

PROJECT: NEW SITE BUILD

TILLMAN SITE NAME: TI-OPP-13245-B

**APPROVALS:** 

CONSTRUCTION MANAGER:

**OPERATIONS MANAGER:** 

REAL ESTATE MANAGER:

IMPLEMENTATION MANAGER

**DESIGN ENGINEER:** 

LANDLORD:

VZW-5

VZW-6

VZW-7

VZW-8

VZW-9

VZW-14

SITE ADDRESS: UNASSIGNED: ALONG

**310TH AVE.** 

**AITKIN, MN 56431** 

SITE TYPE: 260' SELF SUPPORT





NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS. MI 49504

### RAMAKER & ASSOCIATES, INC.

855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

Sauk City, Wl • Willmar, MN Woodcliff Lake, NJ • Bayamon, PR

Certification # Seal:

## VICINITY MAP: PROJECT INFORMATION: SITE ADDRESS WHATEVALUE ADDRESS

UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

### SITE COORDINATES

LATITUDE: 46° 20' 25.51" (46.340419) LONGITUDE: 93° 29' 42.26" (-93.495072)

### **MUNICIPAL ID**

PARCEL: #2 ZONE: FF

#21-0-053600 FR - FARM RESIDENTIAL

### **PROPERTY OWNER**

NORMAN WESTERLUND 30517 270TH LANE AITKIN, MN 56431

### **TOWER OWNER**

TILLMAN INFRASTRUCTURE
152 W. 57TH STREET, 8TH FLOOR
NEW YORK, NY 10019
PHONE: (646) 578-8394

### A&E FIRM

RAMAKER & ASSOCIATES, INC. 855 COMMUNITY DRIVE SAUK CITY, WI 53583 CONTACT: MIKE REEVE EMAIL: mreeve@ramaker.com PHONE: (608) 643-4100

### SITE ACQUISITION

FAULK & FOSTER
NORTHWEST REGIONAL OFFICE
678 FRONT AVENUE NW, SUITE 215
GRAND RAPIDS, MI 49504
PHONE: (248) 891-9214
FAX: (616) 647-8614
CONTACT: BEN HERRICK

### **ELECTRIC PROVIDER**

MILLE LACS ELECTRIC COOP PHONE: (800) 450-2191

### **TELCO PROVIDER**

FRONTIER PHONE: (952) 891-7712

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### CODE COMPLIANCE:

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

- 1. 2015 INTERNATIONAL BUILDING CODE
- INTERNATIONAL MECHANICAL CODE
- ANSI/TIA-222 STRUCTURAL STANDARD
  NFPA 780 LIGHTNING PROTECTION CODE
- 5. NATIONAL ELECTRICAL CODE

VZW-10 VERIZON EQUIPMENT SHELTER FOUNDATION PLAN & DETAILS
VZW-11 VERIZON GENERATOR DETAILS
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VERIZON EQUIPMENT SHELTER ELEVATION & ICE BRIDGE DETAIL

VERIZON TOWER EQUIPMENT SPECIFICATIONS

VERIZON EQUIPMENT SHELTER ELEVATIONS

VERIZON EQUIPMENT SHELTER LAYOUT

VERIZON REDS

VERIZON UTILITY PLAN

TITLE SHEET

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE.

TI-OPP-13245-B

(VZW LOC. 556453)

DATE 01/30/2020

SCALE: NONE

**AITKIN, MN 56431** 

AITKIN COUNTY

DATE DESCRIPTION

PRELIMINARY

PROJECT 40742
SHEET T 1



SITE

LOCATION

### **GENERAL NOTES**

- ALL EQUIPMENT FURNISHED AND WORK PERFORMED UNDER THE CONTRACT DOCUMENTS SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS NOTED OTHERWISE. ANY FAILURE OF EQUIPMENT OR WORK DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP SHALL BE CORRECTED BY THE CONTRACTOR AT NO COST TO THE OWNER
- 2. ALL WORK, MATERIAL, AND EQUIPMENT SHALL COMPLY WITH ALL REQUIREMENTS OF THE LATEST EDITIONS AND INTERIM AMENDMENTS OF THE NATIONAL ELECTRICAL CODE (N.E.C.). NATIONAL ELECTRICAL SAFETY CODE, OSHA, AND ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCES. ALL ELECTRICAL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL BE NEW (EXCEPT WHERE OTHERWISE NOTED) AND SHALL COMPLY WITH THE REQUIREMENTS OF THE UNDERWRITERS' LABORATORIES AND BEAR THE U.L. LABEL.
- VERIZON OR THEIR ARCHITECT/ENGINEER RESERVE THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH IN HIS OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO THE OWNER OR HIS ARCHITECT/ENGINEER
- 4. THE CONTRACTOR SHALL SUPPORT, BRACE AND SECURE EXISTING STRUCTURE AS REQUIRED, CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PROTECTION OF ANY EXISTING STRUCTURES DURING CONSTRUCTION, FIELD VERIFY ALL EXISTING DIMENSIONS WHICH AFFECT THE NEW CONSTRUCTION.
- . THE CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY OF THE WORK TO BE COVERED UP OR ENCLOSED UNTIL IT HAS BEEN INSPECTED BY THE GOVERNING AUTHORITIES. ANY WORK THAT IS ENCLOSED. OR COVERED UP BEFORE SUCH INSPECTION AND TEST SHALL BE UNCOVERED AT THE CONTRACTOR'S EXPENSE, AFTER IT HAS BEEN INSPECTED, THE CONTRACTOR SHALL RESTORE THE WORK TO ITS ORIGINAL CONDITION AT HIS OWN EXPENSE.
- 6. ALL EXISTING UTILITIES, FACILITIES, CONDITIONS AND THEIR DIMENSIONS SHOWN ON PLANS HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THE ARCHITECT/ENGINEER AND OWNER ASSUME NO RESPONSIBILITY WHATEVER AS TO THE SUFFICIENCY OR ACCURACY OF THE INFORMATION SHOWN ON THE PLANS OR THE MANNER OF THEIR REMOVAL OR ADJUSTMENT. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL SAID UTILITIES AND FACILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR SHALL ALSO OBTAIN FROM EACH UTILITY COMPANY DETAILED INFORMATION RELATIVE TO WORKING SCHEDULES AND METHODS OF REMOVING OR ADJUSTING AFFECTED UTILITIES.
- . CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION, ANY DISCREPANCIES OR DOUBTS AS TO THE INTERPRETATION OF PLANS SHALL BE IMMEDIATELY REPORTED TO THE PROJECT MANAGER FOR RESOLUTION AND INSTRUCTION, AND NO FURTHER WORK SHALL BE PERFORMED UNTIL DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INSTRUCTION MEANS CONTRACTOR WILL HAVE WORKED AT HIS OWN RISK AND EXPENSE.
- . CONTRACTORS SHALL CLEAN ENTIRE SITE AFTER CONSTRUCTION SUCH THAT NO PAPERS, TRASH, DEBRIS, WEEDS, BRUSH OR ANY OTHER DEPOSITS REMAIN. ALL MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF-SITE BY THE CONTRACTOR
- ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY THE CONTRACTOR WITH LOCAL GAS, ELECTRIC, TELEPHONE, AND ANY OTHER UTILITY COMPANIES HAVING JURISDICTION OVER THIS
- 10. DURING CONSTRUCTION, THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN THE UTILITIES OF THE BUILDINGS/SITE WITHOUT INTERRUPTION. SHOULD IT BE NECESSARY TO INTERRUPT ANY SERVICE OR UTILITY. THE CONTRACTOR SHALL SECURE PERMISSION IN WRITING FROM THE BUILDING/PROPERTY OWNER FOR SUCH INTERRUPTION, AT LEAST 72 HOURS IN ADVANCE, ANY INTERRUPTION SHALL BE MADE WITH A MINIMUM AMOUNT OF INCONVENIENCE TO THE BUILDING/PROPERTY OWNER AND ANY SUCH SHUTDOWN TIME SHALL BE COORDINATED WITH THE BUILDING/PROPERTY OWNER
- CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS BUILT DRAWINGS TO VERIZON PROJECT MANAGER
- 12. THIS CONTRACTOR SHALL PROVIDE ALL TEMPORARY WIRING FOR ALL TRADES FOR CONSTRUCTION EQUIPMENT (I.E. HANDTOOLS, WELDERS, PIPE BENDERS, ETC.) & CONSTRUCTION LIGHTING PER
- OSHA STANDARDS. INCLUDE ALL COSTS IN THE BASE BID THIS CONTRACTOR SHALL ESTABLISH SAFE WORKING PROCEDURES FOR THE PROTECTION OF THE WORKMEN IN ALL PHASES OF WORK, COMPLYING WITH THE APPLICABLE PROVISIONS OF ALL CITY, STATE AND FEDERAL SAFETY LAWS (OSHA).
- THIS CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE PLANS AND SHALL VERIFY EXISTING SITE CONDITIONS AT THE JOB SITE BEFORE SUBMITTING BID. FAILURE TO RECOGNIZE WORK REQUIRED SHALL BE AT THE EXPENSE OF THIS CONTRACTOR. NO CONSIDERATION SHALL BE GIVEN FOR ADDITIONAL COMPENSATION AFTER THE LETTING OF BIDS
- ENTIRE INSTALLATION SHALL BE PERFORMED IN A FIRST-CLASS WORKMAN LIKE MANNER AND SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES. THE COMPLETED SYSTEMS SHALL BE

- FULLY OPERATIONAL; ACCEPTANCE BY THE OWNER SHALL BE A CONDITION OF THE CONTRACT. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES IN ORDER TO AVOID INTERFERENCE'S PRESERVING MAXIMUM HEADROOM AND AVOID OMISSIONS. ALL MATERIALS WORKMANSHIP AND EQUIPMENT SHALL BE GUARANTEED FOR ONE (1) YEAR AFTER SYSTEM **ACCEPTANCE**
- 15. ALL MATERIALS USED SHALL BE NEW AND BEAR THE U/L LABEL AND BE OF THE APPROPRIATE NEMA STANDARD.
- 16. CONTRACTOR SHALL INCLUDE ALL MISCELLANEOUS ITEMS REQUIRED TO COMPLETE THE WORK.
- 17. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND REQUIRED INSPECTION FEES.
- 18. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE AND REVIEW THE ELECTRICAL CHARACTERISTICS, AMPACITY AND OTHER REQUIREMENTS OF ALL EQUIPMENT PRIOR TO INSTALLATION
- 19. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE THE LOCATIONS OF CONDUIT ROUTING, EQUIPMENT, LIGHTING, ETC. WITH ALL OTHER TRADES IN THE FIELD PRIOR TO
- 20. FOR CLARITY OF ALL PLANS, SOME EQUIPMENT CONDUIT AND WIRE HAS NOT BEEN SHOWN. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO FURNISH AND INSTALL COMPLETE AND OPERATING SYSTEMS INCLUDING ALL CONDUIT AND WIRING
- 21. THE CONTRACTOR SHALL MAINTAIN THE FIRE RATED INTEGRITY OF ALL FLOORS, CEILINGS AND WALLS. ALL PENETRATIONS THROUGH FIRE RATED BUILDINGS ELEMENTS SHALL BE EFFECTIVELY SEALED USING APPROVED MATERIALS AND METHODS. ALL LIGHTING FIXTURES MOUNTED IN FIRE RATED CEILINGS SHALL MAINTAIN THE INTEGRITY OF THE FIRE RATING CEILINGS USING APPROVED MATERIALS AND METHODS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE RATINGS
- 22. THE CONTRACTOR SHALL INSPECT THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS TO DETERMINE HIS ENTIRE SCOPE OF WORK. THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS AND EXTENT OF DEMOLITION AND NEW WORK FOR THE PROJECT PRIOR TO SUBMITTING HIS BID. MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS NOTED OTHERWISE. ANY FAILURE OF EQUIPMENT OR WORK DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP SHALL BE CORRECTED BY THE CONTRACTOR AT NO COST TO THE OWNER.
- 23. THE ELECTRICAL INSTALLATION IS TO BE IN STRICT ACCORDANCE WITH THE APPLICABLE RULES AND REGULATIONS OF ALL LOCAL, STATE AND FEDERAL ELECTRICAL CODES AND THE LOCAL UTILITY COMPANY REQUIREMENTS OR ANY OTHER AUTHORITIES HAVING LAWFUL JURISDICTION.

### SPECIAL CONSTRUCTION/ANTENNA INSTALLATION

- A. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND PROPERTY
- B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND VERIZON SPECIFICATIONS.
- C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED
- D. INSTALL FURNISHED GALVANIZED STEEL AND/OR TOWER WAVEGUIDE.
- E. INSTALL COAXIAL CABLES AND TERMINATIONS BETWEEN ANTENNAS AND FOUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
- F. ANTENNA AND COAXIAL CABLE GROUNDING
- 1. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT #221213 OR
- 2. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS).

### **QUALITY ASSURANCE**

- 1. ALL CONTRACTORS FURNISHED MATERIALS AND EQUIPMENT SPECIFIED ON THE PROJECT SHALL BE NEW AND UNUSED, OF CURRENT MANUFACTURER AND OF THE HIGHEST GRADE
- 2. ALL EQUIPMENT, MATERIAL AND THE INSTALLATION METHODS SPECIFIED ON THE PROJECT DRAWINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES AND REGULATIONS AND APPROPRIATE INDUSTRIAL CONSENSUS STANDARDS AND CODES INCLUDING ANSI IEEE, NEMA, NFPA, AND UL. ALL AS REVISED AS OF THE DATE OF THIS WORK PACKAGE
- ALL ELECTRICAL ITEMS BOTH CONTRACTOR AND OWNER FURNISHED SHALL BE CHECKED FOR AGREEMENT WITH THE PROJECT DRAWINGS AND SPECIFICATIONS AND SHALL BE VISUALLY INSPECTED TO ENSURE THAT EQUIPMENT IS UNDAMAGED AND IS IN PROPER ALIGNMENT. INSTALLED PER MANUFACTURER'S INSTRUCTIONS, ELECTRICAL CONNECTIONS ARE TIGHT AND PROPERLY INSULATED WHERE REQUIRED. FUSES ARE OF THE PROPER TYPE AND SIZE AND ELECTRICAL ENCLOSURES ARE OF THE

- 4. NOTIFY OWNER IN WRITING OF ALL DISCREPANCIES BETWEEN DRAWINGS/SPECIFICATIONS AND FIELD INSTALLATIONS. OR IF THE VISUAL INSPECTIONS SHOW DAMAGE OR IMPROPER INSTALLATION.
- 5. GENERAL: DURING AND UPON COMPLETION OF THE WORK, ARRANGE AND PAY ALL ASSOCIATED INSPECTIONS OF ALL ELECTRICAL WORK INSTALLED UNDER THIS CONTRACT. IN ACCORDANCE WITH THE CONDITIONS OF THE CONTRACT.
- 6. INSPECTIONS REQUIRED: AS PER THE LAWS AND REGULATIONS OF THE LOCAL AND/OR STATE AGENCIES HAVING JURISDICTION AT THE PROJECT SITE
- 7. INSPECTION AGENCY: APPROVED BY THE LOCAL AND/OR STATE AGENCIES HAVING JURISDICTION AT THE PROJECT SITE.

### CABLE TRAYS

- 1. ALL CABLE TRAYS AND FITTINGS SHALL BE DESIGNED.
- MANUFACTURED AND TESTED IN CONFORMANCE WITH NEMA VE 1 2. CABLE TRAYS SHALL BE LADDER TYPE WITH 9-INCH SPACING.
- 3. CABLE TRAYS SHALL BE CAPABLE OF SUPPORTING 75 LBS/LINEAR
- 4. CABLE TRAYS AND FITTINGS SHALL BE MANUFACTURED OF GALVANIZED STEEL
- 5. CABLE TRAYS SHALL BE FURNISHED WITH COVERS WHERE SHOWN ON THE PROJECT DRAWINGS
- 6. ALL DISCONTINUOUS SECTIONS OF CABLE TRAY SHALL BE BONDED ACROSS JOINTS.

### CONDUCTORS

- 1. ALL POWER, CONTROL AND COMMUNICATION WIRING SHALL MEET REQUIRED NEMA-RATINGS, ASTM, UL, AND NEC STANDARDS FOR MATERIAL AND WORKMANSHIP UNLESS OTHERWISE SPECIFIED.
  - A. SERVICE ENTRANCE CONDUCTORS SHALL BE COPPER, 200 VOLT, SUNLIGHT RESISTANT, SUITABLE FOR WET LOCATIONS, TYPE USE-2. THE GROUNDED NEUTRAL CONDUCTOR SHALL BE IDENTIFIED WITH A WHITE MARKING AT EACH TERMINATION.
- B. CONDUCTORS FOR FEEDER AND BRANCH CIRCUITS SHALL BE COPPER 200 VOLT, TYPE THHN/THWN WITH A MINIMUM SIZE OF #12 AWG
- 2 ALL CONDUCTOR ACCESSORIES INCLUDING CONNECTORS TERMINATIONS, INSULATING MATERIALS, SUPPORT GRIPS, MARKER AND CABLE TIES SHALL BE FURNISHED AND INSTALLED. SUPPLIER'S INSTALLATION INSTRUCTIONS SHALL BE OBTAINED FOR CABLE ACCESSORIES. THESE INSTRUCTIONS SHALL BE IN THE POSSESSION OF THE CRAFTSMAN WHILE INSTALLING THE ACCESSORIES AND SHALL BE AVAILABLE TO THE COMPANY FOR REFERENCE.
- 3. TERMINAL CONNECTORS FOR CONDUCTORS SMALLER THAN 8 AWG SHALL BE COMPRESSION TYPE CONNECTORS SIZED FOR THE CONDUCTOR AND THE TERMINAL. THE CONNECTORS SHALL BE CONSTRUCTED OF FINE GRADE HIGH CONDUCTIVITY COPPER IN ACCORDANCE WITH QQ-C-576 AND SHALL BE TIN-PLATED IN ACCORDANCE WITH MIL-T-10727. THE INTERIOR SURFACE OF THE CONNECTOR WIRE BARREL SHALL BE SERRATED, AND THE EXTERIOR SURFACE OF THE CONNECTOR WIRE BARREL SHALL BE PROVIDED WITH CRIMP GUIDES
- 4 TERMINAL CONNECTORS FOR CONDUCTORS 8 AWG AND LARGER SHALL BE PRESSURE OR BOLTED CLAMP TYPE, BURNDY QUIKLUG, ARILUG OR ACCEPTABLE EQUAL; OR COMPRESSION TYPE; BURNDY TYPE YAV OFR YA (LONG BARREL), PANDUIT TYPE LCA OR LCC, OR ACCEPTABLE EQUAL. ACCEPTABLE CONNECTORS INCLUDED WITH COMPANY-FURNISHED EQUIPMENT MAY BE USED.
- 5. TERMINATION PROVISIONS OF EQUIPMENT FOR CIRCUITS RATED100 AMPERES OR LESS, OR MARKED FOR NOS, 14 THROUGH 1 CONDUCTORS. SHALL BE USED ONLY FOR CONDUCTORS RATED 60 DEG. C (140 DEG F). CONDUCTORS WITH HIGHER TEMPERATURE RATINGS SHALL BE PERMITTED, PROVIDED THE AMPACITY OF EACH CONDUCTOR IS DETERMINED BASED ON THE 60 DEG.C (140 DEG.F) AMPACITY OF THE CONDUCTOR SIZE USED
- 6. TERMINATION PROVISIONS OF EQUIPMENT FOR CIRCUITS RATED OVER 100 AMPERES, OR MARKED FOR CONDUCTORS LARGER THAN NO. 1. SHALL BE USED ONLY FOR CONDUCTORS RATED 75 DEG.C. (167 DEG F). CONDUCTORS WITH HIGH TEMPERATURE RATINGS SHALL BE PERMITTED, PROVIDED THE AMPACITY OF EACH CONDUCTOR IS DETERMINED BASE ON THE 75 DEG. C (167 DEG.F) AMPACITY OF THE CONDUCTOR SIZE USED
- 7. ALL 600 VOLT OR LESS WIRING, WHERE COMPRESSION TYPE CONNECTORS ARE USED. SHALL BE INSULATED WITH AT LEAST ONE TURN OF "SCOTCHFILL" 200 AMP ELECTRICAL INSULATING PUTTY AND THEN COVERED WITH TWO HALF TURNS OF TAPE SIMILAR TO 3M COMPANY'S "33 PLUS" (33+) PLASTIC TAPE OR 88 OUTDOOR.
- 8. THE ELECTRICAL SERVICE TO THE SITE SHALL BE GROUNDED AT THE SERVICE DISCONNECTING MEANS REQUIRED IN ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. IN ACCORDANCE WITH ANY LOCAL
- 9. ALL UNDERGROUND (BELOW GRADE) GROUNDING CONNECTIONS SHALL BE MADE BY THE CADWELD PROCESS (MECHANICAL LUG ATTACHMENTS BELOW GRADE ARE NOT ACCEPTABLE). CONNECTIONS SHALL INCLUDE ALL CABLE TO CABLE SPLICES (TEES, Xs, ETC.) ALL MATERIALS USED (MOLDS, WELDING METAL, TOOLS, ETC.) SHALL BE BY CADWELD AND INSTALLED PER MANUFACTURER'S RECOMMENDATION AND PROCEDURES.

### HANGERS AND SUPPORT

1. MATERIALS: ALL HANGERS, SUPPORTS, FASTENERS, AND HARDWARE SHALL BE ZINC COATED OR OF EQUIVALENT CORROSION RESISTANCE BY TREATMENT OR INHERENT PROPERTY, AND SHALL BE MANUFACTURED PRODUCTS DESIGNED FOR THE APPLICATION.

- PRODUCTS FOR OUTDOOR USE SHALL BE HOT DIP GALVANIZED. 2. TYPES: HANGERS, STRAPS, RISER SUPPORTS, CLAMPS, U-CHANNEL THREADED RODS ETC. AS INDICATED OR REQUIRED
- INSTALLATION: RIGIDLY SUPPORT AND SECURE ALL MATERIALS RACEWAY AND EQUIPMENT BUILDING STRUCTURE USING HANGERS, SUPPORTS AND FASTENERS SUITABLE FOR THE USE. MATERIALS AND LOADS ENCOUNTERED, PROVIDE ALL NECESSARY HARDWARE, PROVIDE CONDUIT SUPPORTS AT MAXIMUM 5 FT. O.C.
- OVERHEAD MOUNTING: ATTACH OVERHEAD MOUNTED EQUIPMENT TO STRUCTURAL FRAMEWORK OR SUPPORTING METAL FRAMEWORK
- 5. WALL MOUNTING: SUPPORT WALL MOUNTED EQUIPMENT BY MASONRY, CONCRETE BLOCK, METAL FRAMING OR SUB-FRAMING.
- 6. EXTERIOR WALLS: MOUNT ALL EQUIPMENT LOCATED ON THE INTERIOR OF EXTERIOR BUILDING WALLS AT LEAST ONE INCH AWAY FROM WALL SURFACE, USING SUITABLE SPACERS.
- 7. STRUCTURAL MEMBERS: DO NOT CUT, DRILL OR WELD ANY STRUCTURAL MEMBER EXCEPT SPECIFICALLY APPROVED BY THE ENGINEER.
- 8. INDEPENDENT SUPPORT: DO NOT SUPPORT MATERIALS OR EQUIPMENT FROM OTHER EQUIPMENT, PIPING, DUCTWORK OR SUPPORTS FOR SAME.
- 9. RACEWAY SUPPORTS: RIGIDLY SUPPORT ALL RACEWAY WITH MAXIMUM SPACINGS PER NEC. AND SO AS TO PREVENT DISTORTION OF ALIGNMENT DURING PULLING OPERATION. USE APPROVED HANGERS CLAMPS AND STRAPS FOR INDIVIDUAL RUNS. DO NOT USE PERFORATED STRAPS OR TIE WIRES. WHERE MULTIPLE PARALLEL RACEWAYS ARE TO RUN TOGETHER, USE TRAPEZE TYPE HANGER ARRANGEMENT MADE FROM U-CHANNEL AND ACCESSORIES SUSPENDED FOR FUTURE INSTALLATION OF ADDITIONAL RACEWAYS, RIGIDLY ANCHOR VERTICAL CONDUITS SERVING FLOOR MOUNTED OR "ISLAND" TYPE EQUIPMENT MOUNTED AWAY FROM WALLS WITH METAL BRACKET OR RIGID STEEL CONDUIT EXTENSION SECURED TO FLOOR.
- 10. MISCELLANEOUS SUPPORTS: PROVIDE ANY ADDITIONAL STRUCTURAL SUPPORT STEEL BRACKETS, ANGLES, FASTENERS, AND HARDWARE AS REQUIRED TO ADEQUATELY SUPPORT ALL ELECTRICAL MATERIALS AND EQUIPMENT.
- 11. ONE HOLE STRAPS SHALL NOT BE USED FOR CONDUITS LARGER THAN 3/4 INCH.

### HOLES, SLEEVES AND OPENINGS

- GENERAL: PROVIDE ALL HOLES, SLEEVES, AND OPENINGS REQUIRED FOR THE COMPLETION OF WORK AND RESTORE ALL SURFACES DAMAGED TO MATCH SURROUNDING SURFACES. MAINTAIN INTEGRITY OF ALL FIRE AND SMOKE RATED BARRIERS USING APPROVED FIRE-STOPPING SYSTEMS. WHEN CUTTING HOLES OR OPENINGS, OR INSTALLING SLEEVES. DO NOT CUT, DAMAGE OR DISTURB STRUCTURAL ELEMENTS OR REINFORCING STEEL UNLESS APPROVED IN WRITING, BY THE PROJECT STRUCTURAL ENGINEER.
- 2. CONDUIT PENETRATIONS: SIZE CORE DRILLING HOLES SO THAT AN ANNULAR SPACE OF NOT LESS THAN 1/4 INCH AND NOT MORE THAN 1 INCH IS LEFT AROUND THE CONDUIT, PIPE, ETC. WHEN OPENINGS ARE CUT IN LIEU OF CORE DRILLED. PROVIDE SLEEVE IN ROUGH OPENING SIZE SLEEVES TO PROVIDE AN ANNUL AR SPACE OF NOT LESS THAN 1/4 INCH AND NOT MORE THAN 1 INCH AROUND THE CONDUIT, PIPE, ETC. PATCH AROUND THE SLEEVE TO MATCH SURROUNDING SURFACES.

### SITE WORK

- THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION ALL EXISTING ACTIVE SEWER WATER GAS ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE PROJECT MANAGER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES: CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
- FALL PROTECTION
- CONFINED SPACE **ELECTRICAL SAFETY**
- TRENCHING AND EXCAVATION
- 2. REMOVE FROM SITE/OWNER'S PROPERTY ALL WASTE MATERIALS, UNUSED EXCAVATED MATERIAL, INCLUDING MATERIAL CLASSIFIED UNSATISFACTORY, CONTAMINATED OR DANGEROUS TRASH AND DEBRIS, AND DISPOSE OF IN A LEGAL MANNER (AS REQUIRED).
- 3. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF
- THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE BUILDING OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED, AND COVERED WITH MULCH AS REQUIRED TO RESTORE SITE TO ORIGINAL CONDITION





NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 **GRAND RAPIDS. MI 49504** 



855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

Sauk City, WI • Willmar, MN Woodcliff Lake, NJ · Bayamon, PR

IARK DATE DESCRIPTION PRELIMINARY PROJECT TITLE TI-OPP-13245-B

(VZW LOC. 556453)

UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 **AITKIN COUNTY** 

**SPECIFICATIONS** 

SCALE: NONE

40742 PROJECT NUMBER

SHEET SP-1

- 5. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL AND 1996 BOCA STANDARD GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
- 6. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT SHELTER OR PLATFORM LAYOUT AND CONSTRUCTION STAKING. CONTRACTOR SHALL ESTABLISH GRADE AND LINE STAKES PRIOR TO CONSTRUCTION

### STRUCTURAL STEEL

- DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE
  WITH THE LATEST AISC MANUAL OF STEEL CONSTRUCTION, AWS D1.1
  AND THE STRUCTURAL STEEL SHALL BE AS FOLLOWS:

   DETAIL OF THE STRUCTURAL STEEL SHALL BE AS FOLLOWS:

   TO STRUCTURAL STEEL
- A. ASTM A36, GRADE 36, ROLLED STEEL, RODS, PLATES, U-BOLTS AND ANCHOR BOLTS.
- B. ASTM A325 BOLTS BEARING TYPE
- C. ALL STEEL SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 2. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE REQUIRED DURING CONSTRUCTION UNTIL ALL CONNECTIONS ARE COMPLETE.
- 3. ANY FIELD CHANGES OR SUBSTITUTIONS SHALL HAVE PRIOR APPROVAL FROM THE ENGINEER.
- TIGHTEN HIGH STRENGTH BOLTS TO A SNUG TIGHT CONDITION WHERE ALL PLIES IN A JOINT ARE IN FIRM CONTACT BY EITHER.
- A. A FEW IMPACTS OF A IMPACT WRENCH
- B. THE FULL EFFORT OF A PERSON USING A SPUD WRENCH

### WEI DING

- A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS; CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.
- B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM A-233 E70 SERIES, BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERSED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATION.
- C. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.

### 6. PROTECTION

A. UPON COMPLETION OF ERECTION INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS, OR GALVANIZED BREAKS WITH ZINC BASED PAINT (GALVANOX, DRY GALV OR ZINC IT). COLOR TO MATCH THE GALVANIZING PROCESS.

### RACEWAY:

- CONDUIT AND CONDUIT FITTINGS SHALL MEET ANSI AND NEC STANDARDS FOR MATERIAL AND WORKMANSHIP AND SHALL BE UL LISTED.
- A. RIGID STEEL CONDUIT (FOR ALL ABOVE GRADE WORK) SHALL CONFORM TO ANSI C80-I AND THE REQUIREMENTS OF NEC PARAGRAPH 346 AND BE STANDARD WEIGHT, MILD RIGID STEEL, HOT DIP GALVANIZED WITH INSIDE AND OUTSIDE FINISHED WITH A PROTECTIVE ZINC COATING. COUPLING, ELBOWS AND BENDS SHALL MEET THESE SAME REQUIREMENTS. FITTINGS SHALL BE OF THE GALVANIZED IRON OR STEEL THREADED TYPE.
- B. PVC CONDUIT (FOR UNDERGROUND WORK) SHALL CONFORM TO UL STANDARD 651-89 AND THE REQUIREMENTS OF NEC. PARAGRAPH 347. CONDUIT SHALL BE HEAVY WALL TYPE, SCHEDULE 80, AND SUNLIGHT RESISTANT. FITTINGS SHALL BE OF THE UNTHREADED SOLVENT CEMENT TYPE.
- C. EMT CONDUIT (FOR USE BEHIND WALLS OR ABOVE SUSPENDED CEILINGS ONLY), ELECTRIC METALLIC TUBING SHALL CONFORM TO ANSI C80.3 AND THE REQUIREMENTS OF NEC, PARAGRAPH 348 AND BE PROTECTED ON EXTERIOR WITH A ZINC COATING AND ON INTERIOR SURFACES WITH EITHER A ZINC COATING OR LACQUER ENAMEL. FITTINGS SHALL BE ZINC COATED STEEL.
- 2. MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH, SIZES NOT SHOWN ON DRAWINGS SHALL BE PER NEC.
- 3. ALL SPARE CONDUITS SHALL HAVE A METALLIC OR MULL TAPE
- 4. CONDUIT SUPPORTS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AND IN ACCORDANCE WITH THE NEC.
- 5. UNDERGROUND CONDUITS & ENCLOSURES.
- A. INSTALL A WARNING TAPE TWELVE INCHES ABOVE EACH CONDUIT OR SET OF CONDUITS.
- B. IDENTIFY EACH CONDUIT AT BOTH ENDS.
- C. INSTALL A MINIMUM OF 36 INCHES BELOW THE FINISHED GRADE,

- OR DEEPER IF NOTED ON PLAN DRAWINGS
- D. SLOPE A MINIMUM OF 4 INCHES PER 100 FEET TO DRAIN AWAY
  FROM BUILDINGS AND FOLIPMENT
- E. USE MANUFACTURED ELECTRICAL PVC ELBOWS AND FITTINGS FOR BELOW GRADE BENDS.
- F. MAKE JOINTS AND FITTINGS WATERTIGHT ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
- G. INSTALL A COUPLING BEFORE EACH WALL PENETRATION
- H. RESTORE SURFACE FEATURES DISTURBED BY EXCAVATION (AND TRENCHING) IN ALL AREAS.
- I. ENCLOSURES IN DRY LOCATION SHALL BE NEMA 1
- J. ENCLOSURES IN WET LOCATIONS OR OUTDOOR SHALL BE NEMA 5.

### TELEPHONE SERVICES

 GENERAL INSTRUCTIONS SHALL BE IN ACCORDANCE WITH TELEPHONE UTILITY COMPANY'S RULES AND REGULATIONS.

### LIGHTNING PROTECTION

LIGHTNING PROTECTION MATERIAL SHALL BE FURNISHED BY VERIZON AND INSTALLED BY CONTRACTOR.

### CONCRETE

### PART 1 - GENERAL

 WORK INCLUDED FORM WORK, REINFORCEMENT, ACCESSORIES, CAST-IN-PLACE CONCRETE, FINISHING, AND CURING.

### 2. INSPECTIONS

- A. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING BUILDING DEPARTMENT INSPECTIONS REQUIRED FOR HIS SCOPE OF WORK.
- DEPARTMENT INSPECTIONS REQUIRED FOR HIS SCOPE OF WORK.

  B. ALL REINFORCING STEEL SHALL BE INSPECTED AND APPROVED BY
  THE CARRIER CONSTRUCTION MANAGER, OR THEIR DESIGNEE,
  PRIOR TO PLACEMENT OF CONCRETE.
- C. THE CARRIER CONSTRUCTION MANAGER SHALL BE NOTIFIED NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS.

### 3 QUALITY ASSURANCE

- A. CONSTRUCT AND ERECT CONCRETE FORM WORK IN ACCORDANCE WITH ACI 301 AND ACI 318.
- B. PERFORM CONCRETE REINFORCING WORK IN ACCORDANCE WITH ACI 301, ACI 318, AND ASTM A184.
- C. PERFORM CAST-IN-PLACE CONCRETE WORK IN ACCORDANCE WITH ACI 301, ACI 318, AND ACI 117-90.
- D. OPEN FOUNDATION TRENCHES SHALL BE INSPECTED BY MES PRIOR TO CONCRETE INSTALLATION.
- 4. SUBMITTALS: SUBMIT CONCRETE MIX AND REINFORCING STEEL SHOP DRAWINGS FOR APPROVAL BY CARRIER CONSTRUCTION MANAGERIENGINEER. THE SHOP DRAWINGS SHALL BE SUBMITTED IN THE FORM OF TWO (2) CONCRETE MIX DESIGN INFORMATION SHEETS AND TWO (2) BLUE LINE DRAWINGS FOR REINFORCING STEEL.

### PART 2 - PRODUCTS

- 1. REINFORCEMENT MATERIALS
- A. REINFORCEMENT STEEL, ASTM A615, 60 ksi YIELD GRADE, DEFORMED BILLET STEEL BARS, PLAIN FINISH.
- B. WELDED STEEL WIRE FABRIC ASTM A185 PLAIN TYPE, IN FLAT SHEFTS PLAIN FINISH
- C. CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS. SIZED AND SHAPED FOR SUPPORTS OF REINFORCING.
- D. FABRICATE CONCRETE REINFORCING IN ACCORDANCE WITH ACI 315, ACI 318, ASTM A184

### 2. CONCRETE MATERIALS

- A. CEMENT: ASTM C150, PORTLAND TYPE
- B. FINE AND COURSE AGGREGATES: ASTM C33 MAXIMUM SIZE OF CONCRETE AGGREGATE SHALL NOT EXCEED; ONE (3/4) INCH SIZE SUITABLE FOR INSTALLATION METHOD UTILIZED OR ONE-THIRD CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING.
- C. WATER: CLEAN AND NOT DETRIMENTAL TO CONCRETE
- D. AIR ENTRAINING ADMIXTURE: ASTM C260
- E. BONDING AGENT: LATEX EMULSION FOR BONDING NEW TO OLD CONCRETE AS MANUFACTURED BY DAYTON SUPERIOR.
- F. NON-SHRINK GROUT: PREMIXED COMPOUND CONSISTING OF NONMETALLIC AGGREGATE. CEMENT, WATER REDUCING AND PLASTICIZING AGENTS.

### 3. CONCRETE MIX

- A. CONCRETE MATERIALS SHALL CONFORM TO THE APPROPRIATE
  A C.I. REQUIREMENTS FOR EXPOSED STRUCTURAL CONCRETE
- B. MIX AND DELIVER CONCRETE IN ACCORDANCE WITH ASTM C94, ALT. 3.
- C. PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR LOCAL ANTICIPATED AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENTS OF ACI 318 CHAPTER 4 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE. PROVIDE CONCRETE AS FOLLOWS:
  - 1. COMPRESSIVE STRENGTH: 4000 psi AT 7 DAYS.
  - 2. SLUMP: 3 INCHES

### PART 3 - EXECUTION

- 1. INSERTS, EMBEDDED COMPONENTS AND OPENINGS
- A. THE CONTRACTOR SHALL COORDINATE AND CROSS-CHECK ARCHITECTURAL, BUILDING & ELECTRICAL DRAWINGS FOR OPENINGS, SLEEVES, ANCHORS, HANGERS, AND OTHER ITEMS RELATED TO CONCRETE WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THE PROPER LOCATION BEFORE PLACING CONCRETE
- B. PROVIDE FORMED OPENINGS WHERE REQUIRED FOR WORK TO BE EMBEDDED IN AND PASSING THROUGH CONCRETE MEMBERS.
- C. COORDINATE WORK OF OTHER SECTIONS IN FORMING AND SETTING OPENING, SLOTS, RECESSES, CHASES, SLEEVES, BOLTS, ANCHORS, AND OTHER INSERTS.
- D. INSTALL CONCRETE ACCESSORIES STRAIGHT, LEVEL AND PLUMB.

### 2 REINFORCEMENT PLACEMENT

- A. PLACE REINFORCEMENT, SUPPORTED AND SECURED AGAINST DISPLACEMENT.
- B. ENSURE REINFORCING IS CLEAN, FREE OF LOOSE SCALE, DIRT, OR OTHER FOREIGN COATINGS.
- C. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
- D. MINIMUM CONCRETE COVER FOR REINFORCING SHALL BE 3 INCHES UNLESS OTHERWISE NOTED.
- E. CONCRETE COVER FROM TOP OF FOUNDATION TO ENDS OF VERTICAL REINFORCEMENT SHALL NOT EXCEED 3 INCHES NOR BE LESS THAN 2INCHES.

### 3. PLACING CONCRETE

- A. VIBRATE ALL CONCRETE.
- B. ALL CONCRETE WORK SHALL ADHERE TO THE LATEST A.C.I STANDARDS FOR WINTER POURING AND CURING PROCEDURES IF SEASONAL CONDITIONS APPLY

### CURING

- A. AFTER PLACEMENT, PROTECT CONCRETE FROM PREMATURE
- DRYING.

  B. MAINTAIN CONCRETE WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.
- 5. PROVIDE HAND RUBBED SMOOTH FINISH TO ALL EXPOSED VERTICAL FORMED CONCRETE SURFACES.

### 6. FIELD QUALITY CONTROL

- A. SUBMIT THREE (3) CONCRETE TEST CYLINDERS TAKEN FOR EVERY
- 15 CUBIC YARD OR LESS. SUBMIT CONCRETE TESTS TO THE PROJECT MANAGER IN ACCORDANCE WITH ASTM, C-31 AND C-39. B. SUBMIT ONE (1) ADDITIONAL TEST CYLINDER TAKEN DURING COLD WEATHER POURS, AND CURED ON JOB SITE UNDER SAME
- CONDITIONS AS CONCRETE IT REPRESENTS.

  C. SUBMIT ONE (1) SLUMP TEST TAKEN FOR EACH SET OF TEST CYLINDERS TAKEN.
- 7. DEFECTIVE CONCRETE MODIFY OR REPLACE CONCRETE NOT

CONFORMING TO REQUIRED LINES, DETAILS OR ELEVATIONS AT COST OF GC, AS DIRECTED BY ARCHITECT/ENGINEER.

### GENERAL UTILITY

ALL ELECTRICAL SITE WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE.

- 1. THE EQUIPMENT AND MATERIAL SHALL BE FURNISHED AND INSTALLED TO OPERATE SAFELY AND CONTINUOUSLY OUTDOORS WITH NO PROTECTION FROM THE WEATHER.
- ELECTRICAL WORK REPRESENTED ON THE PROJECT DRAWINGS IS SHOWN DIAGRAMMATICALLY. EXACT LOCATIONS AND ELEVATIONS OF ELECTRICAL EQUIPMENT SHALL BE DETERMINED IN THE FIELD AND VERIFIED WITH THE OWNER'S REPRESENTATIVE.
- 3. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF TEMPORARY, IF REQUIRED, AND PERMANENT POWER WITH THE LOCAL UTILITY COMPANY. THE TEMPORARY POWER AND ALL HOOKUP COSTS ARE TO BE PAID BY THE CONTRACTOR.
- 4. PROVIDE MOLDED CASE BOLT-ON, THERMAL MAGNETIC TRIP, SINGLE, TWO OR THREE POLE CIRCUIT BREAKERS, MULTIPLE POLE CIRCUIT BREAKERS SHALL BE SINGLE HANDLE COMMON TRIP, SHORT CIRCUIT INTERRUPTING RATING SHALL BE AS REQUIRED FOR AVAILABLE FAULT CURRENTS. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE A SHORT CIRCUIT INTERRUPTING RATING EQUAL TO OR GREATER THAN THAT SHOWN ON PROJECT DRAWINGS.
- 5. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENTLY ENGRAVED LAMINATED PHENOLIC NAMEPLATES WITH WHITE ON BLUE BACKGROUND (MINIMUM LETTER HEIGHT SHALL BE 1/2 INCH). NAMEPLATES SHALL BE FASTENED WITH STAINLESS STEEL SCREWS.
- 6. CONTRACTOR SHALL PERFORM ALL EXCAVATION, TRENCHING, BACKFILLING, AND REMOVAL OF DEBRIS IN CONNECTION WITH THE ELECTRICAL WORK IN ACCORDANCE WITH THE PROJECT DRAWINGS CONTRACTOR SHALL COORDINATE THE INSTALLATION OF UNDERGROUND UTILITIES AND GROUNDING WITH THE FOUNDATION INSTALL ATION
- 7. CONTRACTOR SHALL PROVIDE ALL NECESSARY SUPPORTS FOR EQUIPMENT INSTALLED AS PART OF THIS PROJECT. SUPPORTS SHALL CONSIST OF GALVANIZED STEEL FRAMES, PLATES, BRACKETS, RACKS AND OTHER SHAPES OF ADEQUATE SIZE AND FASTENED WITH BOLTS, SCREWS OR BY WELDING TO PROVIDE RIGID SUPPORT.
- 8. CONTRACTOR SHALL CALL THE APPROPRIATE UTILITIES PROTECTION SERVICE BEFORE ANY UNDERGROUND WORK IS PERFORMED, SUCH AS TRENCHING, EXCAVATING, AND DRIVING GROUND RODS.
- CONTRACTOR SHALL SEAL AROUND ELECTRICAL PENETRATIONS
   THROUGH FIRE-RATED WALLS/FLOORS USING APPROVED FIRE STOP MATERIALS TO MAINTAIN THE FIRE RESISTANCE RATING.
- 10. SHORT CIRCUIT RATINGS: PROVIDE EQUIPMENT W/HIGHER FAULT CURRENT RATINGS AS NEEDED TO MATCH UTILITY COMPANY AVAILABLE FAULT CURRENT.

CONTRACTOR

CONTRACTOR

CONTRACTOR

# TILLMAN NFRASTRUCTURE



NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

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ertification \$ Seal:

MATERIALS

**INSTALLED BY** MATERIAL LIST PROVIDED BY ANTENNAS VERIZON WIRELESS CONTRACTOR COAX AND ELLIPTICAL WAVEGUIDE VERIZON WIRELESS CONTRACTOR DIPLEXERS, DIPLEXERS, & COMBINERS VERIZON WIRELESS CONTRACTOR AWS HARDWARE VERIZON WIRELESS CONTRACTOR VERIZON WIRELESS CONTRACTOR SD RET & HYBRID CABLE **VERIZON WIRELESS** CONTRACTOR **GPS ANTENNA & GPS SURGE ARRESTOR VERIZON WIRELESS** CONTRACTOR TMA's, BIAS-T's, & PUD VERIZON WIRELESS CONTRACTOR DISTRIBUTION BOXES, SECTOR BOXES, & RRU's VERIZON WIRELESS CONTRACTOR **VERIZON WIRELESS** CONTRACTOR ANTENNA MOUNTING PIPES VERIZON WIRELESS CONTRACTOR ANTENNA MOUNTING PLATFORM CONTRACTOR ICE BRIDGE HARDWARE VERIZON WIRELESS CONTRACTOR COAX ATTACHMENT TO TOWER HARDWARE CONTRACTOR TOWER BUSS BARS CONTRACTOR CONTRACTOR CONDUIT, CONDUCTORS, & GROUNDING CONTRACTOR CONTRACTOR PPC STYLE CONNECTORS AND CLOSURES CONTRACTOR CONTRACTOR JUMPERS ON THE TOWER & ON PLATFORM CONTRACTOR CONTRACTOR

COAX HANGER KITS/HOISTING GRIPS

GPS COAX & CONNECTORS

CONCRETE & REINFORCING STEEL

MARK DATE DESCRIPTION
ISSUE PHASE PRELIMINARY DATE ISSUED 01/30/2020
PROJECT TITLE:

TI-OPP-13245-B (VZW LOC. 556453)

UNASSIGNED: ALONG 310TH AVE.

AITKIN COUNTY

CONTRACTOR

CONTRACTOR

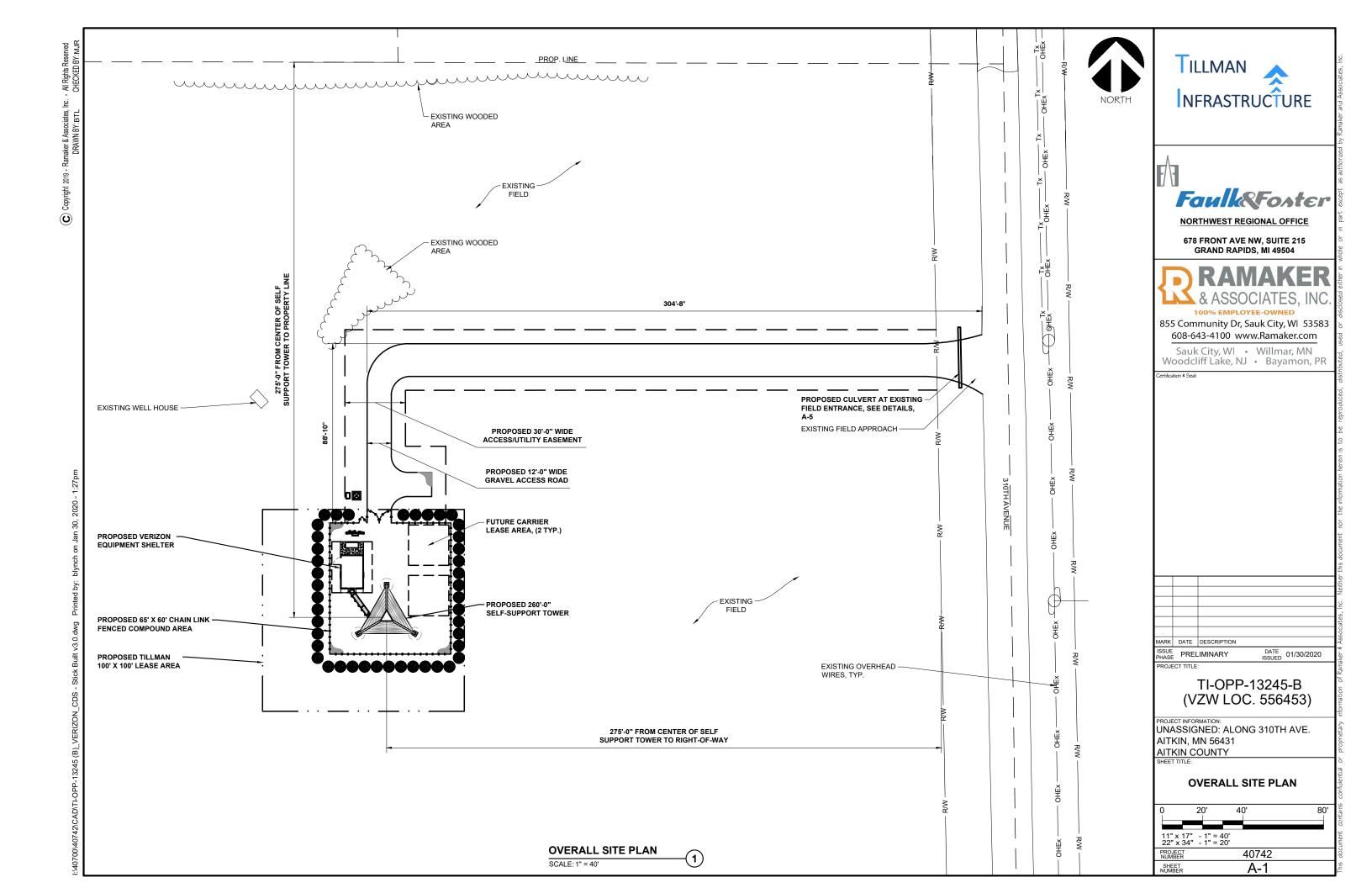
CONTRACTOR

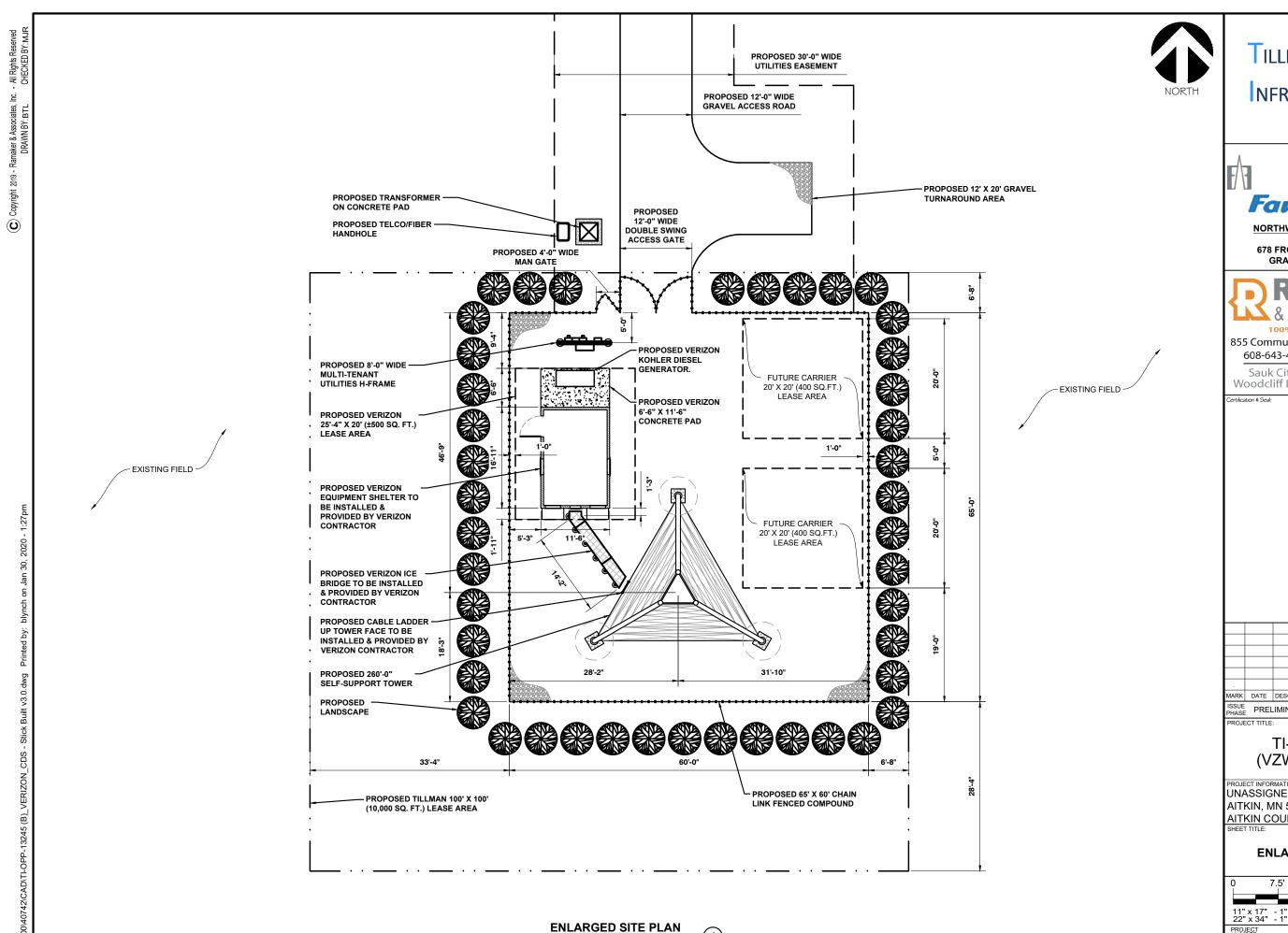
AITKIN, MN 56431

**SPECIFICATIONS** 

SCALE: NONE

PROJECT 40742
SHEET SP-2





SCALE: 1" = 15'

TILLMAN NFRASTRUCTURE



NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504

# RAMAKER & ASSOCIATES, INC.

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MARK DATE DESCRIPTION

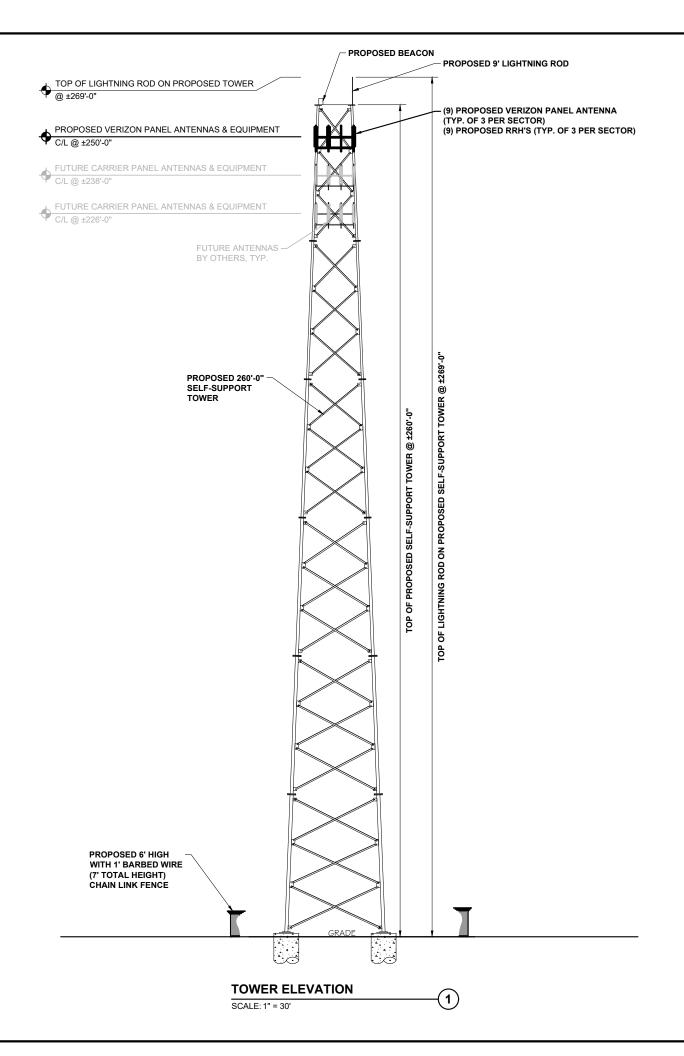
ISSUE PHASE PRELIMINARY DATE ISSUED 01/30/2020
PROJECT TITLE:

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY

### **ENLARGED SITE PLAN**

0 7.5' 15' 30'
11" x 17" - 1" = 15'
22" x 34" - 1" = 7.5'
PROJECT NUMBER 40742
SHEET NUMBER A-2







NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



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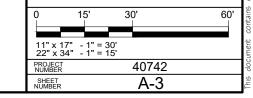
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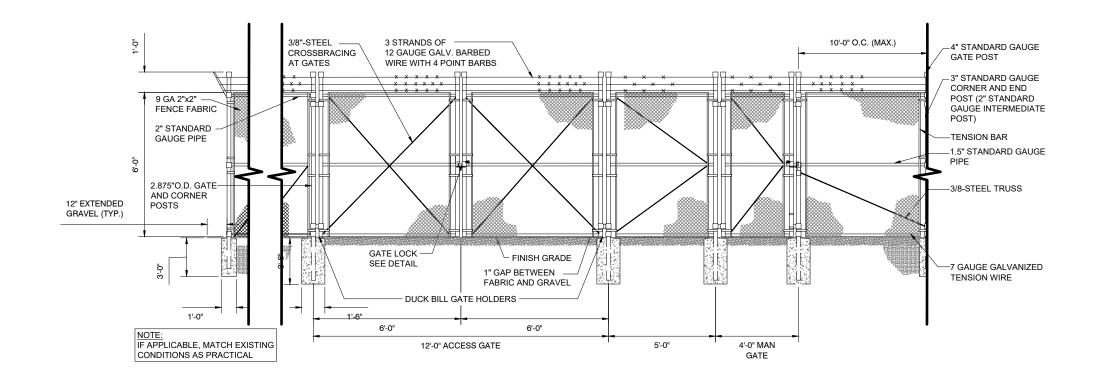
MARK DATE DESCRIPTION ISSUE PRELIMINARY DATE 01/30/2020

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY
SHEET TITLE:

### **TOWER ELEVATION**









NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 **GRAND RAPIDS. MI 49504** 



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1.1 THIS SECTION COVERS THE REQUIREMENTS FOR THE MATERIALS AND THE CONSTRUCTION OF SITE FENCING, GUY AREA FENCING, ACCESS ROAD GATES AND CATTLE GUARDS. SEE SITE PLAN AND DRAWINGS FOR DETAILS.

### 2. SPECIAL REQUIREMENTS:

- 2.1 All WIRE, FABRIC, FITTINGS, HARDWARE AND STEEL MEMBERS USED FOR SITE AREA FENCING, GUY ANCHOR FENCING AND ACCESS ROAD GATES SHALL BE HOT DIPPED GALVANIZED OR OTHER APPROVED NON-CORROSIVE MATERIAL
- 2.2 ALL NON-CORROSIVE MATERIAL SHALL BE APPROVED BY THE PROJECT MANAGER.
- 2.3 ANY DAMAGE TO GALVANIZING OR NON-CORROSIVE COATING DURING CONSTRUCTION SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S RECOMMENDED METHODS

- 3.1 LOCATION OF CORNER POSTS SHALL BE DETERMINED FROM STAKES AND PROPERTY PINS INSTALLED BY THE REGISTERED LAND SURVEYOR UNDER CONTRACT. IF THE STAKES ARE NOT PRESENT OR DO NOT CONFORM TO THE SITE PLAN, CONSULT WITH THE PROJECT MANAGER.
- 3.2 CORNERS AND GATE POST FOR SITE SHALL BE 2.5" O.D. GALVANIZED PIPE. UNLESS SPECIFIED
- 3.3 CORNER POSTS SHALL BE SET WITHIN ONE INCH (1") OF DIMENSIONS INDICATED ON THE SITE PLAN.
- 3.4 FENCE POSTS SHALL BE VERTICALLY PLUMB IN ALL PLANES WITHIN  $\frac{1}{2}$ " INCH. 3.5 CORNER & GATE POST FOUNDATIONS SHALL BE A MINIMUM FOUR FEET (4') DEEP OR SIX INCHES (6")
- BELOW THE FROST LINE, WHICHEVER IS GREATER. WITH MINIMUM SIX INCH (6") CLEARANCE BETWEEN BOTTOM OF POST AND BOTTOM OF THE HOLE.
- 3.6 CORNER POSTS AND GATE POSTS SPACING SHALL BE EQUAL WITH A TEN FOOT (10') MAXIMUM SPACING. GATE POST SPACING AND SPECIFIC LOCATIONS SHALL BE IN ACCORDANCE WITH SITE PLAN AND SHALL BE VERIFIED WITH THE PROJECT MANAGER.
- 3.7 ALL POSTS EXCEPT GATE POSTS SHALL BE CAPPED WITH A COMBINATION CAP AND BARB WIRE SUPPORTING ARM. GATE POSTS SHALL BE TWELVE INCHES (12") HIGHER THAN CORNER OR LINE POSTS TO PROVIDE FOR TERMINATION OF BARBED WIRE. GATE POSTS SHALL BE CAPPED WITH STANDARD CAP
- 3.8 ALL CORNER, GATE AND END PANELS SHALL HAVE MINIMUM %" DIAMETER DIAGONAL TRUSS RODS WITH TURNBUCKLES. HORIZONTAL BRACE RODS, 1 %" INSIDE DIMENSION PIPE, SHALL BE INSTALLED BETWEEN POSTS.
- 3.9 A TOP RAIL (1  $\frac{1}{4}$ " I.D.) GALVANIZED PIPE SHALL BE INSTALLED BETWEEN POSTS. 3.10 ALL FOUR CORNERS POSTS AND BOTH GATE POSTS SHALL BE CONNECTED TO THE SITE
- GROUNDING SYSTEM (REFER TO GROUNDING SYSTEM STANDARD).
- 3.11 ALTERNATE FOOTINGS FOR ALL FENCE POSTS IN LEDGE: IF LEDGÉ IS ENCOUNTERED AT GRADE, OR AT A DEPTH SHALLOWER THAN 3'-6", CORE DRILL AN 8" DIA. HOLE 18" INTO THE LEDGE. CENTER POST IN THE HOLE AND FILL WITH CONCRETE OR GROUT, IF LEDGE IS BELOW FINISH GRADE, COAT BACKFILLED SECTION OF POST WITH COAL TAR, AND BACKFILL WITH WELL-DRAINING GRAVEL.
- 4.1 FENCE FABRIC SHALL BE EIGHT FOOT (8') HIGH, UNLESS OTHERWISE SPECIFIED, #9 GAUGE,
- GALVANIZED CHAIN LINK FABRIC WITH TWISTED TOP SELVAGE AND KNUCKLED BOTTOM SELVAGE 4.2 FABRIC SHALL BE TENSIONED PER MANUFACTURER'S RECOMMENDATIONS TO PRESENT A NEAT APPEARANCE. NO GAP SHALL BE PERMITTED BETWEEN FABRIC AND FINAL GRADE.

- 4.3 FABRIC SHALL BE SECURED AT CORNER AND GATE POSTS USING STRETCHER BARS AND TENSION
- 4.4 FABRIC SHALL BE SECURED TO THE TOP RAIL AND BRACE RODS USING TIE CLIPS.
- 4.5 THREE (3) RUNS OF 4-POINT GALVANIZED BARBED WIRE SHALL BE INSTALLED ALONG TOP OF FENCE. BARBED WIRE SHALL BE TENSIONED PER MANUFACTURER'S RECOMMENDATIONS TO PRESENT A NEAT APPEARANCE

- 5.1 LOCATION OF GATE SHALL CONFORM TO THE SITE PLAN.
- 5.2 All JOINTS BETWEEN TUBULAR GATE MEMBERS SHALL BE WELDED OR HEAVY FITTINGS PROVIDING RIGID AND WATERTIGHT CONNECTIONS.
- 5.3 GATE HINGES SHALL PROVIDE FOR 180 DEGREE RADIUS GATE SWING. ALL HINGE NUTS SHALL BE ON THE INSIDE AND DOUBLE-NUT TO DETER UNAUTHORIZED ENTRY.
- 5.4 GATE STOPS SHALL BE INSTALLED AND SHALL HOLD GATE IN "OPEN" POSITION.
- 5.5 BARBED WIRE GUARD SHALL BE INSTALLED ON TOP OF GATES. ADEQUATE CLEARANCE SHALL BE MAINTAINED TO ALLOW GATE OPERATION.
- 5.6 GATE SHALL BE INSTALLED PLUMB AND SHALL OPEN AND CLOSE FREELY. 5.7 GATE POSTS SHALL NOT BE SHARED AS A CORNER POST
  - COMBINATION LOCK STRONG-ARM **Drive Gate Latch** 1-3/8"

No Drop Rod Needed !!!

IARK DATE DESCRIPTION ISSUE PRELIMINARY DATE 01/30/2020

> TI-OPP-13245-B (VZW LOC. 556453)

UNASSIGNED: ALONG 310TH AVE. **AITKIN, MN 56431** AITKIN COUNTY

**COMPOUND SITE DETAILS** 

SCALE: NONE

40742 PROJECT NUMBER SHEET A-4

**FENCE AND GATE DETAIL** 

SCALE: NTS

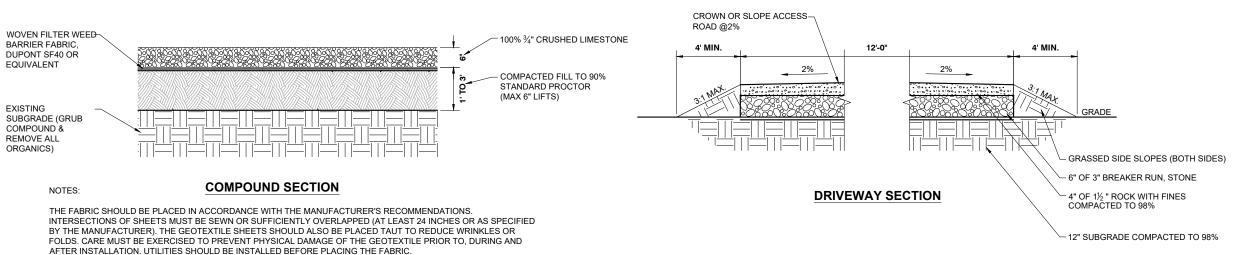


**COMPOUND GRAVEL** 

TYPICAL RIP-RAP DETAIL

SCALE: NTS

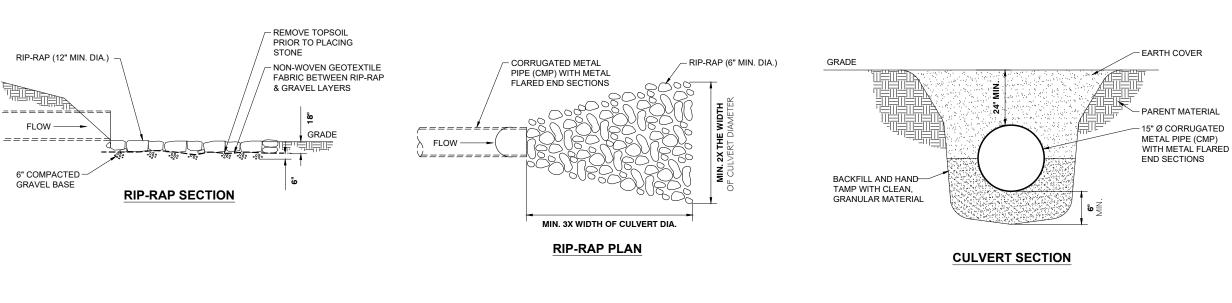
SCALE: NTS



TYPICAL GRAVEL DRIVEWAY

TYPICAL PIPE CULVERT RIP-RAP DETAIL

SCALE: NTS







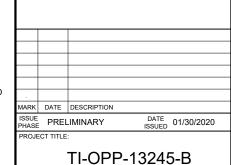
NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504

# 100% EMPLOYEE-OWNED

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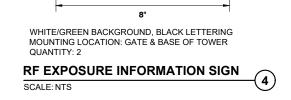
(VZW LOC. 556453)

UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

**COMPOUND SITE DETAILS** 

SCALE: NONE

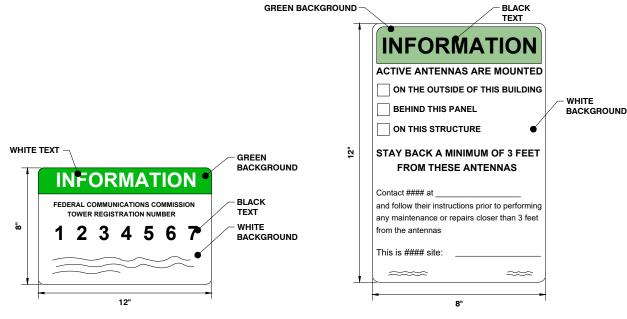
40742 PROJECT NUMBER SHEET A-5



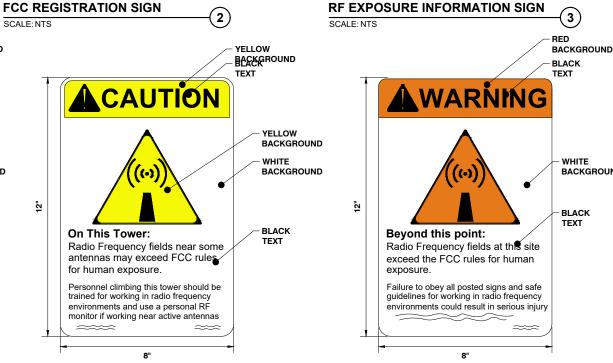
INFORMATION

SIGNAGE NOTES

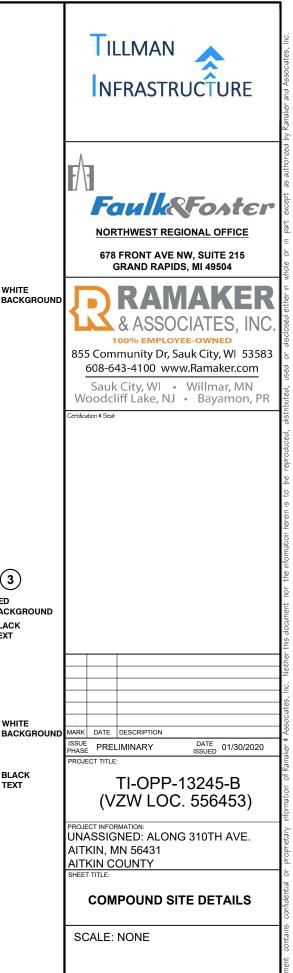
- 1. SIGNS SHALL BE FABRICATED FROM CORROSION RESISTANT PRESSED METAL & PAINTED WITH LONG
- 2. SIGNS (EXCEPT WHERE NOTED OTHERWISE) SHALL BE MOUNTED TO THE TOWER, GATE & FENCE USING A MINIMUM OF 9 GUAGE ALUMINUM WIRE HOG RINGS (FENCE) OR BRACKETS, WHERE NECESSARY, BRACKETS SHALL BE OF SIMILAR METALS AS THE STRUCTURE TO AVOID GALVANIC CORROSION
- 3. ADDITIONAL E911 ADDRESS AND FCC REGISTRATION SIGNS SHALL BE MOUNTED AT EACH ACCESS ROAD GATE LEADING TO THE COMPOUND ASS WELL AS ON THE COMPOUND GATE ITSELF
- CARRIER SITE # AND EMERGENCY CONTACT SIGNS SHALL BE MOUNTED ON THE EQUIPMENT CABINET WITH PERMANENT SET ADHESIVE. TWO SIDED TAPE SHALL BE APPLIED AT EACH CORNER OF THE BACKSIDE TO AVOID PLACEMENT UNTIL THE ADHESIVE SETS

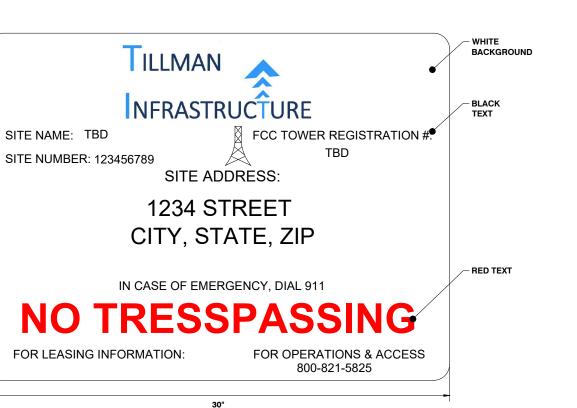


WHITE/GREEN BACKGROUND, BLACK LETTERING MOUNTING LOCATION: GATE & BASE OF TOWER QUANTITY: 2



QUANTITY: 2

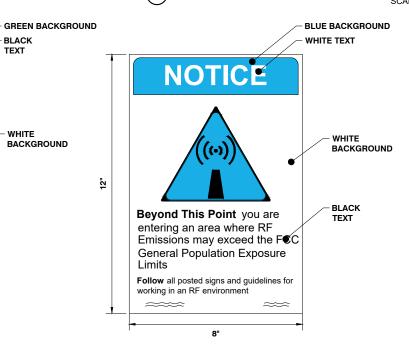




WHITE BACKGROUND RED/BLACK LETTERING MOUNTING LOCATION: SHELTER OR TENNANT IMPROVEMENT ROOM DOOR, IF OUTDOOR CABINET SITE PLACE ON END CABINET CLOSEST TO SITE ACCESS POINT. PLACE ON GENERATOR.

> BLACK TEXT

PROPERTY OF TILLMAN INFRASTRUCTURE



WHITE/BLUE BACKGROUND, BLACK/WHITE LETTERING MOUNTING LOCATION: GATE & BASE OF TOWER

RF EXPOSURE NOTICE SIGN SCALE: NTS

RF EXPOSURE CAUTION SIGN

WHITE/YELLOW BACKGROUND, BLACK LETTERING

MOUNTING LOCATION: BASE OF TOWER

WHITE/GREEN BACKGROUND, WHITE/BLACK LETTERING

MOUNTING LOCATION: GATE & BASE OF TOWER

QUANTITY: 2

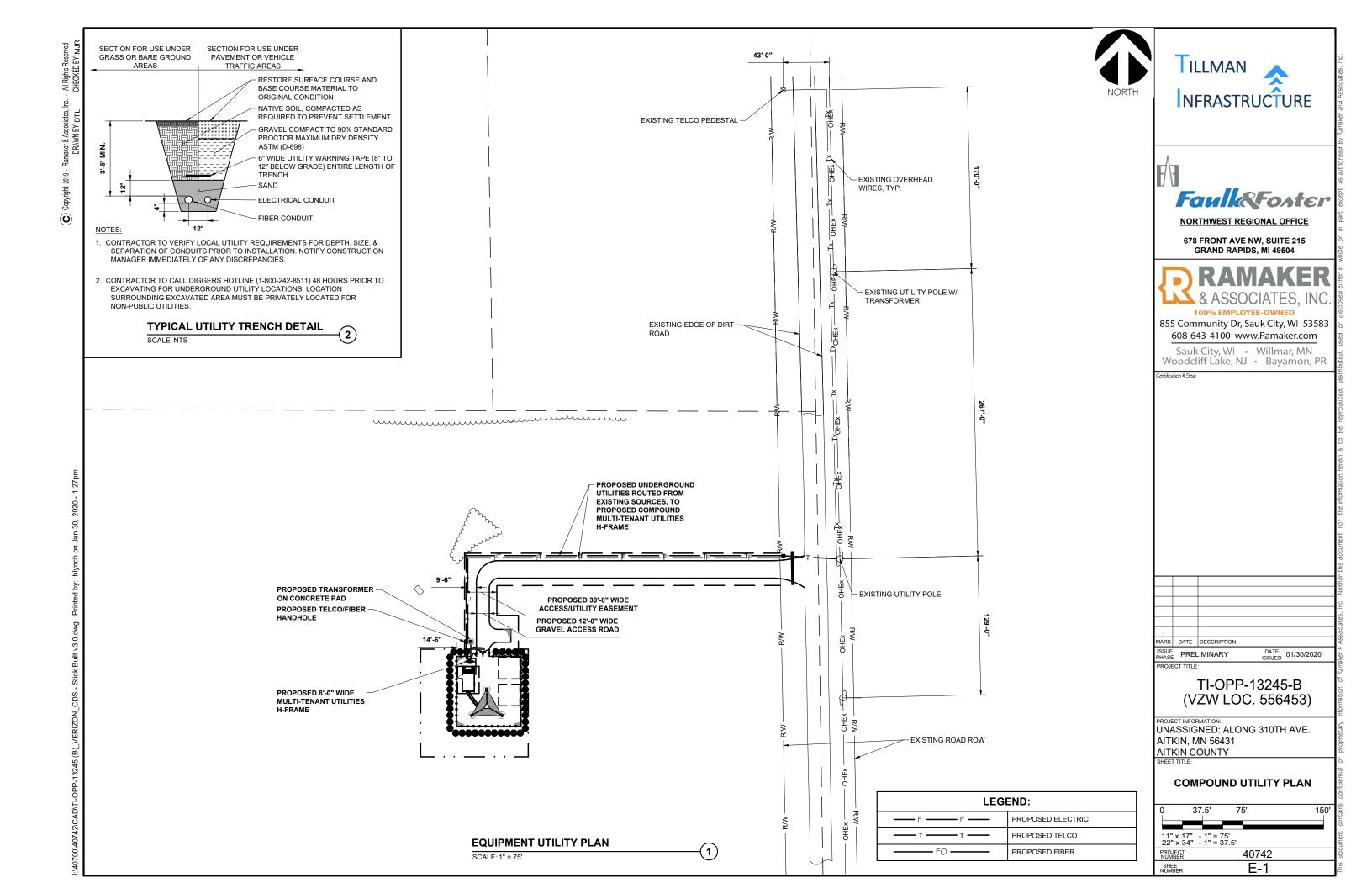
(6)

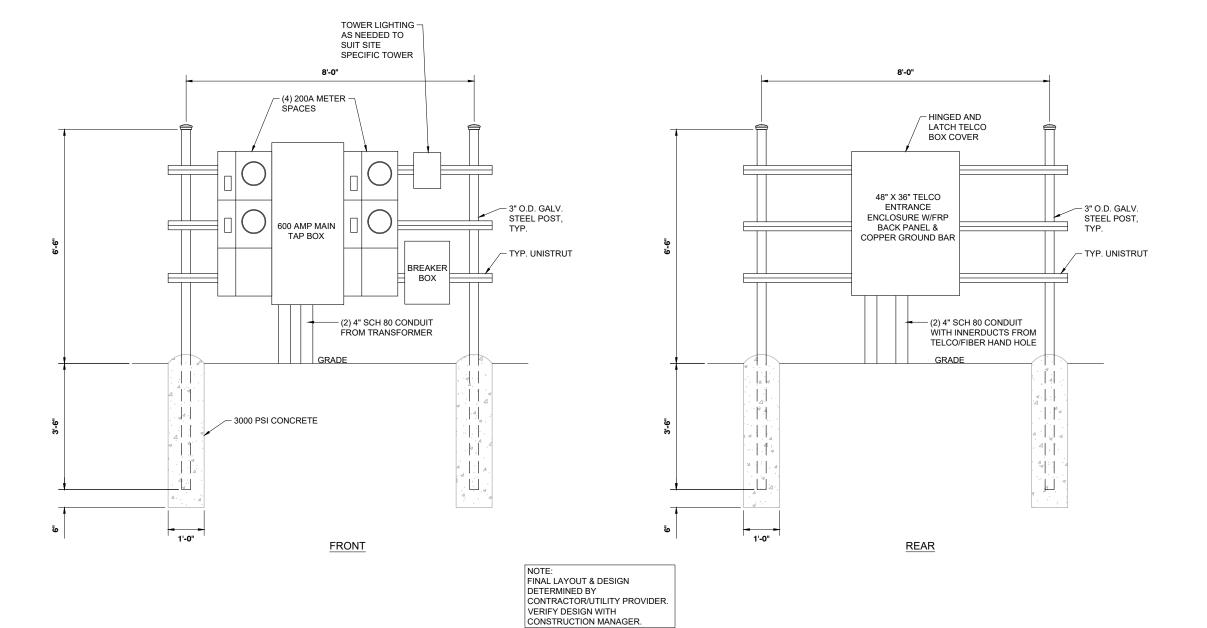
RF EXPOSURE WARNING SIGN SCALE: NTS

WHITE/RED BACKGROUND, BLACK LETTERING

MOUNTING LOCATION: GATE & BASE OF TOWER

PROJECT NUMBER 40742 SHEET A-6









NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504

# RAMAKER & ASSOCIATES, INC

855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

Sauk City, WI • Willmar, MN Woodcliff Lake, NJ • Bayamon, PR

Certification \$ Se

MARK	DATE	DESCRIPTION

ISSUE PRELIMINARY DATE 01/30/2020

PROJECT TITLE:

TI-OPP-13245-B (VZW LOC. 556453)

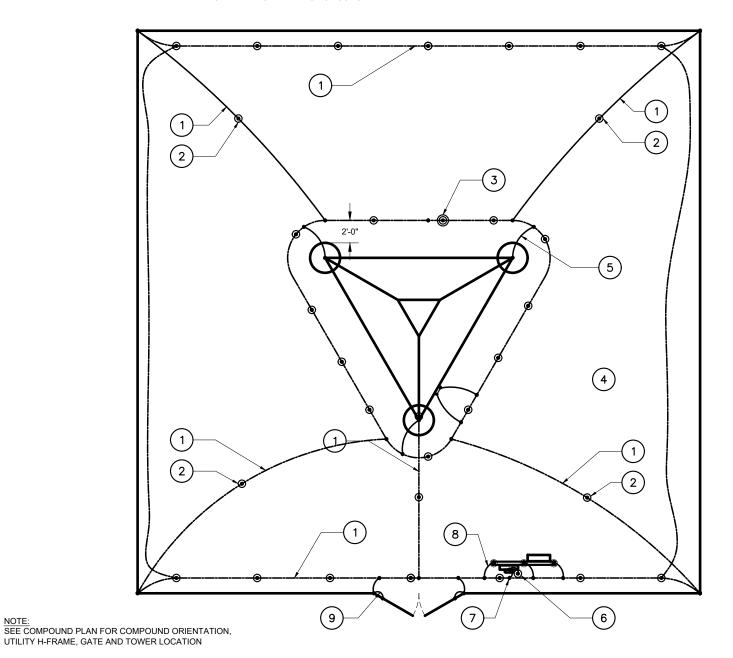
PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY
SHEET TITLE:

### **COMPOUND UTILITY DETAILS**

SCALE: NONE

PROJECT 40742
SHEET BUMBER E-2

- 1. GROUND RING, #2 SOLID TINNED, BARE COPPER WIRE
- 2. 5/8"Ø x 10'-0" COPPER CLAD STEEL GROUND ROD SPACED MIN. 10'-0", MAX 15'-0" APART
- 3. GROUND SYSTEM TEST WELL
- 4. #2 SOLID TINNED, BARE COPPER GROUND WIRE FROM LOWER TOWER GROUND BAR TO NEW GROUND RING (2 REQ'D)
- 5. #2 SOLID TINNED, BARE COPPER GROUND WIRE FROM TOWER BASE PLATE TO NEW GROUND RING
- 6. 5/8"Ø x10'-0" COPPER CLAD GROUND ROD FOR ELECTRICAL SERVICE GROUND
- 7. #2 SOLID TINNED, BARE COPPER GROUND WIRE FROM ELECTRICAL SERVICE GROUND TO LIGHTNING PROTECTION GROUND RING
- 8. #2 SOLID TINNED, BARE COPPER GROUND WIRE, BOND UTILITY POST W/ VS TYPE CADWELD. (1 PER POST
- 9. A.L.T. OR EQUAL 2/0 GROUNDING CONDUCTOR W/ BLACK NEOPRENE INSULATION & PRE-CAPPED ENDS ATTACHED TO GATE POST AND GATE FRAME W/ VS TYPE EXOTHERMIC. INSTALL W/ WELDS 18" ABOVE
- 10. IN THE EVENT A PAD/PIER FOUNDATION IS INSTALLED THE BURIED GROUND RING SHALL BE INSTALLED A MINIMUM 2 FT. FROM THE EDGE OF CONCRETE



TYPICAL COMPOUND GROUNDING PLAN SCALE: NTS





NORTHWEST REGIONAL OFFICE

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MARK DATE DESCRIPTION ISSUE PRELIMINARY DATE 01/30/2020

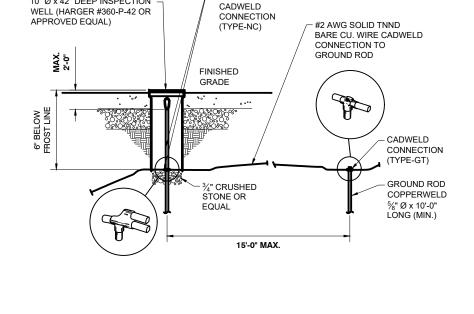
> TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

> TYPICAL COMPOUND **GROUNDING PLAN**

SCALE: NONE

PROJECT NUMBER 40742 SHEET NUMBER E-3



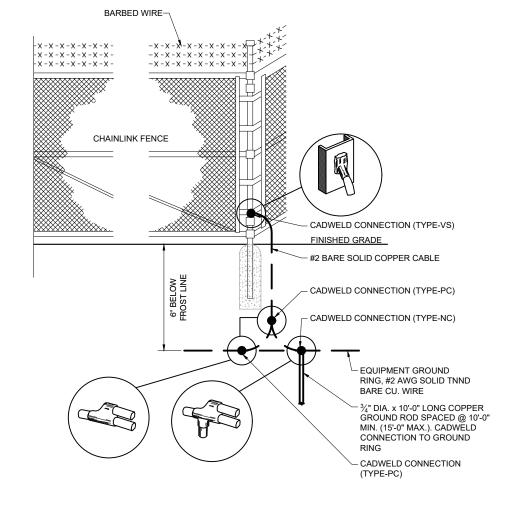
**INSPECTION WELL & GROUND ROD DETAIL** 

- 5/8" Ø x 10'-0" LONG COPPER CLAD

GROUND ROD

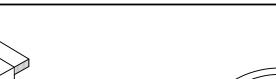
10" Ø x 42" DEEP INSPECTION

SCALE: NTS



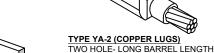
FENCE CORNER POST GROUNDING DETAIL

SCALE: NTS



TYPE LF (FLAT BUSBAR)

TAP OF HORIZONTAL CABLE TO EDGE OF HORIZONTAL



(3)

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



UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

MARK DATE DESCRIPTION

ISSUE PRELIMINARY

TILLMAN

**I**NFRASTRUCTURE

**Faulk&Foster** 

NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215

**GRAND RAPIDS, MI 49504** 

100% EMPLOYEE-OWNED

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**TYPICAL GROUNDING DETAILS** 

TI-OPP-13245-B

(VZW LOC. 556453)

DATE 01/30/2020

SCALE: NONE

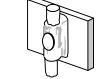
40742 PROJECT NUMBER SHEET E-4

TYPE HS (HORIZ. STEEL SURFACE) TO FLAT STEEL SURFACE OR HORIZONTAL PIPE

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



TYPE TA
TEE OF HORIZONTAL RUN AND



THROUGH VERTICAL CABLE TO VERTICAL STEEL SURFACE OR TO THE SIDE OF EITHER HORIZONTAL OR VERTICAL PIPE

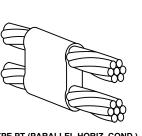




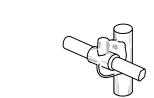




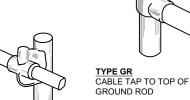




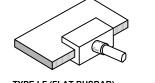
TYPE PT (PARALLEL HORIZ. COND.) PARALLEL THROUGH CONNECTION
OF HORIZONTAL CABLES TYPE VS (VERT. STEEL SURFACE)
CABLE TAP DOWN AT 45° TO VERTICAL STEEL SURFACE INCLUDING PIPE

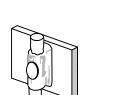


TYPE NC
THROUGH AND TAP CABLES TO

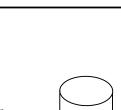


TYPE GY THROUGH CABLE TO SIDE OF GROUND ROD



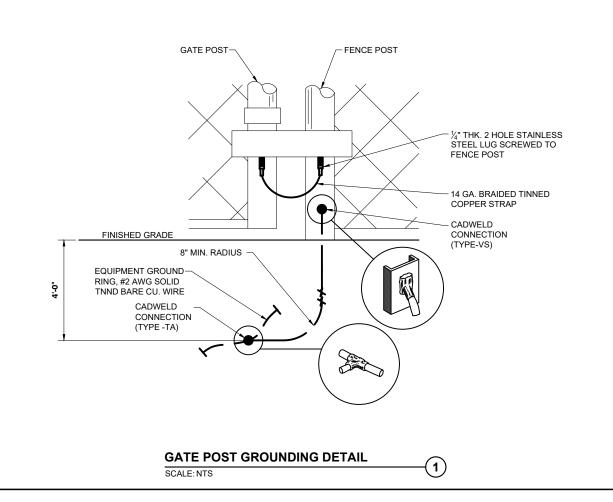


CROSS OF HORIZONTAL CABLES. LAPPED AND NOT CUT.





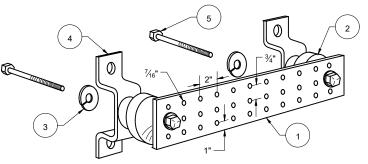
(2)



NOTES:

1. ALL MOUNTING HARDWARE CAN BE USED 6", 12", 18", ETC. GROUND BARS

2. ENTIRE ASSEMBLY AVAILABLE FROM NEWTON INSTRUMENT CO. CAT. NO. 2106060010 OR AS HARGER TGB114420M.



### LEGEND

- (1.) TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON CO., HARGER TGBI14420M, OR EQUIVALENT. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
- (2.) INSULATORS. INSTRUMENT CO. CAT. NO. 3061-4 OR HARGER EQUIVALENT.
- (3.) %" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUIVALENT.
- (4.) WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056 OR HARGER FOLITIVALENT
- $\begin{tabular}{lll} \hline $\%$" x 1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012-1 OR HARGER EQUIVALENT. \\ \hline \end{tabular}$

### TYPICAL GROUND BAR DETAIL

SCALE: NTS

-(2)





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678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



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ertification ¢ Seal:

MARK	DATE	DESCRIPTION									
ISSUE PHASE		IMINARY	DATE ISSUED 01/30/2020								
PROJE	PROJECT TITLE:										

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

**TYPICAL GROUNDING DETAILS** 

SCALE: NONE

PROJECT 40742

SHEET E-5

verizon

PROJECT: **NEW SITE BUILD** 

**VERIZON SITE NAME:** MN06 MILLY - B

**APPROVALS:** 

CONSTRUCTION MANAGER:

**OPERATIONS MANAGER:** 

REAL ESTATE MANAGER:

IMPLEMENTATION MANAGER

**DESIGN ENGINEER:** 

LANDLORD:

SHEET NUMBER

**VERIZON LOCATION CODE:** 556453

> **SITE ADDRESS: UNASSIGNED: ALONG**

> > **310TH AVE.**

**AITKIN, MN 56431** 

260' SELF SUPPORT **SITE TYPE:** 

TILLMAN **INFRASTRUCTURE** 



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# **VICINITY MAP:** SITE LOCATION

### **AERIAL MAP:**



### PROJECT INFORMATION:

SITE ADDRESS UNASSIGNED: ALONG 310TH AVE. **AITKIN, MN 56431** AITKIN COUNTY

### SITE COORDINATES

LATITUDE: 46° 20' 25.51" (46.340419) LONGITUDE: 93° 29' 42.26" (-93.495072)

### **MUNICIPAL ID**

PARCEL · #21-0-053600 FR - FARM RESIDENTIAL

### **PROPERTY OWNER**

NORMAN WESTERLUND 30517 270TH LANE **AITKIN, MN 56431** 

### **TOWER OWNER**

TILLMAN INFRASTRUCTURE 152 W. 57TH STREET, 8TH FLOOR NEW YORK, NY 10019 PHONE: (646) 578-8394

### **A&E FIRM**

RAMAKER & ASSOCIATES, INC. 855 COMMUNITY DRIVE SAUK CITY, WI 53583 CONTACT: MIKE REEVE EMAIL: mreeve@ramaker.com PHONE: (608) 643-4100

### SITE ACQUISITION

**FAULK & FOSTER** NORTHWEST REGIONAL OFFICE 678 FRONT AVENUE NW, SUITE 215 **GRAND RAPIDS, MI 49504** PHONE: (248) 891-9214 FAX: (616) 647-8614 **CONTACT: BEN HERRICK** 

### **ELECTRIC PROVIDER**

MILLE LACS ELECTRIC COOP PHONE: (800) 450-2191

### **TELCO PROVIDER**

FRONTIFR PHONE: (952) 891-7712

### **SHEET INDEX**

SHEET DESCRIPTION

VZW-1	VERIZON COVER SHEET
VZW-2	VERIZON ANTENNA CONFIGURATION
VZW-3	VERIZON ANTENNA CONFIGURATION
VZW-4	VERIZON RFDS
VZW-5	VERIZON RFDS
VZW-6	VERIZON TOWER EQUIPMENT SPECIFICATIONS
VZW-7	VERIZON EQUIPMENT SHELTER LAYOUT
VZW-8	VERIZON EQUIPMENT SHELTER ELEVATIONS
VZW-9	VERIZON EQUIPMENT SHELTER ELEVATION & ICE BRIDGE DETAIL
VZW-10	VERIZON EQUIPMENT SHELTER FOUNDATION PLAN & DETAILS
VZW-11	VERIZON GENERATOR DETAILS
VZW-12	VERIZON GENERATOR DETAILS
VZW-13	VERIZON GROUNDING PLAN
VZW-14	VERIZON UTILITY PLAN

### MARK DATE DESCRIPTION ISSUE PRELIMINARY DATE 01/30/2020

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

**VERIZON COVER SHEET** 

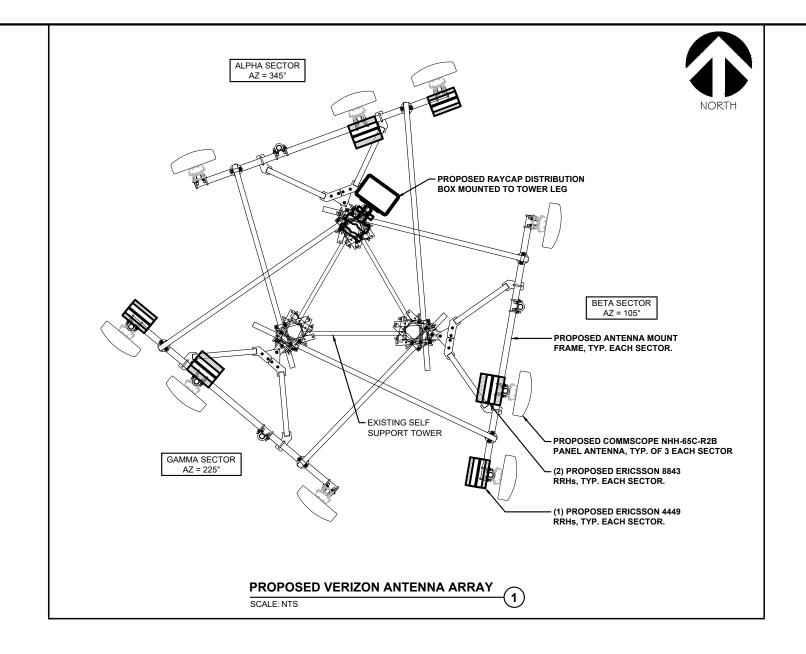
SCALE: NONE

40742 PROJECT NUMBER VZW-1

### **CODE COMPLIANCE:**

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

- 2015 INTERNATIONAL BUILDING CODE
- INTERNATIONAL MECHANICAL CODE
- **ANSI/TIA-222 STRUCTURAL STANDARD**
- NATIONAL ELECTRICAL CODE
- NFPA 780 LIGHTNING PROTECTION CODE



SECTOR	ANTENNA	ANTENNA MAKE	ANTENNA MODEL	FREQ. BAND	ANTENNA C/L	MECH DT	ELEC DT	AZIMUTH	RRH MAKE	RRH MODEL	CABLE LENGTH	JUMPER TYPE
	1	COMMSCOPE	NHH-65C-R2B	850 CDMA	250'	0	0	345°	=	=		(6) COAX
ALPHA	2	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/AWS LTE	250'	0	0	345°	(2) ERICSSON	8843		(6) COAX
	3	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/PCS LTE	250'	4	0	345°	ERICSSON	4449		-
	1	COMMSCOPE	NHH-65C-R2B	850 CDMA	250'	0	0	105°	=	-		(6) COAX
BETA	2	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/AWS LTE	250'	0	0	105°	(2) ERICSSON	8843	±260'	(6) COAX
	3	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/PCS LTE	250'	4	0	105°	ERICSSON	4449		-
	1	COMMSCOPE	NHH-65C-R2B	850 CDMA	250'	0	0	225°	=	-		(6) COAX
GAMMA	2	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/AWS LTE	250'	0	0	225°	(2) ERICSSON	8843		(6) COAX
	3	COMMSCOPE	NHH-65C-R2B	700 LTE/850 LTE/PCS LTE	250'	4	0	225°	ERICSSON	4449		-

### ADDITIONAL:

- (1) RAYCAP RVZDC-6627-PF-48 DISTRIBUTION BOX ON TOWER
- (1) RAYCAP RVZDC-6627-PF-48 DISTRIBUTION BOX AT EQUIPMENT
- (2) HYBRID CABLES (GROUND DISTRIBUTION BOX TO TOWER DISTRIBUTION BOX) COMMSCOPE HFT1206-24S49-275
- (8) ANDREW AVA7-50 1-5/8" COAX LINES FOR 850 CDMA

### **VERIZON EQUIPMENT/ANTENNA SCHEDULE**

SCALE: NTS







NORTHWEST REGIONAL OFFICE

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ertification \$ Seal:

MARK	DATE	DESCRIPTION	
ISSUE		IMINARY	DATE 01/30/2020

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

VERIZON ANTENNA CONFIGURATION

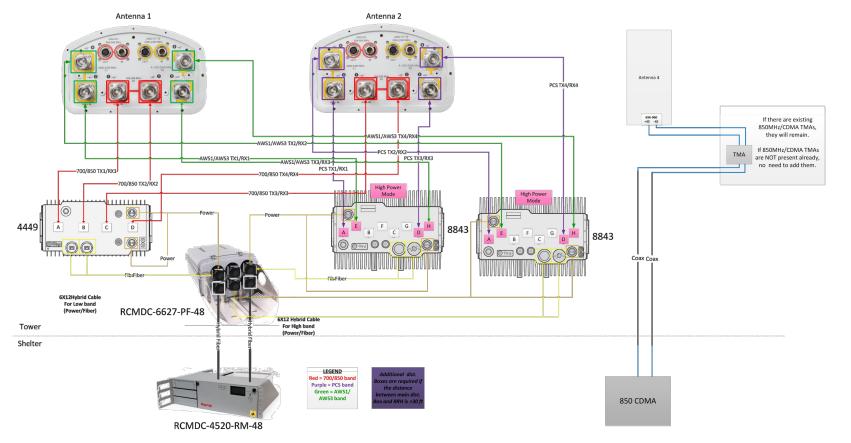
SCALE: NONE

PROJECT TITLE:

PROJECT 10742

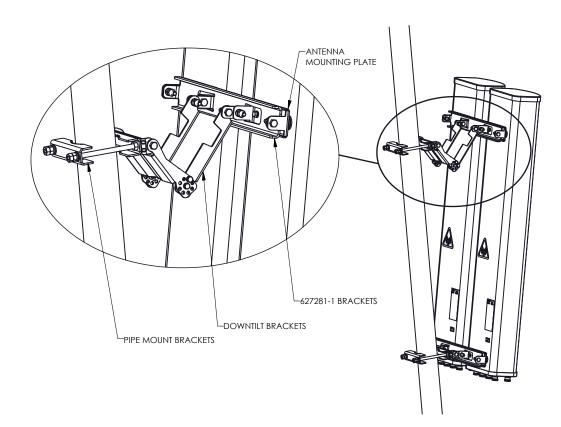
SHEET VZW-2





### VERIZON PLUMBING DIAGRAM

CALE: NTS



ANTENNA ASSEMBLY ATTACHED TO MAST USING BSAMNT-SBS-1-2 MOUNTING KITS.



TILLMAN



NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



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MARK DATE DESCRIPTION
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OJECT TITLE:

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY
SHEET TITLE:

VERIZON ANTENNA CONFIGURATION

SCALE: NONE

PROJECT 40742
SHEET VZW-3

\_\_(2)

WEST > Upper Midwest > Great Plains > Northern MN > MN06 MILLY - B

- Koch, Michael - michael.koch@verizonwireless.com - 06/25/2019 12:53:33

Pro	ject	Deta	ail					Location Information							
Site Ty								Siterra Site ID#							
Carrie	r Aggre	gation			fa	alse		Site Name			MN06 M	ILLY - B			
MPT I	d							Siterra SR#							
eCIP-(	)				fa	alse		E-NodeB ID#							
Projec	t Name				F	ull Relo		PSLC#			556435				
RFDS	Project	ID			1:	516145		Switch Name							
Projec	t ID				1:	5775313		Tower Owner							
Site Ti	aker Pr	oject II	)					Tower Type			Self Support (Lattice Tower)				
RFDS Project Scope					A	djusting CDMA azi	muths as well.	Street Address	Unassigned: Along 310th Ave						
site tha					P	reviously they were	different on the Malmo CDMA azimuths such	City	Aitkin						
					th	nat they will align w	ith town and the roads	State	MN						
lik			ke the LTE.		Zip Code			56431							
								County			Aitkin				
								Latitude		46.34017	3 / 46° 20' 24	1.6228" N			
						Longitude					-93.49476 / 93° 29' 41.136" W				
Adde	d Antei	nnas													
700 LTE	850 CDM A	850 LTE	1900 CDM A	1900 LTE	2100 LTE	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	QTY	
YES	YES	YES		YES	YES	COMMSCOPE	NHH 65C R2B	250	254	225(03),10 5(02),345(0 1),225(03), 105(02),34 5(01)	false	false	PHYSICA L	9	
Remo	ved A	ntenna	IS												
700 LTE	850 CDM A	850 LTE	1900 CDM A	1900 LTE	2100 LTE	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	QTY	
Retai	ned An	tenna	S												
700 LTE	850 CDM	850 LTE	1900 CDM	1900 LTE	2100 LTE	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	QTY	

A		A											
Added Nor	Added Non Antennas												
Equipment Type	700 LTE	850 CDMA	850 LTE	1900 CDMA	1900 LTE	2100 LTE	Location	Make	Model	Cable Length	Cable Size	Inst. Type	Quantity
OVP Box							Tower	Raycap	RVZDC-6627-PF- 48			PHYSICAL	1
Hybrid Fiber							Tower	Commscope	HFT1206-24S49- XXX			PHYSICAL	2
RRU	YES		YES				Tower	Ericsson	4449			PHYSICAL	3
RRU	YES		YES				Tower	Ericsson	8843			PHYSICAL	6
OVP Box							Tower	Raycap				PHYSICAL	1
Removed I	Non An	tennas											
Equipment Type	700 LTE	850 CDMA	850 LTE	1900 CDMA	1900 LTE	2100 LTE	Location	Make	Model	Cable Length	Cable Size	Inst. Type	Quantity
Retained N	Ion Ant	ennas											
Equipment Type	700 LTE	850 CDMA	850 LTE	1900 CDMA	1900 LTE	2100 LTE	Location	Make	Model	Cable Length	Cable Size	Inst. Type	Quantity
Coaxial Cables		YES					Tower					PHYSICAL	6

Cables							201122							
	700 MHZ LTE													
					Curr	ent Vei	rsion:		Proposed Version:					
											0002			
Sector									01		02		03	
Azimuth									345	105		225		
Cell/ENode B	3 ID								195675	195675		195675		
Antenna Mod	del								NHH-65C-R2B_PORT 1 45_00DT_0752 (1529371	NHH-65C- 45_00DT_	-R2B_PORT 1 0752 (1529371)	NHH-65C-R2 45_00DT_075	B_PORT 1 52 (1529371)	
Antenna Mak	ze.								COMMSCOPE	COMMS	COPE	COMMSCO	OPE	
Centerline(Ft									250	250		250		
Mechanical D									0	0		4		
Electrical DT									0	0		0		
Tip Height									254	254		254		
TMA make														
TMA model									- Process					
RRU make									Ericsson	Ericsson		Ericsson		
RRU model									4449	4449		4449		
# of Tx, Rx L	ines								4,4	4,4		4,4		
Position														

	2100 MHZ LT	ГЕ		
	Current Version:		Proposed Version:	
	Odirent Version.		0002	
Sector		01	0002	03
Azimuth		345	105	225
Cell/ENode B ID		195675	195675	195675
Antenna Model		NHH-65C-R2B_PORT 3	NHH-65C-R2B_PORT 3	NHH-65C-R2B_POR
Antenna Model		45_00DT_2110 (1529408)	45_00DT_2110 (1529408)	45_00DT_2110 (1529
Antenna Make		COMMSCOPE	COMMSCOPE	COMMSCOPE
Centerline(Ft)		250	250	250
Mechanical DT(Deg.)		0	0	4
Electrical DT		0	0	0
Tip Height		254	254	254
TMA make				
TMA model				
RRU make		Ericsson	Ericsson	Ericsson
RRU model		2x8843	2x8843	2x8843
# of Tx, Rx Lines		4,4	4,4	4,4
Position				
	1900 MHZ LT	ГЕ		
	Current Version:		Proposed Version:	
			0002	
Sector		01	02	03
Azimuth		345	105	225
Cell/ENode B ID		195675	195675	195675
Antenna Model		NHH-65C-R2B_PORT 3	NHH-65C-R2B_PORT 3	NHH-65C-R2B_POR
2000		45_00DT_2110 (1529408)	45_00DT_2110 (1529408)	45_00DT_2110 (1529
Antenna Make		COMMSCOPE	COMMSCOPE	COMMSCOPE
Centerline(Ft)		250	250	250
Mechanical DT(Deg.)		0	0	4
Electrical DT		0	0	0
Tip Height		254	254	254
TMA make				
TMA model				
RRU make		Ericsson	Ericsson	Ericsson
RRU model		2x8843	2x8843	2x8843
# of Tx, Rx Lines		4,4	4,4	4,4
Position				
	AWS3			
	Current Version:		Proposed Version:	
			0002	
Sector		01	02	03
Azimuth		345	105	225
Cell/ENode B ID				
Antenna Model		195675	195675	195675
		195675 NHH-65C-R2B PORT 3		
		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408)	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408)	NHH-65C-R2B_POR 45_00DT_2110 (1529
Antenna Make		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE	NHH-65C-R2B_POR 45_00DT_2110 (1529) COMMSCOPE
		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250
Antenna Make		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250 4
Antenna Make Centerline(Ft)		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250 4 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.)		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250 4
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250 4 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254	NHH-65C-R2B_POR 45_00DT_2110 (1529 COMMSCOPE 250 4 0 254
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson	NHH-65C-R2B_POR: 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843	NHH-65C-R2B_POR 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson	NHH-65C-R2B_POR: 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843	NHH-65C-R2B_POR 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines	850 MHZ CD:	195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843	NHH-65C-R2B_POR 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines	850 MHZ CDM Current Version:	195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843	NHH-65C-R2B_POR 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4	NHH-65C-R2B_POR 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4
Antenna Make  Centerline(Ft)  Mechanical DT(Deg.)  Electrical DT  Tip Height  TMA make  TMA model  RRU make  RRU model # of Tx, Rx Lines  Position		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B-PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002	NHH-65C-R2B_POX-45_00DT_2110_1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NIHI-45C-R2B-PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version:	NHH-65C-R2B_POR' 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4	NHH-65C-R2B-PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002 02	NHH-65C-R2B_POX-45_00DT_2110_1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002 02	NHH-65C-R2B_POR' 45 00DT_2110 (1529) COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  4,4  MA  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372)	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT 0850 (1529372)	NHH-65C-R2B_POR' 45 00DT_2110 (1529) COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR' 45 00DT_0850 (1529)
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002 02 105 NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE	NHH-65C-R2B_POR' 45 00DT_2110 (1529) COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR' 45 00DT_0850 (1529) COMMSCOPE
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  4,4  MA  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372)	NHH-65C-R2B-PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002 02 105 NHH-65C-R2B-PORT 1 45 00DT 0850 (1529372) COMMSCOPE 250	NHH-65C-R2B_POR- 45 00DT_2110 (152) COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4 0 3 225 NHH-65C-R2B_POR- 45 00DT_0850 (1529)
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  MA  NHH-65C-R2B_PORT 1 45_000T_0850 (1529372) COMMSCOPE	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0	NHH-65C-R2B_POR2 45_00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR 45_00DT_0850 (1529 COMMSCOPE 250 0
Antenna Make  Centerline(Ft)  Mechanical DT(Deg.)  Electrical DT  Tip Height  TMA make  TMA model  RRU make  RRU model  # of Tx, Rx Lines  Position  Sector  Azimuth  Cell/ENode B ID  Antenna Model  Antenna Make  Centerline(Ft)  Mechanical DT(Deg.)		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_000T_0850 (1529372) COMMSCOPE 250	NHH-65C-R2B-PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254 Ericsson 2x8843 4,4  Proposed Version: 0002 02 105 NHH-65C-R2B-PORT 1 45 00DT 0850 (1529372) COMMSCOPE 250	NHH-65C-R2B_POR- 45_00DT_2110-(1529 45_00DT_2110-(1529 250 4 0 254  Ericsson 2x8843 4,4  03 225  NHH-65C-R2B_POR- 45_00DT_0850 (1529 COMMSCOPE 250
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make Centerline(Ft)		195675 NHH-65C-R2B_PORT 3 45_000T_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  MA  NHH-65C-R2B_PORT 1 45_000T_0850 (1529372) COMMSCOPE 250 0	NHH-65C-R2B_PORT 3 45 00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0	NHH-65C-R2B_POR2 45_00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR 45_00DT_0850 (1529 COMMSCOPE 250 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372) COMMSCOPE 250 0 0 0 0	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0 0 0	NHH-65C-R2B_POR-45_00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4 0 03 225 NHH-65C-R2B_POR-45_00DT_0850 (1529 COMMSCOPE 250 0 0 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372) COMMSCOPE 250 0 0 0 0	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0 0 0	NHH-65C-R2B_POR-45_00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4 0 03 225 NHH-65C-R2B_POR-45_00DT_0850 (1529 COMMSCOPE 250 0 0 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372) COMMSCOPE 250 0 0 0 0	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0 0 0	NHH-65C-R2B_POR-45_00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4 0 03 225 NHH-65C-R2B_POR-45_00DT_0850 (1529 COMMSCOPE 250 0 0 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Model Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU make		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372) COMMSCOPE 250 0 0 0 0	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0 0 0	NHH-65C-R2B_POR' 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR' 45 00DT_0850 (1529 COMMSCOPE 250 0 0
Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model RRU model # of Tx, Rx Lines Position  Sector Azimuth Cell/ENode B ID Antenna Model Antenna Make Centerline(Ft) Mechanical DT(Deg.) Electrical DT Tip Height TMA make TMA model		195675 NHH-65C-R2B_PORT 3 45_00DT_2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  01 345  NHH-65C-R2B_PORT 1 45_00DT_0850 (1529372) COMMSCOPE 250 0 0 0 0	NHH-65C-R2B_PORT 3 45 00DT 2110 (1529408) COMMSCOPE 250 0 0 254  Ericsson 2x8843 4,4  Proposed Version: 0002 02 105  NHH-65C-R2B_PORT 1 45 00DT_0850 (1529372) COMMSCOPE 250 0 0 0	NHH-65C-R2B_POR' 45 00DT_2110 (1529 COMMSCOPE 250 4 0 254 Ericsson 2x8843 4,4  03 225 NHH-65C-R2B_POR' 45 00DT_0850 (1529 COMMSCOPE 250 0 0





NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

Sauk City, WI • Willmar, MN Woodcliff Lake, NJ • Bayamon, PR

MARK	DATE	DESCRIPTION	
ISSUE PHASE		IMINARY	DATE ISSUED 01/30/2020
PROJE	CT TITLE	:	

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY
SHEET TITLE:

**VERIZON RFDS** 

SCALE: NONE

PROJECT NUMBER 40742 SHEET NUMBER VZW-4

	850 MHZ LTE						
	Current Version:	Proposed Version:					
			0002				
Sector		01	02	03			
Azimuth		345	105	225			
Cell/ENode B ID		195675	195675	195675			
Antenna Model		NHH-65C-R2B_PORT 1 45_00DT_0752 (1529371)	NHH-65C-R2B_PORT 1 45_00DT_0752 (1529371)	NHH-65C-R2B_PORT 1 45_00DT_0752 (1529371)			
Antenna Make		COMMSCOPE	COMMSCOPE	COMMSCOPE			
Centerline(Ft)		250	250	250			
Mechanical DT(Deg.)		0	0	4			
Electrical DT		0	0	0			
		254	254	254			
Tip Height							
TMA make							
TMA model		Ericsson	Ericsson	Ericsson			
RRU make		4449	4449	4449			
RRU model		4,4	4,4	4,4			
# of Tx, Rx Lines		.,.	,,,	,,,			
Position							

### Callsigns Per Antenna - Proposed

Sector	Make	Model	Centerlin e	Tip Height	Azi mut h(T N)	Elec Tilt	Mec h. Tilt	Gai n	Hor iz BW	Regulato ry Power	700 Callsigns	850 Callsigns	1900 Callsigns	2100 Callsigns	28 GHz Callsigns	31 GHz Callsigns	39 GHz Callsigns
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.7 5	65	137.69	WQJQ691						
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.7 5	65	392.42		KNKN70 1					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	225	0	4	13.7 5	65	137.69	WQJQ691						
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	225	0	4	13.7 5	65	392.42		KNKN70 1					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.7 5	65	137.69	WQJQ691						
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0752 (1529371)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.7 5	65	392.42		KNKN70 1					
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.5 05	60.5	236.32		KNKN70 1					
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.5 05	60.5	236.32		KNKN70 1					
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.5 05	60.5	236.32		KNKN70					
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.5 05	60.5	191.58		KNKN70 1					
02	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	105	0	0	13.5 05	60.5	191.58		KNKN70 1					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	225	0	0	13.5 05	60.5	236.32		KNKN70 1					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	225	0	0	13.5 05	60.5	236.32		KNKN70					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	225	0	0	13.5 05	60.5	236.32		KNKN70 1					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	225	0	0	13.5 05	60.5	191.58		KNKN70 1					
03	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	225	0	0	13.5 05	60.5	191.58		KNKN70 1					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.5 05	60.5	236.32		KNKN70 1					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.5 05	60.5	236.32		KNKN70					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.5 05	60.5	236.32		KNKN70					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.5 05	60.5	191.58		KNKN70 1					
01	COMMS COPE	NHH-65C- R2B_PORT 1 45_00DT_0850 (1529372)	250ft/76.2 m	254ft/77.4 2m	345	0	0	13.5 05	60.5	191.58		KNKN70 1					
02	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	105	0	0	15.9 21	61	744.8			KNLG955 ,KNLG96 8,WPOJ8 34				
02	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	105	0	0	15.9 21	61	744.8			KNLG955 ,KNLG96 8,WPOJ8 34				
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02	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	105	0	0	15.9 21	61	248.27				WQGA71 7,WQPZ9 50			

02	COMMS	NHH-65C-	2500/762	254ft/77.4	105	I <sub>0</sub>	0	15.9	61	744.8			WOVP27		
02	COPE	R2B_PORT 3 45_00DT_2110 (1529408)	m	2m	103		Ů	21	01	/44.0			3		
03	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	225	0	4	15.9 21	61	744.8		KNLG955 ,KNLG96 8,WPOJ8 34			
03	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	225	0	4	15.9 21	61	744.8		KNLG955 ,KNLG96 8,WPOJ8 34			
03	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	m	254ft/77.4 2m	225	0	4	15.9 21	61	744.8		KNLG955 ,KNLG96 8,WPOJ8 34			
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01	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	m	254ft/77.4 2m	345	0	0	15.9 21	61	744.8		KNLG955 ,KNLG96 8,WPOJ8 34			
01	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	m	254ft/77.4 2m	345	0	0	15.9 21	61	744.8		KNLG955 ,KNLG96 8,WPOJ8 34			
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01	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110 (1529408)	250ft/76.2 m	254ft/77.4 2m	345	0	0	15.9 21	61	248.27			WQGA71 7,WQPZ9 50		
01	COMMS COPE	NHH-65C- R2B_PORT 3 45_00DT_2110	m	254ft/77.4 2m	345	0	0	15.9 21	61	744.8			WQVP27		

### Callsigns

Callsigns	Market	Radio Code	Marke t Numb er	Block	State	Count	Licensee Name	Wholl y Owne	Total MHZ	Freq Range 1	Freq Range 2	Freq Range 3	Freq Range 4	Regul atory Power	Thres hold (W)	POPs/ Sq Mi	Status	Proje t Actio
KNKN701	Minnesota 6 - Hubbard	CL	CMA4 87	В	MN	Aitkin	RURAL CELLULAR CORPORATI ON	Yes	25.000	835.00 0- 845.00	880.00 0- 890.00	846.50 0- 849.00	891.50 0- 894.00	392.42	800	8.9	Active	Adde
KNLG955	Brainerd, MN	CW	BTA05	D	MN	Aitkin	Alltel Corporation	Yes	10.000	1865.0 00- 1870.0 00	1945.0 00- 1950.0 00	.000-	.000- .000	744.8	3280	8.9	Active	Adde
KNLG968	Brainerd, MN	CW	BTA05	E	MN	Aitkin	RURAL CELLULAR CORPORATI ON	Yes	10.000	1885.0 00- 1890.0 00	1965.0 00- 1970.0 00	.000- .000	.000- .000	744.8	3280	8.9	Active	Adde
WPOJ834	Brainerd, MN	CW	BTA05	С	MN	Aitkin	Verizon Wireless (VAW) LLC	Yes	15.000	1895.0 00- 1902.5 00	1975.0 00- 1982.5 00	.000- .000	.000- .000	744.8	3280	8.9	Active	Adde
WQGA717	Great Lakes	AW	REA0 03	F	MN	Aitkin	Cellco Partnership	Yes	20.000	1745.0 00-	2145.0 00- 2155.0 00	.000- .000	.000- .000	248.27	3280	8.9	Active	Adde
WQJQ691	Great Lakes	WU	REA0 03	С	MN	Aitkin	Cellco Partnership	Yes	22.000	746.00 0- 757.00 0	776.00 0- 787.00	.000- .000	.000- .000	137.69	2000	8.9	Active	Adde
WQPZ950	Great Lakes	AW	REA0 03	E	MN	Aitkin	Cellco Partnership	Yes	10.000	00-	2140.0 00- 2145.0 00	.000- .000	.000- .000	248.27	3280	8.9	Active	Adde
WQVP273	Minnesota 6 - Hubbard	AT	CMA4 87	G	MN	Aitkin	Cellco Partnership	Yes	10.000	1755.0 00-	2155.0 00- 2160.0 00	.000- .000	.000- .000	744.8	3280	8.9	Active	Adde
WRBD898	Brainerd, MN	UU	PEA14	3-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	38700. 000- 38750.	.000-	.000-	.000-			.0	Active	
WRBD899	Brainerd, MN	UU	PEA14	3-B	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	39400. 000- 39450. 000	.000-	.000-	.000-			.0	Active	
WRBE348	Brainerd, MN	UU	PEA14	4-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	38750. 000- 38800. 000	.000-	.000-	.000-			.0	Active	
WRBE349	Brainerd, MN	UU	PEA14	4-B	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	39450. 000- 39500. 000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBE586	Brainerd, MN	บบ	PEA14	5-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	38800. 000- 38850. 000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBE587	Brainerd, MN	UU	PEA14	5-B	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	39500. 000- 39550. 000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBF238	Brainerd, MN	UU	PEA14	7-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	38900. 000- 38950. 000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBF239	Brainerd, MN	UU	PEA14	7-В	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	39600. 000- 39650. 000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBF680	Brainerd, MN	UU	PEA14	9-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	.000	.000- .000	.000- .000	.000- .000	.000- .000			.0	Active	
WRBF681	Brainerd, MN	UU	PEA14	9-B	MN	Aitkin	Straight Path Spectrum, LLC	Yes	.000	.000-	.000-	.000-	.000-			.0	Active	
WRBG996	Brainerd, MN	UU	PEA14	2-A	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	38650. 000- 38700. 000	.000-	.000-	.000-			.0	Active	
WRBG997	Brainerd, MN	UU	PEA14	2-В	MN	Aitkin	Straight Path Spectrum, LLC	Yes	50.000	39350. 000- 39400. 000	.000- .000	.000- .000	.000- .000			.0	Active	





NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 GRAND RAPIDS, MI 49504



855 Community Dr, Sauk City, WI 53583 608-643-4100 www.Ramaker.com

Sauk City, Wl • Willmar, MN Woodcliff Lake, NJ • Bayamon, PR

ertification ¢ Seal:

MARK	DATE	DESCRIPTION						
ISSUE PHASE		IMINARY	DATE ISSUED 01/30/2020					
PROJECT TITLE:								

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY
SHEET TITLE:

**VERIZON RFDS** 

SCALE: NONE

PROJECT 40742

SHEET VZW-5



COMMSCOPE PANEL ANTENNA MODEL NUMBER: NHH-65C-R2B 96.00" (LENGTH) X 11.90" (WIDTH) X 7.10" (DEPTH) WEIGHT: 51.60 LBS

### COMMSCOPE NHH-65C-R2B PANEL ANTENNA

SCALE: NTS

1



ERICSSON RRH

MODEL NUMBER: 8843
28.00" (LENGTH) X 15.00 (WIDTH) X 10.00" (DEPTH)

WEIGHT: 85.00 LBS.

### **ERICSSON 8843 RRH**

SCALE: NTS

-(2)



ERICSSON RRH MODEL NUMBER: 4449 17.91" (LENGTH) X 13.19 (WIDTH) X 9.45" (DEPTH) WEIGHT: 70.56 LBS.

**ERICSSON 4449 RRH** 

SCALE: NTS





RAYCAP OVP BOX
MODEL NUMBER: RVZDC-6627-PF-48
29.50" (LENGTH) X 16.50" (WIDTH) X 12.60" (DEPTH)
WEIGHT: 31.50 LBS.

### RAYCAP OVP BOX

SCALE: NTS







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Certification \$ Se

MARK	DATE	DESCRIPTION							
ISSUE PHASE		LIMINARY	DATE ISSUED 01/30/2020						
PROJE	PROJECT TITLE:								

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY
SHEET TITLE:

VERIZON TOWER EQUIPMENT SPECIFICATIONS

SCALE: NONE

PROJECT 40742
SHEET VZW-6







TI-OPP-13245-B (VZW LOC. 556453)

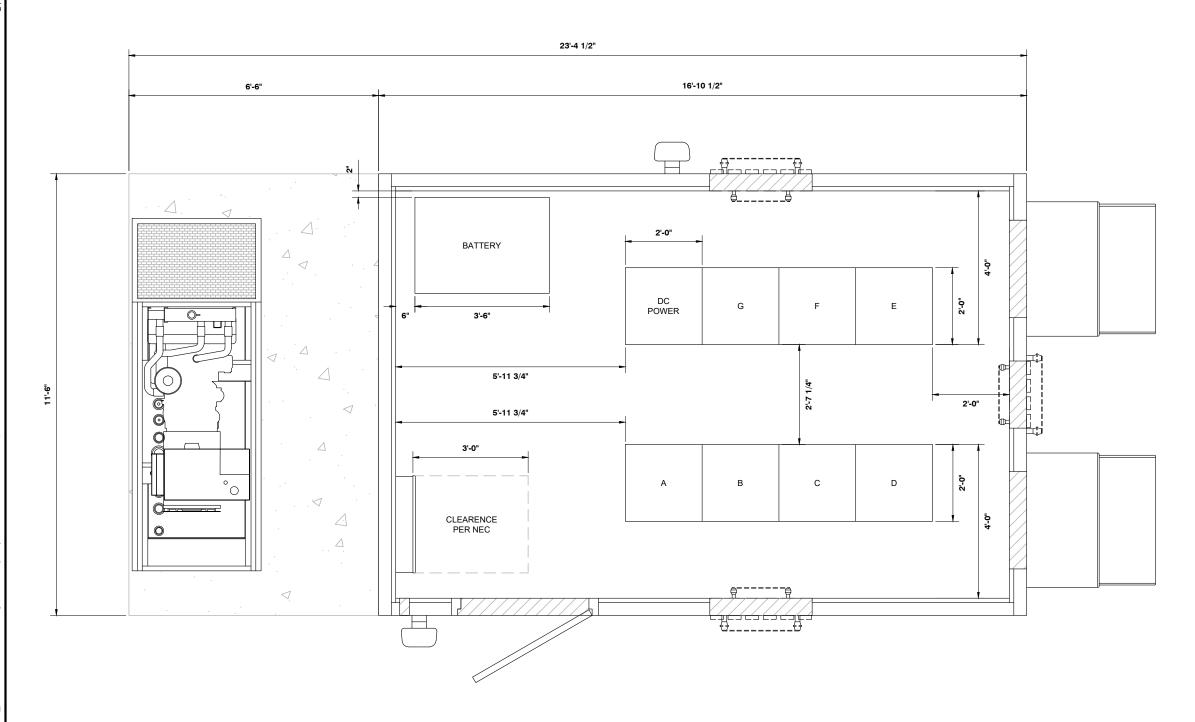
PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE.
AITKIN, MN 56431
AITKIN COUNTY
SHEET TITLE:

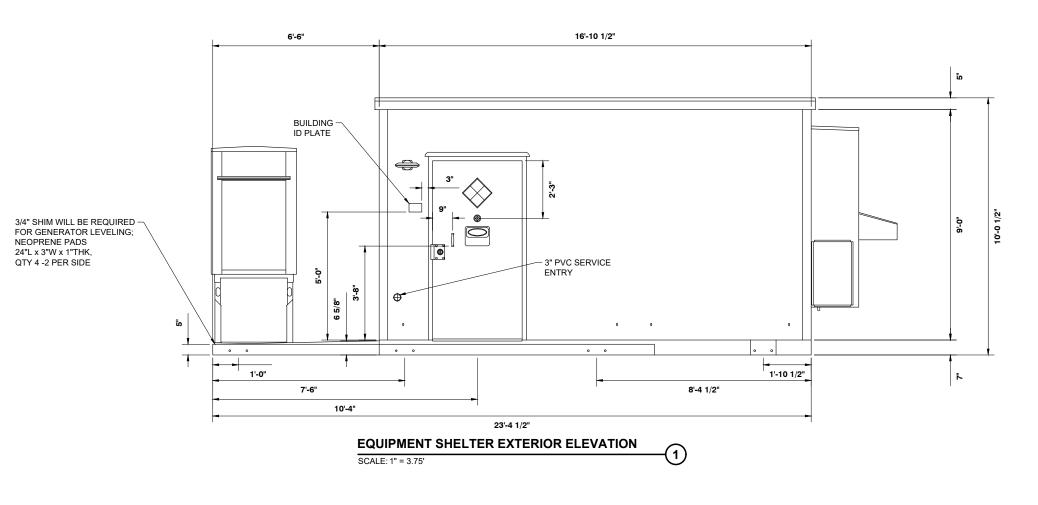
VERIZON EQUIPMENT SHELTER LAYOUT

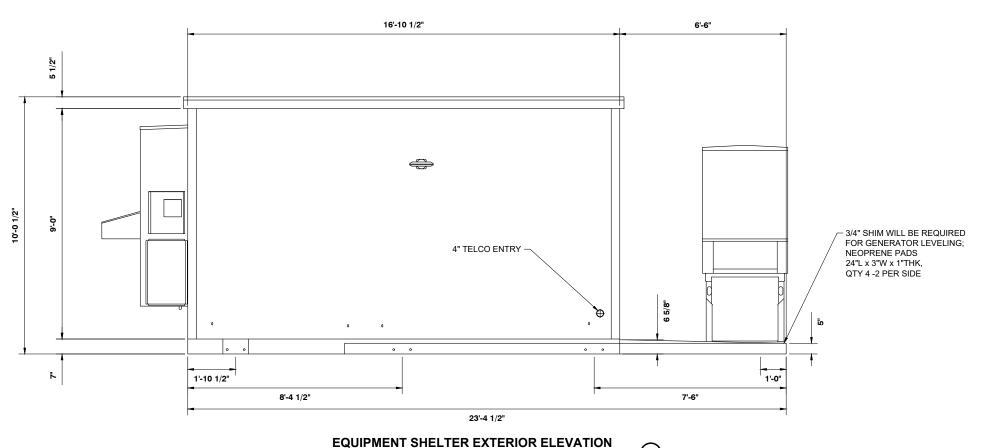
0 1.25' 2.5' 5'

11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'
PROJECT
NUMBER 40742

SHEET
NUMBER VZW-7







SCALE: 1" = 3.75'





NORTHWEST REGIONAL OFFICE

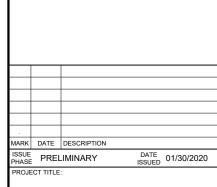
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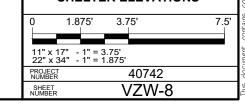
ertification \$ Seal:

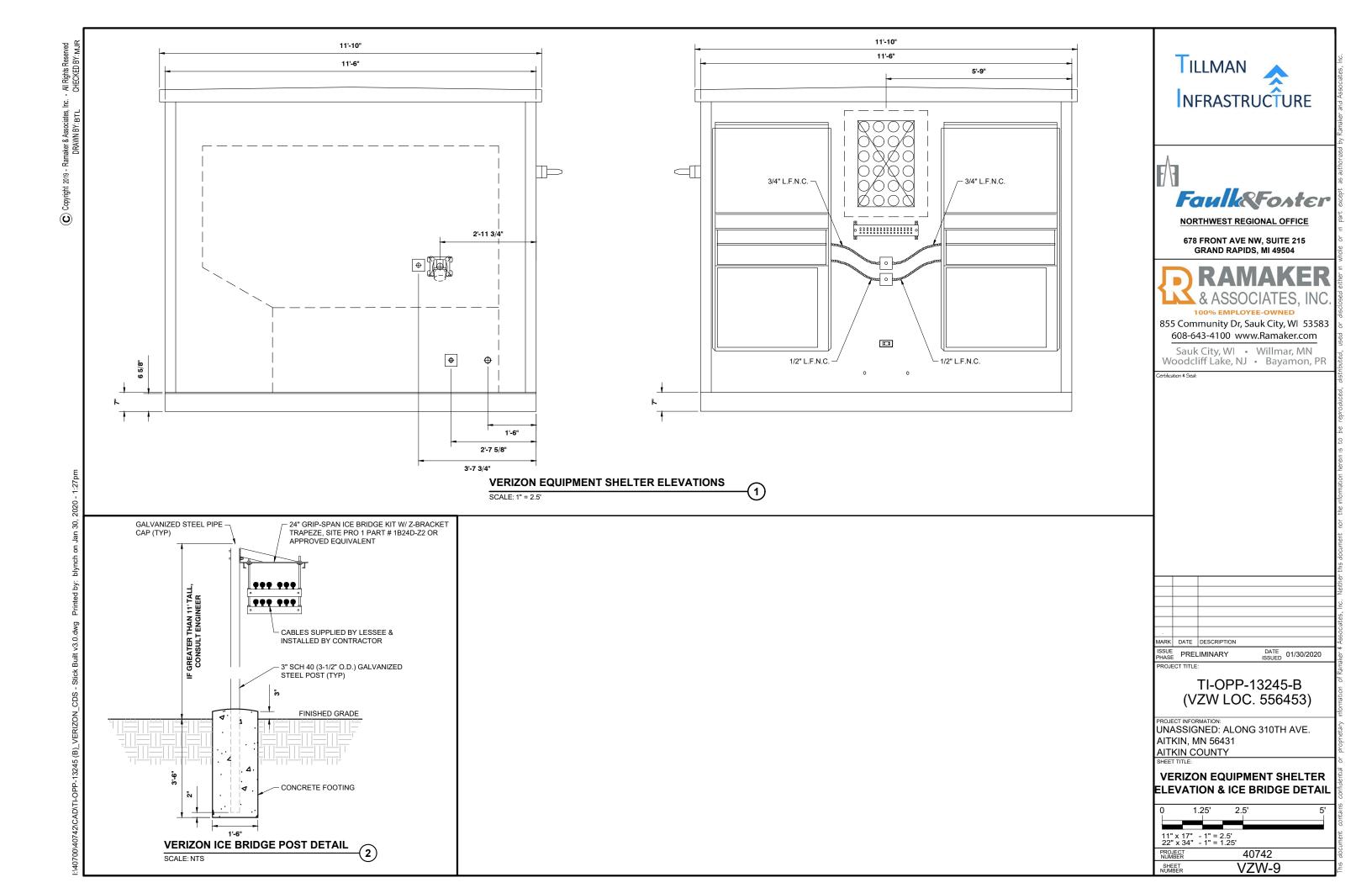


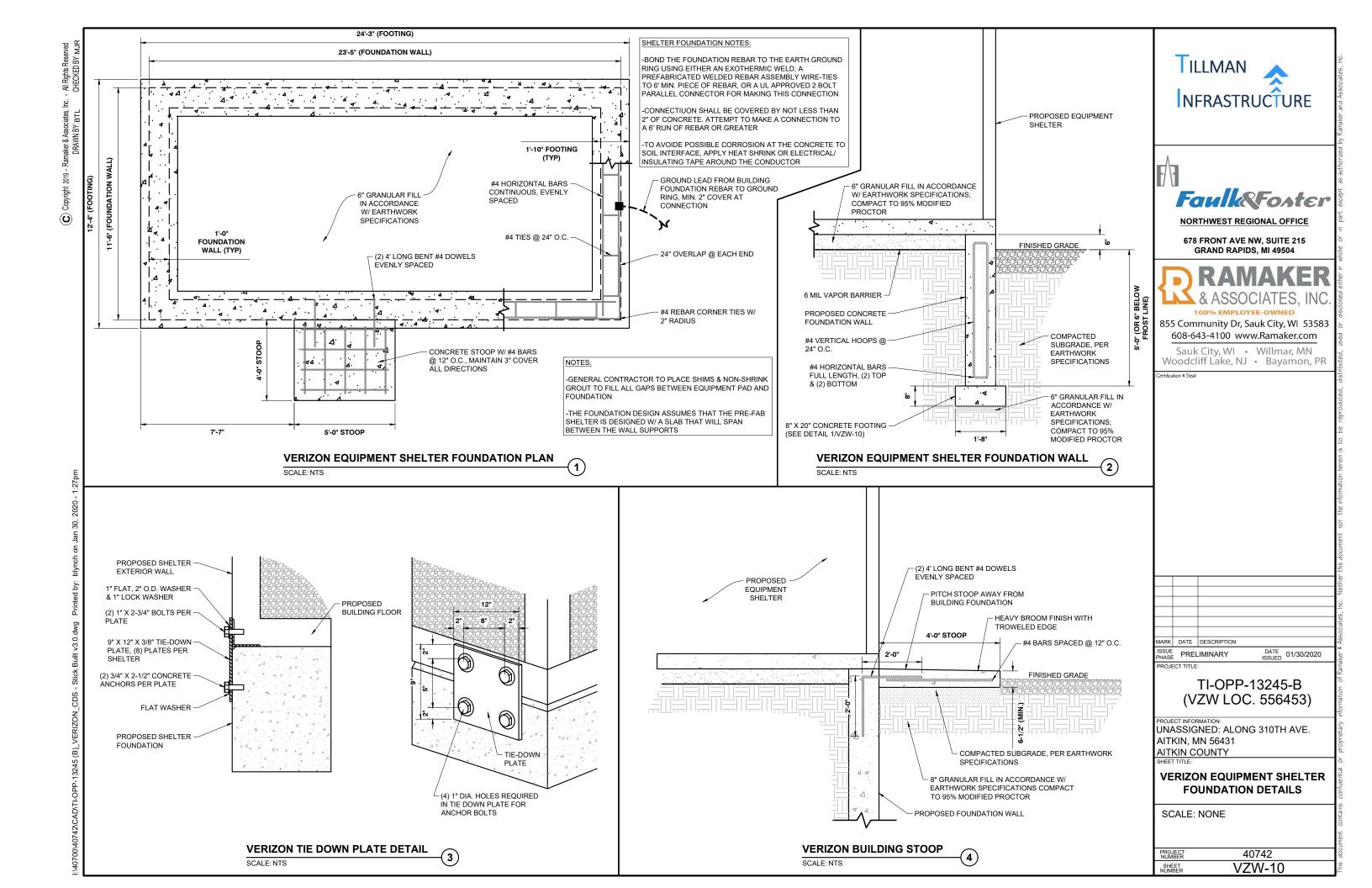
TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION: UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

VERIZON EQUIPMENT SHELTER ELEVATIONS







Model: 30REOZK

Diesel

**KOHLER.** Power Systems

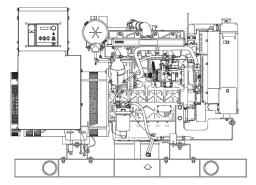
208-600 V



### Tier 4i EPA-Certified for Stationary Standard Features

### **Ratings Range**

		60 F
Standby:	kW	23-3
-	kVA	23-3
Prime:	kW	21-2
	kVA	21-3



### **Generator Set Ratings**

				130°C Standby		105°C Rise Prime Rating		under-unit vibration spring isolators.
Alternator	Voltage	Ph	Hz	kW/kVA	Amps	kW/kVA	Amps	
	120/208	3	60	29/36	101	26/33	90	
	127/220	3	60	29/36	95	26/33	85	
	120/240	3	60	29/36	87	26/33	78	
D= 0	120/240	1	60	23/23	96	21/21	88	
D5.6	139/240	3	60	29/36	87	26/33	78	
	220/380	3	60	27/34	51	25/31	47	
	277/480	3	60	29/36	44	26/33	39	
	347/600	3	60	29/36	35	26/33	31	
	120/208	3	60	31/39	108	28/35	97	
	127/220	3	60	31/39	102	28/35	92	
	120/240	3	60	31/39	93	28/35	84	
D0.0	120/240	1	60	29/29	121	26/26	108	
D8.3	139/240	3	60	31/39	93	28/35	84	
	220/380	3	60	31/39	59	28/35	53	
	277/480	3	60	31/39	47	28/35	42	
	347/600	3	60	31/39	37	28/35	34	
E5.6	120/240	1	60	29/29	121	26/26	108	
E8.3	120/240	1	60	31/31	129	27/27	113	
tage. There is attings are in ac	no overload cap cordance with	ability fo	or this ra	ting. <i>Prime Powe</i> d ISO-3046-1. F	er Ratings: At voor limited runn	varying load, the n ing time and con rfacturer reserves	number of gene ntinuous ratings	tor. Standby Ratings: Standby rating is applicable to varying loads for the duration of a pc attacts set operating hours is unlimited. A 10% overload capacity is available for one hour in two texts experienced capacity is available for one hour in two texts. One of the factory. Obtain the technical information bulletin (TIB-101) for ratings guideliating the design or specifications without notice and without any obligation or liability whatsor 5a.

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.

### • The 60 Hz generator set offers a UL 2200 listing.

- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- The generator set engine is certified to meet the Environmental Protection Agency (EPA) emergency stationary emissions requirements
- A one-year limited warranty covers all generator set systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
- Kohler's wound field excitation system with its unique PowerBoost™ design delivers great voltage response and short-circuit capability.
- o The brushless, rotating-field alternator has broadrange reconnectability.
- Kohler designed controllers for guaranteed system integration and remote communication. See Controllers on page 3.
- o The low coolant level shutdown prevents overheating (standard on radiator models only).
- o Integral vibration isolation eliminates the need for under-unit vibration spring isolators.

### **Alternator Specifications**

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Wound Field
Leads: quantity, type	
	12, Reconnectable
	4, 110-120/220-240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	Controller Dependent
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current

### NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.

- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and

Skewe	u rotor.	
Specifica	tions	Alternator
Peak mot	or starting kVA:	(35% dip for voltages below)
480 V	4D5.6 (12 lead)	75
480 V	4D8.3 (12 lead)	120
240 V	4E5.6 (4 lead)	44
240 V	4E8.3 (4 lead)	74

### **Application Data**

Engine	
Engine Specifications	
Manufacturer	Kohler Diesel
Engine model	KDI2504TM
Engine type	4-Cycle, Turbocharged
Cylinder arrangement	4 Inline
Displacement, L (cu. in.)	2.5 (158)
Bore and stroke, mm (in.)	88 x 102 (3.46 x 4.02)
Compression ratio	18:1
Piston speed, m/min. (ft./min.)	367 (1206)
Main bearings: quantity, type	5, Sleeve
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	36.4 (48.8)
Cylinder head material	Cast Iron
Crankshaft material	Cast Iron
Valve material:	
Intake	Stainless Steel
Exhaust	Stainless Steel
Governor: type, make/model	Stanadyne/Mechanical (or Electronic *)
	Droop E9/

Exhau	st	Stainless Stee
Governo	r: type, make/model	Stanadyne/Mechai (or Electronic *
Frequenc	cy regulation, no-load to full-load	Droop, 5% (or Isochronous
Frequen	cy regulation, steady state	±0.5%
Frequen	су	Fixed
Air clean	er type, all models	Dry

\* Requires available electronic governor option

### **Exhaust**

LAHAUST	
Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	7.8 (275)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	543 (1009)
Maximum allowable back pressure, kPa (in. Hg)	8 (2.4)
Exhaust outlet size at engine hookup, mm (in.)	76.5 (3.0)

Engine Electrical	
Engine Electrical System	
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	50
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating	One, 650
Battery voltage (DC)	12

Fuel	
Fuel System	
Fuel supply line, min. ID, mm (in.)	8.0 (0.31)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. lift, engine-driven fuel pump, m (ft.)	3.0 (10.0)
Max. fuel flow, Lph (gph)	46 (12.2)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel filter	
Prefilter	74 Microns
Primary/Water Separator	5 Microns @ 98% Efficiency
Recommended fuel	#2 Ultra Low Sulfur Dies

### Lubrication

Full Pressure
10.7 (11.3)
11 (11.6)
1, Cartridge
_

G5-436 (30REOZK) 8/15a

### **KOHLER GENERATOR SPECIFICATIONS**







NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 **GRAND RAPIDS. MI 49504** 



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IARK	DATE	DESCRIPTION	
SSUE HASE		IMINARY	DATE ISSUED 01/30/2020
RO IE	CT TITLE		

TI-OPP-13245-B (VZW LOC. 556453)

PROJECT INFORMATION:
UNASSIGNED: ALONG 310TH AVE. AITKIN, MN 56431 AITKIN COUNTY

### **VERIZON GENERATOR DETAILS**

SCALE: NONE

PROJECT NUMBER	40742
SHEET	\/7\/\/ 11

### **Application Data**

### Cooling

ooomig	
Radiator System	
Ambient temperature, °C (°F) *	50 (122)
Engine jacket water capacity, L (gal.)	4.4 (1.6)
Radiator system capacity, including engine, L (gal.)	11.4 (3)
Engine jacket water flow, Lpm (gpm)	59.0 (15.6)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	27.0 (1536)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	406 (16.0)
Fan, kWm (HP)	0.6 (0.8)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. $\rm H_2O$ )	0.125 (0.5)

\* Enclosure reduces ambient temperature capability by 5°C (9°F).

### **Operation Requirements**

Air Requirements	
Radiator-cooled cooling air, m³/min. (scfm) †	53.8 (1900)
Combustion air, m <sup>3</sup> /min. (cfm)	2.7 (96.9)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	10.3 (587)
Alternator, kW (Btu/min.)	6.7 (381)
Max. air intake restriction, kPa (in. Hg)	3.0 (0.89)

† Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

Fuel Consumption		
Diesel, Lph (gph) at % load	Standb	y Rating
100%	9.8	(2.6)
75%	7.9	(2.1)
50%	5.7	(1.5)
25%	3.4	(0.9)
Diesel, Lph (gph) at % load	Prime	Rating
100%	9.1	(2.4)
75%	7.2	(1.9)
50%	5.3	(1.4)
25%	3.0	(8.0)

### Controller



### Decision-Maker® 3000 Controller

Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or serial configuration
- Controller supports Modbus® protocol
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

G5-436 (30REOZK) 8/15a

Refer to G6-100 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric

KOHLER CO., Kohler, Wisconsin 53044 USA Phone 920-457-4441, Fax 920-459-1646 For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444 KOHI FRPower.com

Kohler Power Systems Asia Pacific Headquarters 7 Jurong Pier Road Singapore 619159 Phone (65) 6264-6422, Fax (65) 6264-6455

### **Additional Standard Features**

- Air Cleaner, Heavy Duty
- Alternator Protection
- Battery Rack and Cables
- Closed Crankcase Ventilation
- Oil Drain and Coolant Drain with Hose Barb
- Oil Drain Extension (with enclosure models only)
- Operation and Installation Literature
- Stainless Steel Fasteners on Enclosure (with enclosure models only)
- Rodent Guards
- Stainless Steel Fasteners on Enclosures

### **Available Options**

### Approvals and Listings

CSA Approval
UL2200 Listing

### **Enclosed Unit**

	Sound Enclosure (with enclosed critical silencer)
$\Box$	Weather Enclosure (with enclosed critical silence

Stainless Steel Latches and Hinges

### Open Unit

☐ Exhaust Silencer, Critical (kit: PA-352663)

### ☐ Flexible Exhaust Connector, Stainless Steel

### **Fuel System**

Flexible Fuel Lines
Fuel Pressure Gauge
Subbase Fuel Tanks

### Controller

### Common Failure Relay

☐ Input/Output Module

☐ Manual Speed Adjust (requires Electronic Governor)

### ☐ Remote Annunciator Panel

☐ Remote Emergency Stop Run Relay

### Cooling System

### ☐ Block Heater (700 W, 110-120 V)

Recommended for ambient temperatures below 0°C (32°F).

### Radiator Duct Flange

### **Electrical System**

### Alternator Strip Heater

Battery

### ■ Battery Charger, Equalize/Float Type

Battery Heater

☐ Electronic Governor

☐ Line Circuit Breaker (NEMA type 1 enclosure)

☐ Line Circuit Breaker with Shunt Trip (NEMA type 1 enclosure)

### Miscellaneous

☐ Air Cleaner Restriction Indicator

### ☐ Engine Fluids Added ☐ Rated Power Factor Testing

### Literature

☐ General Maintenance

### ☐ NFPA 110

Overhaul

### Production

Warranty 2-Year Basic Limited

☐ 5-Year Basic Limited

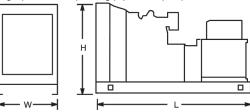
☐ 5-Year Comprehensive Limited

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### **Dimensions and Weights**

Overall Size, L x W x H, mm (in.): Open Unit Skid: 1400 x 813 x 1024 (55.1 x 32.0 x 40.3) 1938 x 813 x 1174 (76.5 x 32.0 x 47.0)

Weight (radiator model), wet, kg (lb.): 512 (1130)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.



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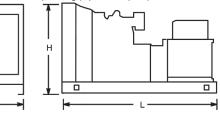
NORTHWEST REGIONAL OFFICE

678 FRONT AVE NW, SUITE 215 **GRAND RAPIDS, MI 49504** 



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**KOHLER GENERATOR SPECIFICATIONS** 

SCALE: NTS



**VERIZON GENERATOR DETAILS** 

TI-OPP-13245-B (VZW LOC. 556453)

UNASSIGNED: ALONG 310TH AVE.

DATE 01/30/2020

SCALE: NONE

AITKIN, MN 56431 AITKIN COUNTY

MARK DATE DESCRIPTION ISSUE PRELIMINARY

PROJECT TITLE

40742 PROJECT NUMBER

VZW-12 SHEET



