTAL REBAR	#3 ASTM A615-60 X 4'-8"	24
HORIZ-02	HORIZONTAL REBAR	#9 ASTM A615-60 X 36'-0"	284

HORIZONTAL REBAR SPLICE LENGTH

REBAR SIZE	MIN. LAP LENGTH
#8	62"
#9	69"
#10	78"
#11	85"

CONCRETE AIR CONTENT

NOMINAL MAXIMUM AGGREGATE SIZE	TARGET AIR CONTENT
3/8"	7.5%
1/2"	7.0%
3/4"	6.0%



2 / F-1 FOUNDATION ELEVATION

SCALE: N.T.S.

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MICHAEL
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SITE NAME:
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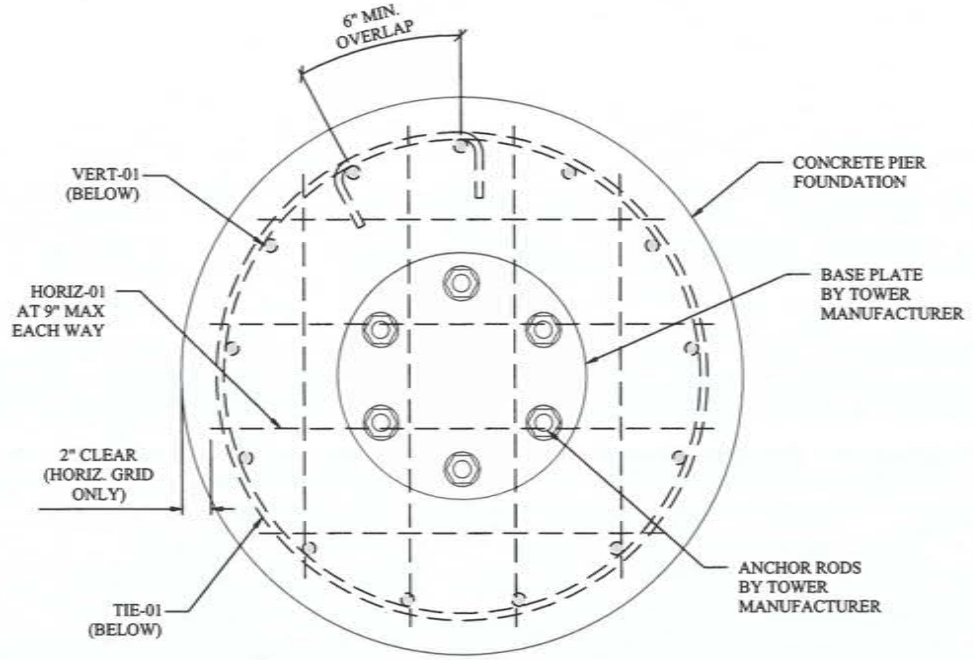
SITE ADDRESS:
DOVE RD
FARMINGTON, KY 42020

SITE ID:
KY0104

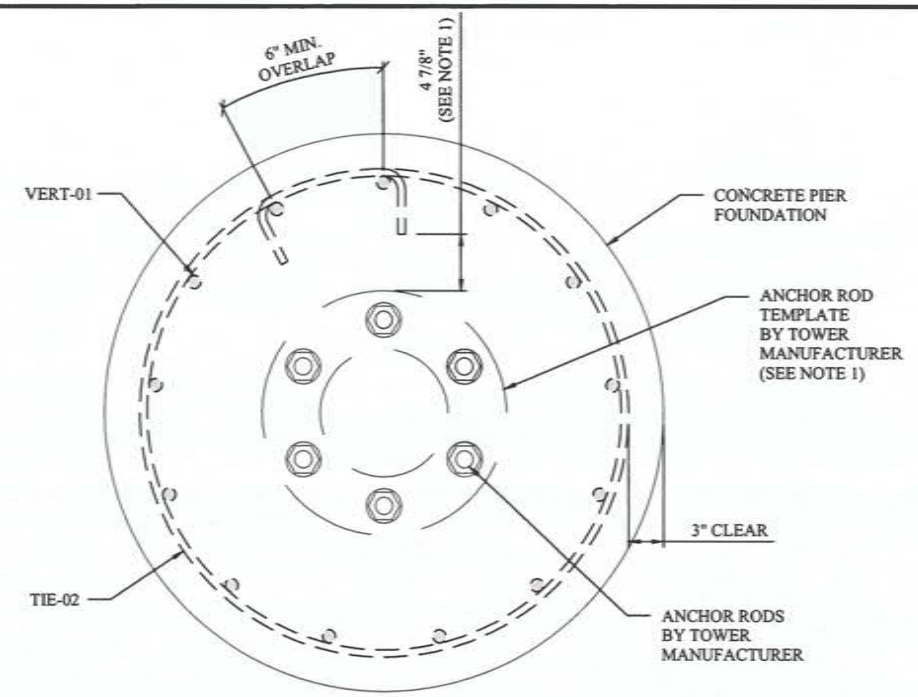
SHEET TITLE
PAD & PIER
FOUNDATION DESIGN

SHEET NUMBER
F-1



1 F-2 FOUNDATION SECTION DETAIL

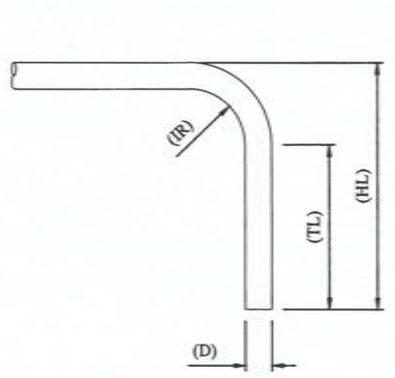
SCALE: N.T.S.



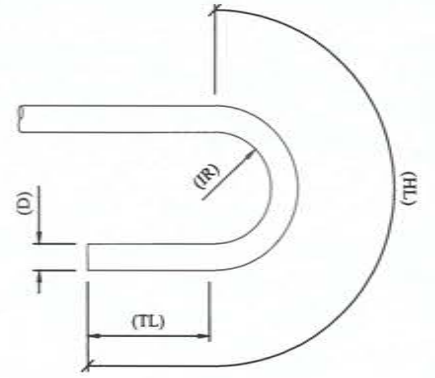
2 F-2 FOUNDATION SECTION DETAIL

SCALE: N.T.S.

NOTES:
1. APPROXIMATE CLEAR FROM ANCHOR ROD TEMPLATE TO REBAR CAGE SHOWN.
2. HORIZONTAL REBAR GRID AT TOP OF PIER MAY BE ADJUSTED AS NECESSARY NOT TO INTERFERE WITH ANCHOR RODS. CONTRACTOR TO MAINTAIN ALL SPACING REQUIREMENTS SPECIFIED IN DETAILS.
3. REFER TO SHEET F-1 FOR PARTS LIST.
4. HORIZ SHALL BE HOOKED 90° EACH END. SEE TYPICAL 90° HOOK (AS REQUIRED FOR VERT AND HORIZ) DETAILS ON THIS SHEET.
5. TIE OVERLAPS AND HOOKS SHALL BE STAGGERED 180° BETWEEN ADJACENT TIES.



TYPICAL 90° HOOK



TYPICAL 180° HOOK

TYPICAL REBAR TERMINATION DETAILS

REBAR SIZE		OVERLAP (TIES)	90° HOOK (AS REQUIRED FOR VERT AND HORIZ)			90° HOOK (TIES)			180° HOOK (TIES)		
BAR SIZE #	BAR Ø (D)		INSIDE RADIUS (IR)	HOOK TAIL LENGTH (TL)	TOTAL HOOK LENGTH (HL)	INSIDE RADIUS (IR)	HOOK TAIL LENGTH (TL)	TOTAL HOOK LENGTH (HL)	INSIDE RADIUS (IR)	HOOK TAIL LENGTH (TL)	TOTAL HOOK LENGTH (HL)
#3	3/8"±	1'-8"	1 1/8"	4 1/2"	6"	3/4"	3"	4 1/8"	3/4"	2 1/2"	7 13/16"
#4	1/2"±	2'-3"	1 1/2"	6"	8"	1"	3"	4 1/2"	1"	2 1/2"	9 9/16"
#5	5/8"±	2'-10"	1 7/8"	7 1/2"	10"	1 1/4"	3 3/4"	5 5/8"	1 1/4"	2 1/2"	11 5/16"
#6	3/4"±	3'-4"	2 1/4"	9"	12"	2 1/4"	9"	12"	2 1/4"	3"	18 5/16"
#7	7/8"±	--	2 5/8"	10 1/2"	14"	--	--	--	--	--	--
#8	1"±	--	3"	12"	16"	--	--	--	--	--	--
#9	1 1/8"±	--	4 1/2"	13 9/16"	19 3/16"	--	--	--	--	--	--
#10	1 1/4"±	--	5"	15 1/4"	21 9/16"	--	--	--	--	--	--
#11	1 3/8"±	--	5 5/8"	16 15/16"	24"	--	--	--	--	--	--
#14	1 3/4"±	--	8 1/2"	20 5/16"	30 1/2"	--	--	--	--	--	--
#18	2 1/4"±	--	11 3/8"	27 1/16"	40 5/8"	--	--	--	--	--	--

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3/20/24	REVIEW	0	MEA

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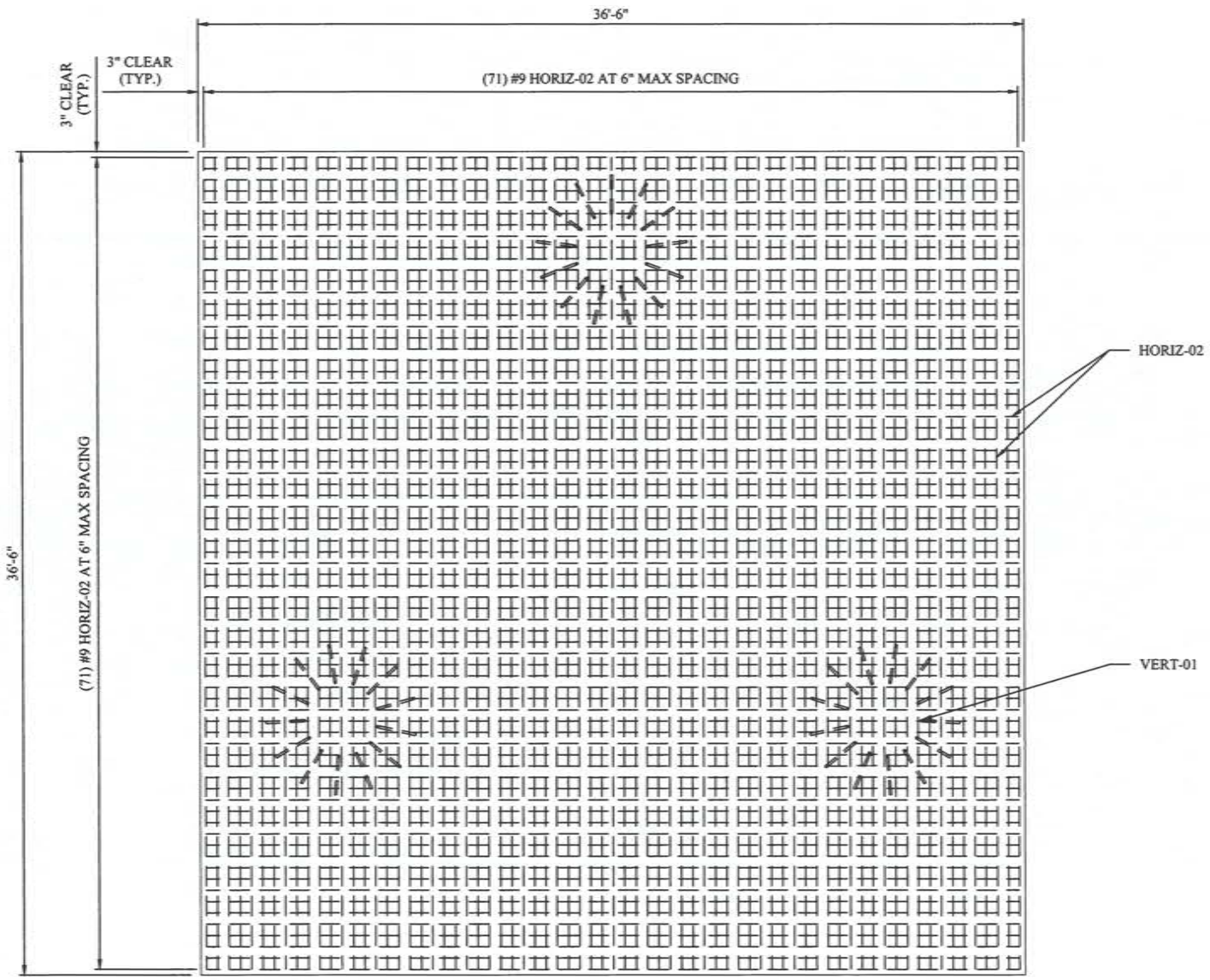
SITE ADDRESS:
DOVE RD
FARMINGTON, KY 42020

SITE ID:
KY0104

SHEET TITLE
FOUNDATION SECTION DETAILS

SHEET NUMBER
F-2

NOTES:
1. REFER TO SHEET F-1 FOR PARTS LIST.
2. ANCHOR RODS AND ANCHOR ROD TEMPLATE NOT SHOWN FOR CLARITY.



1 / F-3 FOUNDATION SECTION DETAIL
SCALE: N.T.S.

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COMMONWEALTH OF KENTUCKY
MICHAEL L. LASSITER
24895
LICENSED PROFESSIONAL ENGINEER

MICHAEL LASSITER, SE, PE 3/20/24
KENTUCKY LICENSE NO. 24895

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DOVE RD
FARMINGTON, KY 42020

SITE ID:
KY0104

SHEET TITLE
FOUNDATION
SECTION DETAILS

SHEET NUMBER
F-3

GENERAL NOTES:

1. ALL REFERENCES TO TOWER OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED AS TOWERCO OR ITS DESIGNATED REPRESENTATIVE.
2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE.
3. THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH ANSI/TIA 222-G ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AND 2018 KENTUCKY BUILDING CODE
4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
5. ALL PRODUCT MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERCEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE MODIFICATION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND IT'S COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE-DOWNS THAT MAY BE NECESSARY, SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES AND PROCEDURES.
8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE AND LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
11. PARTS LISTS AND PART NUMBERS LISTED ON THE CONSTRUCTION DRAWINGS ARE INTENDED TO AID THE CONTRACTOR/OWNER. CONTRACTOR/OWNER SHALL VERIFY PARTS AND QUANTITIES WITH THE MANUFACTURER PRIOR TO BIDDING AND/OR ORDERING MATERIALS.
12. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNING AGENCIES.
13. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
14. 24 HOURS BEFORE THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER. THE CONTRACTOR SHALL REWORK (DRY, SCARIFY, ETC.) ALL MATERIAL NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE.
15. IF THE MATERIAL REMAINS UNSUITABLE AFTER REWORKING, THE CONTRACTOR SHALL UNDERCUT THIS MATERIAL AND REPLACE IT WITH APPROVED MATERIAL. IF PAVING IS TO BE DONE, ALL SUBGRADES SHALL BE PROOFROLLED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK PRIOR TO PAVING. ANY SOFT MATERIAL SHALL BE REWORKED OR REPLACED.
16. THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.
17. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
18. ALL DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

APPLICABLE CODES AND STANDARDS:

1. ANSI/TIA-222-G STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.
2. 2015 INTERNATIONAL BUILDING CODE
3. 2018 KENTUCKY BUILDING CODE
4. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-14.
5. CRSI: CONCRETE REINFORCING STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, LATEST EDITION.
6. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, 13TH EDITION.
7. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE, LATEST EDITION.

CONSTRUCTION INSPECTION NOTES:

1. FOUNDATION AND GEOTECHNICAL INSPECTIONS: A THIRD PARTY INSPECTION SHALL BE PERFORMED TO VERIFY:
   - A. PARAMETERS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT FOR THE SITE
   - B. FOUNDATION DIMENSIONS
   - C. REINFORCING STEEL GRADE, SIZE, CONDITION, SUPPORT, PLACEMENT AND COVER
   - D. CONCRETE MIX DESIGN DOCUMENTATION MATCHES STRENGTH AND DURABILITY REQUIREMENTS
   - E. CONCRETE TESTS REQUIRED TO BE PERFORMED PRIOR TO PLACEMENT OF CONCRETE, INCLUDING SLUMP, TEMPERATURE, AIR CONTENT, AND TEST CYLINDERS
   - F. ANCHOR ROD AND/OR POST-INSTALLED REBAR DIMENSIONS AND PLACEMENT, SIZE, EMBEDMENT DEPTH, PROJECTION ABOVE CONCRETE, ORIENTATION, PATTERN, AND ALIGNMENT
   - G. CONDITION OF SUBGRADE IMMEDIATELY PRIOR TO CONCRETE PLACEMENT
   - H. PROPER CONCRETE PLACEMENT, AVOIDING SEGREGATION OF AGGREGATES, AND CURING
   - I. STRUCTURAL BACKFILL MATERIAL AND PLACEMENT, INCLUDING MAXIMUM LIFT THICKNESS, MOISTURE CONTENT AND DENSITY.

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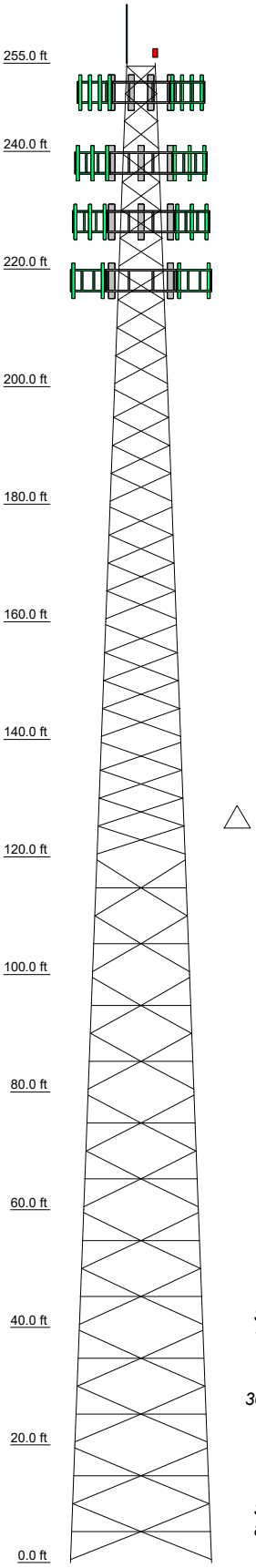
GENERAL NOTES

SHEET NUMBER
GN-1

Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	SR 4 3/4	SR 4 1/2			SR 4 1/4	SR 4	SR 3 3/4		SR 3 1/2	SR 3 1/4	SR 2 3/4	SR 2 1/4	SR 1 3/4
Leg Grade	A529-50												
Diagonals	2L3x3x3/16x3/8			2L2 1/2x2 1/2x3/16x3/8			L3x3x1/4		L3x3x3/16		L2 1/2x2 1/2x3/16		A
Diagonal Grade	A36M-50												
Top Girts	N.A.												A
Horizontals	2L2 1/2x2 1/2x3/16x3/8			2L2x2x3/16x3/8		B			N.A.				
Inner Bracing	L1 3/4x1 3/4x3/16								N.A.				
Face Width (ft)	24	22.5	21	19.5	18	16.5	15	13.5	12	10.5	9	7.5	6
# Panels @ (ft)	51.5	48 @ 4.75											3 @ 4.66667
Weight (K)	6.9	6.7	6.1	5.5	5.0	4.4	4.0	3.5	3.1	2.5	1.9	1.4	0.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10'	255	Sector1(CaAa=6666.67 Sq.in)No Ice (Carrier 3 (Future))	228
Top Beacon	255	Sector2(CaAa=6666.67 Sq.in)No Ice (Carrier 3 (Future))	228
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	250	Sector3(CaAa=6666.67 Sq.in)No Ice (Carrier 3 (Future))	228
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	250	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 3 (Future))	228
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	250	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 3 (Future))	228
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	250	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 3 (Future))	228
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	250	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 3 (Future))	228
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	250	Sector1(CaAa=4500 Sq.in)No Ice (Carrier 4 (Future))	218
Sector1(CaAa=6666.67 Sq.in)No Ice (Carrier 2 (Future))	238	Sector2(CaAa=4500 Sq.in)No Ice (Carrier 4 (Future))	218
Sector2(CaAa=6666.67 Sq.in)No Ice (Carrier 2 (Future))	238	Sector3(CaAa=4500 Sq.in)No Ice (Carrier 4 (Future))	218
Sector3(CaAa=6666.67 Sq.in)No Ice (Carrier 2 (Future))	238	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 4 (Future))	218
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 2 (Future))	238	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 4 (Future))	218
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 2 (Future))	238	Heavy Duty Sector Mount w/ Stiff Arms (Carrier 4 (Future))	218
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 2 (Future))	238		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16	B	2L1 3/4x1 3/4x3/16x3/8

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A529-50	50 ksi	65 ksi	A36M-50	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Graves County, Kentucky.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 30 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity.
9. Tower is also designed for an ultimate wind speed of 115 mph per ASCE 7-10.

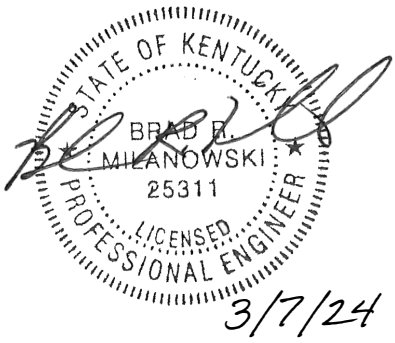
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 664 K
SHEAR: 49 K

UPLIFT: -580 K
SHEAR: 45 K

AXIAL 298 K
SHEAR 11 K *MOMENT 1982 kip-ft*
TORQUE 2 kip-ft
30 mph WIND - 1.000 in ICE

AXIAL 96 K
SHEAR 82 K *MOMENT 13139 kip-ft*
TORQUE 38 kip-ft
REACTIONS - 89 mph WIND



ARCOSA
TELECOM STRUCTURES

B+T GRP
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1717 S Boulder Ave, Suite 300
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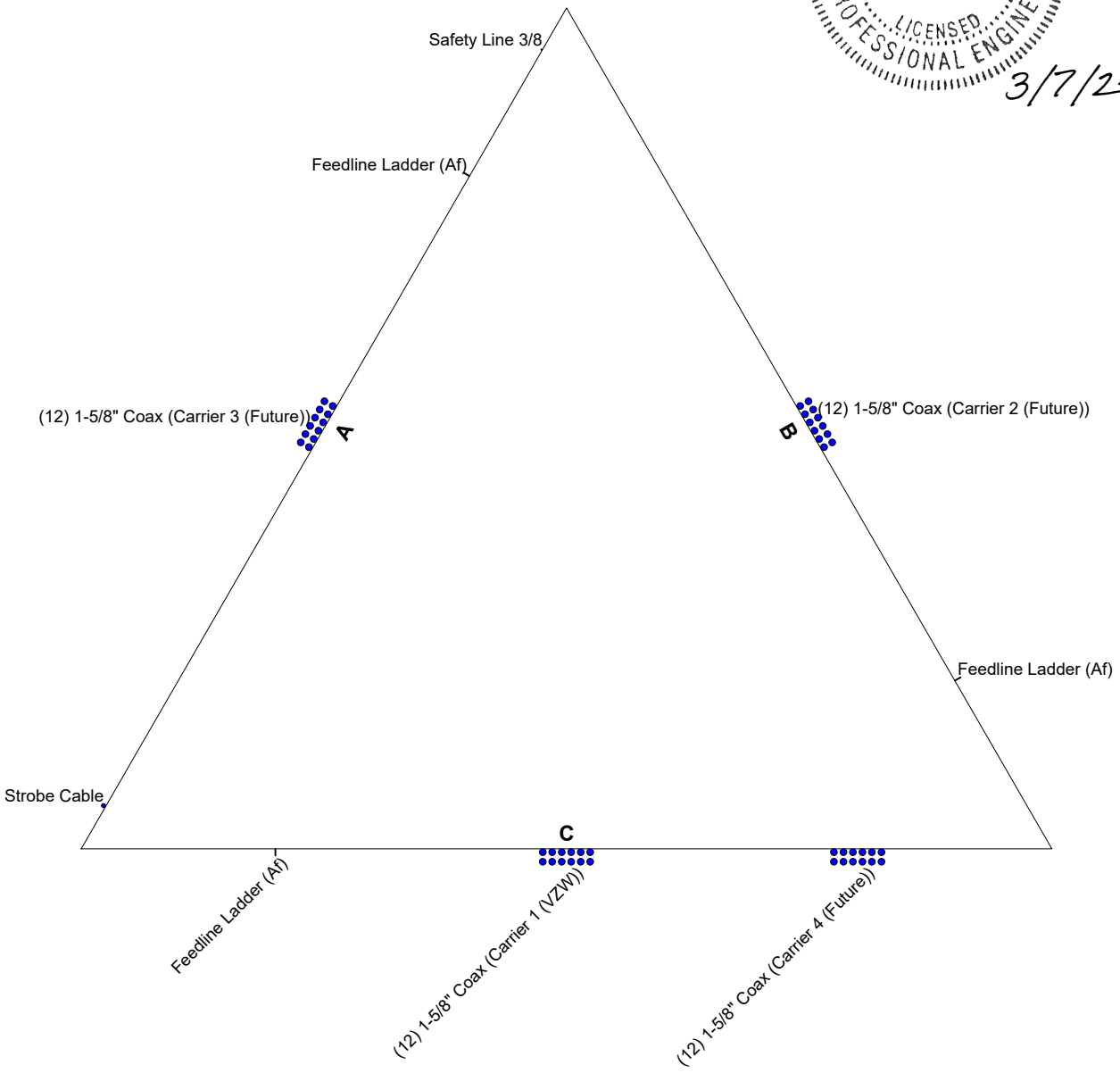
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ATS # A816 - EV Farmington (Site# KY0104)		
Project: 255' SST/36.667958, -88.531919		
Client: TowerCo	Drawn by: T. Cheriyan	App'd:
Code: TIA-222-G	Date: 03/07/24	Scale: NTS
Path:		Dwg No. E-1

Feed Line Plan



STATE OF KENTUCKY
BRAD R. MILANOWSKI
25311
LICENSED PROFESSIONAL ENGINEER
3/7/24

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Job: ***ATS # A816 - EV Farmington (Site# KY0104)***			
Project: ***255' SST/36.667958, -88.531919***			
Client: TowerCo	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 03/07/24	Scale: NTS	
Path:		Dwg No. E-7	

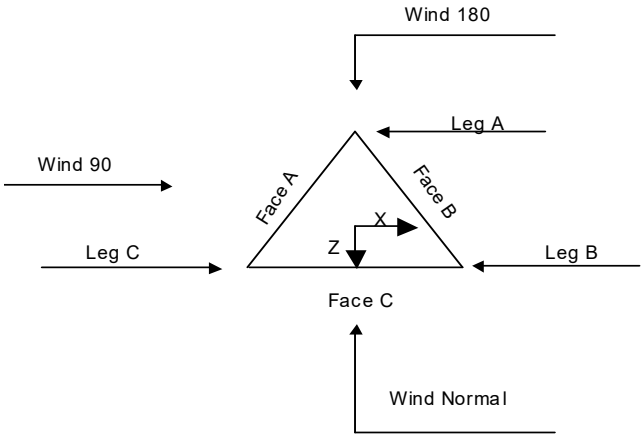
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 255.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 4.875 ft at the top and 24.000 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Graves County, Kentucky.
Basic wind speed of 89 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 30 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity..
Tower is also designed for an ultimate wind speed of 115 mph per ASCE 7-10..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	255.000-240.000			4.875	1	15.000
T2	240.000-220.000			6.000	1	20.000
T3	220.000-200.000			7.500	1	20.000
T4	200.000-180.000			9.000	1	20.000
T5	180.000-160.000			10.500	1	20.000
T6	160.000-140.000			12.000	1	20.000
T7	140.000-120.000			13.500	1	20.000
T8	120.000-100.000			15.000	1	20.000
T9	100.000-80.000			16.500	1	20.000
T10	80.000-60.000			18.000	1	20.000
T11	60.000-40.000			19.500	1	20.000
T12	40.000-20.000			21.000	1	20.000
T13	20.000-0.000			22.500	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	255.000-240.000	4.667	X Brace	No	No	6.000	6.000
T2	240.000-220.000	4.750	X Brace	No	No	6.000	6.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	220.000-200.000	4.750	X Brace	No	No	6.000	6.000
T4	200.000-180.000	4.750	X Brace	No	No	6.000	6.000
T5	180.000-160.000	4.750	X Brace	No	No	6.000	6.000
T6	160.000-140.000	4.750	X Brace	No	No	6.000	6.000
T7	140.000-120.000	4.750	X Brace	No	No	6.000	6.000
T8	120.000-100.000	4.750	Double K	No	Yes	6.000	6.000
T9	100.000-80.000	4.750	Double K	No	Yes	6.000	6.000
T10	80.000-60.000	4.750	Double K	No	Yes	6.000	6.000
T11	60.000-40.000	4.750	Double K	No	Yes	6.000	6.000
T12	40.000-20.000	4.750	Double K	No	Yes	6.000	6.000
T13	20.000-0.000	4.750	Double K	No	Yes	6.000	6.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 255.000-240.000	Solid Round	1 3/4	A529-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T2 240.000-220.000	Solid Round	2 1/4	A529-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36M-50 (50 ksi)
T3 220.000-200.000	Solid Round	2 3/4	A529-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36M-50 (50 ksi)
T4 200.000-180.000	Solid Round	3 1/4	A529-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36M-50 (50 ksi)
T5 180.000-160.000	Solid Round	3 1/2	A529-50 (50 ksi)	Equal Angle	L3x3x3/16	A36M-50 (50 ksi)
T6 160.000-140.000	Solid Round	3 3/4	A529-50 (50 ksi)	Equal Angle	L3x3x3/16	A36M-50 (50 ksi)
T7 140.000-120.000	Solid Round	3 3/4	A529-50 (50 ksi)	Equal Angle	L3x3x1/4	A36M-50 (50 ksi)
T8 120.000-100.000	Solid Round	4	A529-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T9 100.000-80.000	Solid Round	4 1/4	A529-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T10 80.000-60.000	Solid Round	4 1/2	A529-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T11 60.000-40.000	Solid Round	4 1/2	A529-50 (50 ksi)	Double Equal Angle	2L3x3x3/16x3/8	A36M-50 (50 ksi)
T12 40.000-20.000	Solid Round	4 3/4	A529-50 (50 ksi)	Double Equal Angle	2L3x3x3/16x3/8	A36M-50 (50 ksi)
T13 20.000-0.000	Solid Round	4 3/4	A529-50 (50 ksi)	Double Equal Angle	2L3x3x3/16x3/8	A36M-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 255.000-240.000	Equal Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)	Solid Round		A36M-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T8 120.000-100.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L1 3/4x1 3/4x3/16x3/8	A36M-50 (50 ksi)
T9 100.000-80.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2x2x3/16x3/8	A36M-50 (50 ksi)
T10 80.000-60.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2x2x3/16x3/8	A36M-50 (50 ksi)
T11 60.000-40.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T12 40.000-20.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T13 20.000-0.000	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T8 120.000-100.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T9 100.000-80.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T10 80.000-60.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T11 60.000-40.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T12 40.000-20.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T13 20.000-0.000	Solid Round		A36M-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 255.000-240.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T2	0.000	0.375	A36M-50	1	1	1	36.000	36.000	36.000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
240.000-220.000			(50 ksi)						
T3 220.000-200.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T4 200.000-180.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T5 180.000-160.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T6 160.000-140.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T7 140.000-120.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T8 120.000-100.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000
T9 100.000-80.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000
T10 80.000-60.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000
T11 60.000-40.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000
T12 40.000-20.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000
T13 20.000-0.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 255.000-240.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 240.000-220.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 220.000-200.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 200.000-180.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 180.000-160.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T6 160.000-140.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 140.000-120.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 120.000-100.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 100.000-80.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 80.000-60.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 60.000-40.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 40.000-20.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 20.000-0.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 255.000-240.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 240.000-220.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 220.000-200.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 200.000-180.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 180.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 160.000-140.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 140.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T8 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 255.000-240.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T2 240.000-220.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T3 220.000-200.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T4 200.000-180.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T5 180.000-160.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T6 160.000-140.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T7 140.000-120.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T8 120.000-100.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T9 100.000-80.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T10 80.000-60.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T11 60.000-40.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T12 40.000-20.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)
T13 20.000-0.000	0.000	0.75 (1)	0.000	0.75 (1)	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75 (1)	0.000	0.75 (1)
	0.000	0.75 (2)	0.000	0.75 (2)							0.000	0.75 (2)	0.000	0.75 (2)
	0.000	0.75 (3)	0.000	0.75 (3)							0.000	0.75 (3)	0.000	0.75 (3)
	0.000	0.75 (4)	0.000	0.75 (4)							0.000	0.75 (4)	0.000	0.75 (4)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 255.000-240.000	Flange	0.000 A325N	0	0.625 A325X	1	0.625 A325X	1	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T2 240.000-220.000	Flange	0.750 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T3 220.000-200.000	Flange	0.750 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T4 200.000-180.000	Flange	1.000 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T5 180.000-160.000	Flange	1.000 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T6 160.000-140.000	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T7 140.000-120.000	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T8 120.000-100.000	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T9 100.000-80.000	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T10 80.000-60.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T11 60.000-40.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T12 40.000-20.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T13 20.000-0.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325X	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
1-5/8" Coax (Carrier 1 (VZW)) **	C	No	No	Ar (CaAa)	250.000 - 10.000	0.000	0	12	6	0.750	1.980		0.001
1-5/8" Coax (Carrier 2 (Future)) **	B	No	No	Ar (CaAa)	238.000 - 10.000	0.000	0	12	6	0.750	1.980		0.001
1-5/8" Coax (Carrier 3 (Future)) **	A	No	No	Ar (CaAa)	228.000 - 10.000	0.000	0	12	6	0.750	1.980		0.001
1-5/8" Coax (Carrier 4 (Future)) **	C	No	No	Ar (CaAa)	218.000 - 10.000	0.000	-0.3	12	6	0.750	1.980		0.001
Safety Line 3/8	A	No	No	Ar (CaAa)	255.000 - 10.000	0.000	0.45	1	1	0.375	0.375		0.000
Strobe Cable **	A	No	No	Ar (CaAa)	255.000 - 10.000	0.000	-0.45	1	1	1.250	1.250		0.001
Feedline Ladder (Af)	C	No	No	Af (CaAa)	250.000 - 10.000	0.000	0.3	1	1	3.000	0.250		0.008
Feedline	B	No	No	Af (CaAa)	238.000 -	0.000	0.3	1	1	3.000	0.250		0.008

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Ladder (Af) Feedline Ladder (Af) **	A	No	No	Af (CaAa)	10.000 228.000 - 10.000	0.000	0.3	1	1	3.000	0.250		0.008

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	255.000-240.000	A	0.000	0.000	2.438	0.000	0.014
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	24.177	0.000	0.182
T2	240.000-220.000	A	0.000	0.000	22.591	0.000	0.164
		B	0.000	0.000	43.518	0.000	0.328
		C	0.000	0.000	48.353	0.000	0.365
T3	220.000-200.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	91.121	0.000	0.542
T4	200.000-180.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T5	180.000-160.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T6	160.000-140.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T7	140.000-120.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T8	120.000-100.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T9	100.000-80.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T10	80.000-60.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T11	60.000-40.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	95.873	0.000	0.562
T12	40.000-20.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	95.873	0.000	0.562
T13	20.000-0.000	A	0.000	0.000	25.802	0.000	0.192
		B	0.000	0.000	24.177	0.000	0.182
		C	0.000	0.000	47.937	0.000	0.281

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	255.000-240.000	A	2.446	0.000	0.000	17.116	0.000	0.306
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	33.633	0.000	0.897
T2	240.000-220.000	A	2.429	0.000	0.000	49.509	0.000	1.116
		B		0.000	0.000	60.367	0.000	1.604
		C		0.000	0.000	67.075	0.000	1.783
T3	220.000-200.000	A	2.407	0.000	0.000	89.343	0.000	2.166
		B		0.000	0.000	66.841	0.000	1.769
		C		0.000	0.000	117.584	0.000	2.981
T4	200.000-180.000	A	2.383	0.000	0.000	88.897	0.000	2.145
		B		0.000	0.000	66.586	0.000	1.755
		C		0.000	0.000	122.808	0.000	3.092
T5	180.000-160.000	A	2.356	0.000	0.000	88.405	0.000	2.123
		B		0.000	0.000	66.305	0.000	1.739
		C		0.000	0.000	122.352	0.000	3.065
T6	160.000-140.000	A	2.327	0.000	0.000	87.859	0.000	2.098
		B		0.000	0.000	65.994	0.000	1.722
		C		0.000	0.000	121.846	0.000	3.035
T7	140.000-120.000	A	2.294	0.000	0.000	87.243	0.000	2.069
		B		0.000	0.000	65.642	0.000	1.703
		C		0.000	0.000	121.275	0.000	3.002
T8	120.000-100.000	A	2.256	0.000	0.000	86.535	0.000	2.037
		B		0.000	0.000	65.238	0.000	1.681
		C		0.000	0.000	120.619	0.000	2.964
T9	100.000-80.000	A	2.211	0.000	0.000	85.700	0.000	2.000
		B		0.000	0.000	64.762	0.000	1.655
		C		0.000	0.000	119.846	0.000	2.920
T10	80.000-60.000	A	2.156	0.000	0.000	84.679	0.000	1.954
		B		0.000	0.000	64.179	0.000	1.623
		C		0.000	0.000	118.900	0.000	2.866
T11	60.000-40.000	A	2.085	0.000	0.000	83.351	0.000	1.896
		B		0.000	0.000	63.422	0.000	1.583
		C		0.000	0.000	117.671	0.000	2.796
T12	40.000-20.000	A	1.981	0.000	0.000	81.419	0.000	1.814
		B		0.000	0.000	62.321	0.000	1.525
		C		0.000	0.000	115.885	0.000	2.697
T13	20.000-0.000	A	1.775	0.000	0.000	38.795	0.000	0.828
		B		0.000	0.000	30.070	0.000	0.707
		C		0.000	0.000	56.173	0.000	1.252

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	255.000-240.000	-1.006	3.077	-2.564	1.670
T2	240.000-220.000	0.726	-1.669	-0.483	-0.595
T3	220.000-200.000	4.411	-1.589	2.007	-0.633
T4	200.000-180.000	5.336	-1.510	2.632	-0.495
T5	180.000-160.000	5.471	-1.527	2.829	-0.536
T6	160.000-140.000	5.854	-1.617	3.070	-0.584
T7	140.000-120.000	6.217	-1.705	3.301	-0.632
T8	120.000-100.000	7.882	-2.150	3.951	-0.759
T9	100.000-80.000	8.222	-2.229	4.195	-0.812
T10	80.000-60.000	8.614	-2.323	4.456	-0.869
T11	60.000-40.000	8.327	-2.236	4.568	-0.903
T12	40.000-20.000	8.605	-2.301	4.850	-0.974
T13	20.000-0.000	5.340	-1.399	3.195	-0.654

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1-5/8" Coax	240.00 - 250.00	0.6000	0.5279
T1	9	Safety Line 3/8	240.00 - 255.00	0.6000	0.5279
T1	10	Strobe Cable	240.00 - 255.00	0.6000	0.5279
T1	12	Feedline Ladder (Af)	240.00 - 250.00	0.6000	0.5279
T2	1	1-5/8" Coax	220.00 - 240.00	0.6000	0.5704
T2	3	1-5/8" Coax	220.00 - 238.00	0.6000	0.5704
T2	5	1-5/8" Coax	220.00 - 228.00	0.6000	0.5704
T2	9	Safety Line 3/8	220.00 - 240.00	0.6000	0.5704
T2	10	Strobe Cable	220.00 - 240.00	0.6000	0.5704
T2	12	Feedline Ladder (Af)	220.00 - 240.00	0.6000	0.5704
T2	13	Feedline Ladder (Af)	220.00 - 238.00	0.6000	0.5704
T2	14	Feedline Ladder (Af)	220.00 - 228.00	0.6000	0.5704
T3	1	1-5/8" Coax	200.00 - 220.00	0.6000	0.6000
T3	3	1-5/8" Coax	200.00 - 220.00	0.6000	0.6000
T3	5	1-5/8" Coax	200.00 - 220.00	0.6000	0.6000
T3	7	1-5/8" Coax	200.00 - 218.00	0.6000	0.6000
T3	9	Safety Line 3/8	200.00 - 220.00	0.6000	0.6000
T3	10	Strobe Cable	200.00 - 220.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	12	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	13	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	14	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T4	1	1-5/8" Coax	180.00 - 200.00	0.6000	0.6000
T4	3	1-5/8" Coax	180.00 - 200.00	0.6000	0.6000
T4	5	1-5/8" Coax	180.00 - 200.00	0.6000	0.6000
T4	7	1-5/8" Coax	180.00 - 200.00	0.6000	0.6000
T4	9	Safety Line 3/8	180.00 - 200.00	0.6000	0.6000
T4	10	Strobe Cable	180.00 - 200.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	13	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	14	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T5	1	1-5/8" Coax	160.00 - 180.00	0.6000	0.6000
T5	3	1-5/8" Coax	160.00 - 180.00	0.6000	0.6000
T5	5	1-5/8" Coax	160.00 - 180.00	0.6000	0.6000
T5	7	1-5/8" Coax	160.00 - 180.00	0.6000	0.6000
T5	9	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T5	10	Strobe Cable	160.00 - 180.00	0.6000	0.6000
T5	12	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	13	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	14	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T6	1	1-5/8" Coax	140.00 - 160.00	0.6000	0.6000
T6	3	1-5/8" Coax	140.00 - 160.00	0.6000	0.6000
T6	5	1-5/8" Coax	140.00 - 160.00	0.6000	0.6000
T6	7	1-5/8" Coax	140.00 - 160.00	0.6000	0.6000
T6	9	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T6	10	Strobe Cable	140.00 - 160.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	13	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T6	14	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T7	1	1-5/8" Coax	120.00 - 140.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	3	1-5/8" Coax	120.00 - 140.00	0.6000	0.6000
T7	5	1-5/8" Coax	120.00 - 140.00	0.6000	0.6000
T7	7	1-5/8" Coax	120.00 - 140.00	0.6000	0.6000
T7	9	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T7	10	Strobe Cable	120.00 - 140.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	13	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	14	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T8	1	1-5/8" Coax	100.00 - 120.00	0.6000	0.6000
T8	3	1-5/8" Coax	100.00 - 120.00	0.6000	0.6000
T8	5	1-5/8" Coax	100.00 - 120.00	0.6000	0.6000
T8	7	1-5/8" Coax	100.00 - 120.00	0.6000	0.6000
T8	9	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T8	10	Strobe Cable	100.00 - 120.00	0.6000	0.6000
T8	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	14	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T9	1	1-5/8" Coax	80.00 - 100.00	0.6000	0.6000
T9	3	1-5/8" Coax	80.00 - 100.00	0.6000	0.6000
T9	5	1-5/8" Coax	80.00 - 100.00	0.6000	0.6000
T9	7	1-5/8" Coax	80.00 - 100.00	0.6000	0.6000
T9	9	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T9	10	Strobe Cable	80.00 - 100.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	14	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T10	1	1-5/8" Coax	60.00 - 80.00	0.6000	0.6000
T10	3	1-5/8" Coax	60.00 - 80.00	0.6000	0.6000
T10	5	1-5/8" Coax	60.00 - 80.00	0.6000	0.6000
T10	7	1-5/8" Coax	60.00 - 80.00	0.6000	0.6000
T10	9	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T10	10	Strobe Cable	60.00 - 80.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	14	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T11	1	1-5/8" Coax	40.00 - 60.00	0.6000	0.6000
T11	3	1-5/8" Coax	40.00 - 60.00	0.6000	0.6000
T11	5	1-5/8" Coax	40.00 - 60.00	0.6000	0.6000
T11	7	1-5/8" Coax	40.00 - 60.00	0.6000	0.6000
T11	9	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	10	Strobe Cable	40.00 - 60.00	0.6000	0.6000
T11	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	13	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	14	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T12	1	1-5/8" Coax	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T12	3	1-5/8" Coax	20.00 - 40.00	0.6000	0.6000
T12	5	1-5/8" Coax	20.00 - 40.00	0.6000	0.6000
T12	7	1-5/8" Coax	20.00 - 40.00	0.6000	0.6000
T12	9	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	10	Strobe Cable	20.00 - 40.00	0.6000	0.6000
T12	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	13	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	14	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T13	1	1-5/8" Coax	10.00 - 20.00	0.6000	0.6000
T13	3	1-5/8" Coax	10.00 - 20.00	0.6000	0.6000
T13	5	1-5/8" Coax	10.00 - 20.00	0.6000	0.6000
T13	7	1-5/8" Coax	10.00 - 20.00	0.6000	0.6000
T13	9	Safety Line 3/8	10.00 - 20.00	0.6000	0.6000
T13	10	Strobe Cable	10.00 - 20.00	0.6000	0.6000
T13	12	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000
T13	13	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000
T13	14	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 1"x10'	C	From Leg	0.000 0.000 5.000	0.000	255.000	No Ice 1/2" Ice 1" Ice	1.000 2.017 3.050	1.000 2.017 3.050	0.040 0.049 0.065
Top Beacon	B	From Leg	0.000 0.000 1.000	0.000	255.000	No Ice 1/2" Ice 1" Ice	2.700 3.100 3.500	2.700 3.100 3.500	0.050 0.070 0.090
**									
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	A	From Leg	4.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	97.222 121.527 145.832	65.138 81.423 97.708	0.700 1.400 2.100
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	B	From Leg	4.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	97.222 121.527 145.832	65.138 81.423 97.708	0.700 1.400 2.100
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 1 (VZW))	C	From Leg	4.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	97.222 121.527 145.832	65.138 81.423 97.708	0.700 1.400 2.100
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	A	From Leg	2.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	B	From Leg	2.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
Heavy Duty Sector Mount w/ Stiff Arms (Carrier 1 (VZW))	C	From Leg	2.000 0.000 0.000	0.000	250.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
**									
Sector1(CaAa=6666.67 Sq.in)No Ice	A	From Leg	4.000 0.000	0.000	238.000	No Ice 1/2" Ice	46.296 57.870	31.018 38.773	0.700 1.400

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Carrier 2 (Future))			0.000			1" Ice	69.444	46.528	2.100
Sector2(CaAa=6666.67	B	From Leg	4.000	0.000	238.000	No Ice	46.296	31.018	0.700
Sq.in)No Ice			0.000			1/2" Ice	57.870	38.773	1.400
(Carrier 2 (Future))			0.000			1" Ice	69.444	46.528	2.100
Sector3(CaAa=6666.67	C	From Leg	4.000	0.000	238.000	No Ice	46.296	31.018	0.700
Sq.in)No Ice			0.000			1/2" Ice	57.870	38.773	1.400
(Carrier 2 (Future))			0.000			1" Ice	69.444	46.528	2.100
Heavy Duty Sector Mount w/	A	From Leg	2.000	0.000	238.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 2 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	B	From Leg	2.000	0.000	238.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 2 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	C	From Leg	2.000	0.000	238.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 2 (Future))			0.000			1" Ice	23.200	23.200	0.735
**									
Sector1(CaAa=6666.67	A	From Leg	4.000	0.000	228.000	No Ice	46.296	31.018	0.700
Sq.in)No Ice			0.000			1/2" Ice	57.870	38.773	1.400
(Carrier 3 (Future))			0.000			1" Ice	69.444	46.528	2.100
Sector2(CaAa=6666.67	B	From Leg	4.000	0.000	228.000	No Ice	46.296	31.018	0.700
Sq.in)No Ice			0.000			1/2" Ice	57.870	38.773	1.400
(Carrier 3 (Future))			0.000			1" Ice	69.444	46.528	2.100
Sector3(CaAa=6666.67	C	From Leg	4.000	0.000	228.000	No Ice	46.296	31.018	0.700
Sq.in)No Ice			0.000			1/2" Ice	57.870	38.773	1.400
(Carrier 3 (Future))			0.000			1" Ice	69.444	46.528	2.100
Heavy Duty Sector Mount w/	A	From Leg	2.000	0.000	228.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 3 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	B	From Leg	2.000	0.000	228.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 3 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	C	From Leg	2.000	0.000	228.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 3 (Future))			0.000			1" Ice	23.200	23.200	0.735
**									
Sector1(CaAa=4500 Sq.in)No	A	From Leg	4.000	0.000	218.000	No Ice	31.250	20.937	0.700
Ice			0.000			1/2" Ice	39.062	26.171	1.400
(Carrier 4 (Future))			0.000			1" Ice	46.874	31.405	2.100
Sector2(CaAa=4500 Sq.in)No	B	From Leg	4.000	0.000	218.000	No Ice	31.250	20.937	0.700
Ice			0.000			1/2" Ice	39.062	26.171	1.400
(Carrier 4 (Future))			0.000			1" Ice	46.874	31.405	2.100
Sector3(CaAa=4500 Sq.in)No	C	From Leg	4.000	0.000	218.000	No Ice	31.250	20.937	0.700
Ice			0.000			1/2" Ice	39.062	26.171	1.400
(Carrier 4 (Future))			0.000			1" Ice	46.874	31.405	2.100
Heavy Duty Sector Mount w/	A	From Leg	2.000	0.000	218.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 4 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	B	From Leg	2.000	0.000	218.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 4 (Future))			0.000			1" Ice	23.200	23.200	0.735
Heavy Duty Sector Mount w/	C	From Leg	2.000	0.000	218.000	No Ice	13.600	13.600	0.465
Stiff Arms			0.000			1/2" Ice	18.400	18.400	0.600
(Carrier 4 (Future))			0.000			1" Ice	23.200	23.200	0.735
**									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	255 - 240	Leg	Max Tension	15	20.713	0.907	-0.001
			Max. Compression	2	-23.547	1.228	-0.000
			Max. Mx	2	-23.547	1.228	-0.000
			Max. My	18	9.175	-0.628	0.731
			Max. Vy	2	-4.484	1.228	-0.000
			Max. Vx	10	2.936	-0.122	-0.209
		Diagonal	Max Tension	8	5.774	0.000	0.000
			Max. Compression	8	-5.847	0.000	0.000
			Max. Mx	37	0.733	0.026	-0.002
			Max. My	20	-5.827	0.005	0.012
			Max. Vy	32	0.032	0.025	0.003
			Max. Vx	20	-0.004	0.000	0.000
		Top Girt	Max Tension	22	0.776	0.000	0.000
			Max. Compression	11	-0.758	0.000	0.000
			Max. Mx	26	-0.003	-0.052	0.000
			Max. My	30	0.099	0.000	0.001
			Max. Vy	26	-0.042	0.000	0.000
			Max. Vx	30	0.001	0.000	0.000
T2	240 - 220	Leg	Max Tension	15	77.360	2.771	-0.000
			Max. Compression	2	-87.161	1.839	-0.007
			Max. Mx	2	-23.567	3.435	-0.002
			Max. My	18	11.876	-1.734	1.890
			Max. Vy	2	-10.540	1.839	-0.007
			Max. Vx	6	4.095	0.839	-0.734
		Diagonal	Max Tension	4	10.872	0.000	0.000
			Max. Compression	4	-9.974	0.000	0.000
			Max. Mx	2	2.355	0.070	0.002
			Max. My	8	-8.027	0.000	-0.053
			Max. Vy	37	-0.051	0.056	-0.002
			Max. Vx	8	0.014	0.000	0.000
T3	220 - 200	Leg	Max Tension	15	143.940	3.690	-0.028
			Max. Compression	2	-159.869	1.948	-0.027
			Max. Mx	2	-87.188	7.043	-0.021
			Max. My	6	-49.453	3.237	-2.769
			Max. Vy	2	-13.223	1.948	-0.027
			Max. Vx	14	-4.675	0.895	0.673
		Diagonal	Max Tension	24	11.705	0.000	0.000
			Max. Compression	4	-12.335	0.000	0.000
			Max. Mx	30	2.053	0.067	0.003
			Max. My	8	-12.265	-0.013	-0.053
			Max. Vy	34	0.060	0.062	-0.007
			Max. Vx	8	0.012	0.000	0.000
T4	200 - 180	Leg	Max Tension	15	202.211	4.590	-0.072
			Max. Compression	2	-222.657	1.101	-0.025
			Max. Mx	2	-159.895	8.502	-0.102
			Max. My	14	-87.054	3.915	3.003
			Max. Vy	2	-13.743	1.101	-0.025
			Max. Vx	14	-4.666	0.509	0.478
		Diagonal	Max Tension	24	11.440	0.000	0.000
			Max. Compression	24	-12.276	0.000	0.000
			Max. Mx	30	1.957	0.080	0.006
			Max. My	20	-12.082	-0.009	0.034
			Max. Vy	34	0.068	0.079	-0.009
			Max. Vx	20	-0.007	0.000	0.000
T5	180 - 160	Leg	Max Tension	15	254.201	4.979	-0.111
			Max. Compression	2	-279.794	1.067	-0.024
			Max. Mx	2	-222.679	7.947	-0.157
			Max. My	14	-118.080	3.650	2.807
			Max. Vy	2	-14.716	1.067	-0.024
			Max. Vx	4	4.922	-0.005	-0.489

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	24	11.470	0.000	0.000
			Max. Compression	24	-11.820	0.000	0.000
			Max. Mx	30	1.989	0.114	0.009
			Max. My	20	-11.473	-0.014	0.027
			Max. Vy	34	0.088	0.112	-0.012
			Max. Vx	20	-0.005	0.000	0.000
T6	160 - 140	Leg	Max Tension	15	302.586	5.866	-0.152
			Max. Compression	2	-333.923	0.385	-0.018
			Max. Mx	2	-279.818	8.403	-0.206
			Max. My	4	-11.810	-0.010	-2.955
			Max. Vy	2	-15.859	0.385	-0.018
			Max. Vx	4	5.442	-0.004	-0.437
		Diagonal	Max Tension	24	11.903	0.000	0.000
			Max. Compression	24	-11.931	0.000	0.000
			Max. Mx	34	0.452	0.137	-0.014
			Max. My	20	-11.459	-0.004	0.021
			Max. Vy	34	0.097	0.137	-0.014
			Max. Vx	31	-0.004	0.000	0.000
T7	140 - 120	Leg	Max Tension	15	348.206	5.672	-0.156
			Max. Compression	2	-385.927	0.890	-0.056
			Max. Mx	2	-333.946	8.307	-0.245
			Max. My	4	-13.842	-0.005	-3.163
			Max. Vy	2	-16.731	0.890	-0.056
			Max. Vx	4	6.403	-0.023	-1.128
		Diagonal	Max Tension	24	12.310	0.000	0.000
			Max. Compression	24	-12.362	0.000	0.000
			Max. Mx	31	1.251	0.176	-0.015
			Max. My	24	-11.755	0.012	-0.025
			Max. Vy	34	0.112	0.170	-0.017
			Max. Vx	33	0.004	0.000	0.000
T8	120 - 100	Leg	Max Tension	15	391.719	6.710	-0.196
			Max. Compression	2	-436.273	0.195	-0.043
			Max. Mx	2	-385.952	9.242	-0.324
			Max. My	4	-16.092	0.000	-4.333
			Max. Vy	2	-17.423	0.195	-0.043
			Max. Vx	4	6.578	-0.025	-0.954
		Diagonal	Max Tension	24	14.006	0.000	0.000
			Max. Compression	2	-14.539	0.000	0.000
			Max. Mx	32	1.717	0.278	0.000
			Max. My	31	-0.321	0.000	-0.007
			Max. Vy	32	-0.117	0.000	0.000
			Max. Vx	31	-0.003	0.000	0.000
		Horizontal	Max Tension	2	1.860	-0.043	-0.000
			Max. Compression	24	-2.067	0.000	0.000
			Max. Mx	33	0.237	-0.177	0.003
			Max. My	14	0.760	-0.031	0.006
			Max. Vy	33	0.110	-0.177	0.003
			Max. Vx	31	-0.003	-0.177	0.004
		Inner Bracing	Max Tension	17	0.001	0.000	0.000
			Max. Compression	33	-0.013	0.000	0.000
			Max. Mx	26	-0.011	-0.126	0.000
			Max. My	2	-0.006	0.000	-0.000
			Max. Vy	26	0.063	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T9	100 - 80	Leg	Max Tension	15	432.889	7.244	-0.223
			Max. Compression	2	-484.621	0.046	-0.042
			Max. Mx	2	-484.594	-9.132	0.290
			Max. My	4	-18.483	-0.037	-4.248
			Max. Vy	2	-18.343	0.046	-0.042
			Max. Vx	4	6.801	-0.033	-1.098
		Diagonal	Max Tension	25	14.149	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-14.493	0.000	0.000
			Max. Mx	32	1.648	0.318	0.000
			Max. My	31	-0.332	0.000	-0.008
			Max. Vy	32	-0.125	0.000	0.000
			Max. Vx	31	0.003	0.000	0.000
		Horizontal	Max Tension	2	2.041	-0.057	0.000
			Max. Compression	15	-2.072	-0.043	0.002
			Max. Mx	27	0.055	-0.225	0.005
			Max. My	14	0.729	-0.046	0.007
			Max. Vy	27	-0.130	-0.225	0.005
			Max. Vx	31	-0.003	-0.225	0.005
		Inner Bracing	Max Tension	15	0.000	0.000	0.000
			Max. Compression	33	-0.013	0.000	0.000
			Max. Mx	26	-0.012	-0.147	0.000
			Max. My	2	-0.004	0.000	-0.000
			Max. Vy	26	0.067	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T10	80 - 60	Leg	Max Tension	15	472.308	8.207	-0.259
			Max. Compression	2	-531.572	-0.734	-0.030
			Max. Mx	2	-531.541	-10.410	0.331
			Max. My	4	-21.065	-0.041	-4.503
			Max. Vy	2	-19.338	-0.734	-0.030
			Max. Vx	4	7.078	-0.038	-1.049
		Diagonal	Max Tension	25	14.498	0.000	0.000
			Max. Compression	2	-14.694	0.000	0.000
			Max. Mx	32	1.676	0.358	0.000
			Max. My	31	-0.289	0.000	-0.009
			Max. Vy	32	-0.132	0.000	0.000
			Max. Vx	31	0.003	0.000	0.000
		Horizontal	Max Tension	2	2.337	-0.066	0.000
			Max. Compression	15	-2.233	-0.051	0.003
			Max. Mx	27	0.052	-0.258	0.005
			Max. My	14	0.709	-0.058	0.007
			Max. Vy	27	-0.137	-0.258	0.005
			Max. Vx	27	-0.003	-0.258	0.006
		Inner Bracing	Max Tension	15	0.000	0.000	0.000
			Max. Compression	33	-0.014	0.000	0.000
			Max. Mx	26	-0.012	-0.168	0.000
			Max. My	2	-0.003	0.000	-0.000
			Max. Vy	26	-0.070	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T11	60 - 40	Leg	Max Tension	15	510.088	8.063	-0.269
			Max. Compression	2	-577.386	-0.027	-0.043
			Max. Mx	2	-577.356	-10.289	0.343
			Max. My	4	-23.819	-0.014	-4.593
			Max. Vy	2	-20.508	-0.027	-0.043
			Max. Vx	4	7.347	-0.037	-1.158
		Diagonal	Max Tension	25	14.836	0.000	0.000
			Max. Compression	3	-15.054	0.000	0.000
			Max. Mx	32	1.766	0.459	0.000
			Max. My	31	-0.163	0.000	-0.011
			Max. Vy	32	-0.160	0.000	0.000
			Max. Vx	31	0.004	0.000	0.000
		Horizontal	Max Tension	2	2.306	-0.098	0.001
			Max. Compression	15	-2.265	-0.074	0.003
			Max. Mx	27	-0.050	-0.335	0.006
			Max. My	14	0.795	-0.084	0.009
			Max. Vy	27	-0.168	-0.334	0.007
			Max. Vx	27	-0.004	-0.334	0.007
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	33	-0.016	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	26	-0.015	-0.188	0.000
			Max. My	2	-0.005	0.000	-0.000
			Max. Vy	26	0.073	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T12	40 - 20	Leg	Max Tension	15	546.690	9.119	-0.314
			Max. Compression	2	-622.498	-0.897	-0.008
			Max. Mx	2	-622.464	-11.733	0.399
			Max. My	4	-26.831	0.013	-4.836
			Max. Vy	2	-21.654	-0.897	-0.008
			Max. Vx	4	7.460	-0.032	-0.664
		Diagonal	Max Tension	25	15.316	0.000	0.000
			Max. Compression	24	-15.533	0.000	0.000
			Max. Mx	32	2.061	0.499	0.000
			Max. My	27	0.153	0.000	-0.012
			Max. Vy	32	-0.164	0.000	0.000
			Max. Vx	27	-0.004	0.000	0.000
		Horizontal	Max Tension	2	2.643	-0.113	0.001
			Max. Compression	15	-2.434	-0.084	0.004
			Max. Mx	27	-0.084	-0.375	0.007
			Max. My	14	0.772	-0.098	0.009
			Max. Vy	27	-0.172	-0.361	0.007
			Max. Vx	37	0.004	-0.375	0.009
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	33	-0.016	0.000	0.000
			Max. Mx	26	-0.015	-0.203	0.000
			Max. My	2	-0.006	0.000	-0.000
			Max. Vy	26	0.074	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T13	20 - 0	Leg	Max Tension	15	581.617	8.754	-0.316
			Max. Compression	2	-665.727	0.000	0.000
			Max. Mx	2	-665.692	-11.349	0.406
			Max. My	4	-30.031	0.039	-4.399
			Max. Vy	2	-22.678	0.000	0.000
			Max. Vx	4	7.466	0.039	-4.399
		Diagonal	Max Tension	25	15.274	0.000	0.000
			Max. Compression	2	-15.805	0.000	0.000
			Max. Mx	27	2.605	0.513	0.000
			Max. My	27	0.909	0.000	-0.012
			Max. Vy	27	-0.159	0.000	0.000
			Max. Vx	27	0.004	0.000	0.000
		Horizontal	Max Tension	2	2.572	-0.132	0.001
			Max. Compression	15	-2.365	-0.092	0.004
			Max. Mx	27	-0.118	-0.400	0.008
			Max. My	37	0.135	-0.398	0.010
			Max. Vy	33	-0.166	-0.365	0.007
			Max. Vx	37	0.004	-0.398	0.010
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	37	-0.015	0.000	0.000
			Max. Mx	35	-0.014	-0.205	0.000
			Max. My	31	-0.014	0.000	-0.000
			Max. Vy	35	0.069	0.000	0.000
			Max. Vx	31	-0.000	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	639.403	40.557	-22.870
	Max. H_x	18	639.403	40.557	-22.870
	Max. H_z	5	-498.501	-32.056	21.162
	Min. Vert	7	-554.395	-36.793	20.644
	Min. H_x	7	-554.395	-36.793	20.644
	Min. H_z	18	639.403	40.557	-22.870
Leg B	Max. Vert	10	637.848	-40.317	-23.046
	Max. H_x	23	-551.365	36.516	20.828
	Max. H_z	25	-495.767	31.462	21.998
	Min. Vert	23	-551.365	36.516	20.828
	Min. H_x	10	637.848	-40.317	-23.046
	Min. H_z	10	637.848	-40.317	-23.046
Leg A	Max. Vert	2	664.327	0.659	48.752
	Max. H_x	21	23.668	5.456	1.099
	Max. H_z	2	664.327	0.659	48.752
	Min. Vert	15	-580.145	-0.743	-44.556
	Min. H_x	9	23.669	-5.446	1.099
	Min. H_z	15	-580.145	-0.743	-44.556

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	80.388	0.000	0.000	10.558	-8.404	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	96.466	-0.000	-81.624	-13139.441	-10.304	29.245
0.9 Dead+1.6 Wind 0 deg - No Ice	72.350	-0.000	-81.625	-13114.389	-7.748	29.221
1.2 Dead+1.6 Wind 30 deg - No Ice	96.466	38.379	-66.474	-10870.875	-6294.446	37.616
0.9 Dead+1.6 Wind 30 deg - No Ice	72.350	38.380	-66.475	-10850.507	-6278.282	37.579
1.2 Dead+1.6 Wind 60 deg - No Ice	96.466	62.992	-36.368	-6011.430	-10444.610	20.661
0.9 Dead+1.6 Wind 60 deg - No Ice	72.350	62.993	-36.369	-6001.506	-10419.300	20.622
1.2 Dead+1.6 Wind 90 deg - No Ice	96.466	72.500	-0.000	12.522	-11998.323	8.192
0.9 Dead+1.6 Wind 90 deg - No Ice	72.350	72.501	-0.000	9.306	-11969.618	8.159
1.2 Dead+1.6 Wind 120 deg - No Ice	96.466	67.005	38.685	6299.771	-10899.440	8.785
0.9 Dead+1.6 Wind 120 deg - No Ice	72.350	67.006	38.686	6282.965	-10873.341	8.768
1.2 Dead+1.6 Wind 150 deg - No Ice	96.466	38.270	66.286	10853.181	-6268.469	-3.001
0.9 Dead+1.6 Wind 150 deg - No Ice	72.350	38.271	66.287	10826.498	-6252.363	-2.997
1.2 Dead+1.6 Wind 180 deg - No Ice	96.466	-0.000	76.775	12589.782	-10.279	-29.242
0.9 Dead+1.6 Wind 180 deg - No Ice	72.350	-0.000	76.776	12559.342	-7.728	-29.219
1.2 Dead+1.6 Wind 210 deg - No Ice	96.466	-38.379	66.474	10896.949	6273.215	-37.616
0.9 Dead+1.6 Wind 210 deg - No Ice	72.350	-38.379	66.475	10870.158	6262.151	-37.578

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 240 deg - No Ice	96.466	-67.191	38.793	6324.784	10922.327	-20.667
0.9 Dead+1.6 Wind 240 deg - No Ice	72.350	-67.192	38.793	6307.914	10901.228	-20.626
1.2 Dead+1.6 Wind 270 deg - No Ice	96.466	-72.500	-0.000	12.533	11978.006	-8.192
0.9 Dead+1.6 Wind 270 deg - No Ice	72.350	-72.501	-0.000	9.313	11954.409	-8.160
1.2 Dead+1.6 Wind 300 deg - No Ice	96.466	-62.806	-36.261	-5986.512	10381.034	-8.785
0.9 Dead+1.6 Wind 300 deg - No Ice	72.350	-62.806	-36.261	-5976.652	10360.940	-8.768
1.2 Dead+1.6 Wind 330 deg - No Ice	96.466	-38.270	-66.286	-10827.297	6248.737	3.001
0.9 Dead+1.6 Wind 330 deg - No Ice	72.350	-38.271	-66.287	-10807.037	6237.747	2.998
1.2 Dead+1.0 Ice+1.0 Temp	297.847	-0.001	-0.001	63.005	-46.819	-0.001
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	297.847	-0.000	-11.074	-1878.283	-47.171	1.813
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	297.847	5.389	-9.335	-1587.372	-1000.339	1.320
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	297.847	9.106	-5.258	-872.405	-1668.351	1.590
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	297.847	10.479	-0.000	63.587	-1912.261	2.123
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	297.847	9.331	5.387	1013.880	-1693.132	0.974
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	297.847	5.382	9.322	1711.506	-998.595	-1.127
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	297.847	-0.000	10.800	1973.335	-47.167	-1.812
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	297.847	-5.389	9.334	1714.532	906.010	-1.321
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	297.847	-9.344	5.395	1015.632	1601.826	-1.591
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	297.847	-10.479	-0.000	63.595	1817.928	-2.125
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	297.847	-9.094	-5.250	-870.653	1570.985	-0.973
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	297.847	-5.382	-9.322	-1584.348	904.250	1.129
Dead+Wind 0 deg - Service	80.388	-0.000	-23.213	-3722.210	-8.470	8.303
Dead+Wind 30 deg - Service	80.388	10.916	-18.906	-3078.442	-1791.942	10.693
Dead+Wind 60 deg - Service	80.388	17.917	-10.344	-1699.196	-2969.981	5.863
Dead+Wind 90 deg - Service	80.388	20.622	-0.000	10.642	-3410.985	2.308
Dead+Wind 120 deg - Service	80.388	19.057	11.003	1795.005	-3099.075	2.492
Dead+Wind 150 deg - Service	80.388	10.885	18.853	3087.317	-1784.788	-0.838
Dead+Wind 180 deg - Service	80.388	-0.000	21.836	3580.241	-8.466	-8.303
Dead+Wind 210 deg - Service	80.388	-10.916	18.906	3099.713	1775.019	-10.693
Dead+Wind 240 deg - Service	80.388	-19.110	11.033	1802.090	3094.424	-5.862
Dead+Wind 270 deg - Service	80.388	-20.622	-0.000	10.644	3394.072	-2.308
Dead+Wind 300 deg - Service	80.388	-17.864	-10.314	-1692.118	2940.804	-2.493
Dead+Wind 330 deg - Service	80.388	-10.885	-18.853	-3066.062	1767.862	0.838

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-80.388	0.000	-0.000	80.388	-0.000	0.000%
2	0.000	-96.466	-81.628	0.000	96.466	81.624	0.004%
3	0.000	-72.350	-81.628	0.000	72.350	81.625	0.003%
4	38.381	-96.466	-66.478	-38.379	96.466	66.474	0.004%
5	38.381	-72.350	-66.478	-38.380	72.350	66.475	0.003%
6	62.995	-96.466	-36.370	-62.992	96.466	36.368	0.003%
7	62.995	-72.350	-36.370	-62.993	72.350	36.369	0.003%
8	72.504	-96.466	0.000	-72.500	96.466	0.000	0.003%
9	72.504	-72.350	0.000	-72.501	72.350	0.000	0.003%
10	67.009	-96.466	38.688	-67.005	96.466	-38.685	0.004%
11	67.009	-72.350	38.688	-67.006	72.350	-38.686	0.003%
12	38.272	-96.466	66.290	-38.270	96.466	-66.286	0.004%
13	38.272	-72.350	66.290	-38.271	72.350	-66.287	0.003%
14	0.000	-96.466	76.779	0.000	96.466	-76.775	0.003%
15	0.000	-72.350	76.779	0.000	72.350	-76.776	0.003%
16	-38.381	-96.466	66.478	38.379	96.466	-66.474	0.004%
17	-38.381	-72.350	66.478	38.379	72.350	-66.475	0.003%
18	-67.195	-96.466	38.795	67.191	96.466	-38.793	0.004%
19	-67.195	-72.350	38.795	67.192	72.350	-38.793	0.003%
20	-72.504	-96.466	0.000	72.500	96.466	0.000	0.003%
21	-72.504	-72.350	0.000	72.501	72.350	0.000	0.003%
22	-62.809	-96.466	-36.263	62.806	96.466	36.261	0.003%
23	-62.809	-72.350	-36.263	62.806	72.350	36.261	0.003%
24	-38.272	-96.466	-66.290	38.270	96.466	66.286	0.004%
25	-38.272	-72.350	-66.290	38.271	72.350	66.287	0.003%
26	0.000	-297.847	0.000	0.001	297.847	0.001	0.000%
27	0.000	-297.847	-11.076	0.000	297.847	11.074	0.000%
28	5.390	-297.847	-9.335	-5.389	297.847	9.335	0.000%
29	9.107	-297.847	-5.258	-9.106	297.847	5.258	0.000%
30	10.480	-297.847	0.000	-10.479	297.847	0.000	0.000%
31	9.332	-297.847	5.388	-9.331	297.847	-5.387	0.000%
32	5.383	-297.847	9.323	-5.382	297.847	-9.322	0.000%
33	0.000	-297.847	10.801	0.000	297.847	-10.800	0.000%
34	-5.390	-297.847	9.335	5.389	297.847	-9.334	0.000%
35	-9.345	-297.847	5.395	9.344	297.847	-5.395	0.000%
36	-10.480	-297.847	0.000	10.479	297.847	0.000	0.000%
37	-9.095	-297.847	-5.251	9.094	297.847	5.250	0.000%
38	-5.383	-297.847	-9.323	5.382	297.847	9.322	0.000%
39	0.000	-80.388	-23.215	0.000	80.388	23.213	0.001%
40	10.916	-80.388	-18.907	-10.916	80.388	18.906	0.001%
41	17.918	-80.388	-10.345	-17.917	80.388	10.344	0.001%
42	20.623	-80.388	0.000	-20.622	80.388	0.000	0.001%
43	19.058	-80.388	11.003	-19.057	80.388	-11.003	0.001%
44	10.885	-80.388	18.854	-10.885	80.388	-18.853	0.001%
45	0.000	-80.388	21.837	0.000	80.388	-21.836	0.001%
46	-10.916	-80.388	18.907	10.916	80.388	-18.906	0.001%
47	-19.111	-80.388	11.034	19.110	80.388	-11.033	0.001%
48	-20.623	-80.388	0.000	20.622	80.388	0.000	0.001%
49	-17.865	-80.388	-10.314	17.864	80.388	10.314	0.001%
50	-10.885	-80.388	-18.854	10.885	80.388	18.853	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001

2	Yes	12	0.00004755	0.00011748
3	Yes	12	0.00003546	0.00008811
4	Yes	12	0.00004568	0.00011323
5	Yes	12	0.00003367	0.00008394
6	Yes	12	0.00004391	0.00010917
7	Yes	12	0.00003197	0.00007994
8	Yes	12	0.00004575	0.00011350
9	Yes	12	0.00003372	0.00008414
10	Yes	12	0.00004751	0.00011748
11	Yes	12	0.00003540	0.00008806
12	Yes	12	0.00004568	0.00011320
13	Yes	12	0.00003367	0.00008393
14	Yes	12	0.00004379	0.00010876
15	Yes	12	0.00003187	0.00007961
16	Yes	12	0.00004568	0.00011323
17	Yes	12	0.00003367	0.00008394
18	Yes	12	0.00004754	0.00011758
19	Yes	12	0.00003543	0.00008814
20	Yes	12	0.00004575	0.00011352
21	Yes	12	0.00003372	0.00008415
22	Yes	12	0.00004391	0.00010916
23	Yes	12	0.00003196	0.00007993
24	Yes	12	0.00004568	0.00011322
25	Yes	12	0.00003367	0.00008394
26	Yes	9	0.00000001	0.00009640
27	Yes	13	0.00000001	0.00011876
28	Yes	13	0.00000001	0.00011872
29	Yes	13	0.00000001	0.00011907
30	Yes	13	0.00000001	0.00012059
31	Yes	13	0.00000001	0.00012279
32	Yes	13	0.00000001	0.00012300
33	Yes	13	0.00000001	0.00012258
34	Yes	13	0.00000001	0.00012161
35	Yes	13	0.00000001	0.00012022
36	Yes	13	0.00000001	0.00011724
37	Yes	13	0.00000001	0.00011588
38	Yes	13	0.00000001	0.00011680
39	Yes	12	0.00000001	0.00009228
40	Yes	12	0.00000001	0.00009123
41	Yes	12	0.00000001	0.00009022
42	Yes	12	0.00000001	0.00009135
43	Yes	12	0.00000001	0.00009232
44	Yes	12	0.00000001	0.00009119
45	Yes	12	0.00000001	0.00009004
46	Yes	12	0.00000001	0.00009125
47	Yes	12	0.00000001	0.00009239
48	Yes	12	0.00000001	0.00009137
49	Yes	12	0.00000001	0.00009019
50	Yes	12	0.00000001	0.00009120

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
T1	255 - 240	12.225	39	0.426	0.094
T2	240 - 220	10.854	39	0.421	0.080
T3	220 - 200	9.058	39	0.390	0.057
T4	200 - 180	7.405	39	0.348	0.038
T5	180 - 160	5.935	39	0.308	0.025

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	160 - 140	4.647	39	0.267	0.019
T7	140 - 120	3.519	39	0.229	0.016
T8	120 - 100	2.564	39	0.189	0.013
T9	100 - 80	1.796	39	0.151	0.012
T10	80 - 60	1.179	39	0.117	0.010
T11	60 - 40	0.694	39	0.087	0.007
T12	40 - 20	0.344	39	0.056	0.005
T13	20 - 0	0.114	39	0.028	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
255.000	Lightning Rod 1"x10'	39	12.225	0.426	0.094	Inf
250.000	Sector1(CaAa=14000 Sq.in)No Ice	39	11.768	0.426	0.090	Inf
238.000	Sector1(CaAa=6666.67 Sq.in)No Ice	39	10.672	0.419	0.078	171204
228.000	Sector1(CaAa=6666.67 Sq.in)No Ice	39	9.766	0.405	0.066	46087
218.000	Sector1(CaAa=4500 Sq.in)No Ice	39	8.885	0.386	0.055	28811

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	255 - 240	43.222	2	1.509	0.334
T2	240 - 220	38.371	2	1.489	0.283
T3	220 - 200	32.018	2	1.378	0.202
T4	200 - 180	26.170	2	1.230	0.135
T5	180 - 160	20.971	2	1.088	0.088
T6	160 - 140	16.420	2	0.944	0.068
T7	140 - 120	12.430	2	0.810	0.056
T8	120 - 100	9.056	2	0.666	0.047
T9	100 - 80	6.343	2	0.534	0.041
T10	80 - 60	4.161	2	0.415	0.034
T11	60 - 40	2.449	2	0.307	0.025
T12	40 - 20	1.213	2	0.197	0.017
T13	20 - 0	0.403	2	0.099	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
255.000	Lightning Rod 1"x10'	2	43.222	1.509	0.334	409223
250.000	Sector1(CaAa=14000 Sq.in)No Ice	2	41.604	1.506	0.318	409223
238.000	Sector1(CaAa=6666.67 Sq.in)No Ice	2	37.725	1.482	0.276	51016
228.000	Sector1(CaAa=6666.67 Sq.in)No Ice	2	34.520	1.432	0.235	13199

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
218.000	Sector1(CaAa=4500 Sq.in)No Ice	2	31.405	1.364	0.195	8148

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	255	Diagonal	A325X	0.625	1	5.774	9.598	0.602 ✔	1	Member Block Shear
		Top Girt	A325X	0.625	1	0.776	9.598	0.081 ✔	1	Member Block Shear
T2	240	Leg	A325N	0.750	6	3.450	29.821	0.116 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	10.872	13.025	0.835 ✔	1	Member Block Shear
T3	220	Leg	A325N	0.750	6	12.891	29.821	0.432 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	11.704	13.025	0.899 ✔	1	Member Block Shear
T4	200	Leg	A325N	1.000	6	23.988	53.014	0.452 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	11.440	13.025	0.878 ✔	1	Member Block Shear
T5	180	Leg	A325N	1.000	6	33.700	53.014	0.636 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	11.470	14.168	0.810 ✔	1	Member Block Shear
T6	160	Leg	A325N	1.250	6	42.364	82.835	0.511 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	11.902	14.168	0.840 ✔	1	Member Block Shear
T7	140	Leg	A325N	1.250	6	50.428	82.835	0.609 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	12.362	15.186	0.814 ✔	1	Bolt Shear
T8	120	Leg	A325N	1.250	6	58.032	82.835	0.701 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	14.006	26.051	0.538 ✔	1	Member Block Shear
		Horizontal	A325X	0.625	1	7.562	19.195	0.394 ✔	1	Member Block Shear
T9	100	Leg	A325N	1.250	6	65.284	82.835	0.788 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	14.149	26.051	0.543 ✔	1	Member Block Shear
		Horizontal	A325X	0.625	1	8.400	21.480	0.391 ✔	1	Member Block Shear
T10	80	Leg	A325N	1.500	6	72.145	119.282	0.605 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	14.498	26.051	0.557 ✔	1	Member Block Shear
		Horizontal	A325X	0.625	1	9.214	21.480	0.429 ✔	1	Member Block Shear
T11	60	Leg	A325N	1.500	6	78.715	119.282	0.660 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	14.835	28.336	0.524 ✔	1	Member Block Shear
		Horizontal	A325X	0.625	1	10.008	26.051	0.384 ✔	1	Member Block Shear
T12	40	Leg	A325N	1.500	6	85.011	119.282	0.713 ✔	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325X	0.625	1	15.316	28.336	0.541 ✔	1	Member Block Shear
		Horizontal	A325X	0.625	1	10.790	26.051	0.414 ✔	1	Member Block Shear
T13	20	Leg	A325N	1.500	6	91.111	119.282	0.764 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	15.805	29.250	0.540 ✔	1	Member Bearing
		Horizontal	A325X	0.625	1	11.539	26.051	0.443 ✔	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	1 3/4	15.014	4.671	128.1 K=1.00	2.405	-19.276	33.103	0.582 [1] ✔
T2	240 - 220	2 1/4	20.019	4.754	101.4 K=1.00	3.976	-79.201	84.331	0.939 [1] ✔
T3	220 - 200	2 3/4	20.019	4.754	83.0 K=1.00	5.940	-151.526	161.540	0.938 [1] ✔
T4	200 - 180	3 1/4	20.019	4.754	70.2 K=1.00	8.296	-214.839	260.312	0.825 [1] ✔
T5	180 - 160	3 1/2	20.019	4.754	65.2 K=1.00	9.621	-272.330	317.273	0.858 [1] ✔
T6	160 - 140	3 3/4	20.019	4.754	60.9 K=1.00	11.045	-326.634	379.106	0.862 [1] ✔
T7	140 - 120	3 3/4	20.019	4.754	60.9 K=1.00	11.045	-379.047	379.106	1.000 [1] ✔
T8	120 - 100	4	20.019	4.754	57.1 K=1.00	12.566	-423.415	445.717	0.950 [1] ✔
T9	100 - 80	4 1/4	20.019	4.754	53.7 K=1.00	14.186	-471.934	517.034	0.913 [1] ✔
T10	80 - 60	4 1/2	20.019	4.754	50.7 K=1.00	15.904	-518.972	593.004	0.875 [1] ✔
T11	60 - 40	4 1/2	20.019	4.754	50.7 K=1.00	15.904	-565.016	593.004	0.953 [1] ✔
T12	40 - 20	4 3/4	20.019	4.754	48.0 K=1.00	17.721	-610.052	673.582	0.906 [1] ✔
T13	20 - 0	4 3/4	20.019	4.754	48.0 K=1.00	17.721	-653.576	673.582	0.970 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	L1 3/4x1 3/4x3/16	7.166	3.605	125.9 K=1.00	0.621	-5.847	8.845	0.661 [1] ✔
T2	240 - 220	L2 1/2x2 1/2x3/16	8.697	4.343	105.3 K=1.00	0.902	-9.974	18.045	0.553 [1] ✔
T3	220 - 200	L2 1/2x2 1/2x3/16	9.987	4.964	120.3 K=1.00	0.902	-10.939	14.069	0.778 [1] ✔
T4	200 - 180	L2 1/2x2 1/2x3/16	11.329	5.613	136.1 K=1.00	0.902	-10.880	11.004	0.989 [1] ✔
T5	180 - 160	L3x3x3/16	12.706	6.292	126.7 K=1.00	1.090	-11.060	15.344	0.721 [1] ✔
T6	160 - 140	L3x3x3/16	14.108	6.983	140.6 K=1.00	1.090	-11.576	12.457	0.929 [1] ✔
T7	140 - 120	L3x3x1/4	15.529	7.694	156.0 K=1.00	1.440	-11.961	13.375	0.894 [1] ✔
T8	120 - 100	2L2 1/2x2 1/2x3/16x3/8	9.504	9.312	143.4 K=1.00	1.800	-13.767	19.778	0.696 [1] ✔
T9	100 - 80	2L 'a' > 53.320 in - 195 2L2 1/2x2 1/2x3/16x3/8	10.161	9.960	153.4 K=1.00	1.800	-14.121	17.286	0.817 [1] ✔
T10	80 - 60	2L 'a' > 57.034 in - 234 2L2 1/2x2 1/2x3/16x3/8	10.829	10.620	163.5 K=1.00	1.800	-14.606	15.204	0.961 [1] ✔
T11	60 - 40	2L 'a' > 60.815 in - 273 2L3x3x3/16x3/8	11.508	11.302	144.4 K=1.00	2.180	-14.914	23.622	0.631 [1] ✔
T12	40 - 20	2L 'a' > 64.562 in - 312 2L3x3x3/16x3/8	12.195	11.980	153.1 K=1.00	2.180	-15.533	21.024	0.739 [1] ✔
T13	20 - 0	2L 'a' > 68.435 in - 351 2L3x3x3/16x3/8 2L 'a' > 72.411 in - 390	12.889	12.676	161.9 K=1.00	2.180	-15.805	18.779	0.842 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	120 - 100	2L1 3/4x1 3/4x3/16x3/8	16.106	7.886	176.3 K=1.00	1.242	-7.562	9.034	0.837 [1] ✔
T9	100 - 80	2L 'a' > 45.400 in - 193 2L2x2x3/16x3/8	17.606	8.626	167.7 K=1.00	1.430	-8.400	11.487	0.731 [1] ✔
T10	80 - 60	2L 'a' > 49.575 in - 232 2L2x2x3/16x3/8	19.106	9.366	182.1	1.430	-9.214	9.745	0.946 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔
T11	60 - 40	2L 'a' > 53.826 in - 271 2L2 1/2x2 1/2x3/16x3/8	20.606	10.116	155.8 K=1.00	1.800	-10.008	16.759	0.597 [1] ✔
T12	40 - 20	2L 'a' > 57.924 in - 310 2L2 1/2x2 1/2x3/16x3/8	22.106	10.855	167.2 K=1.00	1.800	-10.790	14.553	0.741 [1] ✔
T13	20 - 0	2L 'a' > 62.159 in - 349 2L2 1/2x2 1/2x3/16x3/8 2L 'a' > 66.454 in - 388	23.606	11.605	178.7 K=1.00	1.800	-11.539	12.733	0.906 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	L1 3/4x1 3/4x3/16	4.913	4.767	166.5 K=1.00	0.621	-0.758	5.059	0.150 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	120 - 100	L1 3/4x1 3/4x3/16	8.053	8.053	281.4 K=1.00	0.621	-0.013	1.772	0.007 [1] ✔
T9	100 - 80	KL/R > 250 (C) - 200 L1 3/4x1 3/4x3/16	8.803	8.803	307.6 K=1.00	0.621	-0.013	1.483	0.009 [1] ✔
T10	80 - 60	KL/R > 250 (C) - 239 L1 3/4x1 3/4x3/16	9.553	9.553	333.8 K=1.00	0.621	-0.014	1.259	0.011 [1] ✔
T11	60 - 40	KL/R > 250 (C) - 278 L1 3/4x1 3/4x3/16	10.303	10.303	360.0 K=1.00	0.621	-0.016	1.083	0.014 [1] ✔
T12	40 - 20	KL/R > 250 (C) - 317 L1 3/4x1 3/4x3/16	11.053	11.053	386.2 K=1.00	0.621	-0.016	0.941	0.017 [1] ✔
T13	20 - 0	KL/R > 250 (C) - 356 L1 3/4x1 3/4x3/16 KL/R > 250 (C) - 394	11.803	11.803	412.4 K=1.00	0.621	-0.015	0.825	0.018 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	1 3/4	15.014	0.500	13.7	2.405	20.713	108.238	0.191 [1] ✔
T2	240 - 220	2 1/4	20.019	0.500	10.7	3.976	77.360	178.924	0.432 [1] ✔
T3	220 - 200	2 3/4	20.019	0.500	8.7	5.940	143.940	267.281	0.539 [1] ✔
T4	200 - 180	3 1/4	20.019	0.500	7.4	8.296	202.211	373.310	0.542 [1] ✔
T5	180 - 160	3 1/2	20.019	0.500	6.9	9.621	254.201	432.951	0.587 [1] ✔
T6	160 - 140	3 3/4	20.019	0.500	6.4	11.045	302.586	497.010	0.609 [1] ✔
T7	140 - 120	3 3/4	20.019	0.500	6.4	11.045	348.206	497.010	0.701 [1] ✔
T8	120 - 100	4	20.019	0.500	6.0	12.566	391.719	565.487	0.693 [1] ✔
T9	100 - 80	4 1/4	20.019	0.500	5.7	14.186	432.889	638.381	0.678 [1] ✔
T10	80 - 60	4 1/2	20.019	0.500	5.3	15.904	472.308	715.694	0.660 [1] ✔
T11	60 - 40	4 1/2	20.019	0.500	5.3	15.904	510.088	715.694	0.713 [1] ✔
T12	40 - 20	4 3/4	20.019	0.500	5.1	17.721	546.690	797.425	0.686 [1] ✔
T13	20 - 0	4 3/4	20.019	0.500	5.1	17.721	581.617	797.425	0.729 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	L1 3/4x1 3/4x3/16	7.435	3.736	83.5	0.360	5.774	17.567	0.329 [1] ✔
T2	240 - 220	L2 1/2x2 1/2x3/16	8.697	4.343	67.0	0.571	10.872	27.838	0.391 [1] ✔
T3	220 - 200	L2 1/2x2 1/2x3/16	9.987	4.964	76.6	0.571	11.704	27.838	0.420 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	200 - 180	L2 1/2x2 1/2x3/16	10.368	5.135	79.2	0.571	11.440	27.838	0.411 [1]
T5	180 - 160	L3x3x3/16	12.706	6.292	80.4	0.712	11.470	34.712	0.330 [1]
T6	160 - 140	L3x3x3/16	14.108	6.983	89.2	0.712	11.902	34.712	0.343 [1]
T7	140 - 120	L3x3x1/4	15.529	7.694	99.3	0.939	12.310	45.794	0.269 [1]
T8	120 - 100	2L2 1/2x2 1/2x3/16x3/8	9.504	9.312	143.6	1.139	14.006	55.529	0.252 [1]
T9	100 - 80	2L 'a' > 53.320 in - 194 2L2 1/2x2 1/2x3/16x3/8	10.161	9.960	153.6	1.139	14.149	55.529	0.255 [1]
T10	80 - 60	2L 'a' > 57.034 in - 233 2L2 1/2x2 1/2x3/16x3/8	10.829	10.620	163.8	1.139	14.498	55.529	0.261 [1]
T11	60 - 40	2L 'a' > 60.815 in - 272 2L3x3x3/16x3/8	11.508	11.302	144.4	1.424	14.835	69.423	0.214 [1]
T12	40 - 20	2L 'a' > 64.562 in - 311 2L3x3x3/16x3/8	12.195	11.980	153.1	1.424	15.316	69.423	0.221 [1]
T13	20 - 0	2L 'a' > 68.435 in - 350 2L3x3x3/16x3/8	12.889	12.676	162.0	1.424	15.274	69.423	0.220 [1]
		2L 'a' > 72.411 in - 389							

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	120 - 100	2L1 3/4x1 3/4x3/16x3/8	16.106	7.886	176.3	0.721	7.562	35.134	0.215 [1]
T9	100 - 80	2L 'a' > 45.400 in - 196 2L2x2x3/16x3/8	17.606	8.626	167.8	0.862	8.400	42.001	0.200 [1]
T10	80 - 60	2L 'a' > 49.575 in - 235 2L2x2x3/16x3/8	19.106	9.366	182.2	0.862	9.214	42.001	0.219 [1]
T11	60 - 40	2L 'a' > 53.826 in - 274 2L2 1/2x2 1/2x3/16x3/8	20.606	10.116	156.0	1.139	10.008	55.529	0.180 [1]
T12	40 - 20	2L 'a' > 57.924 in - 310 2L2 1/2x2 1/2x3/16x3/8	22.106	10.855	167.4	1.139	10.790	55.529	0.194 [1]
T13	20 - 0	2L 'a' > 62.159 in - 349 2L2 1/2x2 1/2x3/16x3/8	23.606	11.605	179.0	1.139	11.539	55.529	0.208 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		2L 'a' > 66.454 in - 391							✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	255 - 240	L1 3/4x1 3/4x3/16	4.913	4.767	106.5	0.360	0.776	17.567	0.044 [1] ✔

[1] P_u / ϕP_n controls

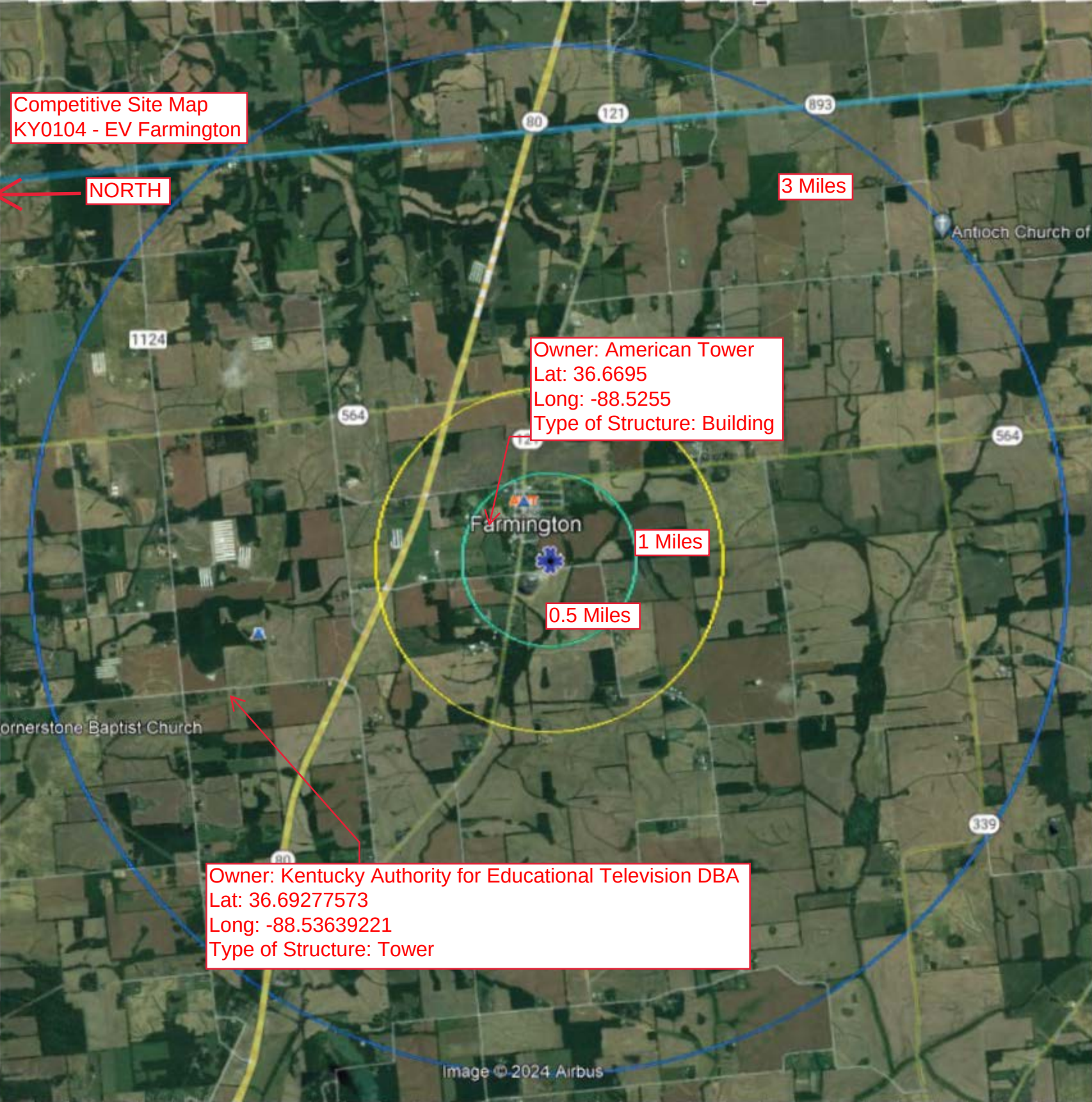
Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	120 - 100	L1 3/4x1 3/4x3/16	8.053	8.053	180.0	0.621	0.001	27.949	0.000 [1] ✔
T9	100 - 80	L1 3/4x1 3/4x3/16	8.803	8.803	196.7	0.621	0.000	27.949	0.000 [1] ✔
T10	80 - 60	L1 3/4x1 3/4x3/16	9.553	9.553	213.5	0.621	0.000	27.949	0.000 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	255 - 240	Leg	1 3/4	3	-19.276	33.103	58.2	Pass
T2	240 - 220	Leg	2 1/4	27	-79.201	84.331	93.9	Pass
T3	220 - 200	Leg	2 3/4	54	-151.526	161.540	93.8	Pass
T4	200 - 180	Leg	3 1/4	81	-214.839	260.312	82.5	Pass
T5	180 - 160	Leg	3 1/2	108	-272.330	317.273	85.8	Pass
T6	160 - 140	Leg	3 3/4	135	-326.634	379.106	86.2	Pass
T7	140 - 120	Leg	3 3/4	162	-379.047	379.106	100.0	Pass
T8	120 - 100	Leg	4	189	-423.415	445.717	95.0	Pass
T9	100 - 80	Leg	4 1/4	228	-471.934	517.034	91.3	Pass
T10	80 - 60	Leg	4 1/2	267	-518.972	593.004	87.5	Pass
T11	60 - 40	Leg	4 1/2	306	-565.016	593.004	95.3	Pass
T12	40 - 20	Leg	4 3/4	345	-610.052	673.582	90.6	Pass


Competitive Site Map
KY0104 - EV Farmington
NORTH
3 Miles
Owner: American Tower
Lat: 36.6695
Long: -88.5255
Type of Structure: Building
Farmington
1 Miles
0.5 Miles
Owner: Kentucky Authority for Educational Television DBA
Lat: 36.69277573
Long: -88.53639221
Type of Structure: Tower
Image © 2024 Airbus

Archive Search Results Form 7460-1 for ASN 2023-ASO-30240-OE

Overview

Study (ASN):	2023-ASO-30240-OE	**Received Date:**	11/03/2023
Prior Study:		**Entered Date:**	11/03/2023
Status:	Determined	**Completion Date:**	12/04/2023
Letters:	Determination	**Expiration Date:**	06/04/2025
Supplemental Form 7460-2:	Please login to add a Supplemental Form 7460-2.	**Map:**	View Map

Sponsor Information

Sponsor:	TowerCo 2013 LLC
Attention Of:	Henry Byrne
Address:	5000 Valley Stone Drive
Address2:	Suite 200
City:	Cary
State:	NC
Postal Code:	27519
Country:	US
Phone:	919-653-5753
Fax:	919-469-5530

Sponsor's Representative Information

Representative:	Wireless Applications Corporation
Attention Of:	Ron Lageson
Address:	111-108th Ave. NE
Address2:	Suite 160
City:	Bellevue
State:	WA
Postal Code:	98004
Country:	US
Phone:	425-643-5000
Fax:	000-000-0000

Construction Info

Notice Of:	CONSTR
Duration:	PERM (Months: 0 Days: 0)
Work Schedule:	12/01/2023 to 11/30/2024
Date Built:	

Structure Summary

Structure Type:	Antenna Tower
Structure Name:	KY0104 EV Farmington
FCC Number:	

Structure Details

Latitude (NAD 83):	36° 40' 04.65" N
Longitude (NAD 83):	88° 31' 54.91" W
Horizontal Datum:	NAD 83
Survey Accuracy:	1A
Marking/Lighting:	Dual-red and medium intensity
Other Description:	
Current Marking/Lighting:	N/A Proposed Structure
Current Marking/Lighting Other Description:	
Name:	
City:	Farmington
State:	KY
Nearest County:	Graves
Nearest Airport:	M25
Distance to Structure:	40115.66 feet
On Airport:	No
Direction to Structure:	157.32°
Description of Location:	Dove Rd
Description of Proposal:	Proposed site is a 265 ft AGL SSL tower, including all top-mounted appurtenances.

Height and Elevation

	Proposed	DNE	DET
Site Elevation:	522		
Structure Height:	265	0	**265**
Total Height (AMSL):	787	0	**787**

Frequencies

Low Freq	High Freq	Unit	ERP	Unit
6	7	GHz	55	dBW
6	7	GHz	42	dBW
10	11.7	GHz	55	dBW
10	11.7	GHz	42	dBW
17.7	19.7	GHz	55	dBW
17.7	19.7	GHz	42	dBW
21.2	23.6	GHz	55	dBW
21.2	23.6	GHz	42	dBW
614	698	MHz	2000	W
614	698	MHz	1000	W
698	806	MHz	1000	W
806	824	MHz	500	W
806	901	MHz	500	W
824	849	MHz	500	W
851	866	MHz	500	W
869	894	MHz	500	W
896	901	MHz	500	W
901	902	MHz	7	W
929	932	MHz	3500	W
930	931	MHz	3500	W
931	932	MHz	3500	W
932	932.5	MHz	17	dBW
935	940	MHz	1000	W
940	941	MHz	3500	W

	1670	1675	MHz	500	W
	1710	1755	MHz	500	W
	1850	1910	MHz	1640	W
	1850	1990	MHz	1640	W
	1930	1990	MHz	1640	W
	1990	2025	MHz	500	W
	2110	2200	MHz	500	W
	2305	2360	MHz	2000	W
	2305	2310	MHz	2000	W
	2345	2360	MHz	2000	W
	2496	2690	MHz	500	W
	3700	3980	MHz	3280	W
	3700	3980	MHz	1640	W

Previous Back to Search Result Next

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-ASO-30240-OE

Issued Date: 12/04/2023

Henry Byrne
TowerCo 2013 LLC
5000 Valley Stone Drive
Suite 200
Cary, NC 27519

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Antenna Tower KY0104 EV Farmington
Location:	Farmington, KY
Latitude:	36-40-04.65N NAD 83
Longitude:	88-31-54.91W
Heights:	522 feet site elevation (SE)
	265 feet above ground level (AGL)
	787 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Emissions from this site must be in compliance with the parameters set by collaboration between the FAA and telecommunications companies and reflected in the FAA 5G C band compatibility evaluation process (such as power, frequencies, and tilt angle). Operational use of this frequency band is not objectionable provided the Wireless Providers (WP) obtain and adhere to the parameters established by the FAA 5G C band compatibility evaluation process. **Failure to comply with this condition will void this determination of no hazard.**

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, a med-dual system-Chapters 4,8(M-Dual),&15.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Air Missions (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.
This determination expires on 06/04/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-ASO-30240-OE.

Signature Control No: 603723658-606183310 (DNE)
Chris Smith
Specialist

Attachment(s)
Additional Information
Frequency Data
Map(s)

cc: FCC

BASIS FOR DECISION:

Part 77 authorizes the FAA to evaluate a structure or object's potential electromagnetic effects on air navigation, communication facilities, and other surveillance systems. It also authorizes study of impact on arrival, departure, and en route procedures for aircraft operating under visual or instrument flight rules, as well as the impact on airport traffic capacity at existing public use airports. Broadcast in the 3.7 to 3.98 GHz frequency (5G C band) currently causes errors in certain aircraft radio altimeters and the FAA has determined they cannot be relied upon to perform their intended function when experiencing interference from wireless broadband operations in the 5G C band. The FAA has adopted Airworthiness Directives for all transport and commuter category aircraft equipped with radio altimeters that prohibit certain operations when in the presence of 5G C band.

This determination of no hazard is based upon those mitigations implemented by the FAA and operators of transport and commuter category aircraft, and helicopters operating in the vicinity of your proposed location. It is also based on telecommunication industry and FAA collaboration on acceptable power levels and other parameters as reflected in the FAA 5G C band evaluation process.

The FAA 5G C band compatibility evaluation is a data analytics system used by FAA to evaluate operational hazards related to aircraft design. The FAA 5G C band compatibility evaluation process refers to the process in which the telecommunication companies and the FAA have set parameters, such as power output, locations, frequencies, and tilt angles for antenna that mitigate the hazard to aviation. As the telecommunication companies and FAA refine the tools and methodology, the allowable frequencies and power levels may change in the FAA 5G C band compatibility evaluation process. Therefore, your proposal will not have a substantial adverse effect on the safe and efficient use of the navigable airspace by aircraft provided the equipment and emissions are in compliance with the parameters established through the FAA 5G C band compatibility evaluation process.

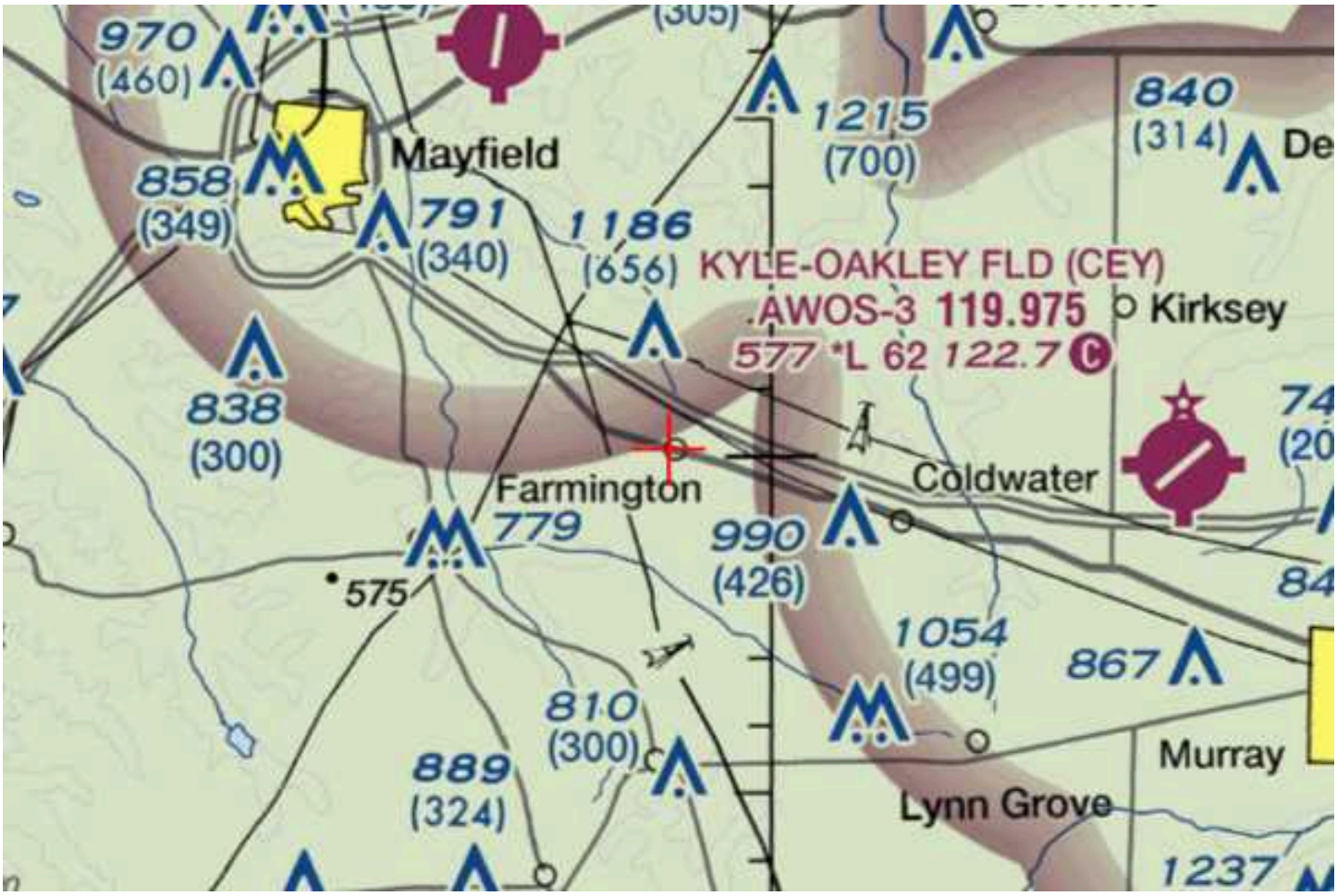
Any future changes that are not consistent with the parameters listed in the FAA 5G C band compatibility evaluation process will void this determination of no hazard.

Frequency Data for ASN 2023-ASO-30240-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
6	7	GHz	55	dBW
6	7	GHz	42	dBW
10	11.7	GHz	55	dBW
10	11.7	GHz	42	dBW
17.7	19.7	GHz	55	dBW
17.7	19.7	GHz	42	dBW
21.2	23.6	GHz	55	dBW
21.2	23.6	GHz	42	dBW
614	698	MHz	2000	W
614	698	MHz	1000	W
698	806	MHz	1000	W
806	824	MHz	500	W
806	901	MHz	500	W
824	849	MHz	500	W
851	866	MHz	500	W
869	894	MHz	500	W
896	901	MHz	500	W
901	902	MHz	7	W
929	932	MHz	3500	W
930	931	MHz	3500	W
931	932	MHz	3500	W
932	932.5	MHz	17	dBW
935	940	MHz	1000	W
940	941	MHz	3500	W
1670	1675	MHz	500	W
1710	1755	MHz	500	W
1850	1910	MHz	1640	W
1850	1990	MHz	1640	W
1930	1990	MHz	1640	W
1990	2025	MHz	500	W
2110	2200	MHz	500	W
2305	2360	MHz	2000	W
2305	2310	MHz	2000	W
2345	2360	MHz	2000	W
2496	2690	MHz	500	W
3700	3980	MHz	3280	W
3700	3980	MHz	1640	W

TOPO Map for ASN 2023-ASO-30240-OE

Sectional Map for ASN 2023-ASO-30240-OE



KAZC Application Documentation

Ron,

We received your application, and it will be placed on the Agenda for the KY Airport Zoning Commission, KAZC, on June 13, 2024.
We will contact you if we have questions.

Regards,

TEAM KENTUCKY
TRANSPORTATION CABINET

Anthony Adams
KY AIRPORT ZONING
COMMISSION, ADMINISTRATOR
Department of Aviation
90 Airport Road, Bldg 400
Frankfort, Kentucky 40601
(502) 564-0151 office
(502) 330-4022 mobile
Airport Zoning Commission | KYTC

From: ron.lageson@wacorp.net <ron.lageson@wacorp.net>
Sent: Friday, March 29, 2024 3:57 PM
To: Airport Zoning Commission <AirportZoning@ky.gov>
Cc: 'Henry Byrne' <hbyrne@towerco.com>
Subject: Proposed tower in KY

1. TowerCo – 5000 Valleystone Dr., Cary, NC 27519
2. Requester Contact: Henry Byrne : (919) 272-7766
3. Work Schedule: 8/1/24-9/30/24
4. Lat/Long: 36-40-04.65, -88-31-54.91
5. Site Elevation: 521.5'
6. Tower Height: 265' – Crane Height: 275'
7. On Site Contact: Bob Evans – 919-653-5700

Proposed 265 ft AGL tower near Mayfield, KY, please let me know if you need anything else, Signed KAZC TC55-2 and FAA DNH letter attached.

Thank you,

Ronald W. Lageson, Jr
Regulatory Compliance Manager
Wireless Application Corporation
425-643-5000

GEOTECHNICAL REPORT OF SUBSURFACE INVESTIGATION

January 31, 2024

PROPOSED SELF SUPPORT TOWER
EV FARMINGTON
KY0104

215 Farmington Street
Farmington, KY 42040

36.6679, -88.5319

Prepared for:

TowerCo
EMPOWERING connectivity

Prepared by:

ENGINEERED
TOWER SOLUTIONS

Matt Nesbit, E.I.
Geotechnical Engineer I

J. Scott Hilgoe, P.E.
Registered KY 38635

01/31/2024

Reviewed by: Jorge Varela, P.E.
Senior Geotechnical Engineer

Engineered Tower Solutions, PLLC - 3227 Wellington Court - Raleigh, NC 27615
(919) 782-2710

Project Summary

Item	Description
Project Description	A geotechnical exploration and report have been prepared for this proposed self-supported tower. Included in this report are the results of the field exploration and the recommendations for the design of the foundation system.
Site Coordinates	Latitude: 36.6679 Longitude: -88.5319
Site Condition	The proposed tower will be installed at 215 Farmington Street in Farmington, Kentucky.
Frost Depth	Based on the TIA Standard (TIA-222-H), dated October 2017, the recommended design frost penetration depth to be used for Graves County, KY is 20 inches (1.6 ft).
Groundwater	Groundwater was encountered at 4 feet below ground surface at the time of drilling. Please note that subsurface water levels will fluctuate with seasonal and cyclical temperatures and precipitation and can be higher or lower at other times.
Proposed Foundation	We assume the proposed foundation will be supported with either pad and pier or drilled shaft (caisson).

Field Exploration

Item	Description
Date	January 26th, 2024
Number of Borings	1
Location	Latitude: 36.6679 Longitude: -88.5319
Equipment Used	CME 45
Advancement Method	Hollow Stem Auger (HSA) and Rock Coring
Sampling Method	ASTM D-1586 with 1.5 I.D. Split Spoon Sampler

Laboratory Classification and Testing

Standard	Description
ASTM D2488	Standard Practice for Description and Identification of Soils

Subsurface Profile

Based on the results of our borings, the soils beneath the surface can be summarized in the table below:

Material Encountered	Approximate Depth to Bottom of Stratum	Description	Consistency / Density
CLAY	5	Brown, moist sandy lean clay	Very Soft to Medium Stiff
SAND	8	Brown and red, clayey sand	Medium Dense
CLAY	12	Gray and orange, sandy lean clay	Very Stiff
SAND	50	Tan and gray, poorly graded sand with gravel	Medium Dense to Very Dense

Detailed descriptions of conditions encountered at each exploration point are indicated on the individual logs in the Appendix B. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual.

Groundwater was encountered at 4 feet below ground surface at the time of drilling. Groundwater levels will fluctuate with seasonal and climatic changes and may be different at other times.

Earthwork Recommendations – Equipment Mat

Earthwork is anticipated to include excavations and fill placement. The following sections provide recommendations for use in the preparation of the equipment mat foundation area and access drive.

Site Preparation

The subgrade should be evaluated under the direction of the Geotechnical Engineer. Areas where soft material are present or excessively wet or dry material should either be removed, or moisture conditioned and recompacted.

Fill Material Types

Soil Type	USCS Classification	Acceptable Parameters (for Structural Fill)
Imported Low- to Moderate- Plasticity Soil [2]	CL, ML, SC or SM	All locations and elevations
Sand / Gravel with greater than 12% fines	GW/GP, SW/SP	Crushed stone base course may be used for the access roadway or beneath shallow foundations as a replacement material for overexcavated soils.
Near-Surface On-site soils [2]	SC, CL	On-site soils generally appear suitable for use as fill when they contain at least 12% fines (clay and/or silt) and are compacted at an appropriate moisture content.

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. A sample of each material type should be submitted to the geotechnical engineer for evaluation.
2. Low- to moderate-plasticity cohesive soil or granular soil having at least 12% fines

Fill Compaction Requirements

Item	Structural Fill	General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used	Same as Structural fill
Minimum Compaction Requirements [1, 2]	98% of max. below foundations and within 1 foot of finished pavement subgrade 95% of max. above foundations, below floor slabs, and more than 1 foot below finished pavement subgrade	92% of max.
Water Content Range [1]	Low plasticity cohesive: -2% to +3% of optimum High plasticity cohesive: 0 to +4% of optimum Granular: -3% to +3% of optimum	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. High plasticity cohesive fill should not be compacted to more than 100% of standard Proctor maximum dry density.

Excavations

Groundwater was encountered at 4 feet below ground surface at the time of drilling. Although not expected, if encountered in deep trench excavations during construction, groundwater or perched groundwater will require dewatering until backfilling operations are complete.

All excavations that may be required should, at a minimum, comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards to provide stability and safe working conditions.

Slopes

For permanent slopes in unreinforced compacted fill areas, we recommended maximum configurations of 3:1 (Horizontal: Vertical) for the cohesive soils (clay) found at the site.

If steeper slopes are required for site development, stability analyses should be completed to design the grading plan. The face of all slopes should be compacted to the minimum specification for fill embankments. Fill slopes should be overbuilt and trimmed to compacted material.

Earthwork Construction Considerations

The near-surface, on-site soils will lose strength when exposed to moisture. To the extent practical, earthwork should be performed during drier periods of weather. Increased remedial measures due to wet and soft or otherwise unsuitable conditions should be expected if earthwork is performed during colder and wetter periods of weather.

A qualified geotechnical engineer should be retained during the earthwork phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; to monitor proof-rolling, placement and compaction of controlled compacted fills, and backfilling of excavations to the completed subgrade.

Foundations Recommendations

The following recommendations are made based on our review of the test boring data and our past experience with similar projects and subsurface conditions. Ultimate soil strength parameters are presented on table below.

Ultimate Strength Parameters

Boring #	Depth (ft)	Unified Soil Classification	Total Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (psf)
B-1	0.0 – 3.0	CL	100	--	100
	3.0 – 5.0	CL	105	--	700
	5.0 – 8.0	SC	115	30	--
	8.0 – 12.0	CL	115	--	1,600
	12.0 – 22.0	SP	130	38	--
	22.0 – 32.0	SP	125	32	--
	32.0 – 42.0	SP	125	30	--
	42.0 – 50.0	SP	125	32	--

1. Groundwater was encountered at 4 feet below ground surface at the time of drilling. Utilize bouyon unit weight below this depth

Based on the subsurface conditions and typical design foundation loads for similar self-support towers, we recommend that either a caisson (drilled shaft) or a pad/pier be used to support the new tower.

Modulus of Subgrade Reaction

A vertical and horizontal modulus of subgrade reaction may be derived using the following equations and soils parameters expressed in the above table:

$$k_{s\text{-}v} = 12 \cdot SF \cdot q_a$$

$$k_{s\text{-}h} = k_{s\text{-}v} \cdot B$$

Where:

q_a = Allowable Bearing Capacity (ksf)
SF = Safety Factor
B = Base width (ft), use 1 if B< 1ft
$k_{s\text{-}v}$ =Vertical Modulus of Subgrade Reaction (kcf)
$k_{s\text{-}h}$ = Horizontal Modulus of Subgrade Reaction (ksf)

Caisson (Drilled Shaft)

Should caissons (drilled shafts) be used, the caissons (drilled shafts) will achieve compressive (downward) and tensile (uplift) resistance through skin friction along the sides of the shafts. In addition to skin friction, bearing resistance at the caisson's tip will contribute to compressive capacity. We recommend the values given the table below be used for this project. Please note the tip bearing capacity and skin frictions are net ultimate and ultimate values respectively. Appropriate factors of safety or resistance factors should be used. Lateral loads can be resisted by the lateral stiffness of the soil. Parameters for analysis of the laterally loaded caisson are also given the table below.

Caisson (Drilled Shaft) Parameters

Depth (ft)	Net Ultimate Tip Bearing Capacity (ksf)	Ultimate Skin Friction[1] (ksf)		Lateral Modulus (pci)	ε_{50} (in/in)
		Compressive	Uplift		
0.0 – 3.0	--	--	--	--	--
3.0 – 5.0	--	0.4	0.4	100	0.01
5.0 – 8.0	--	0.3	0.3	60	--
8.0 – 12.0	--	0.8	0.8	1,000	0.005
12.0 – 22.0	40	0.9	0.9	125	--
22.0 – 32.0	27	1.1	1.1	125	--
32.0 – 42.0	25	1.4	1.4	60	--
42.0 – 50.0	40	2.1	2.1	125	--

1. We recommend the skin friction be ignored for the top 3 ft of the caisson

Based on the subsurface soil conditions, excavations for the caissons (drilled shafts) should be possible using a large, truck-mounted, hydraulic-advanced drill rig. All debris, loose or disturbed soil should be removed from the excavation prior to placing reinforced steel and/or concrete. Reinforcing steel and/or concrete should be placed immediately upon completion of the excavation.

The excavations may be susceptible to caving. Drilling fluid or casing could be used to assist in keeping the drilled hole open. If casing is used, we recommend it be removed from the excavation

as concrete is being placed. Continuous vibration or other approved methods should be used during casing withdrawal to reduce the potential for void-space formation within the concrete. If water is present during concrete placement and/or drilling fluids are used to maintain hole stability, concrete should be pumped or otherwise discharged to the bottom of the hole via a hose or tremie pipe. The end of the hose or tremie pipe must remain below the top surface of any water, drilling fluid and the in-place concrete at all times. Additionally, concrete should be consolidated using vibration methods over the entire length and width of the caissons and the consolidation should be performed only after these fluids are removed and to the extent possible.

Pad & Pier / Single Mat Foundation

If the site has been prepared in accordance with the requirements noted in *Earthwork Recommendations – Equipment Mat*, the tower's foundation capacity can be determined using the soil's bearing capacity, passive pressure resistance, and a sliding friction factor.

Net Ultimate Bearing Capacity and Sliding Friction Factor

Depth[2] (ft)	Net Ultimate Bearing Capacity[1] (psf)	Sliding Friction Factor[1]
0.0 – 2.0	--	--
3.0 – 5.0	7,000	0.30
5.0 – 8.0	5,000	
8.0 – 15.0	8,000	

1. This value is a net ultimate value and an appropriate factor of safety or resistance factor should be used

Ultimate Passive Pressure and Friction Factor

Boring #	Depth (ft)	Ultimate Passive Pressure[1] (psf)[1]
B-1	0.0 – 2.0	0 – 400
	2.0 – 4.0	400 – 800
	4.0 – 8.0	800 – 2,000
	8.0 – 12.0	2,000 – 2,800
	12.0 – 20.0	2,800 – 6,000

1. Ultimate passive pressure can be interpolated for foundation depths with the depth ranges given

Seismic Parameters

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC)

Seismic Site Classification

Item	Seismic Parameter
2018 International Building Code Seismic Site Classification	D[1]
Design Spectral Response Acceleration Parameters	S_{ds} = 0.726g S_{d1} = null[2]

1. The IBC seismic site classification is based on the subsurface profile depth of 100 feet. The scope of work did not authorize exploration to a depth of 100 feet. A seismic Site Soil Classification of D should be used if insufficient details are known about the 100-foot soil profile.
2. Refer to ASCE 7-16 section 11.4.8

LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practices for the specific application of this project. The conclusions in this report are based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

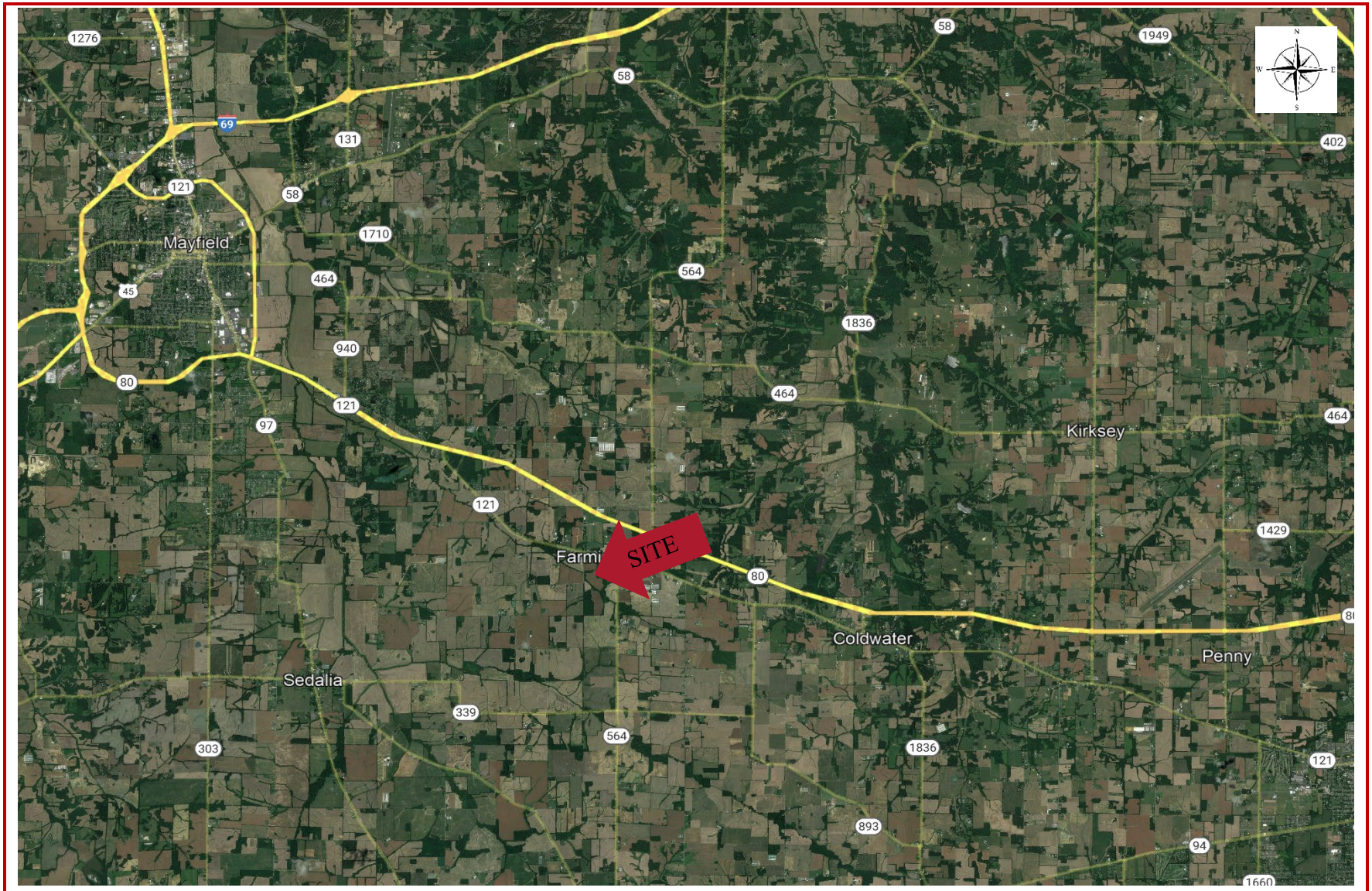
The analyses and conclusions submitted herein are based, in part, upon the data obtained from the subsurface exploration performed for this analysis. The soil and ground water conditions can vary across the site. Opinions and conclusions are subject to change if new or additional information is submitted for review.

APPENDIX A
LOCATION INFORMATION

SITE LOCATION PLAN

EV FARMINGTON (KY0104)

Job Number: 24124186



BORING LOCATION PLAN

EV FARMINGTON (KY0104)

Job Number: 24124186

SITE PHOTO
EV FARMINGTON (KY0104)
Job Number: 24124186

APPENDIX B
SOIL TEST BORING

BORING NUMBER B-1

ENGINEERED TOWER SOLUTIONS

CLIENT Tower Co
PROJECT NAME EV Farmington
PROJECT NUMBER 24124186
PROJECT LOCATION 215 FARMINGTON ST, Farmington, KY 42040
DATE 1/26/2024
COORDINATES 36.6679, -88.5319
DRILLING METHOD Hollow Stem Auger (HSA)
GROUND WATER LEVELS:
DRILLING EQUIPMENT CME 45
AT TIME OF DRILLING 4.00 ft / Elev 517.50 ft
LOGGED BY M. Nesbit
AT END OF DRILLING 4.00 ft / Elev 517.50 ft
NOTES
AFTER DRILLING 4.00 ft / Elev 517.50 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
0		SANDY LEAN CLAY (CL), brown, moist, very soft.	SS 1	0-1-0 (1)
		SANDY LEAN CLAY (CL), brown, moist, medium stiff.	SS 2	1-3-4 (7)
		CLAYEY SAND (SC), brown and red, moist, medium dense.	SS 3	4-6-6 (12)
10		SANDY LEAN CLAY (CL), gray and orange, moist, very stiff.	SS 4	3-6-10 (16)
		POORLY GRADED SAND WITH GRAVEL (SP), tan and gray, moist, medium dense to dense.	SS 5	23-23-27 (50)
20			SS 6	24-27-23 (50)
			SS 7	18-19-11 (30)
30			SS 8	17-20-22 (42)
			SS 9	17-12-13 (25)
40			SS 10	16-19-25 (44)
		POORLY GRADED SAND WITH GRAVEL (SP), tan and gray, moist, dense to very dense.	SS 11	18-18-42 (60)
50			SS 12	16-20-21 (41)

Bottom of borehole at 50.0 feet.

ETS - BORING LOG - ETS DATABASE_STANDARD_GEOTECH.GDT - 1/31/24 12:38 - \\ETS.LOCAL\ETS-PUBLIC\2024\124186_EV FARMINGTON\GEX\XXX_GEOTECH\REPORT\EV FARMINGTON.GPJ

DIRECTIONS FROM GRAVES COUNTY SEAT

FROM: GRAVES COUNTY SEAT: 1102 PARIS RD, MAYFILED, KY 42066: TURN LEFT (EAST) ONTO BARTON DR (0.1 MI.). TURN RIGHT (SOUTH) ONTO S COMMONWEALTH DR AND THEN LEFT (EAST) TOWARD KY-121 BYPASS N. TURN RIGHT (SOUTH) ONTO KY-121 BYPASS N (0.6 MI.). TURN LEFT (EAST) ONTO KY-121 S/KY-80 E (3.2 MI.). TURN RIGHT (SOUTH) ONTO KY-121 S (2.8 MI.). TURN RIGHT (SOUTH) ONTO DOVE RD (0.2 MI.). SITE WILL BE LOCATED ON THE EAST SIDE OF THE ROAD.

Prepared by: GPD Group, Inc. 330.572.2100

Prepared by and after recording return to:
Jason Catalini
TowerCo
5000 Valleystone Drive, Suite 200
Cary, North Carolina 27519

(Recorder's Use Above this Line)

STATE OF KENTUCKY)
)
COUNTY OF GRAVES)

PARCEL NO. 139.00.00.047.00

MEMORANDUM OF LEASE

This Memorandum of Lease is entered into on this 31st day of August, 2023, by and between **M. Scott Wilferd and Kellie Wilferd**, a married couple, having a mailing address of P.O. Box 100, Farmington, KY 42040 (hereinafter referred to as "**Lessor**") and **TOWERCO 2013 LLC,** a Delaware limited liability company having a mailing address of 5000 Valleystone Drive, Suite 200, Cary, North Carolina 27519 (hereinafter referred to as "**Lessee**").

1. Lessor and Lessee entered into that certain Ground Lease dated the 31st day of August, 2023 (the "Lease") for certain real property and easements as described in **Exhibit B** attached hereto (collectively, the "Premises"), which are a portion of that certain parcel of real property located in Farmington, County of Graves, State of Kentucky, described in **Exhibit A** attached hereto (the "Land").

2. The Lease shall have an initial term of five (5) years, with nineteen (19) additional five (5) year renewal terms.

3. The purpose of this Memorandum is to give record notice of the Lease and of the rights created thereby all of which are hereby confirmed. In the event of a conflict between the terms of this Memorandum or the addition of any terms in this Memorandum which are not contained in the Lease, the Lease shall control. The terms of the Lease are hereby incorporated by reference.

4. Pursuant to the Lease, Lessee has a right of first refusal to meet any bona fide offers for (i) any sale or transfers of the Land, and any (ii) grant from Lessor to a third party by easement or other legal instrument of an interest in and to any portion of the Land, the Premises or the Lease for any purpose relating to the assignments of any right to the rent or rental stream associated with the Lease.

(SIGNATURES BEGIN ON NEXT PAGE)

IN WITNESS WHEREOF, the parties have executed this Memorandum under seal as of the dates set forth in the respective acknowledgements.

LESSOR:

M. Scott Wilferd and Kellie Wilferd, a married couple

By: _____
Name: M. Scott Wilferd
Title: Owner
Date: 8-11-2023

By: _____
Name: Kellie Wilferd
Title: Owner
Date: 8/11/23

LESSOR ACKNOWLEDGEMENT:

STATE OF KENTUCKY)
)
COUNTY OF ~~GRAVES~~ Calloway)

Before me, Jimmy D. Hicks the undersigned, a Notary Public for the State, personally appeared M. Scott Wilferd personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument.

WITNESS my hand and official seal, this 11th day of August, 2023.

_____
Notary Public
Print Name Jimmy D. Hicks
Title (and Rank): Notary Public
My commission expires: 2-23-2024 (seal)

LESSOR ACKNOWLEDGEMENT:

STATE OF KENTUCKY)
)
COUNTY OF ~~GRAVES~~Calloway)

Before me, Jimmy D. Hicks the undersigned, a Notary Public for the State, personally appeared Kellie Wilferd personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument.

WITNESS my hand and official seal, this 11th day of August, 2023.

Jimmy Dan Hicks
Notary Public
Print Name Jimmy D. Hicks
Title (and Rank): Notary Public
My commission expires: 2-23-2024 (seal)

LESSEE:

TOWERCO 2013 LLC, a Delaware limited liability company

By: _____
Name: Mike Smith
Title: CFO
Date: 8/31/23

LESSEE ACKNOWLEDGEMENT:

STATE OF NORTH CAROLINA)
)
COUNTY OF WAKE)

Before me, Jill E Harvey the undersigned, a Notary Public for the State, personally appeared Mike Smith who is the CFO of TowerCo 2013 LLC, a Delaware limited liability company, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument, the entity upon behalf of which he acted, executed the instrument.

WITNESS my hand and official seal, this 31st day of August, 2023.

_____
Notary Public
Print Name Jill E Harvey
Title (and Rank): Paralegal / Notary Public
My commission expires: 7/26/2025

JILL E HARVEY
NOTARY PUBLIC
WAKE COUNTY, NC
My Commission Expires 7/26/2025 (seal)

EXHIBIT A
DESCRIPTION OF LAND

The Land is described and/or depicted as follows:

PARCEL NO. 1:
Being 22.6 acres of land in the Southeast Quarter of Section 3 T 2 R 2 E described as beginning at a post at the Harley Cloys Northwest corner on the east line of the old Farmington-Sedalia Road at a distance of 90 poles south from the northwest corner of the quarter, and running thence North 85 degrees East 64 poles along the Cloys line 64 poles to a post; thence North 1/2 degrees West 41 poles to a post; thence North 83 degrees West 24-3/4 poles to a post; thence North 12 degrees East 6 poles to a post; thence North 83 degrees West 7-1/2 poles to a post; thence North 12 degrees East 25-1/4 poles to an iron stake on the south line of the Mayfield-Murray Road; thence North 75 degrees West 11 poles along the road to an iron stake; thence South 12 degrees West 26-1/4 poles to a post; thence North 83 degrees West 25-1/2 poles to a post on the east line of the old Farmington-Sedalia Road; thence South 4 degrees East 60-1/2 poles along the east line of the old Farmington-Sedalia Road to the point of beginning.

LESS AND EXCEPT:
Being two acres, more or less, out of the Southeast Quarter of Section 3, T 2 R 2 E and being out of the North part of a 22.6 acre tract of land described in Deed Book 246, Page 399, Graves County Court Clerk's Office, and with said two acres, more or less, being more particularly described as follows:

Beginning at a stake on the South right-of-way line of Kentucky Highway No. 121 with said stake being at the northeast corner of the 22.6 acre tract more fully described in Deed Book 246, Page 399, Graves County Court Clerk's Office; thence North 75 degrees West 11 poles along the South line of the Mayfield-Murray Road (Kentucky Highway No. 121) to an iron stake; thence South 12 degrees West 26-1/4 poles to a stake; thence South 83 degrees East 11 poles to a stake; thence North 12 degrees East 25-1/4 poles to an iron stake on the South line of the Mayfield-Murray Road (Kentucky Highway No. 121) and the point of beginning and containing 2 acres, more or less.

There is excepted from the above 2 acres, a 30 foot right-of-way in the Southeast corner of said property, leaving 151-1/2 foot frontage on Kentucky Highway 121, and 200 feet, more or less, off the back portion of said 2 acres, leaving said lot being conveyed 151-1/2 feet wide and 234-1/4 feet deep, more or less.

Being the same real estate conveyed to Gary Dale Derrington and wife, Sandra Jean Derrington, by deed from Bobby G. Wilferd and wife, Mary Edna Wilferd, dated February 11, 1981, of record in Deed Book 281, Page 28, Graves County Clerk's Office.

LESS AND EXCEPT:
That property conveyed in Deed Book 405, Page 686 and Deed Book 475, Page 398.

EXHIBIT B
DESCRIPTION OR DEPICTION OF PREMISES

An approximately 100' x 100' (10,000) square foot tract of land, together with easements for ingress, egress and utilities described or depicted as follows.

LEASE AREA DESCRIPTION:
A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

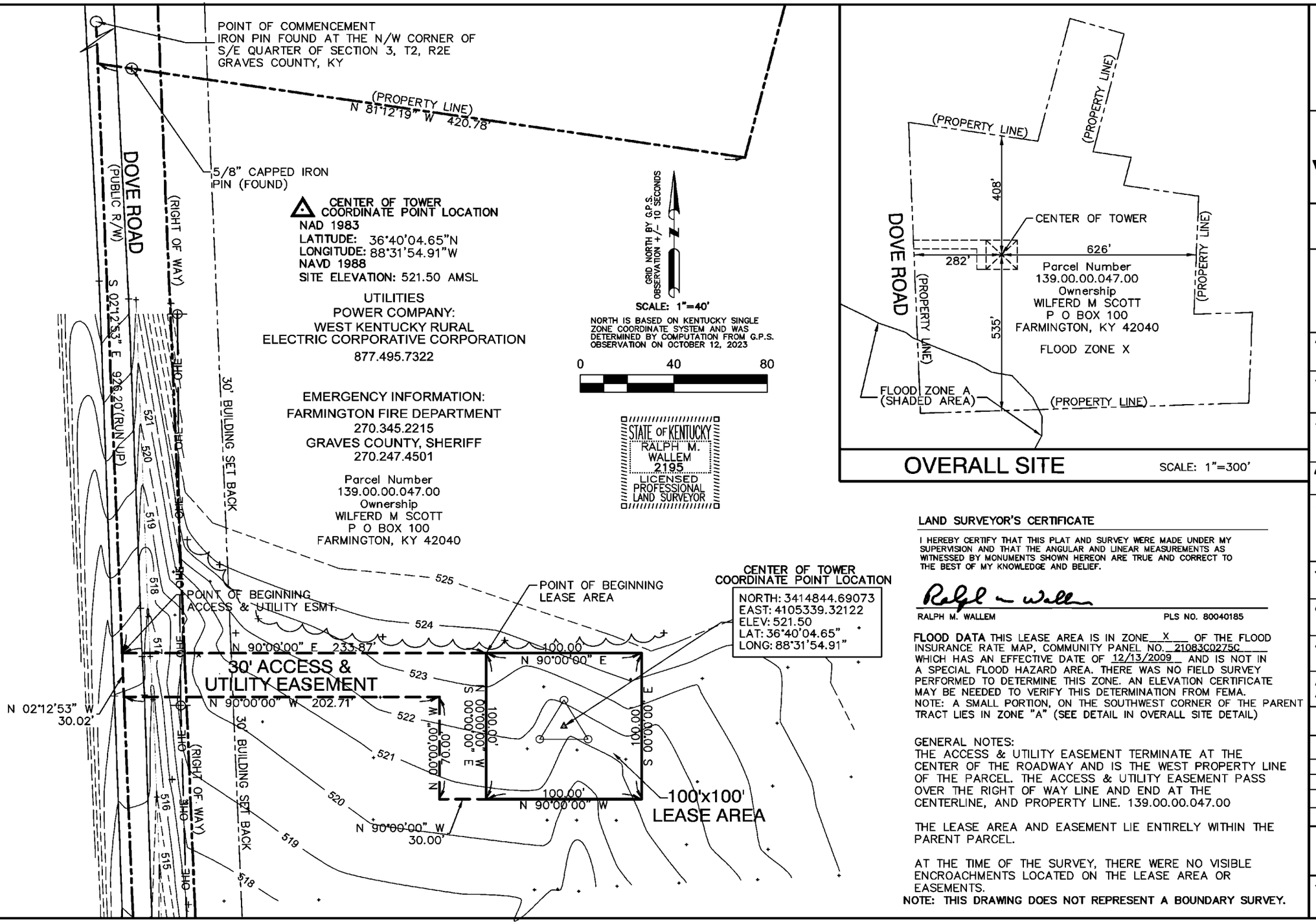
COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO A POINT; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 FEET TO THE TRUE PLACE OF BEGINNING; THENCE CONTINUING NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 10,000 SQUARE FEET, (0.23 ACRES), MORE OR LESS.

30' ACCESS & UTILITY EASEMENT:
A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO THE TRUE PLACE OF BEGINNING; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 TO THE NORTHWEST LEASE CORNER; THENCE ALONG THE WEST LEASE LINE BEARING SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET TO THE SOUTHWEST LEASE CORNER; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 30.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 70.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 202.71 FEET; THENCE NORTH 02 DEGREES 12 MINUTES 53 SECONDS WEST 30.02 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 9099 SQUARE FEET, (0.21 ACRES), MORE OR LESS.

THE ABOVE-DESCRIBED PARCELS ARE SUBJECT TO ALL LEGAL RIGHTS OF WAYS AND EASEMENTS OF RECORD.

(see attached survey)



OVERALL SITE

SCALE: 1"=300'

LAND SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT AND SURVEY WERE MADE UNDER MY SUPERVISION AND THAT THE ANGULAR AND LINEAR MEASUREMENTS AS WITNESSED BY MONUMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

RALPH M. WALLEM PLS NO. 80040185

FLOOD DATA THIS LEASE AREA IS IN ZONE X OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 21083C0275C WHICH HAS AN EFFECTIVE DATE OF 12/13/2009 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. THERE WAS NO FIELD SURVEY PERFORMED TO DETERMINE THIS ZONE. AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION FROM FEMA. NOTE: A SMALL PORTION, ON THE SOUTHWEST CORNER OF THE PARENT TRACT LIES IN ZONE "A" (SEE DETAIL IN OVERALL SITE DETAIL)

GENERAL NOTES:
THE ACCESS & UTILITY EASEMENT TERMINATE AT THE CENTER OF THE ROADWAY AND IS THE WEST PROPERTY LINE OF THE PARCEL. THE ACCESS & UTILITY EASEMENT PASS OVER THE RIGHT OF WAY LINE AND END AT THE CENTERLINE, AND PROPERTY LINE. 139.00.00.047.00

THE LEASE AREA AND EASEMENT LIE ENTIRELY WITHIN THE PARENT PARCEL.

AT THE TIME OF THE SURVEY, THERE WERE NO VISIBLE ENCROACHMENTS LOCATED ON THE LEASE AREA OR EASEMENTS.

NOTE: THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519
PH: (919) 653-5744

verizon

BENCHMARK SERVICES, INC.
Consulting Engineers
Land Surveyors
318 North Main Street
Huntingburg, IN 47542
(812) 683-3049
benchmark@mw.twcbc.com

PROJECT No.

SITE NAME: EV FARMINGTON

SITE ADDRESS: DOVE ROAD
FARMINGTON, KY 42040

LEASE AREA: 10,000 SQ. FT.

PROPERTY OWNER: WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

SECTION/TOWNSHIP/RANGE: SEC 3, T2, R2E

COUNTY: GRAVES COUNTY

PARCEL: 139.00.00.047.00

LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W

DWG BY:	CHKD BY:	DATE:
GVW	RMW	10.26.23

NO.	REVISION/ISSUE	DATE:
1.	FLOOD NOTE	1.17.24
2.	REVIEW ITEM	1.19.24

TITLE: SURVEY PLAN

SHEET: 1 OF 2

MIS22

GRAVES COU

Issued By U.S. TITLE SOLUTIONS
FILE NO. UST75502
REFERENCE NO. KY0104
DATE OF REPORT: JUNE 28, 2023
SCOPE OF SEARCH: MARCH 4, 1920 TO JUNE 12, 2023

TITLE TO SAID REAL ESTATE OR INTEREST IN THE LAND DESCRIBED OR REFERENCED TO IN THIS REPORT IS AT THE EFFECTIVE DATE HEREOF VESTED IN:

M. SCOTT WILFERD AND WIFE, KELLIE WILFERD

SCORCE OF TITLE:
WARRANTY DEED MADE BY M. SCOTT WILFERD AND WIFE, KELLIE WILFERD, SABRINA WILFERD, A SINGLE PERSON AND RUTH WILFERD, A SINGLE PERSON, DATE NOVEMBER 24, 1999, RECORDED NOVEMBER 30, 1999, IN DEED BOOK 384, PAGE 591.

PROPERTY ID: 139.00.00.047.00

I, RALPH M. WALLEM, CERTIFY TO:
TOWERCO IV HOLDINGS, LLC
LAND SURVEYOR'S CERTIFICATE

I CERTIFY THAT THIS PLAT AND SURVEY WERE MADE UNDER MY SUPERVISION, AND THAT THE ANGULAR AND LINEAR MEASUREMENTS, AS WHITNESSED BY MONUMENTS SHOWN HEREON, ARE TRUE AND CORRECT TO THE BEST OF MY ABILITIES AND BELIEFS.
THIS SURVEY AND PLAT MEETS OR EXCEEDS THE MINIMUM STANDARDS OF THE GOVERNING AUTHORITIES.
SURVEYOR STATEMENT–MY COMMENTS ARE BASED SOLELY ON THE TITLE DOCUMENT THAT HAVE BEEN SUPPIED TO ME BY THE TITLE COMPANY . SINCE THE TITLE DOCUMENTS ARE FURNISHED FOR THE PARENT TRACT, OUR TOPOGRAPHIC SURVEY IS OF A PORTION OF THAT TRACT. MY COMMENTS ARE RESTRICTED TO EXCLUSIONS THAT I CAN DETERMINE AFFECT ONLY OUR PORTION OF THE PARENT TRACT. NO BOUNDARY SURVEY WAS PERFORMED ON THE PARENT TRACT, THUS IT IS NOT POSSIBLE TO DETERMINE WITH CERTAINTY EXCLUSIONS REFERENCING THE PARENT TRACT.

SCHEDULE "B" ITEMS
NO SCHEDULE "B" ITEMS TO ADDRESS.

STATE OF KENTUCKY
RALPH M. WALLEM
2195
LICENSED PROFESSIONAL LAND SURVEYOR

END OF SCHEDULE B, PART II

Ralph M. Wallem

RALPH M. WALLEM — PLS NO. KY LS 2195

DOCUMENT NO: 397206
RECORDED: 1/19/2024 2:40:56 PM
VIA ERECORDING
TRANSFER TAX: $0.00
TOTAL FEES: $58.00
COUNTY CLERK: KIMBERLY D GI
DEPUTY CLERK:
COUNTY: GRAVES COUNTY
BOOK: MIS22 PAGES: 698-706

DESCRIPTION OF LEASE AREA

A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO A POINT; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 FEET TO THE TRUE PLACE OF BEGINNING; THENCE CONTINUING NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 100.00 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 10,000 SQUARE FEET, (0.23 ACRES), MORE OR LESS.

DESCRIPTION OF 30' ACCESS AND UTILITY EASEMENT

A PART OF THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 2, RANGE 2 EAST, GRAVES COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A RAILROAD SPIKE FOUND AT THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 3, AND BEING PART OF PARCEL NUMBER 139.00.00.047.00; THENCE BEARING FROM SAID RAILROAD SPIKE SOUTH 02 DEGREES 12 MINUTES 53 SECONDS EAST 926.20 TO THE TRUE PLACE OF BEGINNING; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST 233.87 TO THE NORTHWEST LEASE CORNER; THENCE ALONG THE WEST LEASE LINE BEARING SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 100.00 FEET TO THE SOUTHWEST LEASE CORNER; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 30.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 70.00 FEET; THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS WEST 202.71 FEET; THENCE NORTH 02 DEGREES 12 MINUTES 53 SECONDS WEST 30.02 FEET TO THE TRUE PLACE OF BEGINNING AND CONTAINING 9099 SQUARE FEET, (0.21 ACRES), MORE OR LESS.

DESCRIPTION OF PARENT PARCEL DEED (FURNISHED)

PARCEL NO. I:
Being 22.6 acres of land in the Southeast Quarter of Section 3 T 2 R 2 E described as beginning at a post at the Harley Cloys Northwest corner on the east line of the old Farmington–Sedalia Road at a distance of 90 poles south from the northwest corner of the quarter, and running thence North 85 degrees East 64 poles along the Cloys line 64 poles to a post; thence North 1/2 degrees West 41 poles to a post; thence North 83 degrees West 24–3/4 poles to a post; thence North 12 degrees East 6 poles to a post; thence North 83 degrees West 7–1/2 poles to a post; thence North 12 degrees East 25–1/4 poles to an iron stake on the south line of the Mayfield–Murray Road; thence North 75 degrees West 11 poles along the road to an iron stake; thence South 12 degrees West 26–1/4 poles to a post; thence North 83 degrees West 25–1/2 poles to a post on the east line of the old Farmington– Sedalia Road; thence South 4 degrees East 60–1/2 poles along the east line of the old Farmington–Sedalia Road to the point of beginning.

LESS AND EXCEPT:
Being two acres, more or less, out of the Southeast Quarter of Section 3, T 2 R 2 E and being out of the North part of a 22.6 acre tract of land described in Deed Book 246, Page 399, Graves County Court Clerk's Office, and with said two acres, more or less, being more particularly described as follows:
Beginning at a stake on the South right–of–way line of Kentucky Highway No. 121 with said stake being at the northeast corner of the 22.6 acre tract more fully described in Deed Book 246, Page 399, Graves County Court Clerk's Office; thence North 75 degrees West 11 poles along the South line of the Mayfield–Murray Road (Kentucky Highway No. 121) to an iron stake; thence South 12 degrees West 26–1/4 poles to a stake; thence South 83 degrees East 11 poles to a stake; thence North 12 degrees East 25–1/4 poles to an iron stake on the South line of the Mayfield–Murray Road (Kentucky Highway No. 121) and the point of beginning and containing 2 acres, more or less.
There is excepted from the above 2 acres, a 30 foot right–of–way in the Southeast corner of said property, leaving 151–1/2 foot frontage on Kentucky Highway 121, and 200 feet, more or less, off the back portion of said 2 acres, leaving said lot being conveyed 151–1/2 feet wide and 234–1/4 feet deep, more or less.
Being the same real estate conveyed to Gary Dale Derrington and wife, Sandra Jean Derrington, by deed from Bobby G. Wilferd and wife, Mary Edna Wilferd, dated February 11, 1981, of record in Deed Book 281, Page 28, Graves County Clerk's Office.
Less and Except that property conveyed in Deed Book 405 page 686 and Deed Book 475 page 398.

NOTE: THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

TowerCo
5000 VALLEYSTONE DR
CARY, NC 27519
PH: (919) 653–5744

verizon

BENCHMARK SERVICES, INC.
Consulting Engineers
Land Surveyors
318 North Main Street
Huntingburg, IN 47542
(812) 683-3049
benchmark@mw.twcbc.com

PROJECT No.

SITE NAME:
EV FARMINGTON

SITE ADDRESS:
DOVE ROAD
FARMINGTON, KY 42040

LEASE AREA:
10,000 SQ. FT.

PROPERTY OWNER:
WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

SECTION/TOWNSHIP/RANGE
SEC 3, T2, R2E

COUNTY:
GRAVES COUNTY

PARCEL:
139.00.00.047.00

LATITUDE: 36°40'04.65"N
LONGITUDE: 88°31'54.91"W

DWG BY:	CHKD BY:	DATE:
GVW	RMW	10.26.23

NO.	REVISION/ISSUE	DATE:
1.	FLOOD NOTE	1.17.24
2.	REVIEW ITEM	1.19.24

TITLE:
SURVEY PLAN

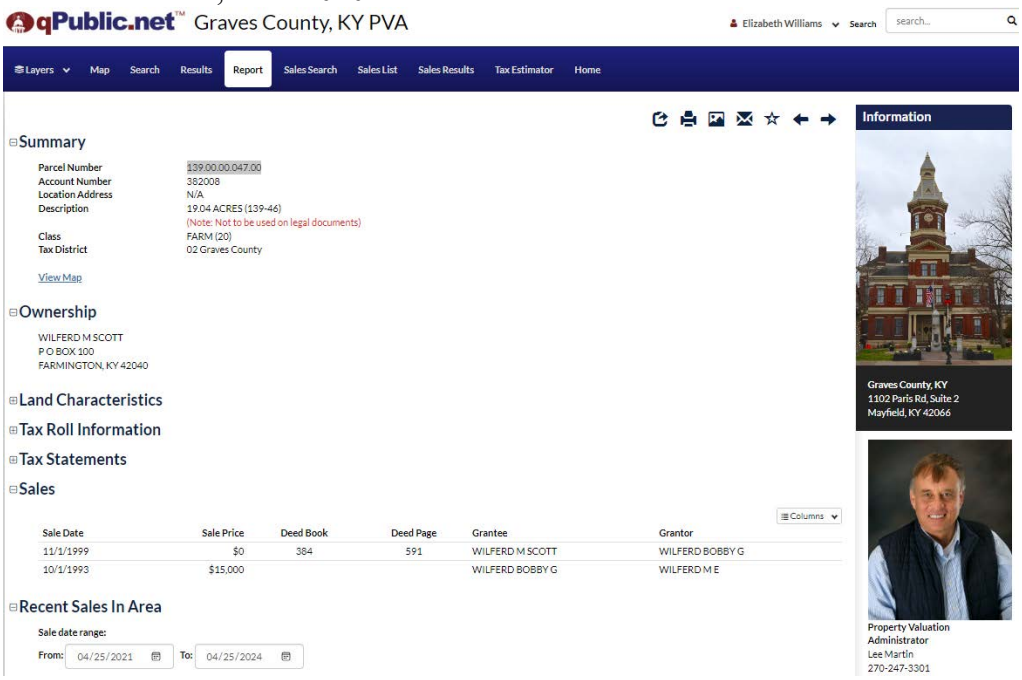
SHEET:
2 OF 2

MIS22 PG 698

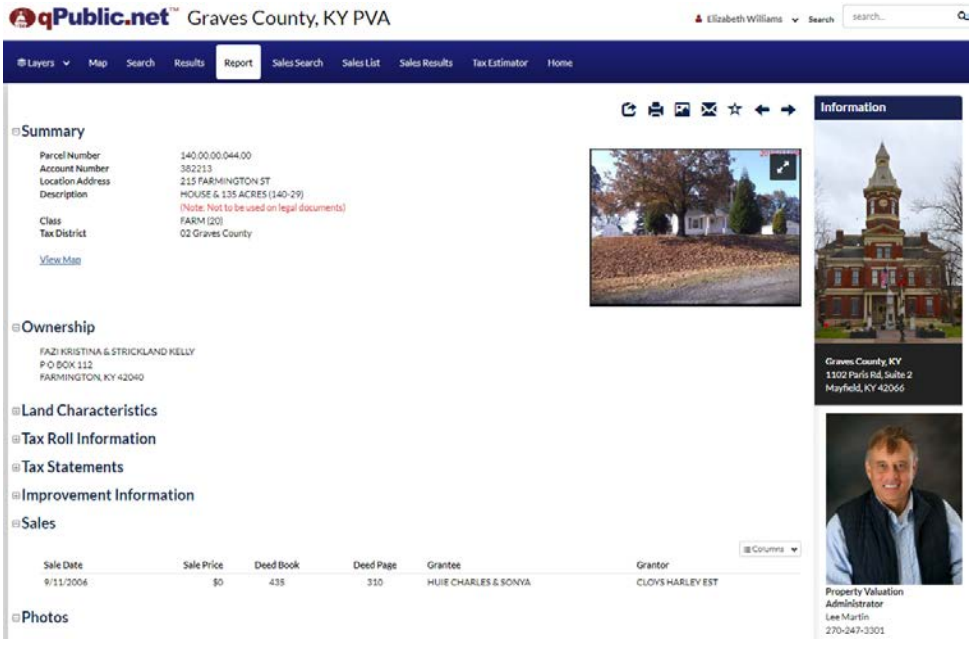
GRAVES COUNTY

Notification Listing

Parcel # 139.00.00.047.00
WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

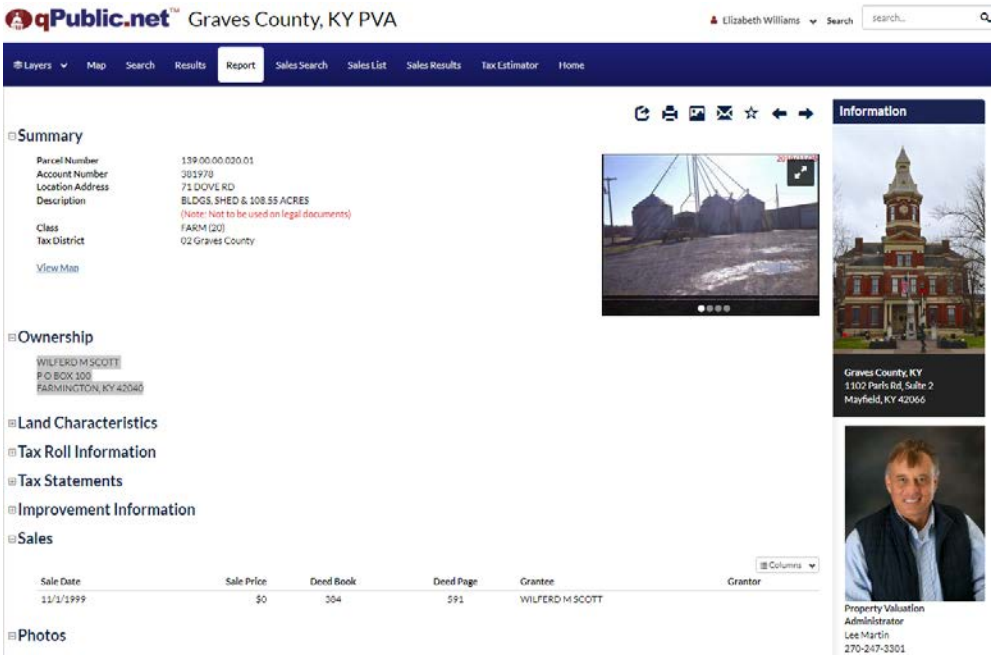


Parcel # 140.00.00.044.00
FAZI KRISTINA & STRICKLAND KELLY
P O BOX 112
FARMINGTON, KY 42040

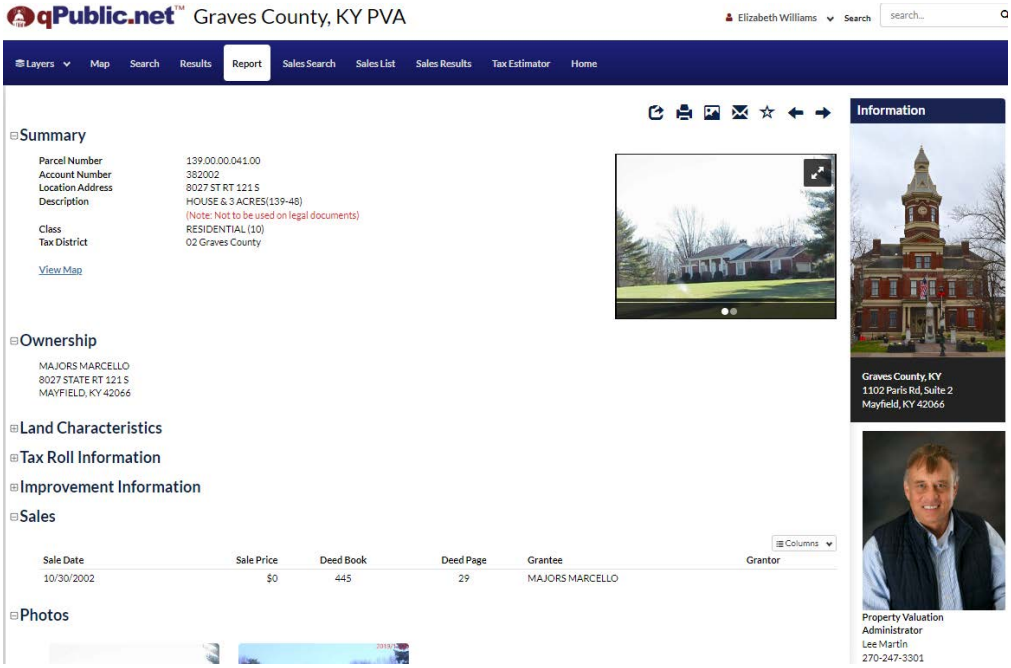


Parcel # 139.00.00.020.01

WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040



Parcel # 139.00.00.041.00
MAJORS MARCELLO
8027 STATE RT 121 S
MAYFIELD, KY 42066



Parcel # 139.00.00.043.00
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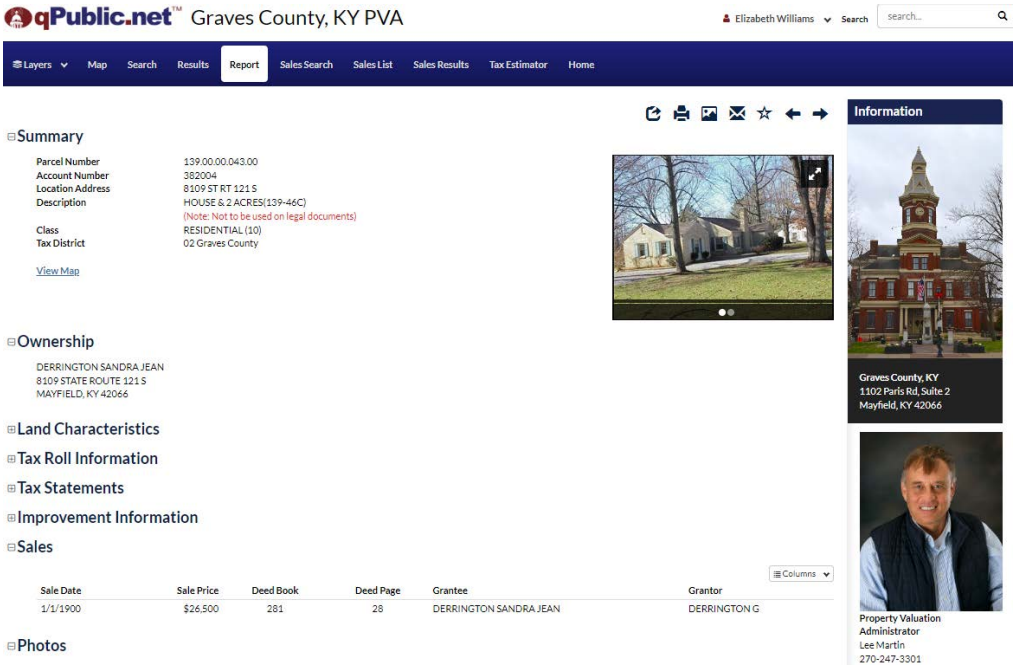
8109 STATE ROUTE 121 S
MAYFIELD, KY 42066



Parcel # 139.00.00.046.00
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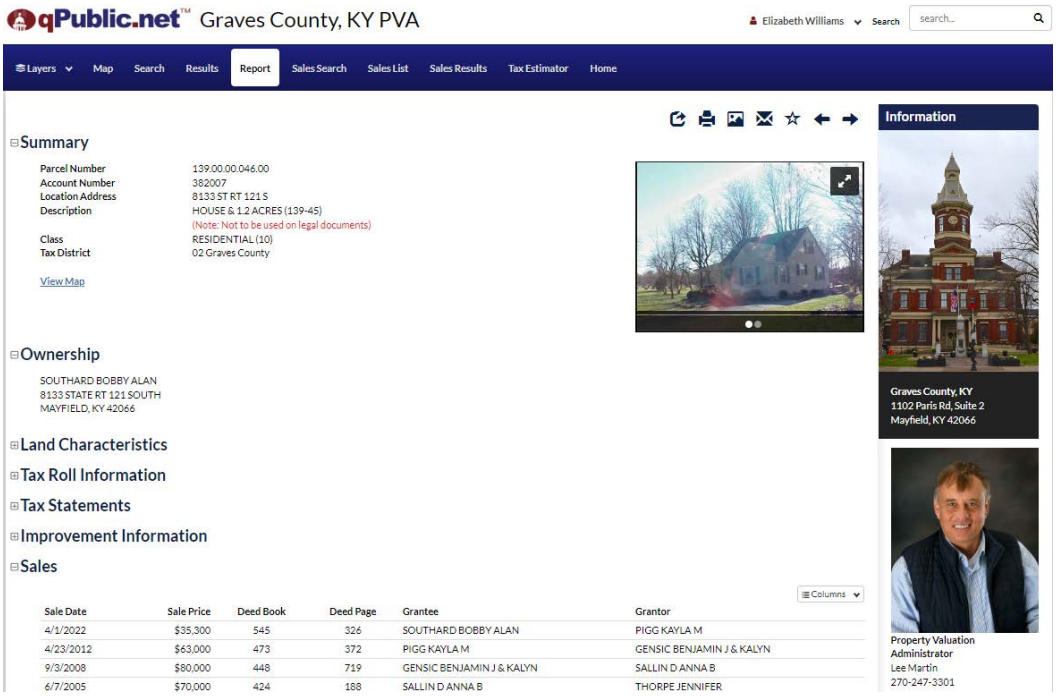
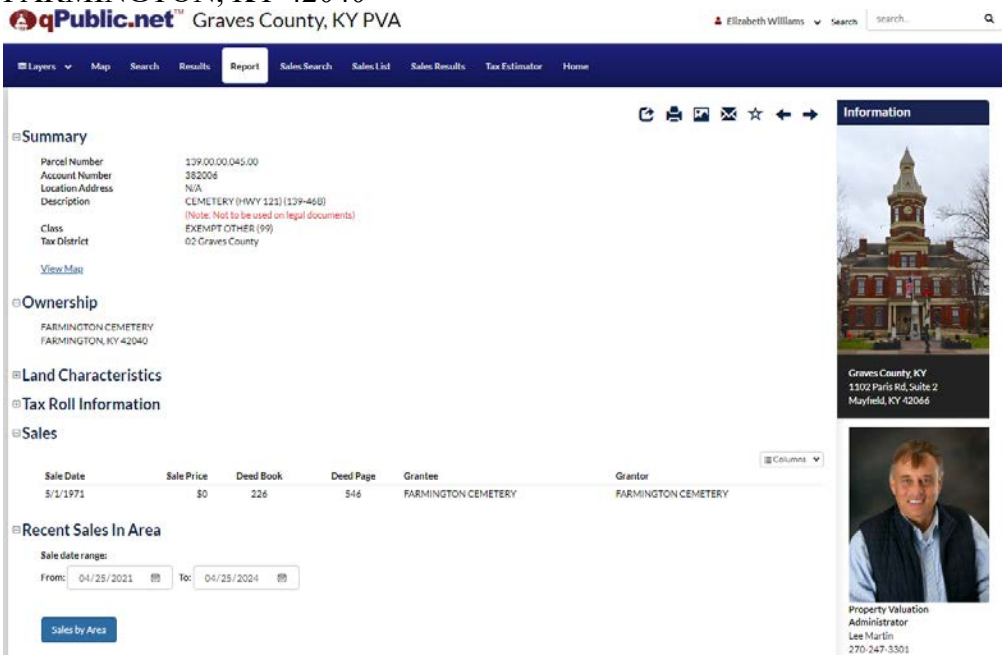
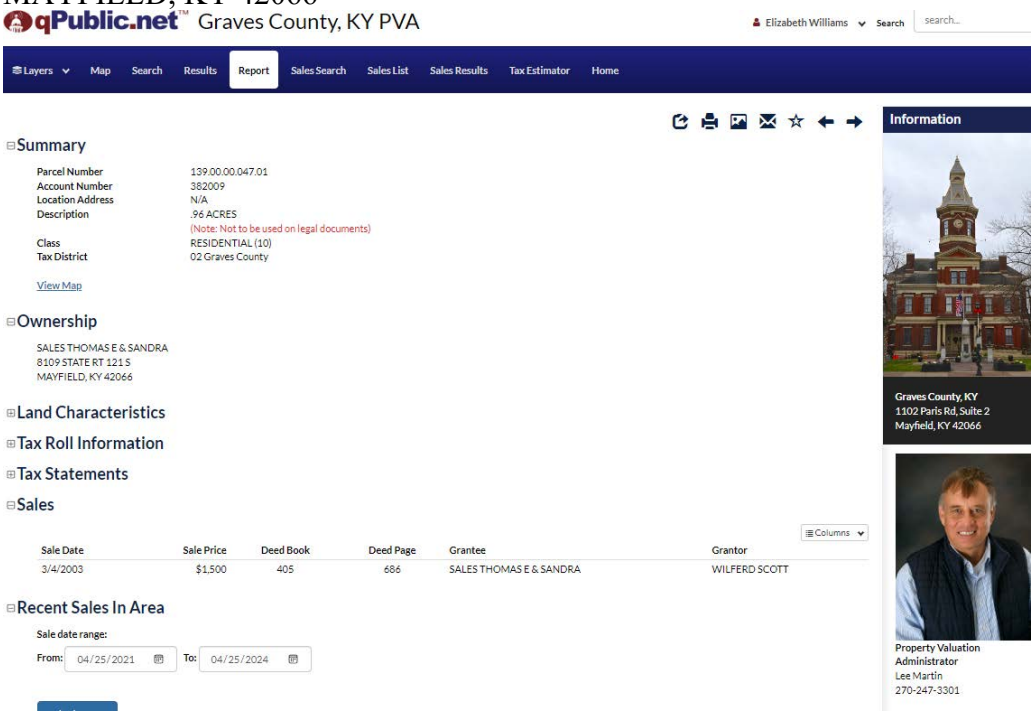
8133 STATE RT 121 SOUTH
MAYFIELD, KY 42066



Parcel # 139.00.00.045.00
FARMINGTON CEMETERY
FARMINGTON, KY 42040



Parcel # 139.00.00.047.01
SALES THOMAS E & SANDRA
8109 STATE RT 121 S
MAYFIELD, KY 42066



Parcel # 139.00.00.049.00
SMITH PHILLIP & LUDEAN
1999 DOVE RD
MAYFIELD, KY 42066

qPublic.net™ Graves County, KY PVA

Elizabeth Williams | Search | search...

Layers | Map | Search | Results | Report | Sales Search | Sales List | Sales Results | Tax Estimator | Home

Summary

Parcel Number	139.00.00.049.00
Account Number	382010
Location Address	159 DURBIN ST
Description	2 MFG HOMES & 3 ACRES (139-43) (Note: Not to be used on legal documents)
Class	MOBILE HOME (70)
Tax District	02 Graves County

View Map

Ownership

SMITH PHILLIP & LUDEAN
1999 DOVE RD
MAYFIELD, KY 42066

Land Characteristics

Tax Roll Information

Tax Statements

Improvement Information

Sales

Columns

Sale Date	Sale Price	Deed Book	Deed Page	Grantee	Grantor
8/5/2020	$0	531	826	SMITH PHILLIP & LUDEAN	SMITH PHILLIP & LUDEAN
5/18/2017	$0	508	706	SMITH PHILLIP & LUDEAN	SMITH PHILLIP & LUDEAN
11/17/2016	$19,200	505	760	SMITH PHILLIP & LUDEAN	U S BANK N A
8/1/2016	$19,000	503	521	U S BANK N A	WAGGONER ROBIN & MELISSA

Information

Graves County, KY
1102 Paris Rd, Suite 2
Mayfield, KY 42066

Property Valuation Administrator
Lee Martin
270-247-3301

ClarkQuinn

www.clarkquinnlaw.com

Russell L. Brown
Attorney at Law
rbrown@clarkquinnlaw.com

320 N. Meridian St., Ste. 1100
Indianapolis, IN 46204
(317) 637-1321 main
(317) 687-2344 fax

April 25, 2024

Notice of Proposed Construction of
Wireless Communications Facility
Site Name: Farmington

Cellco Partnership, d/b/a Verizon Wireless and TowerCo 2013, LLC propose to construct a wireless communications facility on a site located on the east side of Dove Road, south of KY-121, Farmington, KY 42020 (North Latitude: (36° 40' 04.65", West Longitude 88° 31' 54.91"). The proposed facility will include a 255-foot tall antenna tower, plus a 5-foot lightning arrestor and related ground facilities. This facility is needed to provide improved coverage for wireless communications in the area.

This notice is being sent to you because the County Property Valuation Administrator's records indicate that you may own property that is within a 500' radius of the proposed tower site or contiguous to the property on which the tower is to be constructed. You have a right to submit testimony to the Kentucky Public Service Commission ("PSC"), either in writing or to request intervention in the PSC's proceedings on the application. You may contact the PSC for additional information concerning this matter at: Kentucky Public Service Commission, Executive Director, 211 Sower Boulevard, P.O. Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2024-00128 in any correspondence sent in connection with this matter.

We have attached a map showing the site location for the proposed tower. Applicant's radio frequency engineers assisted in selecting the proposed site for the facility, and they have determined it is the proper location and elevation needed to provide quality service to wireless customers in the area. Please feel free to contact us at 317-637-1321 if you have any comments or questions about this proposal.

Sincerely,
Russell L. Brown

Attorney for Applicant
RLB/mnw
enclosure

Location Map

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

WILFERD M SCOTT
P O BOX 100
FARMINGTON, KY 42040

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

FAZI KRISTINA &
STRICKLAND KELLY
P O BOX 112
FARMINGTON, KY 42040

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

MAJORS MARCELLO
8027 STATE RT 121 S
MAYFIELD, KY 42066

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

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US POSTAGE IMI PITNEY BOWES
ZIP 46204
02 7H
0006035028
$ 008.69⁰
APR 25 2024

DERRINGTON SANDRA JEAN
8109 STATE ROUTE 121 S
MAYFIELD, KY 42066

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MAYFIELD, KY 42066

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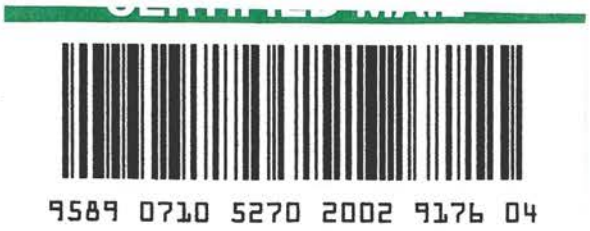
APR 25 2024

FARMINGTON CEMETERY
FARMINGTON, KY 42040

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP



SALES THOMAS E & SANDRA
8109 STATE RT 121 S
MAYFIELD, KY 42066

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

SMITH PHILLIP & LUDEAN
1999 DOVE RD
MAYFIELD, KY 42066

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

FAZI KRISTINA &
STRICKLAND KELLY
P O BOX 112
FARMINGTON, KY 42040

9590 9402 8749 3310 9190 20

2. Article Number *(Transfer from service label)*

9589 0710 5270 2002 9175 50

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Kristina Fazi ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Kristina Fazi

C. Date of Delivery 4/30/24

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☑ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Mail Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricte Delivery
- ☐ Signature Confirmation™
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PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DERRINGTON SANDRA JEAN
8109 STATE ROUTE 121 S
MAYFIELD, KY 42066

9590 9402 8749 3310 9190 06

2. Article Number *(Transfer from service label)*

9589 0710 5270 2002 9175 74

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

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☐ Adult Signature Restricted Delivery
☑ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery

☐ Priority Mail Express®
☐ Registered Mail™
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☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

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SALES THOMAS E & SANDRA
8109 STATE RT 121 S
MAYFIELD, KY 42066

9590 9402 8749 3310 9189 79

2. Article Number *(Transfer from service label)*

9589 0710 5270 2002 9176 04

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

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☐ Adult Signature Restricted Delivery
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☑ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery

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PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

WILFEID M SCOTT
P O BOX 100
FARMINGTON, KY 42040

9590 9402 8749 3310 9190 37

2. Article Number *(Transfer from service label)*

9589 0710 5270 2002 9175 43

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X M Scott Wilfeid ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* M Scott Wilfeid

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricte Delivery
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Mail
Mail Restricted Delivery
(...00)

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

ALERT: SEVERE WEATHER IN THE SOUTH, SOUTHEAST, CENTRAL, NORTHERN MID-ATLANTI...

USPS Tracking®

FAQs >

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Tracking Number:

9589071052702002917598

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Moving Through Network

In Transit to Next Facility

May 8, 2024

Arrived at USPS Regional Facility

LOUISVILLE KY DISTRIBUTION CENTER
May 1, 2024, 3:27 pm

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Product Information ⌄

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FAQs

ALERT: SEVERE WEATHER IN THE SOUTH, SOUTHEAST, CENTRAL, NORTHERN MID-ATLANTI...

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9589071052702002917567

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Out for Delivery

Preparing for Delivery

Moving Through Network

In Transit to Next Facility

May 2, 2024

Arrived at USPS Regional Facility

EVANSVILLE IN DISTRIBUTION CENTER
April 27, 2024, 11:17 am

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What Do USPS Tracking Statuses Mean? (https://faq.usps.com/s/article/Where-is-my-package)

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FAQs

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Moving Through Network

In Transit to Next Facility

May 2, 2024

Arrived at USPS Regional Facility

EVANSVILLE IN DISTRIBUTION CENTER
April 27, 2024, 11:17 am

See All Tracking History

What Do USPS Tracking Statuses Mean? (https://faq.usps.com/s/article/Where-is-my-package)

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FAQs

ALERT: SEVERE WEATHER IN THE SOUTH, SOUTHEAST, CENTRAL, NORTHERN MID-ATLANTI...

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Tracking Number:

9589071052702002917581

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Preparing for Delivery

Moving Through Network

In Transit to Next Facility

May 24, 2024

Arrived at USPS Regional Facility

LOUISVILLE KY DISTRIBUTION CENTER
May 18, 2024, 3:50 pm

See All Tracking History

What Do USPS Tracking Statuses Mean? (https://faq.usps.com/s/article/Where-is-my-package)

Text & Email Updates

Feedback

USPS Tracking Plus®

Product Information

See Less

Track Another Package

Enter tracking or barcode numbers

Need More Help?

Contact USPS Tracking support for further assistance.

FAQs

ClarkQuinn

www.clarkquinnlaw.com

Russell L. Brown
Attorney at Law
rbrown@clarkquinnlaw.com

320 N. Meridian St., Ste. 1100
Indianapolis, IN 46204
(317) 637-1321 main
(317) 687-2344 fax

May 30, 2024

Notice of Proposed Construction of
Wireless Communications Facility
Site Name: Farmington

Cellco Partnership, d/b/a Verizon Wireless and TowerCo 2013, LLC propose to construct a wireless communications facility on a site located on the east side of Dove Road, south of KY-121, Farmington, KY 42020 (North Latitude: (36° 40' 04.65", West Longitude 88° 31' 54.91"). The proposed facility will include a 255-foot tall antenna tower, plus a 5-foot lightning arrestor and related ground facilities. This facility is needed to provide improved coverage for wireless communications in the area.

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We have attached a map showing the site location for the proposed tower. Applicant's radio frequency engineers assisted in selecting the proposed site for the facility, and they have determined it is the proper location and elevation needed to provide quality service to wireless customers in the area. Please feel free to contact us at 317-637-1321 if you have any comments or questions about this proposal.

Sincerely,
Russell L. Brown

Attorney for Applicant
RLB/mnw
enclosure

Location Map

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

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MAY 30 2024

MAJORS MARCELLO
8027 STATE RT 121 S
MAYFIELD, KY 42066

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

CERTIFIED MAIL®

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ZIP 46204
02 7H
0006035028

$ 008.69⁰

MAY 30 2024

FARMINGTON CEMETERY
FARMINGTON, KY 42040

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$ 008.69⁰
MAY 30 2024

SMITH PHILLIP & LUDEAN
1999 DOVE RD
MAYFIELD, KY 42066

CERTIFIED MAIL®

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

9589 0710 5270 2002 9189 39

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US POSTAGE PITNEY BOWES

ZIP 46204
02 7H
0006035028

$ 008.69⁰
MAY 30 2024

SOUTHARD BOBBY ALAN
8133 STATE RT 121 SOUTH
MAYFIELD, KY 42066

ClarkQuinn

www.clarkquinnlaw.com

Russell L. Brown
Attorney at Law
rbrown@clarkquinnlaw.com

320 N. Meridian St., Ste. 1100
Indianapolis, IN 46204
(317) 637-1321 main
(317) 687-2344 fax

April 25, 2024

Via Certified Mail, Return Receipt Requested
9589 0710 5270 2002 9175 36

Hon. Jesse Perry
Graves County Judge/Executive
1102 Paris Rd Ste 2
Mayfield, KY 42066

RE: Notice of Proposal to Construct Wireless Communications Facility
Kentucky Public Service Commission Docket No. 2024-00128
Site Name: Farmington

Dear Judge Perry:

Cellco Partnership, d/b/a Verizon Wireless and TowerCo 2013, LLC propose to construct a wireless communications facility on a site located on the east side of Dove Road, south of KY-121, Farmington, KY 42020 (North Latitude: (36° 40’ 04.65”, West Longitude 88° 31' 54.91"). The proposed facility will include a 255-foot tall antenna tower, plus a 5-foot lightning arrestor and related ground facilities. This facility is needed to provide improved coverage for wireless communications in the area.

You have a right to submit comments to the PSC or to request intervention in the PSC's proceedings on the application. You may contact the PSC at: Executive Director, Public Service Commission, 211 Sower Boulevard, P.O. Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2024-00128 in any correspondence sent in connection with this matter.

We have attached a map showing the site location for the proposed tower. Verizon Wireless' radio frequency engineers assisted in selecting the proposed site for the facility, and they have determined it is the proper location and elevation needed to provide quality service to wireless customers in the area. Please feel free to contact us with any comments or questions you may have.

Sincerely,
Russell L. Brown

Attorney for Applicant

Location Map

CERTIFIED MAIL®

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

9589 0710 5270 2002 9175 36

FIRST-CLASS

US POSTAGE PITNEY BOWES

ZIP 46204
02 7H
0006035028

$ 008.69⁰
APR 25 2024

Hon. Jesse Perry
Graves County Judge/Executive
1102 Paris Rd Ste 2
Mayfield, KY 42066

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Jesse Perry
Graves County Judge/Executive
1102 Paris Rd Ste 2
Mayfield, KY 42066

9590 9402 8749 3310 9189 31

Article Number *(Transfer from service label)*

9589 0710 5270 2002 9175 36

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Vickie VenCasor ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Vickie VenCasor C. Date of Delivery 9-20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Mail
- ☐ Mail Restricted Delivery (500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricte Delivery
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

SITE NAME: FARMINGTON
NOTICE SIGNS

The signs are at least (2) feet by four (4) feet in size, of durable material, with the text printed in black letters at least one (1) inch in height against a white background, except for the word **"tower,"** which is at least four (4) inches in height.

Tower Ventures and Cellco Partnership, d/b/a Verizon Wireless proposes to construct a telecommunications **tower** on this site. If you have questions, please contact Clark, Quinn, Moses, Scott & Grahn, LLP, 320 N. Meridian Street, Indianapolis, IN 46204; 317-637-1321, or the Executive Director, Public Service Commission, 211 Sower Boulevard, PO Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2024-00128 in your correspondence.

Tower Ventures and Cellco Partnership, d/b/a Verizon Wireless proposes to construct a telecommunications **tower** on this site. If you have questions, please contact Clark, Quinn, Moses, Scott & Grahn, LLP, 320 N. Meridian Street, Indianapolis, IN 46204; 317-637-1321, or the Executive Director, Public Service Commission, 211 Sower Boulevard, PO Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2024-00128 in your correspondence.

ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

Robert B. Scott
Charles R. Grahn
Frank D. Otte*
John "Bart" Herriman
William W. Gooden**
Michael P. Maxwell
Russell L. Brown**†
Jennifer F. Perry
Keith L. Beall
N. Davey Neal
Travis W. Cohron
Maggie L. Sadler
Kristin A. McIlwain
Olivia A. Hess

Land Use Consultant
Elizabeth Bentz Williams, AICP

*Also admitted in Montana
†Also admitted in Kentucky
**
Registered Civil Mediator

VIA EMAIL: ggilbert@tribunecourier.com

Tribune Courier
86 Commerce Blvd.
Benton, KY 42025

RE: Legal Notice Advertisement
Site Name: Farmington

To Whom It May Concern,

Please publish the following legal notice advertisement in the next available edition of the publication serving Graves County, Farmington, Kentucky:

NOTICE

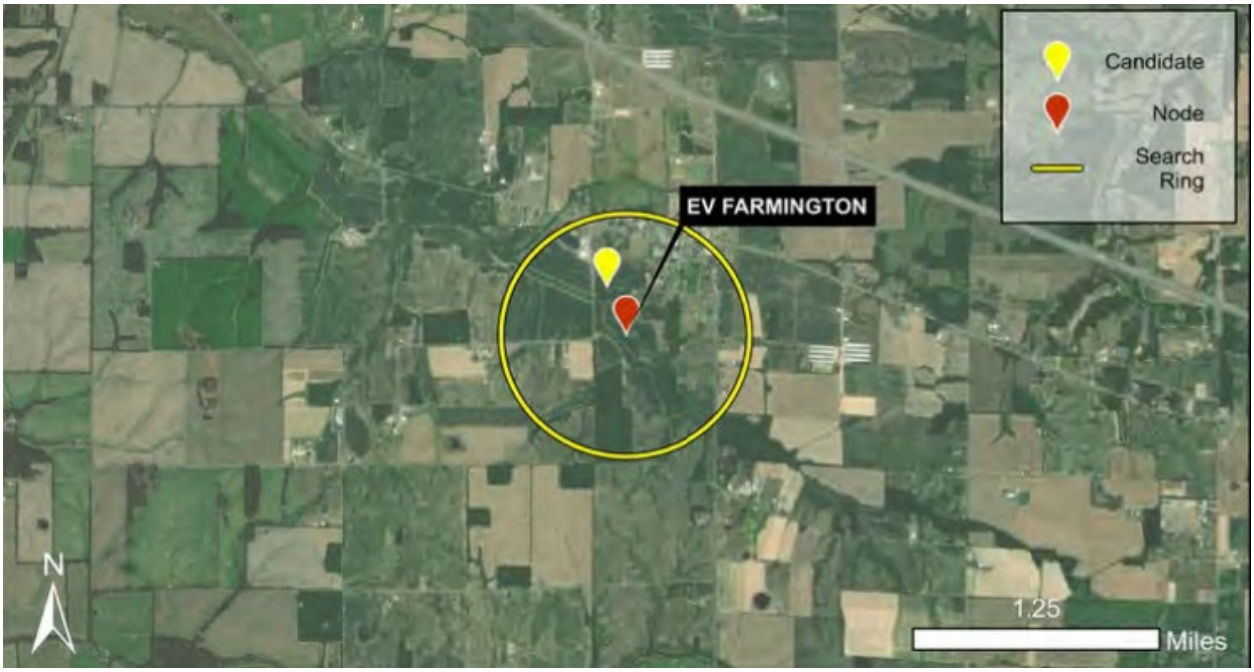
Cellco Partnership, d/b/a Verizon Wireless and TowerCo 2013, LLC propose to construct a wireless communications facility on a site located on the east side of Dove Road, south of KY-121, Farmington, KY 42020 (North Latitude: (36° 40' 04.65", West Longitude 88° 31' 54.91"). The proposed facility will include a 255-foot tall antenna tower, plus a 5-foot lightning arrestor and related ground facilities. Site name is Farmington. You have a right to submit comments to the PSC or to request intervention in the PSC's proceedings on the application. You may contact the PSC at: Executive Director, Public Service Commission, 211 Sower Boulevard, P.O. Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2024-00128 in any correspondence sent in connection with this matter.

After this advertisement has been published, please forward a tearsheet copy, affidavit of publication, and invoice to Clark, Quinn, Moses, Scott & Grahn, LLC, 320 N. Meridian Street, Indianapolis, IN 46204 or by email to ebw@clarkquinnlaw.com. Please call me on my cell with any questions at 317-902-2187 if you have any questions. Thank you for your assistance.

Sincerely,

Elizabeth Bentz Williams, AICP

Radio Frequency Design Search Area



verizon

January, 4th, 2024

RE: Proposed Cellco Partnership d/b/a Verizon Wireless Communications Facility
Site Name: EV Farmington
Type of Tower: 255 ft. Self-Support
Location: Dove Road, Farmington, KY 42020 Graves County

To Whom It May Concern:

As a radio frequency engineer for Verizon Wireless, I am providing this letter to state the need for a Verizon Wireless site called, EV Farmington.

The EV Farmington site is proposed with the below objectives:

1. To improve cellular service for the residents and businesses in Graves County near Farmington. This will improve coverage along KY-80 & KY-121.
2. To offload existing traffic of existing Verizon sites in this area.

Currently the area is experiencing poor service along KY-80 & KY-121 and in the residential areas near Farmington. There is high demand for wireless high-speed data in these locations. This tower is needed to provide Verizon customers in the area with the best experience on their wireless devices.

Raw Land – Design plans for a new tower would provide an overall tower height of 255 feet with a Verizon Wireless Centerline of 250'. The new structure height was decided upon to best cover KY-80, KY-121, the residents in the area, and to offload traffic from the nearby existing Verizon sites. If we are limited to building a structure less than the proposed height, another tower would be needed in the vicinity in the near future. In addition, building a structure that is too short can cause existing taller sites to cover over the proposed site and building a site that is too tall can cause the proposed site to shoot over existing sites. Both situations create a poor experience from a user perspective. The new structure is proposed to be placed near the center of the problem area. The new tower design solves the stated objectives.

Verizon Wireless cares about the communities as well as the environment and prefers to collocate on existing structures when available. Verizon Wireless is currently collocated on many structures in the County. We prefer collocation due to reduced construction costs, faster deployment, and environment protection. However, Verizon Wireless was unable to find a suitable structure within the center of the demand area to collocate the proposed site on.

verizon

Verizon Wireless design engineers establish search area criteria in order to effectively meet coverage objectives as well as offload existing Verizon cell sites. When met, the criterion also reduces the need for a new site to cover the area in the immediate future. Each cellular site covers a limited area, depending on site configuration and the surrounding terrain. Cell sites are built in an interconnected network; which means each cell site must be located so that their respective coverage areas are contiguous. This provides uninterrupted communications throughout the coverage area.

Since collocation is generally the most cost-effective means for prompt deployment of new facilities, Verizon Wireless makes every effort to investigate the feasibility for using existing towers or other tall structures for collocation when designing a new site or system expansion. However, collocation on an existing tower or tall structure is not always feasible due to location of existing cell sites. Cell sites are placed in a way so they provide a smooth hand off to each other and are placed at some distance from each other to eliminate too much overlap. Too much overlap may result in a waste of resources and raise a system capacity overload concern.

This cell site has been designed, and shall be constructed and operated in a manner that satisfies regulations and requirements of all applicable governmental agencies that have been charged with regulating tower specifications, operation, construction, and placement, including the FAA and FCC.

Sincerely,

Jared A. Sharp
RF Engineer III
Verizon Wireless

Subscribed and sworn to before me this 9 Day of January 2024.

Lauren Brooke Pollard
(Signature of Notary)

SEAL

Lauren Brooke Pollard
(Printed Name of Notary)

LAUREN BROOKE POLLARD
Notary Public - State at Large
Kentucky
My Commission Expires Nov. 09, 2026
Notary ID KYNP61878

January, 4th, 2024

RE: Zoning Coverage Plots

Site Name: EV Farmington

To Whom It May Concern:

This map is not a guarantee of coverage and may contain areas with no service. This map reflects a depiction of predicted and approximate wireless coverage of the network and is intended to provide a relative comparison of coverage. The depictions of coverage do not guarantee service availability as there are many factors that can influence coverage and service availability. These factors vary from location to location and change over time. The coverage areas may include locations with limited or no coverage. Even within a coverage area shown, there are many factors, including but not limited to, usage volumes, outage, customer's equipment, terrain, proximity to buildings, foliage, and weather that may impact service.

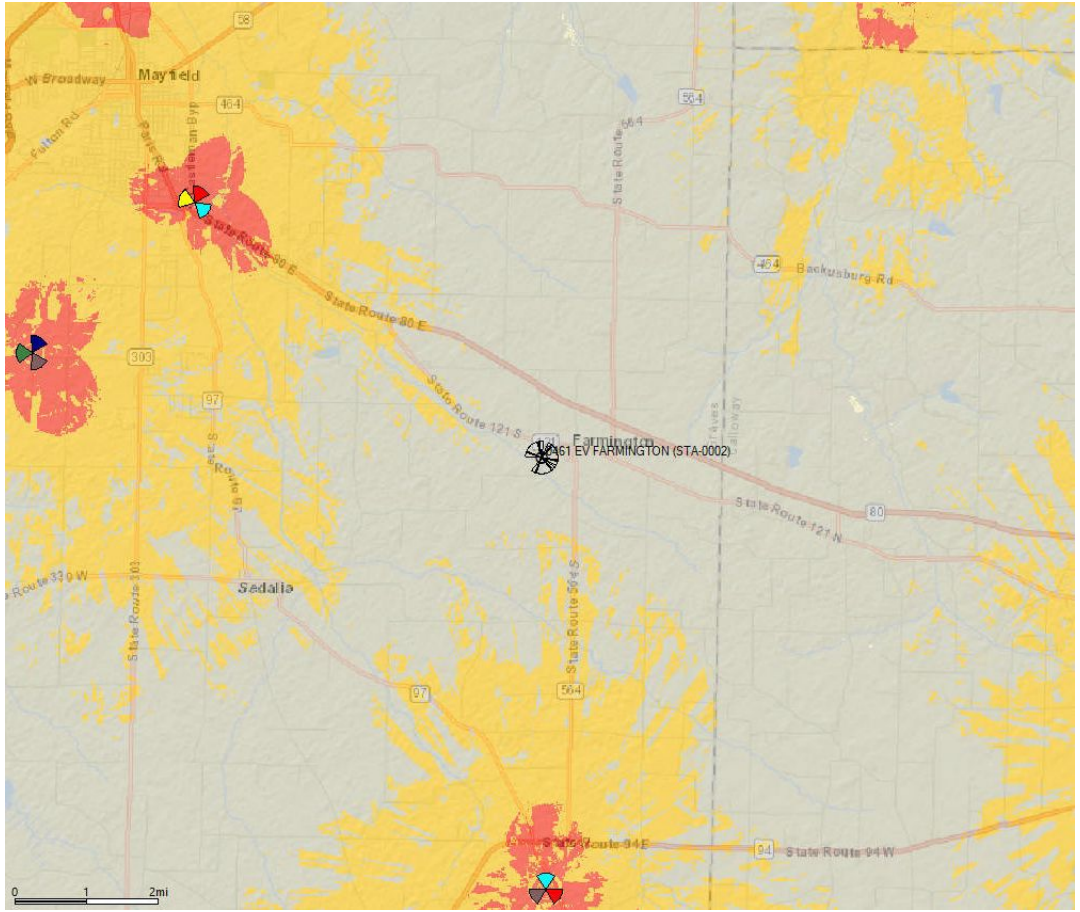
The proposed site is needed to offload capacity from existing sites and to improve coverage in the area. This map reflects the predicted coverage area that will be offloaded from existing sites and transferred to the proposed site and also depicts improved coverage in the area.

Sincerely,

Jared Sharp

Jared A. Sharp
RF Engineer III
Verizon Wireless

Current Coverage - Without Proposed EV Farmington



Coverage - With Proposed EV Farmington

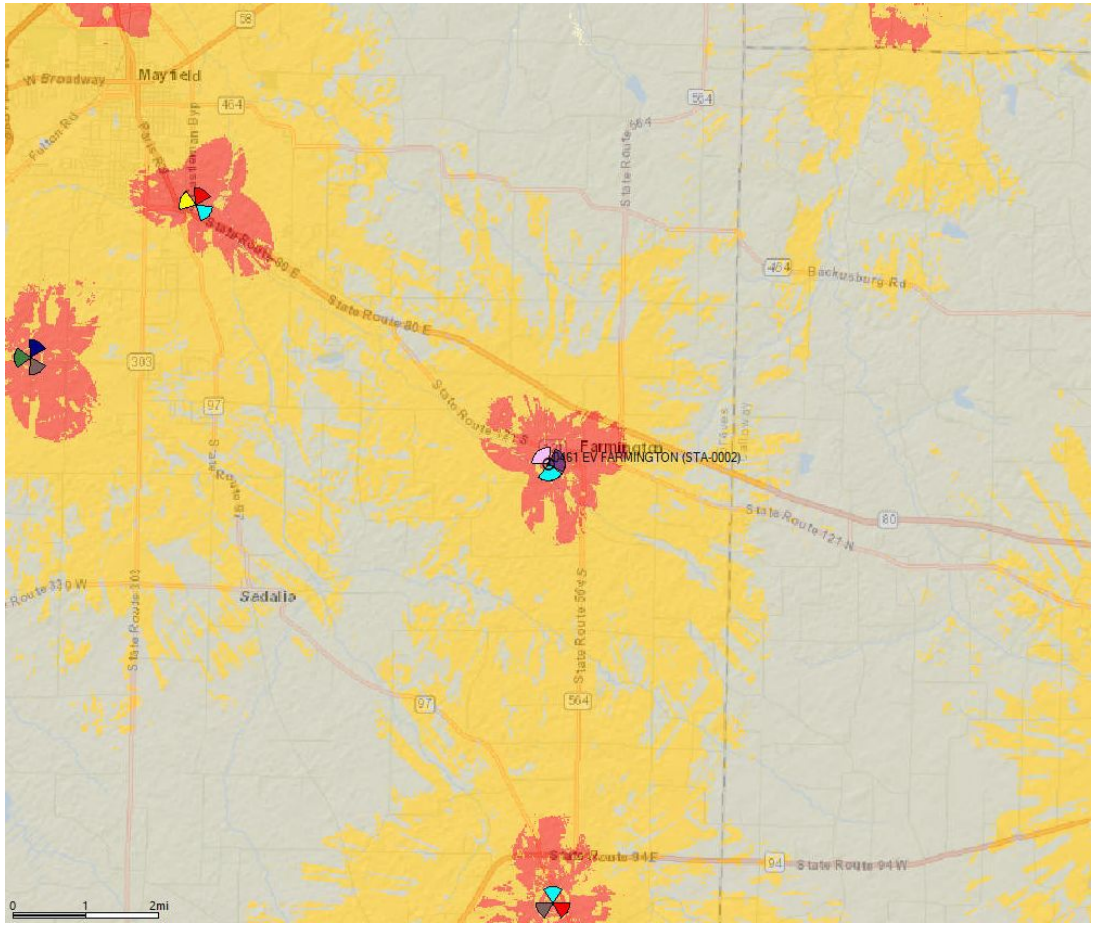


Exhibit S
List and Identity and Qualifications of Professionals

Christopher J. Scheks
Professional Engineer
Kentucky License 29760
GPD Group, Inc.
520 South Main Street
Akron, OH 44311

Ralph M. Wallem
Professional Land Surveyor
Kentucky License 2195
Benchmark Services, Inc.
318 North Main Street
Huntingburg, IN 47542

J. Scott Hilgoe
Professional Engineer
Kentucky License 38635
Engineered Tower Solutions, PLLC
3227 Wellington Court
Raleigh, NC 27615

Michael L. Lassiter
Professional Engineer
Kentucky License 24895
Delta Oaks Group
4904 Professional Court, Second Floor
Raleigh, NC 27609

Brad R. Milanowski
Professional Engineer
Kentucky License 25311
B + T Group
1717 Boulder Ave., Suite 300
Tulsa, OK 74009

Larry Rhoads
Construction Manager
Verizon Wireless
2421 Holloway Road
Louisville, KY 40299

Jared Sharp
RF Engineer
Verizon Wireless

2421 Holloway Road
Louisville, KY 40299

STATE OF INDIANA)
) SS:
COUNTY OF MARION)

AFFIDAVIT OF CERTIFICATION
COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION

I Russell L. Brown, attorney for Cellco Partnership, d/b/a Verizon Wireless do hereby certify that as the person supervising the preparation of this application and all statements and information contained herein are true and accurate to the best of that person's knowledge, information, and belief formed after a reasonable inquiry for all information within this application.

Russell L. Brown
Attorney, for Cellco Partnership, d/b/a Verizon Wireless

STATE OF INDIANA,
COUNTY OF MARION, SS:
Subscribed and sworn to before me this 31st day of May, 2024.

Notary Public
Printed Name of Notary: Elizabeth Bentz Williams
My commission expires: November 18, 2028
My County of Residence: Marion
Commission #: 0639620