# FIRST AMENDMENT TO LEASE AGREEMENT

THIS FIRST AMENDMENT TO LEASE AGREEMENT ("Amendment") is made and entered into by and between TOWN OF MUNSTER, an Indiana municipal corporation ("Landlord") and SprintCom LLC, a Kansas limited liability company as successor in interest to SprintCom, Inc., a Kansas corporation ("Tenant").

## RECITALS

Landlord and Tenant recite, declare and agree as follows:

A. Landlord and Tenant's predecessor in interest entered into a Lease Agreement, dated December 21, 2004 ("the Lease") with respect to a portion of the Property located at approximately 8845 White Oak Road, Munster, Indiana 46321.
B. Landlord owns the real property described in Exhibit B attached hereto and by this reference made a part hereof.
C. Landlord and Tenant desire to enter into this Amendment in order to modify and amend certain provisions of the Lease.

**NOW, THEREFORE,** in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant covenant and agree as follows:

1. Exhibit C to the Lease is hereby removed and replaced with the plans set forth in **Exhibit C-1** of this Amendment.

2. For notice purposes, Tenant's name and address in Section 1.1 of the Lease, is hereby deleted and replaced with the following:

   T-Mobile USA, Inc.
   12920 SE 38th Street
   Bellevue, WA 98006
   Attn: Lease Compliance/Site No. CH87073A / Site Name: CH60XC216C

3. The terms and conditions of the Lease are incorporated herein by reference, and capitalized terms used in this Amendment shall have the same meanings as such terms are given in the Lease. Except as specifically set forth herein, this Amendment shall in no way modify, alter or amend the remaining terms of the Lease, all of which are ratified by the parties and shall remain in full force and effect. To the extent there is any conflict between the terms and conditions of the Lease and this Amendment, the terms and conditions of this Amendment will govern and control.

4. Landlord represents and warrants that the consent or approval of no third party, including without limitation, a lender, is required with respect to the execution of this Amendment,

or if any such third party consent or approval is required, Landlord has obtained any and all such consents or approvals.

5. This Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute a single instrument. Signed facsimile and electronic copies of this Amendment shall legally bind the parties to the same extent as original documents.

**IN WITNESS WHEREOF**, the parties have executed this Amendment effective as of the date of execution by the last party to sign.

**LANDLORD:**
**Town of Munster**

By:

_____

Print Name:

_____

Title:

_____

Date:

_____

**TENANT:**
**SprintCom LLC**

By:

_____

Print Name:

_____

Title:

_____

Date:

_____

TMO Legal Digitally signed by TMO Legal Date: 2024.10.15 10:40:54 -04'00'

# EXHIBIT B

## LEGAL DESCRIPTION OF THE LEASED PROPERTY

LEGAL DESCRIPTION:

That part of the southwest quarter of Section Twenty (20), Township Thirty-Six (36) north, range nine (9) west of the second principal meridian, commencing at a point on the west line of said section which is 54 feet north of the southwest corner of said section; thence north on the section line, 180.38 feet; thence east, 325.71 feet to a point which is 234.05 feet north of the south line of said section; thence south, 180.05 feet to a point which is 325.49 feet east of the west line of said section; thence west, 325.49 feet to the place of beginning, containing 1.347 acres, more or less, in the town of Munster, Lake County, Indiana.

LEASE SITE DESCRIPTION:

A parcel of land for lease site purposes located in that part of the southwest quarter of Section 20, Township 36 North, Range 9 west of the second principal meridian, described as follows:

Commencing at a point on the west line of said section which is 54.00 feet north of the southwest corner of said section; thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 205.81 feet; thence N.01°02'20"W., 122.74 feet to a point of beginning; thence continuing N.01°02'20"W., 40.00 feet; thence S.88°57'40"W., 22.00 feet; thence S.01°02'20"E., 40.00 feet; thence N.88°57'40"E., 22.00 feet to the point of beginning, containing 0.0202 acres, more or less, in the Town of Munster, Lake County, Indiana.

ACCESS EASEMENT DESCRIPTION:

A parcel of land for access easement purposes located within that part of the southwest quarter of Section 20, Township 36 North, Range 9 West of the second principal meridian, described as follows:

Commencing at a point on the west line of said section which is 54.00 feet north of the southwest corner of said section: thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 205.81 feet to a point of beginning; thence N.01°02'20"W., 162.74 feet; thence N.88°57'40"E., 12.00 feet; thence S.01°02'20"E., 6.75 feet; thence S.46°02'21"E., 7.07 feet; thence N.88°57'40"E., 15.00 feet; thence S.01°02'20"E., 12.00 feet; thence S.81°31'28"W., 15.55 feet; thence S.55°49'53"W., 5.47 feet; thence S.01°02'20"E., 134.24 feet to a point 54.00 feet north of the south line of the southwest quarter of said Section 20; thence N.89°49'55"W., along a line 54.00 feet north and parallel with the south line of the southwest quarter of said Section 20, 12.00 feet to the point of beginning, containing 0.0514 acres, more or less, in the Town of Munster, Lake County, Indiana.

EXHIBIT B CONTINUED

UTILITY EASEMENT NO. 1 DESCRIPTION:

A parcel of land for utility easement purposes located within that part of the southwest quarter of Section 20, Township 36 North, Range 9 West of the second principal meridian, described as follows:

Commencing at a point on the west line of said section which is 54.00 feet north of the southwest corner of said section; thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 205.81 feet to a point of beginning; thence N.01°02'20"W., 122.74 feet; thence S.88°57'40"W., 8.00 feet; thence S.01°02'20"E., 122.57 feet to a point 54.00 feet north of the south line of the southwest quarter of said Section 20; thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 8.00 feet to the point of beginning, containing 0.225 acres, more or less, in the Town of Munster, Lake County, Indiana.

UTILITY EASEMENT NO. 2 DESCRIPTION:

A parcel of land for utility easement purposes located in that part of the southwest quarter of Section 20, Township 36 North, Range 9 West of the second principal meridian, described as follows:

Commencing at a point on the west line of said section which is 54.00 feet north of the southwest corner of said section; thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 205.81 feet; thence N.01°02'20"W., 122.74 feet; thence S.88°57'40"W., 22.00 feet to a point of beginning; thence S.88°57'40"W., 6.01 feet; thence N.01°02'20W., 38.08 feet; thence N.89°46'27"W., 176.37 feet to the west line of the southwest quarter of said Section 20; thence N.00°31'42"W., along the west line of the southwest quarter of said Section 20, 20.00 feet; thence S.89°46'27"E., 182.20 feet; thence S.01°02'20"E., 57.95 feet to the point of beginning, containing 0.0889 acres, more or less in the Town of Munster, Lake County, Indiana.

UTILITY EASEMENT NO. 3 DESCRIPTION:

A parcel of land for utility easement purposes located in that part of the southwest quarter of Section 20, Township 36 North, Range 9 west of the second principal meridian, described as follows:

Commencing at a point on the west line of said section which is 54.00 feet north of the southwest corner of said section; thence S.89°49'55"E., along a line 54.00 feet north of and parallel with the south line of the southwest quarter of said Section 20, 205.81 feet; thence N.01°03'00"W., 151.19 feet to a point of beginning; thence N.01°02'20"W., 9.61 feet; thence S.57°21'27"E., 55.89 feet; thence S.25°09'03"W., 7.97 feet; thence N.57°27'51"W., 51.60 feet to the point of beginning, containing 0.0098 acres, more or less, in the Town of Munster, Lake County, Indiana.

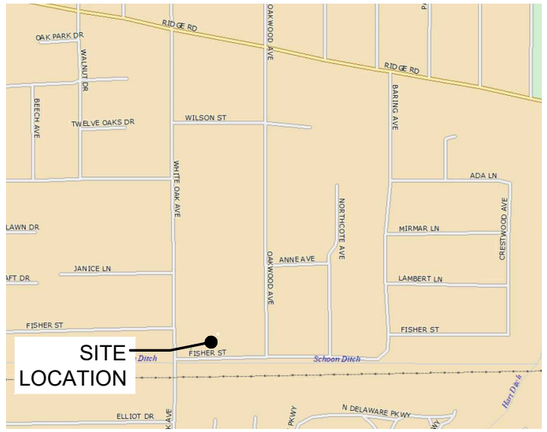
EXHIBIT C-1
(See attached drawings)

## CONSULTANT TEAM

| | |
|---|---|
| PROJECT CONSULTANT: | TERRA CONSULTING GROUP<br>600 BUSSE HIGHWAY<br>PARK RIDGE, IL 60068<br>(847) 698-6400 |
| STRUCTURAL: (TOWER ANALYSIS) | KRECH OJARD & ASSOCIATES, PA<br>101 PUTNAM STREET<br>EAU CLAIRE, WI 54703<br>(715) 552-7374<br>(715) 552-7336 (FAX) |
| STRUCTURAL ANALYSIS DATE: | 04/28/2024 |

## VICINITY MAP

N.T.S.




## REGIONAL MAP

N.T.S.


## PROJECT TYPE

PROPOSED T-MOBILE ANTENNAS TO BE REINSTALLED ON EXISTING WATER TOWER STRUCTURE.

## PROJECT INFORMATION

| | |
|---|---|
| SITE COORDINATES: | LATITUDE: 41° 33' 9.2988" N<br>LONGITUDE: 87° 29' 21.5016" W |
| ADDRESS: | 8835 WHITE OAK AVE<br>MUNSTER, IN 46321 |
| JURISDICTION: | LAKE COUNTY |
| CONSTRUCTION TYPE: | REINSTALL |
| PROPERTY OWNER: | TOWN OF MUNSTER |
| TOWER OWNER: | TOWN OF MUNSTER |
| APPLICANT: | T-MOBILE<br>1400 OPUS PLACE<br>DOWNERS GROVE, IL 60515 |
| CONSTRUCTION MANAGER: | DAVID COLLINS (224) 470-9585 |
| REAL ESTATE MANAGER: | PATRICE LEWIS (847) 706-7434 |

T-Mobile
stick together

1400 OPUS PLACE
DOWNERS GROVE, IL 60515

# SITE ID CH87073A

# SITE NAME: CH60XC216

# 8835 WHITE OAK AVE MUNSTER, IN 46321

Indiana 811
KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.
CONTACT INDIANA 811 TWO WORKING DAYS
BEFORE STARTING PROJECT
Call 811, 1-800-382-5544

JOHN J ZIMMERMANN
REGISTERED
NO. 19500464
STATE OF
INDIANA
PROFESSIONAL ENGINEER
7/19/2024

| SHEET | DRAWING INDEX | REVISION |
|---|---|---|
| T-1 | TITLE SHEET | 1.,2.,3. |
| C-1 | SITE LAYOUT | 1.,2. |
| ANT-1 | SITE ELEVATION | 1.,2.,3. |
| ANT-2 | ANTENNA LAYOUT | 1. |
| ANT-2A | PROPOSED ANTENNA LAYOUT | 1., 2. |
| ANT-3 | ANTENNA INFORMATION | - |
| ANT-3A | COMBINER CABLE DATA & CABLE DIAGRAM | - |
| ANT-4 | PAINTING SPECIFICATION | 2. |
| ANT-5 | DETAILS | 3. |
| E-1 | GROUNDING LAYOUT PLAN | 2. |
| E-2 | GROUNDING DETAILS | - |
| E-3 | GROUNDING DETAILS | - |
| S-1 | GENERAL NOTES & STRUCTURAL PLANS | 1. |
| S-2 | STRUCTURAL DETAILS | 1. |
| S-3 | STRUCTURAL DETAILS | 1. |

22" x 34" IS FULL SCALE | 11" x 17" IS HALF SCALE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TEL: (773) 444-5400

TERRA CONSULTING GROUP
600 BUSSE HIGHWAY
PARK RIDGE, IL 60068
PH: 847-698-6400
FAX: 847-698-6401


REVISIONS

| NO. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| - | ISSUED FOR REVIEW | 02/28/2024 | RA |
| 1. | REVISED PER UPDATED SA | 03/29/2024 | RA |
| 2. | ADDITION OF PAINTING NOTES AND REVISED HANDRAIL DESIGN | 05/09/2024 | AU |
| 3. | ISSUED FOR PERMITTING/REVISED PER THIRD PARTY COMMENTS | 06/24/2024 | RA |
| 4. | ISSUED FOR FINAL | 07/19/2024 | RA |

SITE ID # CH87073A

CH60XC216 REINSTALL

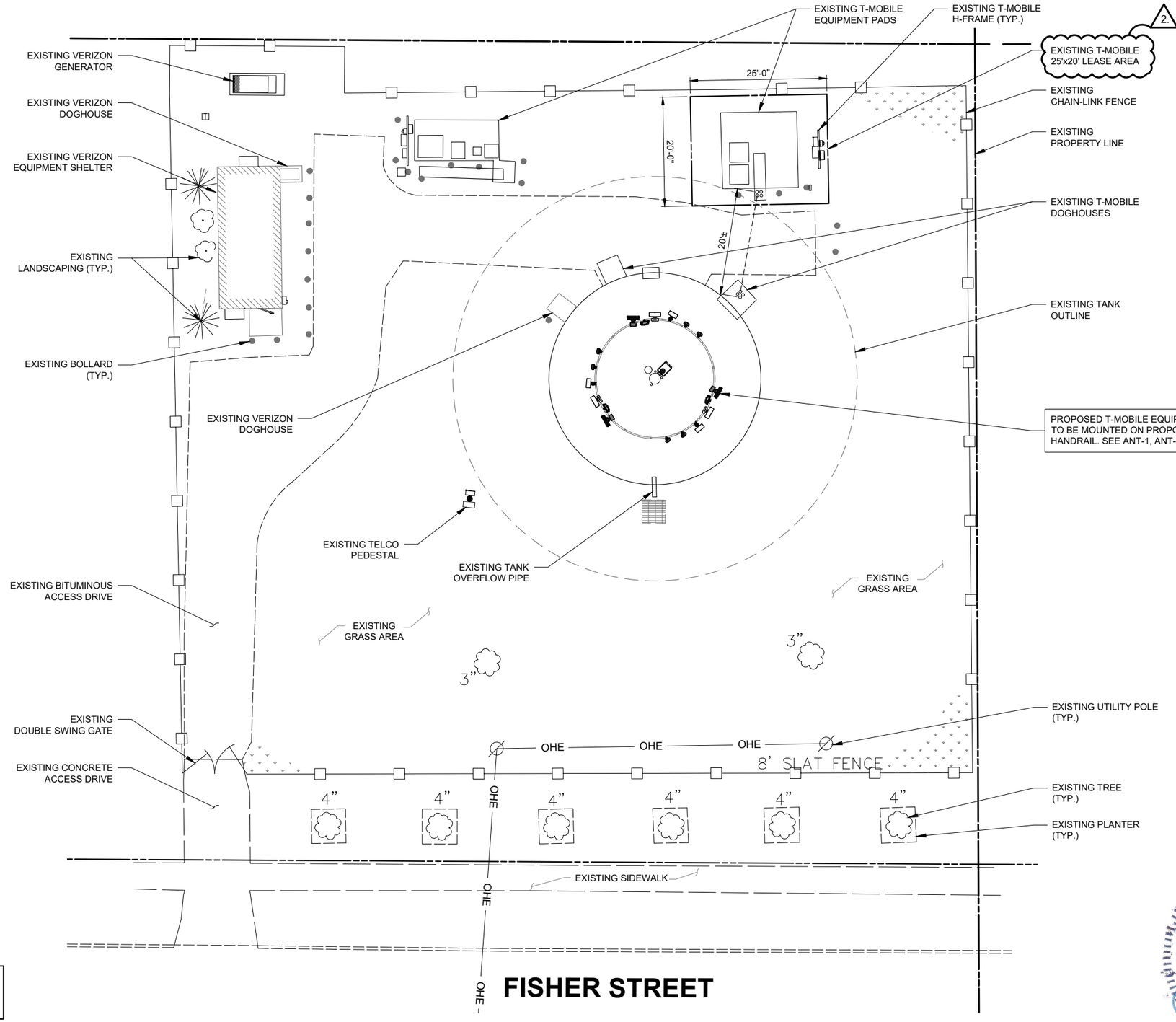
8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
TITLE SHEET

SHEET NUMBER
**T-1**

TMO Signatory Level: L06
NLG-103032




1 SITE LAYOUT

G.C. TO WEATHERPROOF AND SEAL ALL LESSEE PORTS, BASEBELL PENETRATIONS, ANTENNA LEVEL PENETRATIONS, AND CONDUITS WITH APPROPRIATE BOOTS AFTER CABLE REMOVAL AND INSTALLATION

THIS SITE PLAN WAS CREATED OFF OF FIELD MEASUREMENTS BY THE DESIGNER, AS BOUNDARY SURVEY WAS NOT SUPPLIED FOR PURPOSES OF SITE LAYOUT.

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# SITE ID # CH87073A

## CH60XC216 REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE

SITE LAYOUT

SHEET NUMBER

**C-1**

JOHN J. ZIMMERMANN
REGISTERED
NO. 19500464
STATE OF
INDIANA
PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032

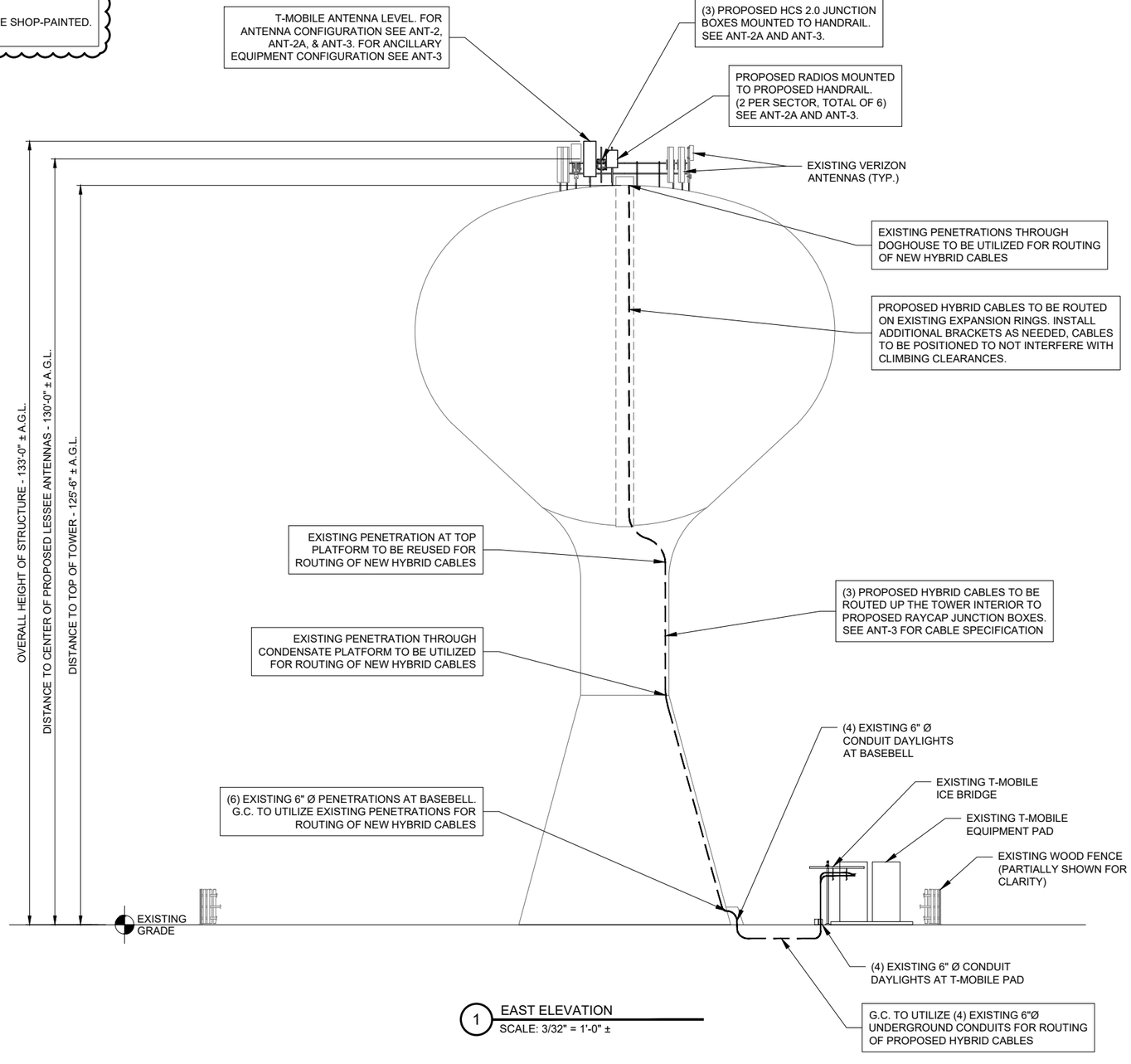
NOTES:
THIS DRAWING IS FOR EXHIBIT AND LAYOUT PURPOSES ONLY.

PLEASE REFER TO TOWER AND MOUNT ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

**MOUNT MODIFICATIONS** REQUIRED. NO ANTENNA WORK TO BEGIN PRIOR TO COMPLETION OF REINFORCEMENT INSTALLATION.

2.

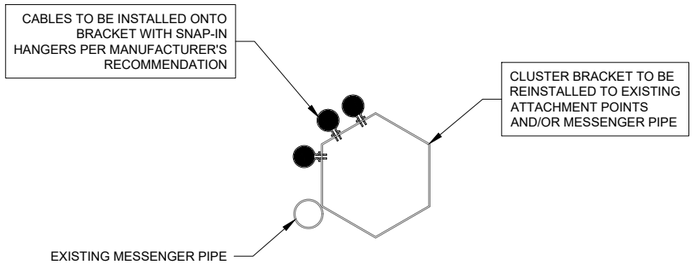
NOTE:
ANTENNAS ARE TO BE SHOP-PAINTED. SEE SHEET ANT-4




1 EAST ELEVATION
SCALE: 3/32" = 1'-0" ±

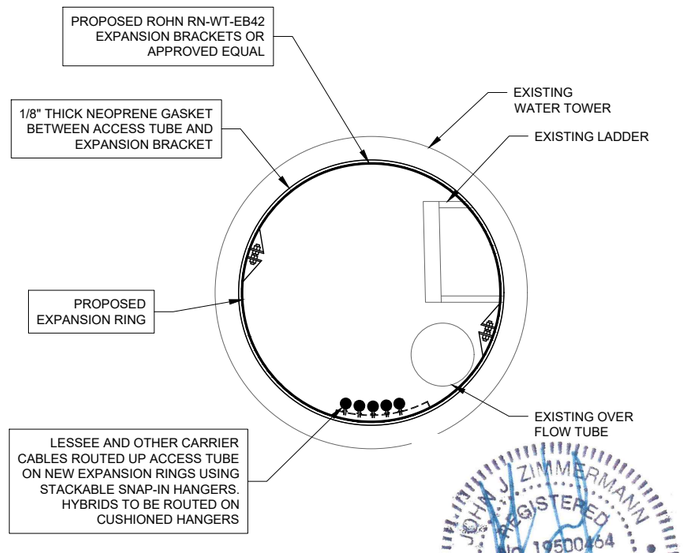
3.

NOTE:
ANY PROPOSED WELDED ATTACHMENT OF NEW OR ADDITIONAL CABLE BRACKETS TO THE WATER TOWER WILL NEED TO BE COMPLETED PRIOR TO PAINTING THE WATER TOWER.




3.
2 CABLE ATTACHMENT DETAIL
SCALE: N.T.S.

FULL SCALE PRINT IS ON 22"x34" MEDIA
HALF SCALE PRINT IS ON 11"x17" MEDIA




3.
3 DRY ACCESS TUBE PLAN
SCALE: N.T.S.

JOHN J. ZIMMERMANN
REGISTERED
No. 10500464
STATE OF
INDIANA
PROFESSIONAL ENGINEER
7/19/2024

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# SITE ID # CH87073A

## CH60XC216 REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
SITE ELEVATION

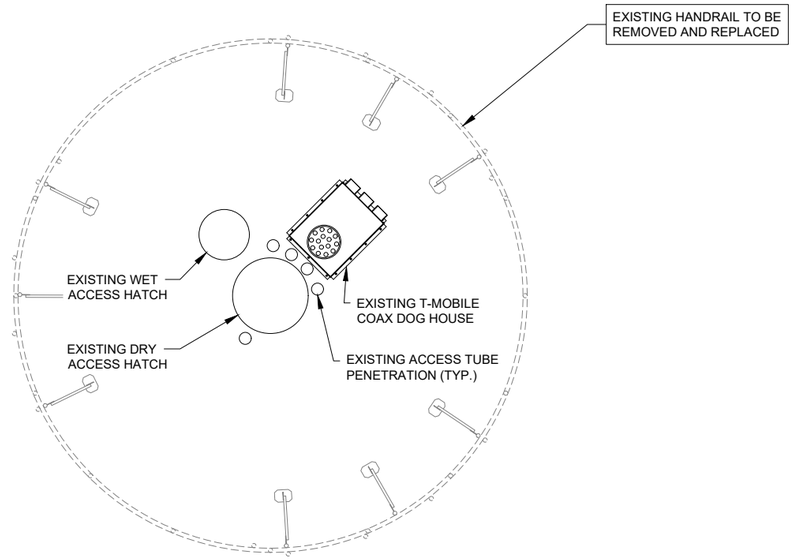
SHEET NUMBER
**ANT-1**

TMO Signatory Level: L06
NLG-103032

NOTES:
THIS DRAWING IS FOR EXHIBIT AND LAYOUT PURPOSES ONLY.

PLEASE REFER TO TOWER AND MOUNT ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

**MOUNT MODIFICATIONS** REQUIRED. NO ANTENNA WORK TO BEGIN PRIOR TO COMPLETION OF REINFORCEMENT INSTALLATION.




1 EXISTING ANTENNA LAYOUT
N.T.S.

EXISTING SITE CONDITIONS SUPPLIED BY VERIZON WIRELESS AND ARE NOTED IN THE MOUNT ANALYSIS (BY OTHERS). SITE VISIT WAS NOT PERFORMED FOR THIS UPGRADE.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SITE ID #
CH87073A

CH60XC216
REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
ANTENNA LAYOUT

SHEET NUMBER
**ANT-2**

JOHN J ZIMMERMANN
REGISTERED
No. 19500464
STATE OF INDIANA
PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032

NOTES:
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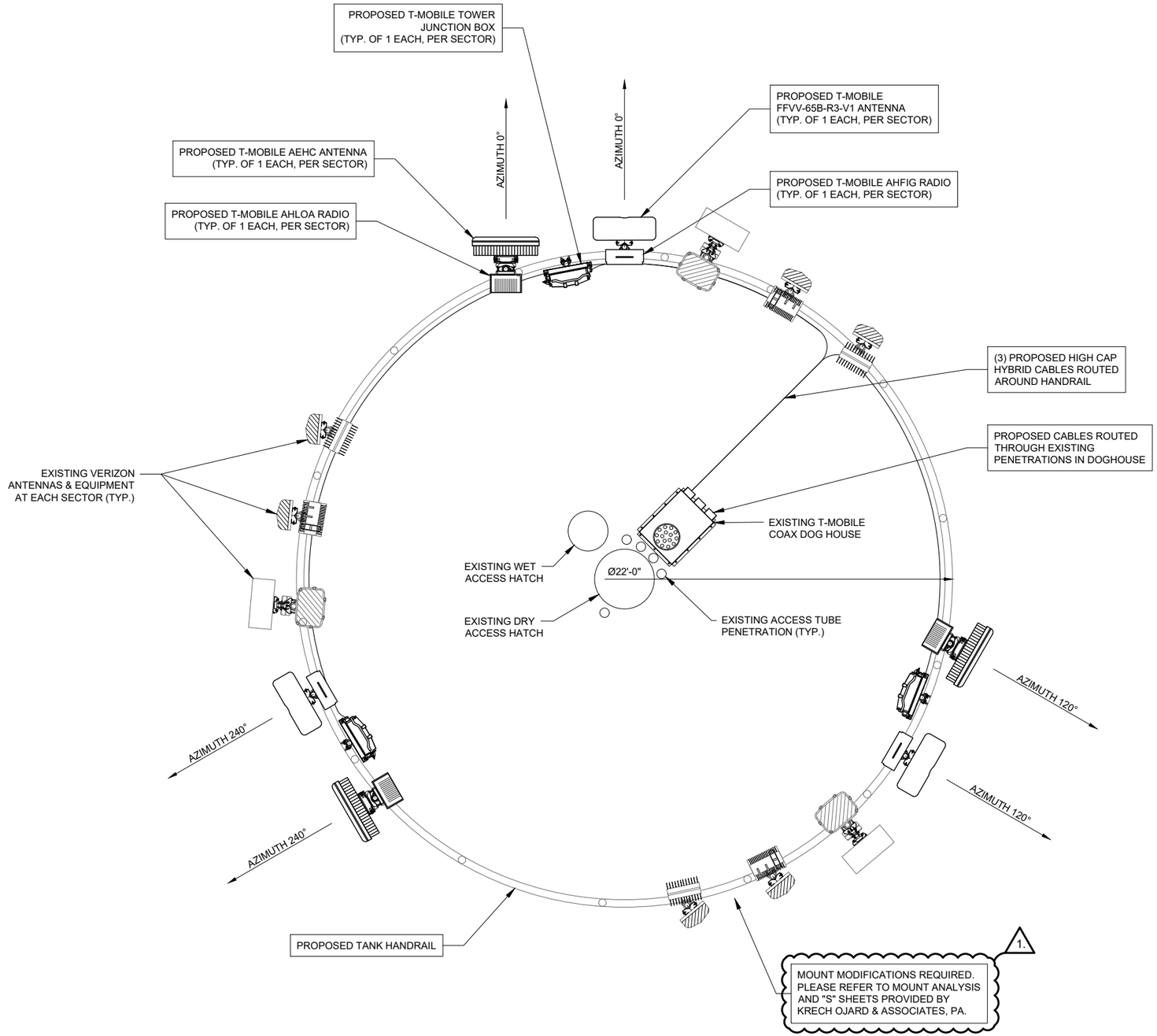
PLEASE REFER TO TOWER AND MOUNT ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

**MOUNT MODIFICATIONS** REQUIRED. NO ANTENNA WORK TO BEGIN PRIOR TO COMPLETION OF REINFORCEMENT INSTALLATION.

FINAL CONFIGURATION TO MATCH RFDS. REMOVE ALL EQUIPMENT NOT LISTED ON THE RFDS. REFER TO MOUNT ANALYSIS FOR ADDITIONAL REQUIREMENTS.




1 PROPOSED ANTENNA LAYOUT
N.T.S.

G.C. TO WEATHERPROOF AND SEAL ALL LESSEE PORTS, BASEBELL PENETRATIONS, ANTENNA LEVEL PENETRATIONS, AND CONDUITS WITH APPROPRIATE BOOTS AFTER CABLE REMOVAL AND INSTALLATION

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| | |
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| PROJECT #: | 194-136 |

SHEET TITLE
PROPOSED ANTENNA LAYOUT

SHEET NUMBER
**ANT-2A**

JOHN J. ZIMMERMANN
REGISTERED
No. 19500464
STATE OF INDIANA
PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032

| Proposed RAN Equipment | | | | |
|---|---|---|---|---|
| Template: 56790EZ_SR_T | | | | |
| **Enclosure** | **1** | **2** | **3** | **4** |
| **Enclosure Type** | Tower Top Mount (Nokia) | Delta HPL3 600A Site Support Cabinet - ESOA600-HCU01 | Ancillary Equipment (Nokia) | Delta LB3 Battery Cabinet (4 strings) |
| **Radio** | AHFIG (x3): N1900, N2100 (DARK), L1900, L2100, G1900; AHLOA (x3): N600, L600, L700 | | | |
| **Baseband** | | ASIA: L600, L700, L1900, L2100; ASIL: N600, N1900, N2100 (DARK); ASIL: N2500; FSMF: G1900 | | |
| **Hybrid Cable System** | | Delta BOOST Voltage Booster w/ 4 Modules; Extra Module for Delta Voltage Booster | 225' HCS 2.0 Trunk - 12#6AWG 24 SM FIBER PR (x3) | |
| **Baseband Submodule** | | ABIA (x2): L1900, L2100; ABIA: L600, L700; ABIL: N600; ABIL (x2): N1900, N2100 (DARK); ABIO: N2500 | | |
| **Baseband Subrack** | | AMIA (x2) | | |
| **Transport System** | | CSR IXRe V2 (Gen2) | | |
| **Junction Box** | | | Nokia HCS 2.0 Tower Junction Box (x3) | |
| **RAN Scope of Work:** | | | | |

01/30/2024: This is the RFDS for when the site moves from the temp pole to the WT.

Per Rob Sobich: "Please also provide a return to tank RFDS / PM. The return to tank (V3) will need the following adjustments:
- RAD = 130'
- Change 65C-OCTO to 65B-OCTO (to accommodate new handrail design)
- Add a third trunk and make config a trunk per sector (3 total)
- Keep entire config as HCS 2.0"

The above has been updated in the this RFDS.

1 PROPOSED RAN EQUIPMENT
N.T.S.

| Sector 1 (Proposed) view from front (Note: the images show view from behind) | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 0 | | | | 0 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700, L600, N600 | L700, L600, N600 | G1900, L2100, L1900, N1900 | G1900, L2100, L1900, N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |
| **Unconnected Equipment:** | | | | | |
| **Scope of Work:** | | | | | |

1 PROPOSED ANTENNA CONFIGURATION (SECTOR 1)
N.T.S.

| Sector 2 (Proposed) view from front (Note: the images show view from behind) | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 120 | | | | 120 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700, L600, N600 | L700, L600, N600 | L1900, L2100, G1900, N1900 | L1900, L2100, G1900, N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |
| **Unconnected Equipment:** | | | | | |
| **Scope of Work:** | | | | | |

3 PROPOSED ANTENNA CONFIGURATION (SECTOR 2)
N.T.S.

| Sector 3 (Proposed) view from front (Note: the images show view from behind) | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 240 | | | | 240 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700, L600, N600 | L700, L600, N600 | L1900, L2100, G1900, N1900 | L1900, L2100, G1900, N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |
| **Unconnected Equipment:** | | | | | |
| **Scope of Work:** | | | | | |

4 PROPOSED ANTENNA CONFIGURATION (SECTOR 3)
N.T.S.


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PARK RIDGE, IL 60068
PH: 847-698-6400
FAX: 847-698-6401


REVISIONS

| NO. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| - | ISSUED FOR REVIEW | 02/28/2024 | RA |
| 1. | REVISED PER UPDATED SA | 03/29/2024 | RA |
| 2. | ADDITION OF PAINTING NOTES AND REVISED HANDRAIL DESIGN | 05/09/2024 | AU |
| 3. | ISSUED FOR PERMITTING/REVISED PER THIRD PARTY COMMENTS | 06/24/2024 | RA |
| 4. | ISSUED FOR FINAL | 07/19/2024 | RA |

SITE ID #
CH87073A

CH60XC216
REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
ANTENNA INFORMATION

SHEET NUMBER
**ANT-3**

JOHN J ZIMMERMANN REGISTERED No. 19500464 STATE OF INDIANA PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032

## ANTENNA & CABLE SCHEDULE

| SECTOR | ALPHA | ALPHA | BETA | BETA | GAMMA | GAMMA |
|---|---|---|---|---|---|---|
| LOCATION | A-1 | A-2 | B-1 | B-2 | C-1 | C-2 |
| TECHNOLOGY | L2500/N2500 | G1900/L1900/L2100/ N1900/N2100 L700/L600/N600 | L2500/N2500 | G1900/L1900/L2100/ N1900/N2100 L700/L600/N600 | L2500/N2500 | G1900/L1900/L2100/ N1900/N2100 L700/L600/N600 |
| AZIMUTH | 0° | 0° | 120° | 120° | 240° | 240° |
| RAD CENTER | 130' | 130' | 130' | 130' | 130' | 130' |
| MODEL # | AEHC | FFVV-65B-R3-V1 | AEHC | FFVV-65B-R3-V1 | AEHC | FFVV-65B-R3-V1 |
| MECH. DOWNTILT | - | - | - | - | - | - |
| ELEC. DOWNTILT | - | - | - | - | - | - |
| RRU TYPE | - | AHOLA AHFIG | - | AHOLA AHFIG | - | AHOLA AHFIG |
| TMAS/ DIPLEXERS | | - | | - | | - |
| HCS 2.0 | 1-5/8" HIGH CAPACITY | 1-5/8" HIGH CAPACITY | 1-5/8" HIGH CAPACITY | 1-5/8" HIGH CAPACITY | 1-5/8" HIGH CAPACITY | 1-5/8" HIGH CAPACITY |
| HCS FACTORY LENGTH | ±225' | | ±225' | | ±225' | |
| HCS ACTUAL LENGTH | | ±230' | | ±240' | ±250' | |
| JUMPER TYPE FROM JUNCTION BOX TO RRU | - | HCS 2.0 | - | HCS 2.0 | - | HCS 2.0 |
| JUMPER LENGTH | - | 15' | - | 15' | - | 15' |
| JUMPER TYPE FROM RRU TO ANTENNA | RF JUMPER | RF JUMPER | RF JUMPER | RF JUMPER | RF JUMPER | RF JUMPER |
| JUMPER LENGTH | 15' | 15' | 15' | 15' | 15' | 15' |

### ANTENNA AND COAXIAL CABLE SCHEDULE

1. ALL ANTENNAS SHALL BE FURNISHED WITH DOWNTILT BRACKETS. CONTRACTOR SHALL COORDINATE REQUIRED MECHANICAL DOWNTILT FOR EACH ANTENNA WITH RF ENGINEER. ANTENNA DOWNTILT SHALL BE SET AND VERIFIED BY A SMART LEVEL.
2. ANTENNA CENTERLINE HEIGHT IS IN REFERENCE TO GROUND ELEVATION 0'-0"
3. CONTRACTOR SHALL INSTALL COLOR CODE RINGS ON EACH OF THE HYBRID CABLES AND JUMPER CABLES WITH UV RESISTANT TAPE. ALL CABLE SHALL BE MARKED AT TOP AND BOTTOM WITH 2" COLOR TAPE OR STENCIL TAG. COLOR TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONICS.

NOTES:

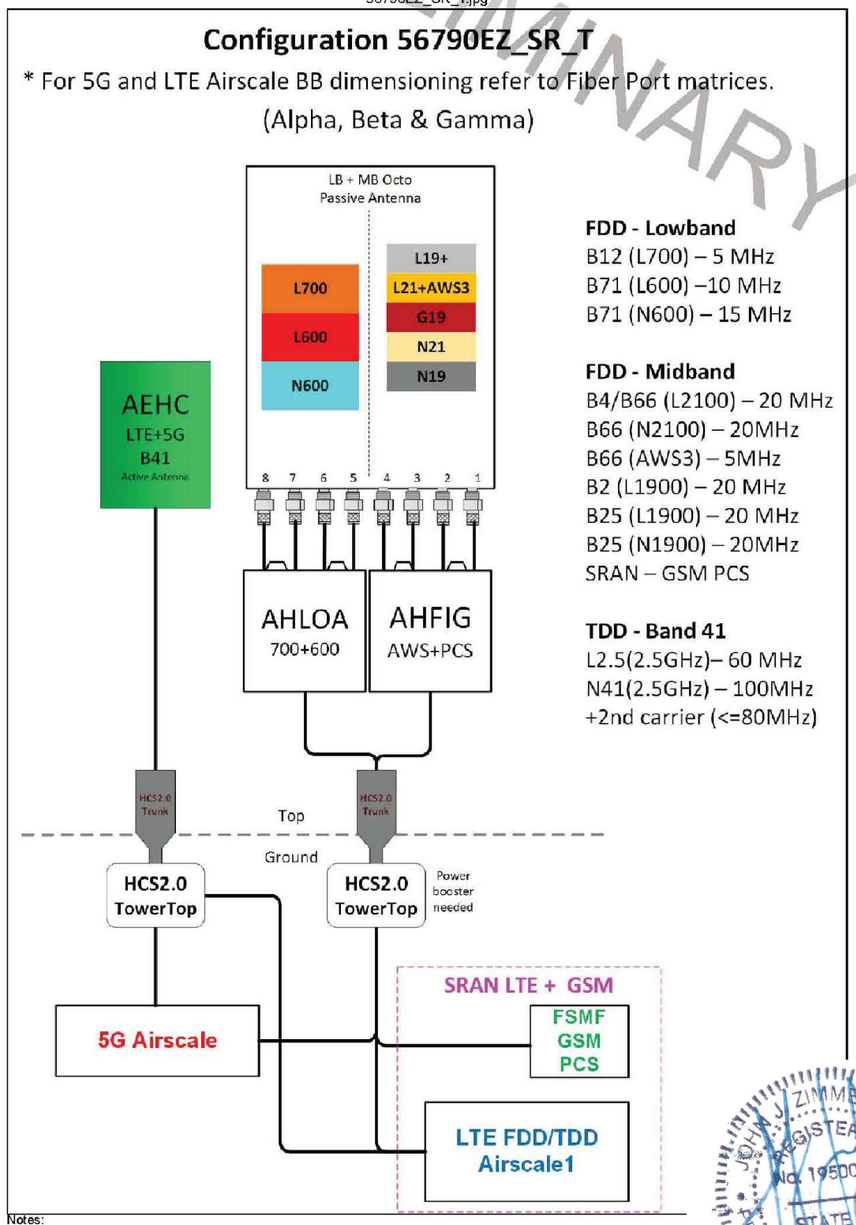
1. GC TO VERIFY FINAL RF CONFIGURATION W/ T-MOBILE RF ENGINEER PRIOR TO INSTALLATION.
2. GC TO VERIFY W/ T-MOBILE RF ENGINEER WHICH PORTS SHALL REMAIN UNUSED; GC TO INSTALL A CAP ON ALL UNUSED PORTS.

1 ANTENNA AND CABLE SCHEDULE
N.T.S.

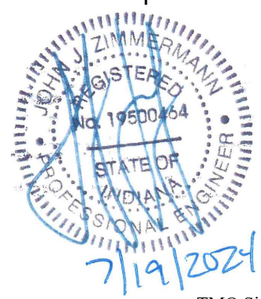


Section 3 - Proposed Template Images

56790EZ_SR_T.jpg




2 CABLE DIAGRAM
N.T.S.

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FAX: 847-698-6401

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SITE ID #
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CH60XC216
REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

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|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
COMBINER CABLE DATA & CABLE DIAGRAM

SHEET NUMBER
**ANT-3A**

TMO Signatory Level: L06
NLG-103032

VMC LLC

# COATING SYSTEMS FOR TELECOMMUNICATION EQUIPMENT

## PART 1 - GENERAL

1. **SUMMARY:**
   A. Section includes painting and painting repair work associated with the installation of antennas, coaxial cables, and other common components with direct attachment to water tank facilities.
2. **REFERENCES:**
   A. Society for Protective Coatings (SSPC): www.sspc.org
      1) Volume 1: Good Painting Practice
      2) Volume 2: Systems and Specifications
3. **SUBMITTALS:**
   A. Product Data: Submit data sheet for each coating system.

## PART 2 – PRODUCTS

1. **MATERIALS**
   A. Manufacturers:
      1) Sherwin Williams Company www.sherwin-williams.com
      2) Tnemec Company www.tnemec.com
      3) X-I-M Products www.ximbonder.com

## PART 3 – EXECUTION

1. **EXAMINATION**
   A. Visually evaluate surface preparation by comparison with pictorial standards of SSPC-VIS-1-89.
2. **PREPARATION**
   A. Remove all surface contaminants in accordance with SSPC-SP1 Solvent Cleaning.
      1) Do not use hydrocarbon solvents on surfaces to be coated with water-based coatings.
   B. Clean and remove all rust, slag, weld splatter, weld scabs, mill scale, and loose paint.
   C. Protect areas adjacent to welding & or grinding operations to prevent damage of surrounding intact paint system.
   D. Ferrous Metal: SSPC-SP6 Commercial Blast Cleaning
   E. Galvanized Steel: SSPC-SP7 Brush Off Blast
   F. Antenna Covers, Coaxial Cable, Non-metallic Substrates and Previously Painted Surfaces: Scarify to de-gloss. SSPC-SP1 with a non-hydrocarbon solvent.
   G. Surface profile shall be in accordance with manufacturer's product recommendation.
   H. Re-blast all surfaces:
      1) Where rusting has recurred.







      2) That do not meet the requirements of these specifications.
3. **APPLICATION**
   A. Coatings shall be applied in accordance with manufacturer's printed instructions.
   B. Surfaces to be coated shall be clean, dry, and free of airborne dust and contaminants at the time of application and while film is forming.
   C. Finish coat shall be uniform in color and sheen without streaks, laps, runs, sags or missed areas.
   D. Shop Painting: Tape-off (2-inch minimum) surfaces that will be in the *Heat-Affected-Zone* during field welding.
   E. Component Painting:
      1) Interior Exposed Ferrous Metal and Galvanized Steel:
         a) Product: Sherwin Williams Macropoxy 646 or Tnemec Series 161
            I. Number of Coats: 2
            II. Dry Film Thickness: 4.0–6.0 mils (per coat)
            III. Color: By Owner
      2) Exterior Exposed Ferrous Metal and Galvanized Steel:
         a) Primer: Sherwin Williams Macropoxy 646 or Tnemec Series 161 or N69
            I. Number of Coats: 1
            II. Dry Film Thickness: 4.0–6.0 mils
            III. Color: By Owner
         b) Finish: Sherwin Williams Acrolon 218 or Tnemec Series 10740/10750
            I. Number of Coats: 1
            II. Dry Film Thickness: 2.0–3.0 mils
            III. Color: By Owner
      3) Antenna Covers:
         a) Primer: Sherwin Williams Pro-Cryl Primer
            I. Number of Coats: 1
            II. Dry Film Thickness: 2.0–4.0 mils
         b) Finish: Sherwin Williams Sher-Cryl HPA
            I. Number of Coats: 1
            II. Dry Film Thickness: 2.5–4.0 mils
            III. Color: By Owner
      4) Coaxial Cable
         a) Primer: X-I-M 1138
            I. Number of Coats: 1
            II. Dry Film Thickness: 2.0–3.0 mils
         b) Finish: Sherwin Williams Sher-Cryl HPA
            I. Number of Coats: 1
            II. Dry Film Thickness: 2.5–4.0 mils







            III. Color: By Owner
4. **REPAIR OF AREAS DAMAGED BY WELDING**
   A. Prepare the damage by one of the two following methods as directed by the Engineer.
      1) Abrasive-blast to SSPC-SP6.
      2) Mechanically clean to SSPC-SP11.
   B. Feather edges to provide smooth coating transition.
   C. Apply prime coat to bare metal surface.
   D. Mask off rectangular area around prime coat.
   E. Apply finish coat.
5. **QUALITY CONTROL**
   A. Measure dry film thickness with a magnetic film thickness gage in accordance with SSPC-PA2.
   B. Visually inspect dried film for funs, sags, dry spray, overspray, embedded particles and missed areas.
   C. Repair defective or damaged areas in accordance with Articles 3.02 and 3.03.






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SITE ID #
CH87073A

CH60XC216
REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
COMBINER CABLE DATA & CABLE DIAGRAM

SHEET NUMBER
**ANT-4**

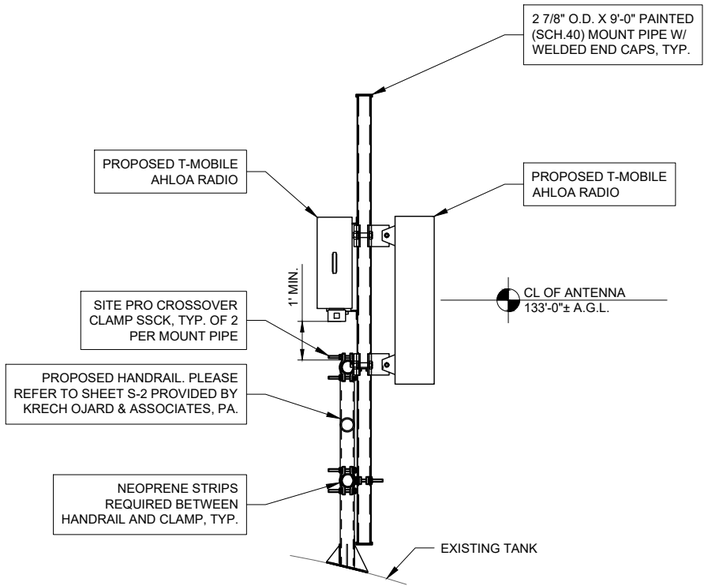
TMO Signatory Level: L06
NLG-103032

PLEASE REFER TO STRUCTURAL ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

G.C. TO CONTACT ENGINEER FOR ANY DEVIATION IN INSTALLATION

NOTE:

1. INCLUDED NEOPRENE, A METAL SHIM, AND COLORED (TO MATCH THE TOWER) TAPE AS NECESSARY BENEATH AND AROUND ALL CLAMPS, ANGLE ADAPTERS, ETC.
2. FOR LAYOUT, SEE SHEET ANT-2A.
3. FOR PAINT SPECIFICATIONS, SEE SHEET ANT-4.




1 EQUIPMENT ELEVATION
SCALE: 3/4" = 1'-0" ±

PLEASE REFER TO STRUCTURAL ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

G.C. TO CONTACT ENGINEER FOR ANY DEVIATION IN INSTALLATION

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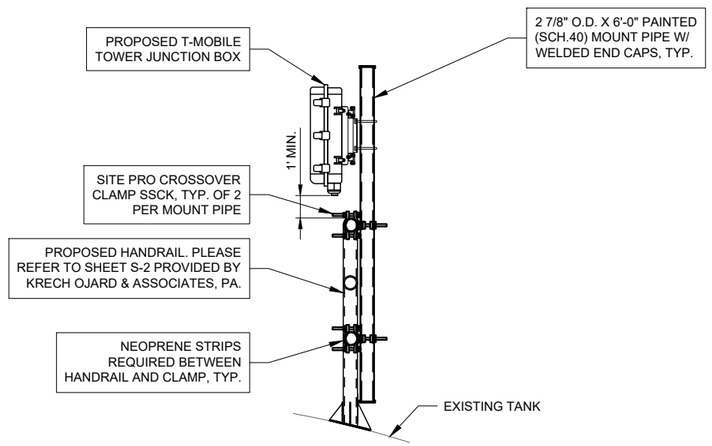


2 EQUIPMENT ELEVATION
SCALE: 3/4" = 1'-0" ±

PLEASE REFER TO STRUCTURAL ANALYSIS PROVIDED BY KRECH OJARD & ASSOCIATES, PA.

G.C. TO CONTACT ENGINEER FOR ANY DEVIATION IN INSTALLATION

NOTE:

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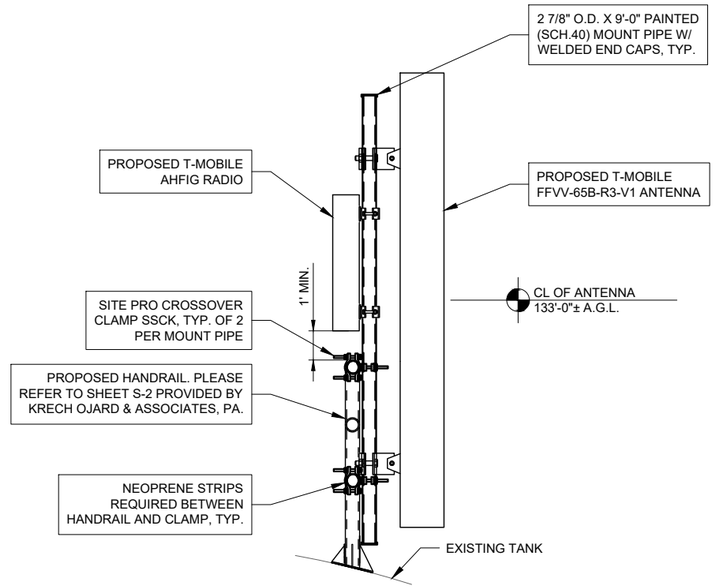


3 EQUIPMENT ELEVATION
SCALE: 3/4" = 1'-0" ±

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| 4. | ISSUED FOR FINAL | 07/19/2024 | RA |

SITE ID # CH87073A

CH60XC216 REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
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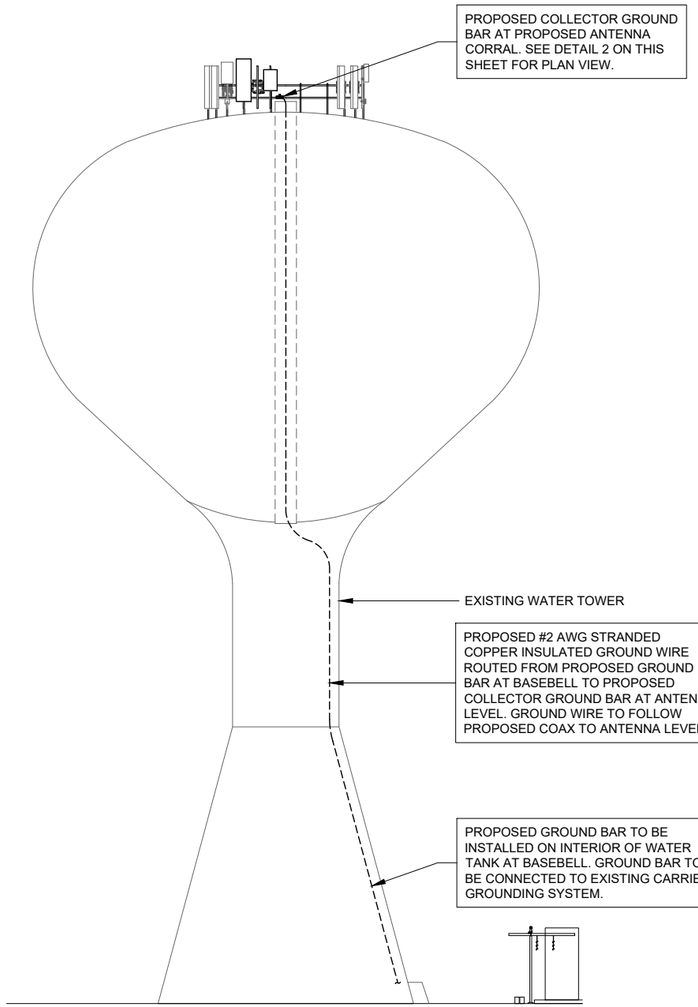
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
DETAILS

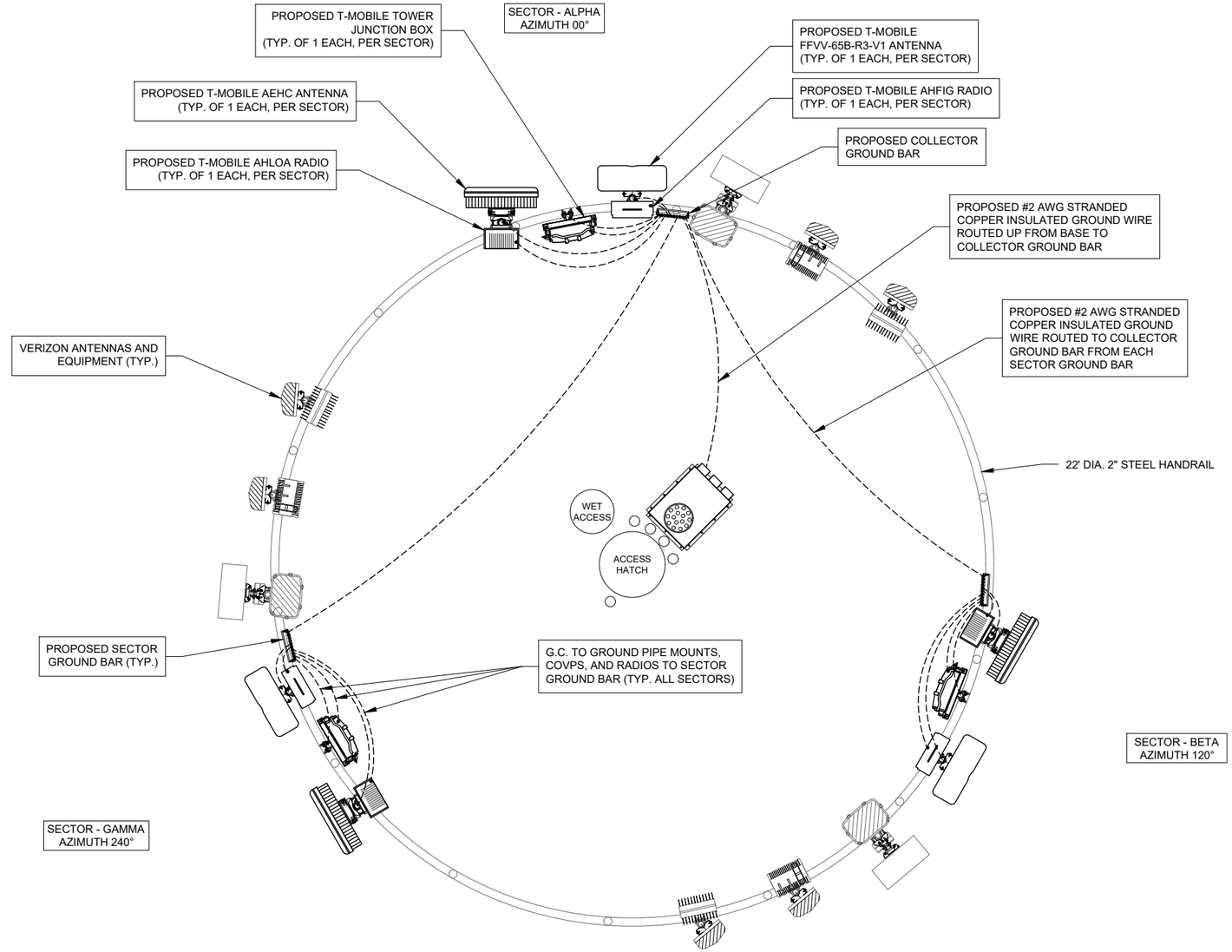
SHEET NUMBER
**ANT-5**

JOHN J. ZIMMERMANN
REGISTERED
NO. 19500464
STATE OF
INDIANA
PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032




1 PROPOSED GROUNDING ELEVATION
N.T.S.




2 PROPOSED GROUNDING PLAN
N.T.S.

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# SITE ID # CH87073A

## CH60XC216 REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

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| CHECKED BY: | AU |
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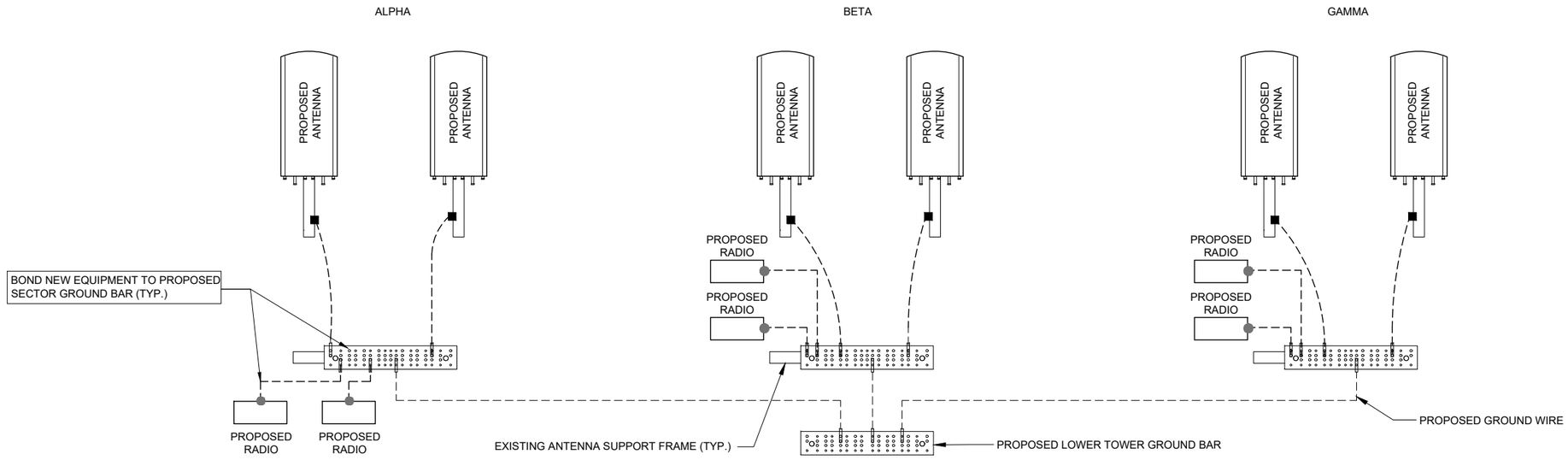
| PROJECT #: | 194-136 |

SHEET TITLE
GROUNDING LAYOUT PLAN

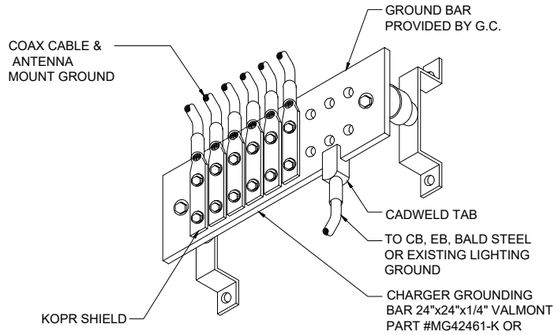
SHEET NUMBER
**E-1**

JOHN J. ZIMMERMANN
REGISTERED
No. 19500464
STATE OF INDIANA
PROFESSIONAL ENGINEER
7/19/2024

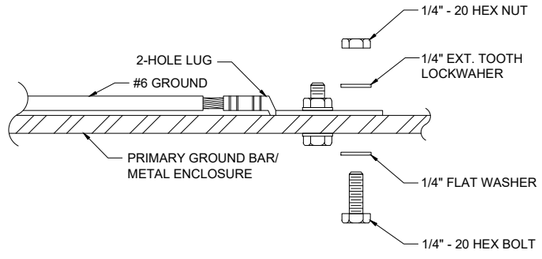
TMO Signatory Level: L06
NLG-103032




1 PROPOSED GROUNDING LAYOUT
N.T.S.




2 SECTOR GROUND BAR DETAIL
SCALE: N.T.S.




INSTALLATION NOTES

1. SELECT BOLT LENGTH TO PROVIDE A MINIMUM OF 2 EXPOSED THREADS.
2. BURNISH MOUNTING SURFACE TO REMOVE PAINT IN THE AREA OF LUG CONTACT.
3. APPLY ANTI-OXIDANT COMPOUND TO MATING SURFACE OF LUG AND WIPE CLEAN EXCESS COMPOUND.
4. USE SOLID COPPER WIRE AND MECHANICAL 2- HOLE LUG FOR ALL EXTERIOR GROUNDING.

3 PRIMARY GROUND BAR DETAIL
SCALE: N.T.S.

JOHN J. ZIMMERMANN REGISTERED No. 19500464 STATE OF INDIANA PROFESSIONAL ENGINEER
7/19/2024

TMO Signatory Level: L06
NLG-103032

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| CHECKED BY: | AU |
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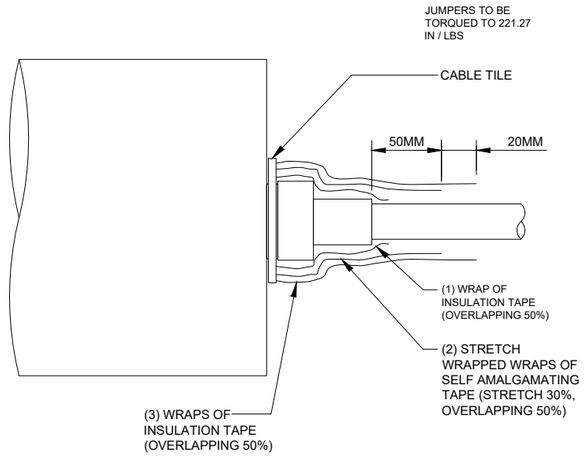
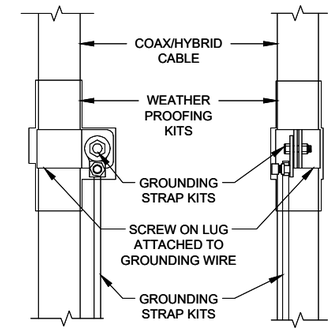
SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
**E-2**

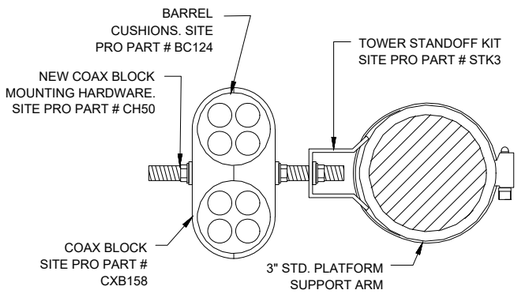



1 RF JUMPER CONNECTION DETAIL
SCALE: N.T.S.

NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. THIS DETAIL IS TYPICAL FOR EACH COAX CABLE WHERE IT IS SPECIFIED TO BE GROUNDED
3. CABLE TO BE GROUNDED AT ANTENNA LEVEL AND PRIOR TO ENTERING EQUIPMENT CABINET.
4. CABLE ALSO TO BE GROUNDED TO GROUND BAR AT TOWER BASE IF APPLICABLE.
5. USE ONLY TIN PLATED GROUNDING KITS.



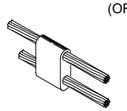

2 COAX / HYBRID CABLE GROUND KIT DETAIL
SCALE: N.T.S.



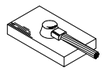

3 RF JUMPER MOUNTING DETAIL
SCALE: N.T.S.

JOHN J. ZIMMERMANN REGISTERED No. 19500464 STATE OF INDIANA PROFESSIONAL ENGINEER
7/19/2024

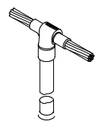
CADWELD CONNECTIONS
(OR APPROVED EQUAL)



PARALLEL HORIZONTAL CONDUCTORS
PARALLEL THROUGH CONNECTION OF HORIZONTAL CABLES TYPE PT



HORIZONTAL STEEL SURFACE
TO FLAT STEEL SURFACE OR HORIZONTAL PIPE TYPE HS



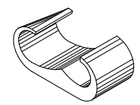
THROUGH CABLE TO GROUND ROD
THROUGH CABLE TO TOP OF GROUND ROD TYPE GT

VERTICAL STEEL SURFACE
CABLE DOWN AT 45° TO VERTICAL STEEL SURFACE INCLUDING PIPE TYPE VS

HORIZONTAL SPLICE
SPLICE OF HORIZONTAL CABLES

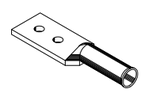
VERTICAL PIPE
CABLE DOWN AT 45° TO RANGE OF VERTICAL PIPES TYPE VS

BURNDY CONNECTIONS
(OR APPROVED EQUAL)



"C" CONNECTOR
HYPRESS TYPE YGHC

BOND JUMPER
FIELD FABRICATED GREEN STRANDED INSULATED TYPE 2-YA-2



COPPER LUGS
TWO HOLE - LONG BARREL LENGTH TYPE YA-2

4 TYPICAL WELDING CONNECTIONS
N.T.S.

T-Mobile
stick together
1400 OPUS PLACE
DOWNERS GROVE, IL 60515
TEL: (773) 444-5400

TERRA CONSULTING, LLC
600 BUSSE HIGHWAY
PARK RIDGE, IL 60068
PH: 847-698-6400
FAX: 847-698-6401

REVISIONS

| NO. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| - | ISSUED FOR REVIEW | 02/28/2024 | RA |
| 1. | REVISED PER UPDATED SA | 03/29/2024 | RA |
| 2. | ADDITION OF PAINTING NOTES AND REVISED HANDRAIL DESIGN | 05/09/2024 | AU |
| 3. | ISSUED FOR PERMITTING/REVISED PER THIRD PARTY COMMENTS | 06/24/2024 | RA |
| 4. | ISSUED FOR FINAL | 07/19/2024 | RA |

SITE ID # CH87073A

CH60XC216 REINSTALL

8835 WHITE OAK AVE
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | RA |
| CHECKED BY: | AU |
| DATE: | 02/28/2024 |
| PROJECT #: | 194-136 |

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-3

TMO Signatory Level: L06
NLG-103032

GENERAL STRUCTURAL NOTES

1. DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES:
   A. AWWA-D100-21
   B. TIA-222-H
2. WATER TANK DESIGN LOADS (PER AWWA-D100-21):
   A. WIND LOAD:
      BASIC WIND SPEED (3 SEC. GUST) = 119 MPH
      RISK CATEGORY: IV
      WIND EXPOSURE: C
3. ANTENNA SUPPORTING STRUCTURES & ANTENNA DESIGN LOADS (PER TIA-222-H)
   A. WIND LOAD:
      BASIC WIND SPEED (3 SEC. GUST) = 119 MPH
      RISK CATEGORY IV
      WIND EXPOSURE: C
   B. ICE LOAD:
      UNIFORM ICE THICKNESS: T = 1.5 INCHES
      ICE IMPORTANCE FACTOR: $I_i$ = 1.25
      DESIGN ICE THICKNESS: $T_D$ = 2.15 INCHES
      CONCURRENT WIND SPEED (3 SEC. GUST) = 40 MPH
4. VERIZON EQUIPMENT SUMMARY:
      (3) KRE 105281/1 W/ 4408
      (3) AIR6449
      (6) NHH-65B-R2B
      (3) RRU 4449
      (3) RRU 8843
      (3) RVZDC-3315-PF-48
5. T-MOBILE EQUIPMENT SUMMARY:
      (3) AEHC
      (3) FFVV-65B-R3-V1
      (3) AHLOA
      (3) AHFIG
      (3) HCS 2.0 TRUNK BOX
6. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF EXISTING BUILDING UTILITIES, STREETS, EQUIPMENT ETC. DURING CONSTRUCTION. PROVIDE TEMPORARY PROTECTION AS REQUIRED.
7. FIELD VERIFY ALL EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS PRIOR TO FABRICATION.
8. ANY HOLES CUT IN THE EXISTING OR NEW STRUCTURE WHICH ARE NOT DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE REVIEWED PRIOR TO CONSTRUCTION WITH THE ENGINEER.
9. CONTRACTOR TO VERIFY ALL EQUIPMENT DIMENSIONS AND FASTENING REQUIREMENTS WITH MANUFACTURER.
10. STRUCTURAL DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS, COORDINATE WITH THE ENGINEER IF DIMENSIONS ARE NOT CLEAR.
11. ANY CLAMPING-STYLE FRICTION CONNECTIONS, INCLUDING U-BOLTS, SHOULD INCLUDE A RUBBER STRIP BETWEEN THE CLAMP / U-BOLT AND THE BASE MATERIAL TO PREVENT METAL ON METAL CONTACT.
12. RESTORE THE SITE TO PRE-PROJECT CONDITIONS AT THE END OF THE PROJECTS
13. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE EXISTING STRUCTURE WHERE THE EXISTING STRUCTURE IS MODIFIED TO ACCOMMODATE NEW CONSTRUCTION.

STRUCTURAL STEEL AND MISCELLANEOUS METALS

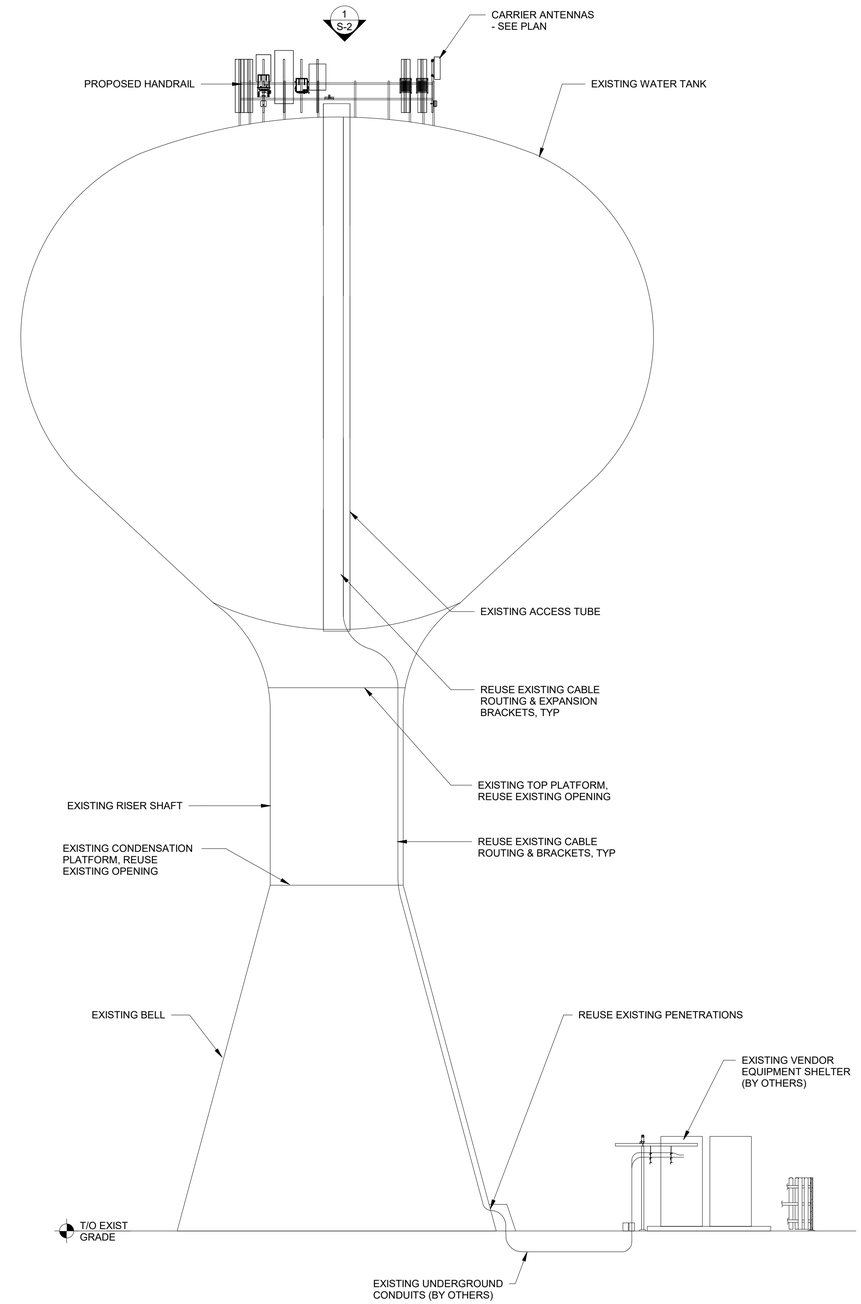
1. ALL WIDE FLANGE MEMBERS TO BE ASTM A992.
2. HSS STRUCTURAL TUBING TO BE A500, GRADE C.
3. PIPE TO BE A53, GRADE B.
4. ALL OTHER STRUCTURAL STEEL SHAPES TO BE ASTM A36
5. FABRICATION AND ERECTION OF STRUCTURAL STEEL MEMBERS IS TO BE IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE.
6. ALL STRUCTURAL STEEL AND MISCELLANEOUS METALS EXPOSED TO EXTERIOR CONDITIONS SHALL BE GALVANIZED. TOUCH UP ALL DISTURBED AREAS.
7. BOLTED CONNECTION TO USE A325 HIGH STRENGTH BOLTS WITH THE THREADS INCLUDED IN THE SHEAR PLANE WITH A563 NUTS AND F436 WASHERS UNLESS NOTED OTHERWISE ON PLANS.

WELDING

1. ALL WELDING SHALL BE BY A CERTIFIED WELDER.
2. ALL WELDING SHALL COMPLY WITH THE AWS STRUCTURAL WELDING CODES, INCLUDING ANSI/AWWA D100-96 "AWWA STANDARD FOR WELDED STEEL TANKS FOR WATER STORAGE" AS MODIFIED TO DATE.
3. MAKE ALL WELDS TO THE TANK WALL WITH E7018 LOW HYDROGEN ROD. WELD SMOOTH AND AVOID UNDERCUTS AND BURRS. GRIND SMOOTH ALL WELDS SO THAT NO SHARP PROTRUSIONS REMAIN. SMOOTH IS DEFINED AS NO CUTS OR ABRASIONS OCCUR WHEN RUBBING YOUR HAND OVER THE WELD.
4. DO NOT WELD WHEN THE AMBIENT TEMPERATURE IS BELOW 32°F UNLESS THE REQUIREMENTS OF THE AWWA D100, SEC. 10.2.1 ARE FOLLOWED.
5. BEFORE WELDING, REMOVE ALL COATINGS WITHIN 6" OF THE AREA TO BE WELDED. PREPARE EXISTING STRUCTURAL COMPONENT SURFACES WHERE WELDING IS TO BE PERFORMED IN ACCORDANCE WITH SSPC-SP-10 WHITE METAL BLAST CLEANING CODE.
6. DO NOT WELD GALVANIZED COMPONENTS DIRECTLY TO THE TANK SURFACE. GRIND GALVANIZED SURFACES FREE OF GALVANIZING PRIOR TO WELDING. PREPARE EXISTING STRUCTURAL COMPONENT SURFACES WHERE WELDING IS TO BE PERFORMED IN ACCORDANCE WITH AWS CODE.
7. COMPLY WITH APPLICABLE AWWA D-100, AWS D1.1, ANSI, ASTM STANDARDS, ACI, AISC AND FEDERAL, STATE, AND LOCAL CODES DURING CONSTRUCTION DESIGN AND FABRICATION.
8. ALL WELDS FOR THIS PROJECT NEED TO BE SEAL WELDS. STITCH WELDING IS NOT PERMITTED.
9. WELDING TO THE TANK OPPOSITE THE WATER LEVEL IS NOT PERMITTED. WATER LEVEL SHALL BE DRAWN DOWN TO A LEVEL TWO FEET BELOW THE POINT OF WELDING.

GENERAL PAINT NOTES:

1. PAINTING SPECIFICATIONS ARE PROVIDED BY OTHERS.




2 PROPOSED SITE ELEVATION


T-Mobile
stick together
1400 OPUS PLACE
DOWNERS GROVE, IL 60515
TEL: (773) 444-5400

verizon
1515 WOODFIELD ROAD,
SUITE 1400
SCHAUMBURG, ILLINOIS 60173
PHONE: (847) 619-5397
FAX: (847) 706-7415

KRECH OJARD & ASSOCIATES, INC.


SEAL:

EVAN M. BERGLUND
REGISTERED
No. 11600220
STATE OF INDIANA
PROFESSIONAL ENGINEER

Revision 2
6/19/2024

| REVISIONS | | | |
|---|---|---|---|
| NO. | DESCRIPTION | | |
| - | ISSUED FOR CONSTRUCTION | 3/27/24 | SMB |
| 1 | REVISION 1 | 4/2/24 | SMB |
| 2 | REVISION 2 | 6/17/24 | SMB |

VERIZON SITE 130081

T-MOBILE SITE
CH87073A

MUNSTER WT

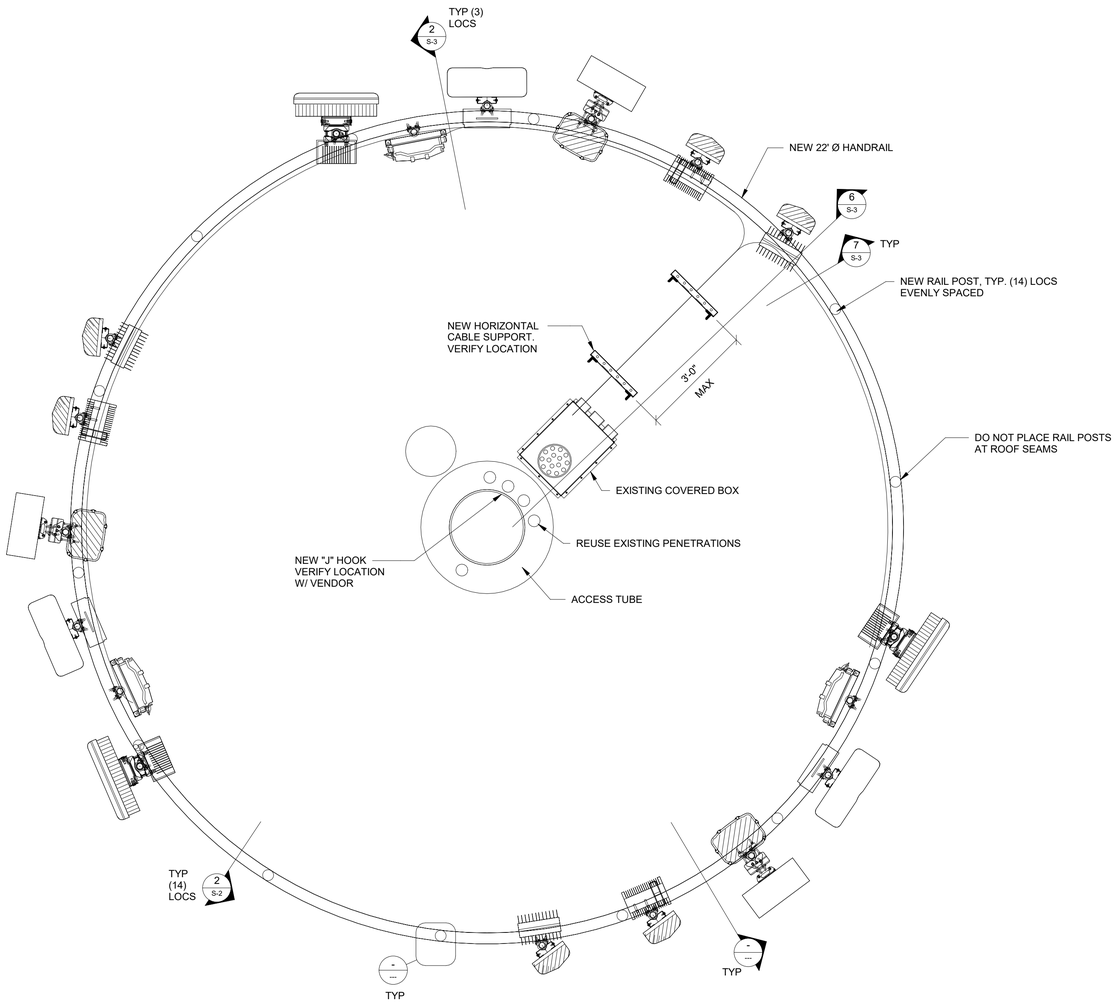
8835 WHITE OAK AVE.
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | JTF |
| CHECKED BY: | SMB |
| DATE: | 3/27/2024 |
| PROJECT #: | 242001.06 |

SHEET TITLE
GENERAL NOTES &
STRUCTURAL PLANS

SHEET NUMBER
**S-1**

TMO Signatory Level: L06
NLG-103032



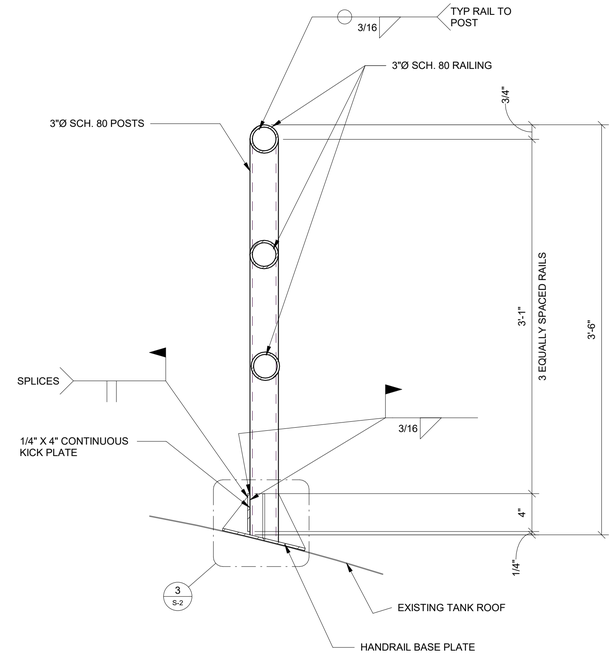

## PLAN NOTES

1. CONTRACTOR TO PROTECT ALL EXISTING EQUIPMENT.
2. ALL ATTACHMENTS TO PAINTED SURFACES ARE TO INCLUDE THE PLACEMENT OF NEOPRENE STRIPS BETWEEN HARDWARE AND POINTS OF CONTACT TO REDUCE/ELIMINATE DAMAGE TO THE PAINTED SURFACE. METAL SHIMS ARE REQUIRED IN SITUATIONS WHERE TIGHTENING A CLAMP MAY CAUSE THE NEOPRENE TO TEAR CAUSING METAL TO METAL CONTACT. WHERE POSSIBLE EXPOSED NEOPRENE SHOULD BE WRAPPED WITH WHITE TAPE. FASTENING SEQUENCE SHOULD INCLUDE NYLON WASHERS BETWEEN THE PAINTED SURFACE AND THE GALVANIZED WASHER.
3. ALL EXPOSED JUMPERS & CABLES WILL BE PROVIDED WITH WHITE JACKETING, OR TAPED WHITE.
4. ALL EQUIPMENT IS TO BE IDENTIFIED BY CARRIER.
5. PROPOSED MOUNTING PIPES ARE TO HAVE WELDED END CAPS. ALL MOUNTING HARDWARE IS TO BE GALVANIZED AND/OR PROVIDED IN A NON-CORRODING MATERIAL.
6. ANTENNA FEED LINES, JUMPERS, COAX AND HYBRID CABLES SHALL NOT INTERFERE WITH TOP OF THE HANDRAIL AND MUST BE ROUTED SO THAT THEY COMPLY WITH OSHA REQUIREMENTS REGARDING HANDRAILS.
7. THE INSTALLATION OF NEW EQUIPMENT WILL BE PLACED BEHIND THE ANTENNAS AND IN A MANNER THAT MAINTAINS THE HANDRAILS COMPLIANCE WITH CURENT OSHA GUIDLINES FOR ACCESS.
8. ALL ABANDONED ANTENNAS, COAXIAL CABLE AND DETACHABLE EQUIPMENT THAT IS NO LONGER USED ARE TO BE REMOVED DURING THE FINAL MIGRATION.
9. CONTRACTOR TO VERIFY ANTENNA & EQUIPMENT ORIENTATION.
10. HANDRAIL HAS BEEN DESIGNED PER THE REQUIRED TIA MAINTENANCE LOADS. HANDRAIL IS NOT DESIGNED AS A FALL PROTECTION TIE-OFF.
11. VERIFY LOCATION OF ALL ROOF PLATE SEAMS PRIOR TO FABRICATION OF HANDRAIL. DO NOT WELD OVER TANK SEAMS. CONTACT EOR IF MODIFICATIONS TO RAILING ARE NECESSARY TO AVOID SEAMS.
12. PROPOSED ANTENNAS AND MOUNTING PIPES INSTALLED ON THE EXTERIOR OF THE WATER TOWER SHALL BE SHOP PAINTED TO MATCH THE COLOR OF THE WATER TOWER (VERIFY COLOR).
13. ALL MOUNTING HARDWARE IS TO BE GALVANIZED AND/OR PROVIDED IN A NON-CORRODING MATERIAL.
14. TENANT NEEDS TO VERIFY THAT THE PROPOSED HANDRAIL DESIGN MEETS WITH THEIR SATISFACTION AND APPROVAL
15. TENANT NEEDS TO VERIFY WITH THE TOWN OF MUNSTER THAT THE PROPOSED ADDITIONAL ANTENNAS AND EQUIPMENT ARE WITHIN THE LEASE SPACE ON THE WATER TOWER AND QUANTITIES AS SPECIFIED ARE IN THE LEASE DOCUMENTS.
16. DRILLING HOLES IN THE NEW HANDRAIL IS NOT ACCEPTABLE.
17. TENANT NEEDS TO VERIFY WITH THE TOWN OF MUNSTER THAT THE PROPOSED HANDRAIL DESIGN MEETS WITH THEIR SATISFACTION AND APPROVAL.
18. ALL PROPOSED WELDING IS TO BE COMPLETED PRIOR TO THE PAINTING OF THE WATER TOWER.

2

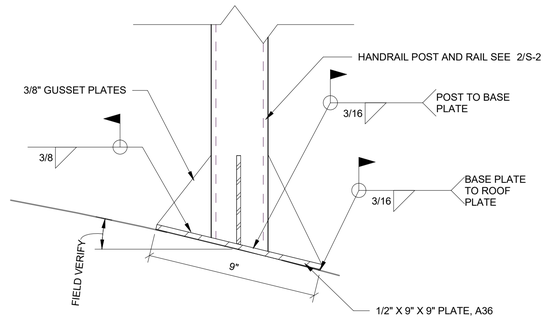
1 ANTENNA, EQUIPMENT, & FRAMING PLAN

NORTH




NOTE:
1. RAILING TO BE SHOP PRIMED AND PAINTED TO MATCH EXISTING TOWER COATING.
2. ALL WELDS SHALL BE SEALED TO PREVENT RUST.
3. FOR ADD'L INFO SEE PLAN NOTES THIS SHEET.
4. FABRICATE HANDRAIL STRUCTURE ON THE GROUND AND INSTALL ON THE HANDRAIL BASE PLATES AS A COMPLETE UNIT
5. ALL WELDING TO BE DONE WITH E70XX ELECCTRODES

2 HANDRAIL DETAIL
NOT TO SCALE




NOTE:
1. WELD A36 SHIMS TO HANDRAIL POST BASE PLATE AS REQUIRED IF E PLATE IS LOCATED ON ROOF PLATE LAP
2. KICK PLATE NOT SHOWN FOR CLARITY PURPOSES.

3 BASE PLATE DETAIL
NOT TO SCALE

T-Mobile
stick together
1400 OPUS PLACE
DOWNERS GROVE, IL 60515
TEL: (773) 444-5400

verizon
1515 WOODFIELD ROAD,
SUITE 1400
SCHAUMBURG, ILLINOIS 60173
PHONE: (847) 619-5397
FAX: (847) 706-7415

KRECH OJARD & ASSOCIATES, INC.

2

SEAL:

EVAN M. BERGLUND REGISTERED No. 11600220 STATE OF INDIANA PROFESSIONAL ENGINEER

Revision 2 6/19/2024

REVISIONS

| NO. | DESCRIPTION | | |
|---|---|---|---|
| - | ISSUED FOR CONSTRUCTION | 3/27/24 | SMB |
| 1 | REVISION 1 | 4/2/24 | SMB |
| 2 | REVISION 2 | 6/17/24 | SMB |

2

VERIZON SITE 130081

T-MOBILE SITE
CH87073A

MUNSTER WT

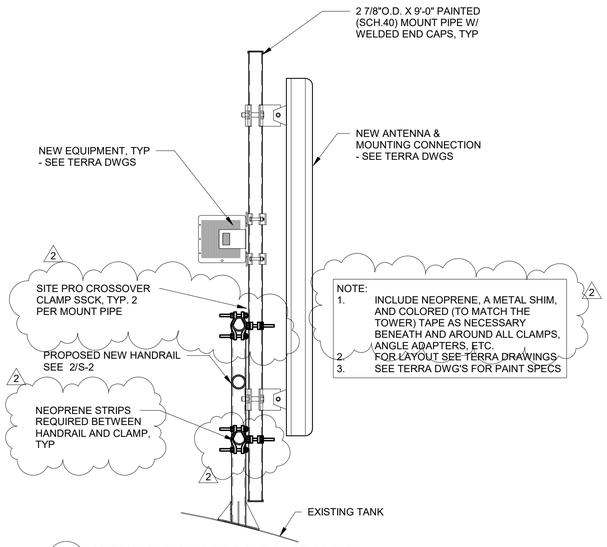
8835 WHITE OAK AVE.
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | JTF |
| CHECKED BY: | SMB |
| DATE: | 3/27/2024 |
| PROJECT #: | 242001.06 |

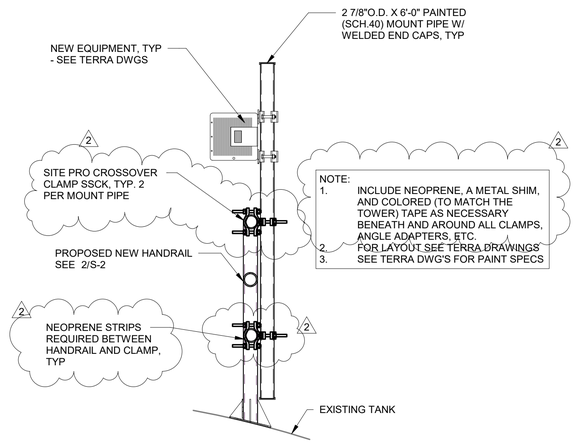
SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
**S-2**

TMO Signatory Level: L06
NLG-103032

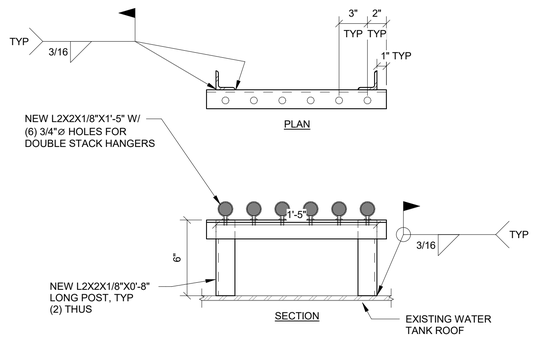



1 S-3 ANTENNA MOUNT PIPE SUPPORT DETAIL
3/4" = 1'-0"

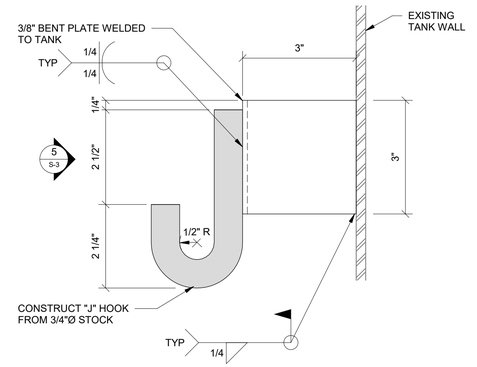



2 EQUIPMENT PIPE SUPPORT AT HANDRAIL

NOTE:
1. SUPPORT BRACKETS SHALL BE WELDED TO THE TANK ROOF PRIOR TO THE PAINTING / TOWER RECONDITIONING.

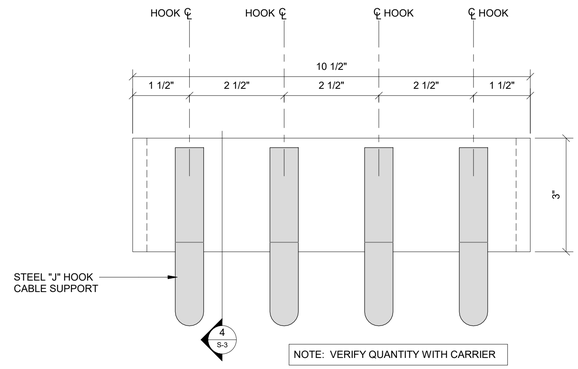



3 TANK CABLE TOP SUPPORT BRACKET - SIDE ELEVATION



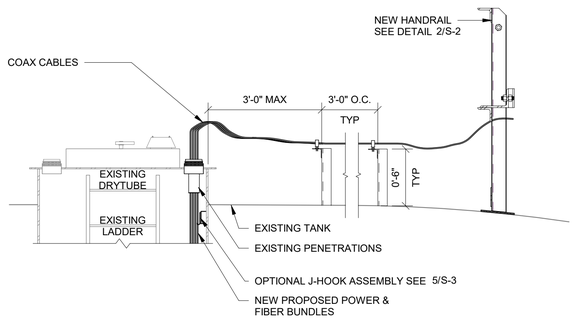

NOTE:
1. VERIFY RADIUS OF BAR IS ACCEPTABLE FOR CABLE DIAMETER.

4 "J" HOOK ASSEMBLY

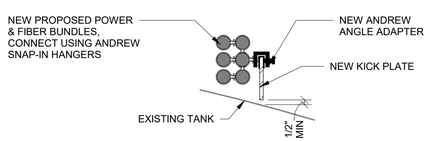



NOTE: VERIFY QUANTITY WITH CARRIER

5 "J" HOOK ASSEMBLY DETAIL




6 ENTRY PORT & CABLE SUPPORT DETAIL




NOTES:
1. CABLES TO BE SUPPORTED EVERY 4'-0" O.C.
2. FOR ADD'L INFO SEE PLAN NOTES THIS SHEET.

7 COAX CABLE CONNECTION DETAIL

T-Mobile
stick together
1400 OPUS PLACE
DOWNERS GROVE, IL 60515
TEL: (773) 444-5400

verizon
1515 WOODFIELD ROAD,
SUITE 1400
SCHAUMBURG, ILLINOIS 60173
PHONE: (847) 619-5397
FAX: (847) 706-7415

KRECH OJARD & ASSOCIATES, INC.

SEAL:

EVAN M. BERGLUND REGISTERED No. 11600220 STATE OF INDIANA PROFESSIONAL ENGINEER

Revision 2 6/19/2024

| REVISIONS | | | |
|---|---|---|---|
| NO. | DESCRIPTION | | |
| - | ISSUED FOR CONSTRUCTION | 3/27/24 | SMB |
| 1 | REVISION 1 | 4/2/24 | SMB |
| 2 | REVISION 2 | 6/17/24 | SMB |

VERIZON SITE 130081

T-MOBILE SITE
CH87073A

MUNSTER WT

8835 WHITE OAK AVE.
MUNSTER, IN 46321

| | |
|---|---|
| DRAWN BY: | SMB |
| CHECKED BY: | EMB |
| DATE: | 3/27/2024 |
| PROJECT #: | 242001.06 |

SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
**S-3**

TMO Signatory Level: L06
NLG-103032

| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)



## Section 1 - Site Information

**Site ID:** CH87073A
**Status:** Preliminary
**Version:** 3
**Project Type:** Sprint Retain
**Approved:** 01/30/2024 12:55:01 PM
**Approved By:** Akash.Patel@T-Mobile.com
**Last Modified:** 01/30/2024 12:55:01 PM
**Last Modified By:** Akash.Patel@T-Mobile.com

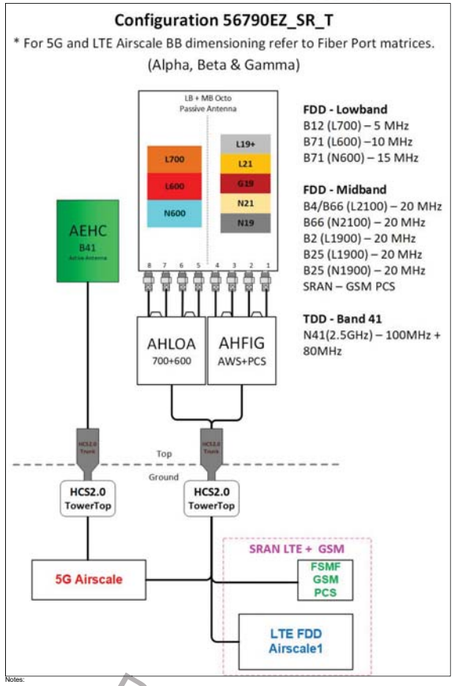
**Site Name:** CH60XC216
**Site Class:** Watertank
**Site Type:** Structure Non Building
**Plan Year:** 2024
**Market:** CHICAGO
**Vendor:** Nokia
**Landlord:** Town of Munster, Lake County, Indiana

**Latitude:** 41.552675
**Longitude:** -87.4895
**Address:** 8845 White Oak
**City, State:** Munster, IN
**Region:** CENTRAL

| RAN Template: 56790EZ_SR_T | | | A&L Template: 56790EZ_SR_T | |
|---|---|---|---|---|
| Sector Count: 3 | Antenna Count: 6 | Coax Line Count: 0 | TMA Count: 0 | RRU Count: 6 |

## Section 2 - Existing Template Images

56790EZ_SR_T.jpg

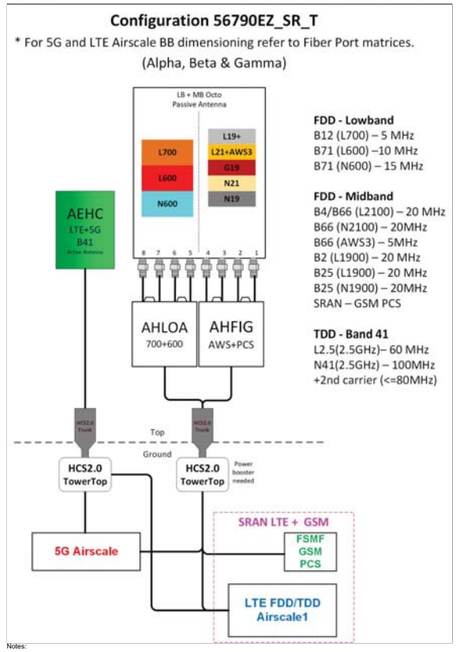



Notes:










Notes:

56790EZ_SR_T.jpg








Notes:



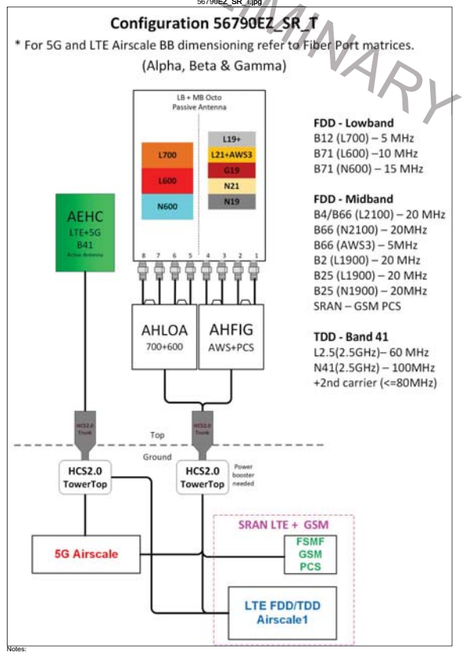




## Section 3 - Proposed Template Images

56790EZ_SR_T.jpg





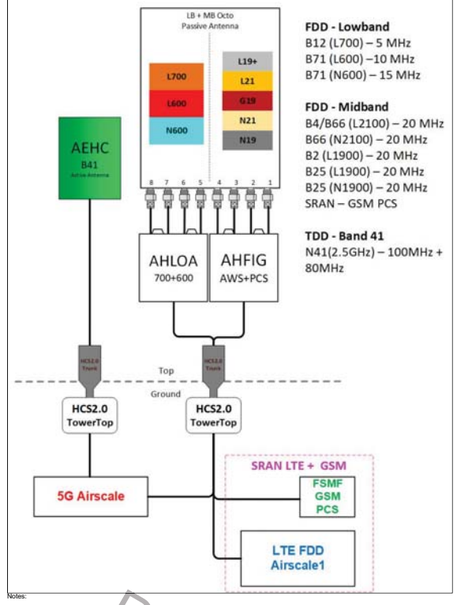

Notes:

56790EZ_SR_T.jpg

## Configuration 56790EZ_SR_T

* For 5G and LTE Airscale BB dimensioning refer to Fiber Port matrices.

(Alpha, Beta & Gamma)




**FDD - Lowband**
B12 (L700) – 5 MHz
B71 (L600) –10 MHz
B71 (N600) – 15 MHz

**FDD - Midband**
B4/B66 (L2100) – 20 MHz
B66 (N2100) – 20 MHz
B2 (L1900) – 20 MHz
B25 (L1900) – 20 MHz
B25 (N1900) – 20 MHz
SRAN – GSM PCS

**TDD - Band 41**
N41(2.5GHz) – 100MHz + 80MHz

Notes:









## Section 4 - Siteplan Images

----- This section is intentionally blank. -----







| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)



## Section 5 - RAN Equipment

### Existing RAN Equipment

**Template:** 56790EZ_SR_T

| Enclosure | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Enclosure Type | Tower Top Mount (Nokia) | Delta HPL3 600A Site Support Cabinet - ESOA600-HCU01 | Ancillary Equipment (Nokia) | Delta LB3 Battery Cabinet (4 strings) |
| Radio | AHFIG (x 3): N1900, N2100 (DARK), L1900, L2100, G1900 / AHLOA (x 3): N600, L600, L700 | | | |
| Baseband | | ASIA: L600, L700, L1900, L2100 / ASIL: N600, N1900, N2100 (DARK) / ASIL: N2500, FSMF, G1900 | | |
| Hybrid Cable System | | Delta BOOST Voltage Booster w/ 4 Modules; Extra Module for Delta Voltage Booster | 325' HCS 2.0 Trunk - 12#4AWG 24 SM FIBER PR (Tower) (x 2) | |
| Baseband Submodule | | ABIA (x 2): L1900, L2100 / ABIA: L600, L700 / ABIL: N600 / ABIL (x 2): N1900, N2100 (DARK) / ABIO: N2500 | | |
| Baseband Subrack | | AMIA (x 2) | | |
| Transport System | | CSR IXRe V2 (Gen2) | | |
| Junction Box | | | Nokia HCS 2.0 Tower Junction Box (x 2) | |

### Proposed RAN Equipment

**Template:** 56790EZ_SR_T

| Enclosure | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Enclosure Type | Tower Top Mount (Nokia) | Delta HPL3 600A Site Support Cabinet - ESOA600-HCU01 | Ancillary Equipment (Nokia) | Delta LB3 Battery Cabinet (4 strings) |
| Radio | AHFIG (x 3): N1900, N2100 (DARK), L1900, L2100, G1900 / AHLOA (x 3): N600, L600, L700 | | | |
| Baseband | | ASIA: L600, L700, L1900, L2100 / ASIL: N600, N1900, N2100 (DARK) / ASIL: N2500, FSMF, G1900 | | |
| Hybrid Cable System | | Delta BOOST Voltage Booster w/ 4 Modules; Extra Module for Delta Voltage Booster | 225' HCS 2.0 Trunk - 12#6AWG 24 SM FIBER PR (x 3) | |





| | | | | |
|---|---|---|---|---|
| Baseband Submodule | | ABIA (x 2): L1900, L2100 / ABIA: L600, L700 / ABIL: N600 / ABIL (x 2): N1900, N2100 (DARK) / ABIO: N2500 | | |
| Baseband Subrack | | AMIA (x 2) | | |
| Transport System | | CSR IXRe V2 (Gen2) | | |
| Junction Box | | | Nokia HCS 2.0 Tower Junction Box (x 3) | |

**RAN Scope of Work:**

01/30/2024: This is the RFDS for when the site moves from the temp pole to the WT.

Per Rob Sobioch: "Please also provide a return to tank RFDS / PM. The return to tank (V3) will need the following adjustments:
- RAD = 130'
- Change 65C OCTO to 65B OCTO (to accommodate new handrail design)
- Add a third trunk and make config a trunk per sector (3 total)
- Keep entire config as HCS 2.0"

The above has been updated in the this RFDS.

| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)



## Section 6 - A&L Equipment

**Existing Template:** 56790EZ_SR_T
**Proposed Template:** 56790EZ_SR_T

### Sector 1 (Existing) view from front (Note: the images show view from behind)

| | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65C-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 0 | | | | 0 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 115 | | | | 115 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | G1900 L2100 L1900 N1900 | G1900 L2100 L1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**





| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)

### Sector 1 (Proposed) view from front (Note: the images show view from behind)

| | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 0 | | | | 0 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | G1900 L2100 L1900 N1900 | G1900 L2100 L1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**





| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)

### Sector 2 (Existing) view from front (Note: the images show view from behind)

| | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65C-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 120 | | | | 120 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 115 | | | | 115 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | L1900 L2100 G1900 N1900 | L1900 L2100 G1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**





| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)

### Sector 2 (Proposed) view from front (Note: the images show view from behind)

| | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 120 | | | | 120 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | L1900 L2100 G1900 N1900 | L1900 L2100 G1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)

| Sector 3 (Existing) view from front (Note: the images show view from behind) | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65C-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 240 | | | | 240 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 115 | | | | 115 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | L1900 L2100 G1900 N1900 | L1900 L2100 G1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**





| RAN Template: | A&L Template: |
|---|---|
| 56790EZ_SR_T | 56790EZ_SR_T |

CH87073A_Sprint Retain_3_preliminary

**Print Name:** Standard (WT to Temp Pole)

| Sector 3 (Proposed) view from front (Note: the images show view from behind) | | | | | |
|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | |
| **Antenna** | 1 | | | | 2 |
| **Antenna Model** | Commscope - FFVV-65B-R3-V1 (Octo) | | | | AEHC (Active Antenna - Massive MIMO) |
| **Azimuth** | 240 | | | | 240 |
| **M. Tilt** | 0 | | | | 0 |
| **Height (ft)** | 130 | | | | 130 |
| **Ports** | P1 | P2 | P3 | P4 | P5 |
| **Active Tech** | L700 L600 N600 | L700 L600 N600 | L1900 L2100 G1900 N1900 | L1900 L2100 G1900 N1900 | N2500 |
| **Dark Tech** | | | N2100 | N2100 | L2500 |
| **Restricted Tech** | | | | | |
| **Decomm. Tech** | | | | | |
| **E. Tilt** | | | | | |
| **Cables** | | | | | |
| **TMAs** | | | | | |
| **Diplexer / Combiners** | | | | | |
| **Radio** | | | | | |
| **Sector Equipment** | | | | | |

**Unconnected Equipment:**

**Scope of Work:**

# MUNSTER WT

## 8835 White Oak Ave.

## Munster, Indiana

STRUCTURAL ANALYSIS & MOUNT REPORT

VERIZON (#130081)

T-MOBILE (CH87073A)

April 27, 2024

KOA PROJECT NO.: 242001.06

Revision #1

**PREPARED BY:**

SARAH BROST

KRECH OJARD & ASSOCIATES, INC.

101 PUTNAM ST.

EAU CLAIRE, WI 54703

715-552-7374

**PROFESSIONAL SEAL:**

EVAN M. BERGLUND REGISTERED No. 11600220 STATE OF INDIANA PROFESSIONAL ENGINEER

4/28/2024

Revision #1: The proposed handrail has been updated to a pipe handrail vs. angle handrail. The handrail has also been designed for Risk Category IV. Additional modifications based on third party review comments by VMC, LLC. Engineering.

**INSTALLATION SUMMARY:**

A new handrail is being proposed for the roof of the reservoir to support the Verizon and T-Mobile antennas and equipment. The Sprint carrier and its mounts will be removed from the tank. The proposed antennas and equipment are listed below for each carrier.

**Proposed Final Verizon Antenna and Equipment Summary:**

- (6) NHH-65B-R2B (RAD = 129')
- (3) AIR6449 (RAD = 131')
- (3) KRE105281/1 w/ Ericsson 4408 B48 Radio (RAD = 127')
- (3) 4449
- (3) 8843
- (3) Raycap RVZDC-3315-PF-48 w/ 3315-ALM-RS485 inside
- (3) Hybrid Cables

**Proposed Final T-Mobile Antenna and Equipment Summary:**

- (3) AEHC (RAD = 130')
- (3) FFVV-65B-R3-V1 (RAD = 130')
- (3) AHLOA
- (3) AHFIG
- (3) HCS 2.0 Trunk Box

**Existing Other Carrier Equipment to remain:**

A list of existing other carriers on the tank was provided in a 2015 mapping report and are listed below. There is assumed to be no additional antennas or equipment on the tank besides those listed.

- (2) Small Beacons (Center @ 146'-2")
- (1) GPS (Center @ 130'-9")

**MOUNT ANALYSIS SUMMARY:**

Design Criteria per TIA-222-H & ASCE 7-16

- Wind Speed: 119 MPH
  - Risk Category IV
  - Wind Exposure Category: C
- Uniform Ice Thickness: 1.5 inches
  - Ice Importance Factor: 1.25
  - Concurrent Wind Speed: 40 MPH

The proposed antennas will be installed on a new 22' diameter handrail constructed of 3" Sch. 80 pipes. Details for the proposed handrail are shown in the Krech Ojard & Associates, Inc. construction drawings S-1, S-2, and S-3. The handrail was analyzed based on the loading and requirements per the TIA-222-H. With the proposed antennas installed, the handrail will be loaded to approximately 50% of its allowable design strength and is sufficient to support the change in loading.

***The proposed handrail is capable of safely resisting the resultant forces from the change in loading.***

**WATER TANK ANALYSIS RESULTS SUMMARY**

Design Criteria per AWWA D100-21

- Wind Speed: 119 MPH
  - Risk Category IV
  - Wind Exposure Category: C

The water tower has been analyzed for the original and proposed new antenna loading. Upon installation of the proposed antennas and handrail, the water tower's overturning will increase a total of 12%, which includes the addition of the other telecommunication equipment and mounts. The percent change in overturning is based on the existing handrail and Sprint mounts to be removed.

The International Existing Building Code (IEBC) states; "Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered."

**Steel Shaft**

The tower shaft was analyzed to determine the percent increase in stress due to the addition of telecommunication mounts and equipment compared to the original tank design. Class 1 material was assumed to be the minimum as required by the AWWA and with no additional documentation that would indicate Class 2 was used. The International Existing Building Code (IEBC) states; "Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered." The largest increase in stress caused by the existing and proposed telecommunications equipment and its supports is 1.35% which is less than the 10% allowed per the IEBC. In addition, the IEBC also states it "allows for an increase in gravity loads as long as the existing members affected by the increase loads do not experience an increase in stress of more than 5 percent". The proposed total increase in gravity load causes the shaft stress to increase by 0.05%. The additional dead load is negligible compared to the total dead load and water load. The shaft diameter and thicknesses used in the analysis are based on the original tank drawings which can be found in the appendix of this report.

**Anchorage:**

The water tower anchorage capacity was determined using (22) 1-1/2" diameter anchor bolts, as noted in the original tower drawings and confirmed in the previous mapping report. The anchors are assumed to be Gr. 36 ksi steel. The anchor bolts are stressed to approximately 20% of their allowable design stress, when the tank is empty and full wind is applied. The anchor bolts were checked based on the requirements and allowable unit stresses found in the AWWA code. The load on the base plate increases 0.83% which is less than the 10% allowance by the IEBC.

**Pile Foundation**

The piles have been analyzed for the original and proposed new loading. The new antenna layout will increase the compressive pile force by approximately 1% from the original design, when the tank is full and full wind is applied. The 1% increase is less than the allowable 10%. In addition, there is no uplift on the piles when the tank is empty and full wind is applied.

***The water tower is capable of safely resisting the resultant forces from the change in loading.***

**ASSUMPTIONS:**

- Because the information was not readily available in the information provided, Krech Ojard & Associates made the following assumptions in their analysis:
    - The tank is constructed of class 1 material (Fy <= 34 ksi)
    - Shaft thickness is a minimum of 0.706 throughout the length of the shaft, including base of shaft and base of reservoir.
    - Anchor bolts are Gr. 36 ksi steel
    - Reservoir roof plate thickness if ¼" at new handrail post base plate location
- Original self-weight of the tank is 566.82 kips
- Any reinforcement or modifications are assumed to be fully installed and functional.
- The International Existing Building Code (IEBC) states; "Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered." Because the weight of the telecommunication equipment compared to the full tank is negligible, seismic considerations were not considered.
- All welds are assumed to have been performed to current welding standards and are assumed to develop their full capacity and to be in good condition. All bolts and bolt-like anchors are assumed to be fully tightened, fastened or bonded to the manufacturers' specifications and are assumed to have full capacity.
- Soil conditions and foundations are not considered unless specified in the analysis and have no deterioration or defects.
- The information provided to Krech Ojard & Associates for analysis is assumed accurate and up to date.
- The tower is assumed to be properly maintained and monitored and this analysis cannot be considered a condition assessment of the tower. No accommodation is taken for damaged, rusted, deteriorated, or otherwise compromised member conditions.

*If it is determined that any of these assumptions are not accurate, this analysis is void and an additional analysis should be performed.*

**REFERENCED DOCUMENTS:**

- Verizon RFDS dated 2/7/2024
- T-Mobile Antenna Summary dated 1/30/2024
- Hightower Solutions Mapping report dated 9/30/2015
- Previous Verizon SA by Robert Wozniak dated April 13, 2013
- Proposed handrail/antenna layout by Terra Consulting
- Tank and foundation drawings (No date or name)
- Review comments by VMC LLC dated April 15, 2024

**CODES & STANDARDS:**

- American Water Works Association AWWA D100-21
- ASCE 7-16
- TIA-222-H
- AISC 15$^{th}$ Edition LRFD
- 2015 International Existing Building Code (IEBC)

# MOUNT ANALYSIS PER TIA-222-H