## PROJECT TEAM

APPLICANT:
GOGO LLC
1250 N ARLINGTON HEIGHTS RD.,
SUITE 500
ITASCA, ILLINOIS 60143

CONSTRUCTION MANAGER:
CONTACT: ALEX MOULEDOUS
PH.: (630) 647-1026

REAL ESTATE MANAGER:
CONTACT: SEAN KEENAN
PH.: (630) 647-1047

SITE ACQUISITION & ZONING:
SURESITE CONSULTING LLC
3659 GREEN ROAD, SUITE 214
CLEVELAND, OH 44122
CONTACT: BRENNA FLEMING
PH.: (412) 719-7834
FAX: (216) 593-0401
EMAIL: b.fleming@sure-site.com

PROJECT MANAGER:
RAMAKER & ASSOCIATES, INC.
1120 DALLAS STREET
SAUK CITY, WI 53583
CONTACT: KEITH BOHNSACK, P.E.,
PROJECT MANAGER
PH.: (608) 643-4100
FAX: (608) 643-7999
EMAIL: kbohnsack@ramaker.com

## DRIVING DIRECTIONS

FROM DENVER INT'L. AIRPORT: TAKE PENA BLVD TO I-70. TAKE I-70 WEST TO INTERCHANGE WITH I-225. TAKE I-225 SOUTH TO I-25. TAKE I-25 SOUTH TOWARD PUEBLO. AT EXIT 101 IN PUEBLO, TAKE US-50 WEST TOWARD GUNNISON. IN GUNNISON TAKE SR-135/MAIN STREET NORTH PAST HWY 135 FRONTAGE RD. TAKE NEXT ROAD TO THE LEFT (WEST). SITE IS AT GUYED TOWER SOUTH OF LOG BUILDING.

GATE COMBINATION: NO FENCE

## APPROVALS

REAL ESTATE: _____

RF ENGINEER: _____

DEPLOYMENT ENGINEERING MANAGER: _____

DEPLOYMENT ENGINEER: _____

TOWER OWNER: _____

PROPERTY OWNER: _____

## REGIONAL MAP


## VICINITY MAP


# CONSTRUCTION DRAWINGS

GOGO LLC
1250 N ARLINGTON HEIGHTS RD., SUITE 500
ITASCA, ILLINOIS 60143
PH.: (630) 647-1400 FAX: (630) 647-1687

## SITE I.D.: C0011-B
## SITE NAME: GUNNISON - PILGRIM TOWER COLO
## 1445 STATE HIGHWAY 135
## GUNNISON, COLORADO 81230
## GUNNISON COUNTY

## PROJECT INFORMATION

SITE DATA:
P.I.N. #: 3701-250-00-022
LATITUDE: 38°-33'-53.0" N (38.564722°)
LONGITUDE: 106°-55'-40.0" W (-106.927778°)
GROUND ELEVATION: 7743 FT AMSL

POWER COMPANY:
CITY OF GUNNISON ELECTRIC DEPARTMENT
PH.: (970) 641-8090

TELEPHONE COMPANY:
CENTURYLINK
PH.: (866) 706-8592

JURISDICTION: GUNNISON COUNTY
MUNICIPALITY: CITY OF GUNNISON
OCCUPANCY: UNMANNED
ZONING: N/A
CONSTRUCTION TYPE: CO-LOCATION

LAND OWNER:
PILGRIM COMMUNICATIONS INC
PO BOX 90
NEW PALESTINE, IN 46163-0090
BUSINESS NAME: KVLE RADIO STATION

CONTACT PERSON:
CONTACT: MARTY GRANTHAM
PH.: (970) 468-4365

TOWER MANAGER:
WORLD TELECOM SITES
2300 5TH AVENUE, SUITE 131
VERO BEACH, FL 32960

CONTACT PERSON:
CONTACT: RON CRIDER
PH.: (772) 770-9000

## SHEET INDEX



TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN COLORADO

COLORADO 811
811 OR 1-800-922-1987

REQUIRES MIN. 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE.


Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com


Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME: GUNNISON - PILGRIM TOWER COLO
SITE NUMBER: C0011-B
SITE ADDRESS: 1445 STATE HIGHWAY 135, GUNNISON, CO 81230, GUNNISON COUNTY
SHEET NAME: TITLE SHEET
SHEET NUMBER: T-1
SCALE: NONE
PROJECT NUMBER: 25975


LOCATION PLAN - AERIAL
SCALE: 1"= 60'-0"

NORTH

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SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
LOCATION PLAN - AERIAL MAP

SHEET NUMBER:
C-1A

0 30' 60' 120'
11" x 17" - 1" = 60'
22" x 34" - 1" = 30'

PROJECT NUMBER:
25975

I:\25900\25975\CAD\Telecom\AutoCAD\Construction Drawings\25975 C0011-B Gunnison-Pilgrm Tower COLO CDs.dwg Printed by: steves on Aug 08, 2013 - 12:46pm

PROPOSED FIBER OPTIC SERVICE IN 2" DIAMETER SCHEDULE 40 PVC PIPE MINIMUM 30" BELOW GRADE FROM PROPOSED HAND HOLE AT ROW TO PROPOSED HAND HOLE NEAR SHELTER (565'±) WITH (2) FULL LENGTH PULL ROPES SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR. CONTRACTOR TO ADD PULL BOXES AS NECESSARY. (INSTALLATION OF CONDUIT BY CONTRACTOR)

NOTE: CONTRACTOR TO PROVIDE AN ADDITIONAL 6 FEET OF CABLE AT PROPOSED HAND HOLES & 12 FEET OF CABLE WITHIN THE GOGO SHELTER.

PROPOSED 24" X 36" HAND HOLE FOR FIBER OPTIC SERVICE

EXISTING FENCE

PROPOSED COW/TOW EQUIPMENT, SEE SHEET C-2A FOR DETAILS

TREES

PROPERTY LINE

CANAL

EXISTING TRAILERS

EX. LOG BLDG.

EXISTING 12' WIDE NON-EXCLUSIVE VERIZON ACCESS & UTILITY EASEMENT IN EXISTING GRAVEL DRIVE

PROPOSED GOGO 16'-6" X 18'-0" LEASE AREA WITH 11'-5" X 14'-0" FIBREBOND SHELTER MODEL #D-8953 ON 11'-5" X 14'-0" CONCRETE FOUNDATION

25' DITCH SETBACK

PROPERTY LINE

IRRIGATION DITCH

PROPOSED 195' GUYED TOWER (BY OTHERS)

25' DITCH SETBACK

EXISTING 201'-6" GUYED TOWER TO BE REMOVED (BY OTHERS)

PROPERTY LINE

EXISTING VERIZON LEASE AREA, EQUIPMENT SHELTER & GENERATOR

EXISTING LEACH FIELD

EXISTING FENCE

CR-13

OPEN LAND

STATE HIGHWAY 135 ROW VARIES

7740 7741 7742 7743 7744 7745 7746 7747 7748 7749 7750 7751 7752 7753 7754 7755

LOCATION PLAN
SCALE: 1"= 60'-0"

NORTH

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SITE NUMBER:
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SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
LOCATION PLAN

SHEET NUMBER:
C-1B

0 30' 60' 120'
11" x 17" - 1" = 60'
22" x 34" - 1" = 30'

PROJECT NUMBER:
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EXISTING ELECTRICAL BOXES

EXISTING CABLE TV PEDESTAL

EXISTING TRAILER

PROPERTY LINE

TEMPORARY GOGO SHELTER ON WHEELS LOCATION WITH 7'-0" X 7'-6" SHELTER (TO BE REMOVED AT COMPLETION OF PERMANENT SITE)

EXISTING GRAVEL DRIVE

EXISTING ELECTRICAL TRANSFORMER

EXISTING WELL

GUY WIRE, TYP.

40'-0" TYP.

20'±

7'-2"

2'-4"

7'-2"

EXISTING 12' WIDE NON-EXCLUSIVE VERIZON ACCESS & UTILITY EASEMENT IN EXISTING GRAVEL DRIVE

PROPOSED 5' WIDE GOGO UTILITY EASEMENT

16'-0"

TEMPORARY GOGO TOWER ON WHEELS LOCATION WITH 100' TOWER (TO BE REMOVED AT COMPLETION OF PERMANENT SITE)

12'-6"

DITCH SETBACK

EXISTING TELCO PEDESTAL

EXISTING ELECTRICAL METERS

EXISTING LOG BUILDING

EXISTING SEPTIC TANK

PROPOSED GOGO 16'-6" X 18'-0" LEASE AREA WITH 11'-5" X 14'-0" FIBREBOND SHELTER MODEL #D-8953 ON 11'-5" X 24'-0" CONCRETE FOUNDATION, SEE SHEET C-2B FOR MORE INFORMATION

EXISTING WOOD DECK

NORTH

COW/TOW SITE PLAN

SCALE: 1"= 10'-0"

1

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1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
COW/TOW SITE PLAN

SHEET NUMBER:
C-2A

0 5' 10' 20'

11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER:
25975

EXISTING ELECTRICAL TRANSFORMER

PROPOSED 5' WIDE GOGO UTILITY EASEMENT

EXISTING WELL

CANAL

25'-0" DITCH SETBACK

EXISTING VERIZON 5' WIDE UTILITY EASEMENT

EXISTING TELCO PEDESTAL

EXISTING ELECTRICAL METERS

EXISTING LOG BLDG.

EXISTING WOOD DECK

PROPOSED GOGO 200 AMP, 120/240V SINGLE PHASE, 3 WIRE SINGLE METER

PROPOSED GOGO COW/TOW EQUIPMENT, SEE SHEET C-2A FOR DETAILS

EXISTING 12' WIDE NON-EXCLUSIVE VERIZON ACCESS & UTILITY EASEMENT IN EXISTING GRAVEL DRIVE

EXISTING CONCRETE PATIO TO BE REMOVED (BY OTHERS)

PROPOSED GOGO 16'-6" X 18'-0" LEASE AREA WITH 11'-5" X 14'-0" FEBREBOND SHELTER MODEL #D-8953 ON 11'-5" X 14'-0" CONCRETE FOUNDATION

EXISTING GUYED WIRE & ANCHOR TO BE REMOVED, TYP. (BY OTHERS)

EXISTING DISHES

EXISTING SEPTIC TANK

EXISTING LEACH FIELD

PROPOSED 195' GUYED TOWER (BY OTHERS)

PROPOSED TOWER FOUNDATION (BY OTHERS)

PROPOSED 24" X 36" HAND HOLE FOR FIBER OPTIC SERVICE

PROPOSED HVAC DRYWELL, TYP. OF (2), SEE DETAIL 4/C-7

EXISTING GUYED TOWER & ASSOCIATED EQUIPMENT TO BE REMOVED (BY OTHERS)

EXISTING VERIZON LEASE AREA & EQUIPMENT SHELTER

(2) PROPOSED GOGO GPS ANTENNAS AT ICE BRIDGE, SEE DETAIL 3/C-7

PROPOSED GOGO ICE BRIDGE, SEE DETAIL 1/C-7

PROPOSED GOGO COAX TO ROUTE UP TOWER VIA TRANSMISSION LINE HANGER, SEE DETAIL 2/C-7

PROPOSED VERIZON ICE BRIDGE REROUTING/ADDITION TO NEW TOWER (BY OTHERS)

EXISTING VERIZON GENERATOR

EXISTING BOLLARDS, TYP.

PROPOSED GUY WIRE, TYP. (BY OTHERS)

PROPOSED GUY ANCHOR FOUNDATION, TYP. (BY OTHERS)

IRRIGATION DITCH

SITE PLAN
SCALE: 1"= 15'-0"

NORTH

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1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SITE PLAN

SHEET NUMBER:
C-2B

0 7.5' 15' 30'
11" x 17" - 1" = 15'
22" x 34" - 1" = 7.5'

PROJECT NUMBER:
25975

Bitmap

## RF Approval Form

| | | | | | |
|---|---|---|---|---|---|
| **Date:** | 7/17/2013 5:34:20 PM | **Latitude:** | 38.56486 \| 555334 ZTE \| 38° 33' 53.51" N | **Tower Company:** | Pilgrim Tower |
| **Site Number:** | COO11 | **Longitude:** | -106.92792 \| -1539762 ZTE \| 106° 55' 40.5" | **Tower Co SiteID:** | TBD |
| **Site Name:** | Gunnison | **Desired Tx AMSL:** | 7900 ft | **Address:** | 1445 State Highway 135, Gunnison 81230 |
| **RF Candidate Rank:** | Primary (6-sector config) | | | **County:** | Gunnison |
| **Tower Type/ Structure:** | Guyed | | | **State:** | CO |

**Sector 1**

| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 35 | 35 |
| RAD center | 140 ft. | 130 ft. |
| Antenna Model: | TA-819-10H-39B | TA-819-10H-39B |
| Antenna Dimentions: | 96" x 18" x 6" | 96" x 18" x 6" |
| Mechanical uptilt | 3 | 3 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Orange / Brown | Orange / White |

**Sector 2**

| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 155 | 155 |
| RAD center | 140 ft. | 130 ft. |
| Antenna Model: | TA-819-10H-39B | TA-819-10H-39B |
| Antenna Dimentions: | 96" x 18" x 6" | 96" x 18" x 6" |
| Mechanical uptilt | 3 | 3 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Blue / Brown | Blue / White |

**Sector 3**

| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 275 | 275 |
| RAD center | 140 ft. | 130 ft. |
| Antenna Model: | TA-819-10H-39B | TA-819-10H-39B |
| Antenna Dimentions: | 96" x 18" x 6" | 96" x 18" x 6" |
| Mechanical uptilt | 3 | 3 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Green / Brown | Green / White |

**Sector 4**

| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 95 | 95 |
| RAD center | 140 ft | 130 ft. |
| Antenna Model: | TA-819-10V-39B | TA-819-10V-39B |
| Antenna Dimentions: | 96" x 24" x 8" | 96" x 24" x 8" |
| Mechanical uptilt | 4 | 4 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Yellow / Brown | Yellow / White |

**Sector 5**

| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 215 | 215 |
| RAD center | 140 ft | 130 ft. |
| Antenna Model: | TA-819-10V-39B | TA-819-10V-39B |
| Antenna Dimentions: | 96" x 24" x 8" | 96" x 24" x 8" |
| Mechanical uptilt | 3.5 | 3.5 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Gray / Brown | Gray / White |

**Sector 6**

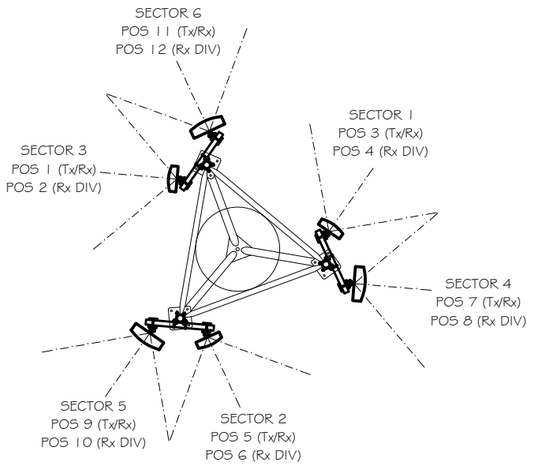
| | Tx/Rx Ant | Rx Diversity Ant |
|---|---|---|
| Azimuth: | 335 | 335 |
| RAD center | 140 ft | 130 ft. |
| Antenna Model: | TA-819-10V-39B | TA-819-10V-39B |
| Antenna Dimentions: | 96" x 24" x 8" | 96" x 24" x 8" |
| Mechanical uptilt | 3 | 3 |
| Coax Run Length: | 190 ft. | 180 ft. |
| Coax Size: | 1-1/4" | 1-1/4" |
| Color ID: | Red / Brown | Red / White |

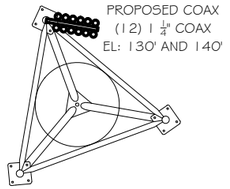
**BTS-Sector Assignment:**

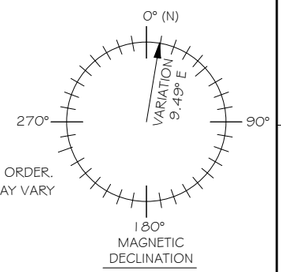
**RF Comments:**

6/21/13: Issue COO11 RFA. 7/17/13: Adjust Rads to 140' and 130'.

| SEC | POS | SECTOR ID | SECTOR ID |
|---|---|---|---|
| 1 | 1 | ORANGE | BROWN |
| 1 | 2 | ORANGE | WHITE |
| 2 | 3 | BLUE | BROWN |
| 2 | 4 | BLUE | WHITE |
| 3 | 5 | GREEN | BROWN |
| 3 | 6 | GREEN | WHITE |
| 4 | 7 | YELLOW | BROWN |
| 4 | 8 | YELLOW | WHITE |
| 5 | 9 | GRAY | BROWN |
| 5 | 10 | GRAY | WHITE |
| 6 | 11 | RED | BROWN |
| 6 | 12 | RED | WHITE |

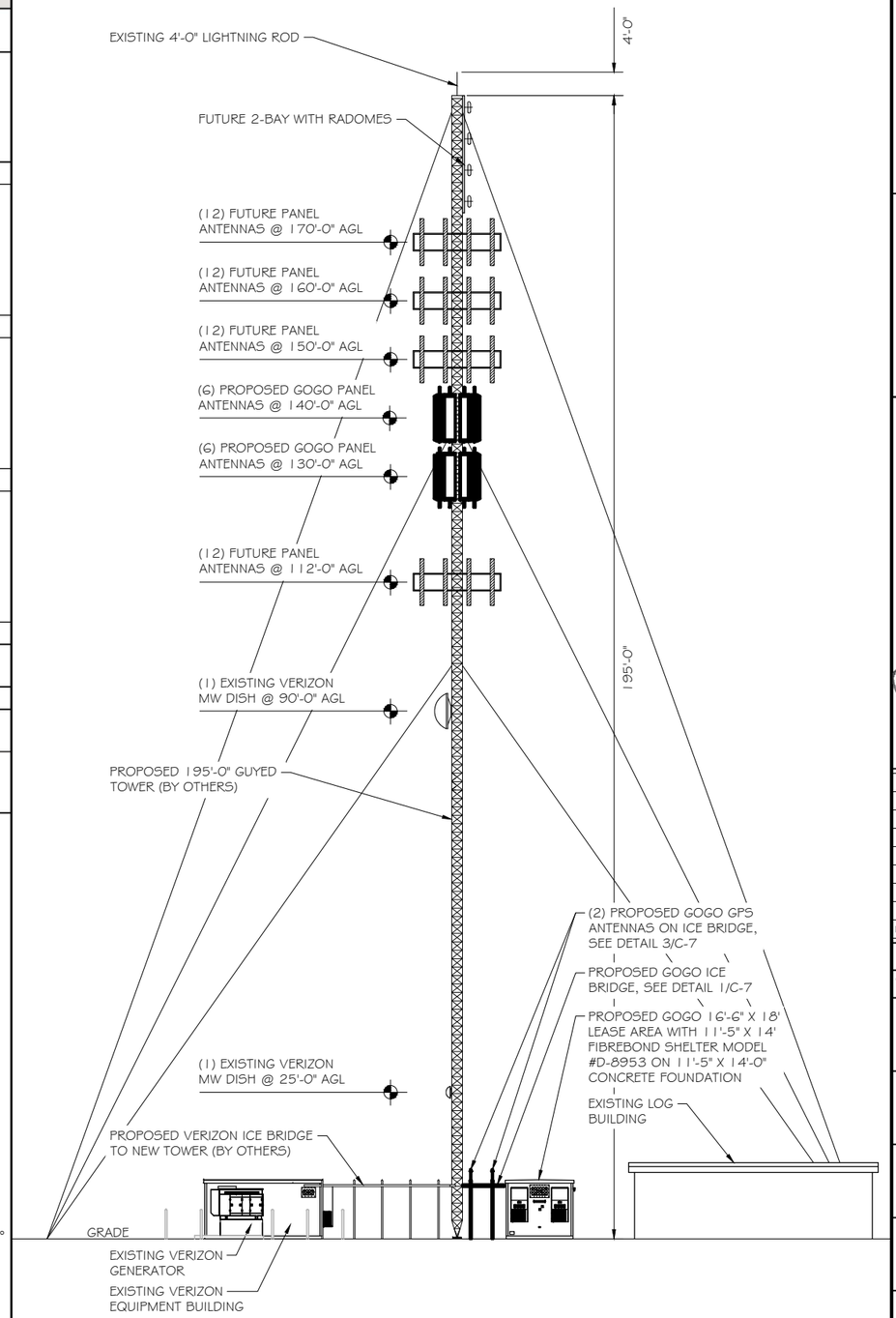



NOTES:
1. VERIFY EACH COAXIAL CABLE LENGTH, DIAMETER, ROUTING, AND ALL MOUNTING APPURTENANCES WITH OWNER PRIOR TO ORDER.
2. THE COAX LENGTH IS APPROXIMATE, AND IS NOT TO BE USED FOR CONSTRUCTION. ACTUAL ANTENNA CABLE LENGTHS MAY VARY FROM ESTIMATED MAXIMUM LENGTH AND MUST BE VERIFIED.
3. TAG ALL MAIN CABLES AT THREE (3) LOCATIONS:
   A. TOP OF TOWER AT ANTENNAS
   B. INSIDE EQUIPMENT SHELTER NEAR THE WAVEGUIDE ENTRY PORT
   C. OUTSIDE EQUIPMENT SHELTER NEAR THE WAVEGUIDE ENTRY PORT
4. EACH COAX SHALL BE SUPPORTED WITH COLUMN GRIP (CHINESE FINGER GRIP) HUNG FROM A J-HOOK AT TOP OF TOWER. (10' ABOVE FOR LATTICE TOWER).
5. EACH COAX SHALL BE GROUNDED AT (3) THREE LOCATIONS. TOWER PLATFORM, TOWER BASE AND BUILDING PORT ENTRY.
6. COAXIAL CABLES TO BE SUPPORTED EVERY 3'-0" ON PLATFORM WITH STAINLESS STEEL HANGERS.
7. JUMPERS TO BE SUPPORTED EVERY 18" WITH STAINLESS STEEL HANGERS.
8. ANTENNA CONTRACTOR RESPONSIBLE FOR FABRICATING ENCLOSURE JUMPERS.

ANTENNA CONFIGURATION TABLE & NOTES (2)
SCALE: NTS




NOTE:
CONTRACTOR TO INSTALL COAX WITH DOUBLE STACK COAX HANGER ASSEMBLY ON AN EMPTY FACE, NOT ON CLIMBING LADDER/ SAFETY CLIMB SIDE, AS PER TOWER OWNER'S STRUCTURAL ASSESSMENT.

NOTE:
CONTRACTOR TO INSTALL COAX WAVEGUIDE LADDER AS PER TOWER OWNER'S STRUCTURAL ASSESSMENT.

EAST ELEVATION (1)
SCALE: 1"= 25'-0"

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SITE NUMBER:
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SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

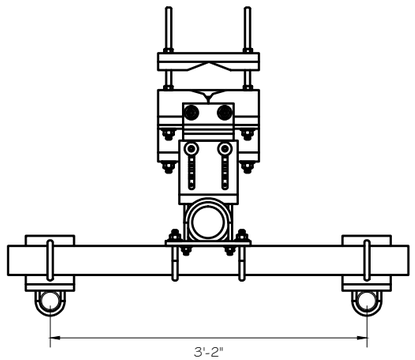
SHEET NAME:
ELEVATION

SHEET NUMBER:
C-3

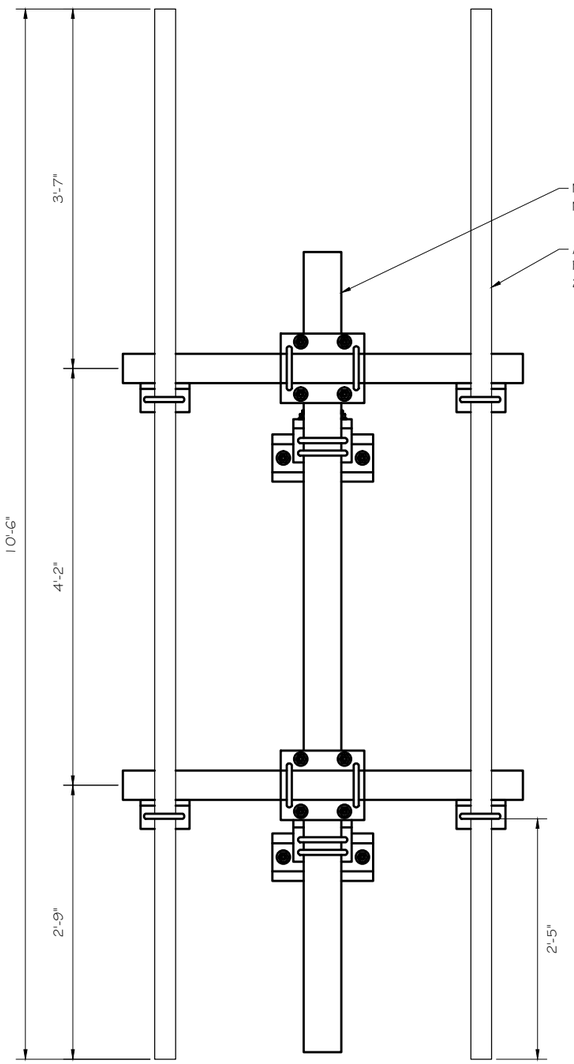
0 12.5' 25' 50'
11" x 17" - 1" = 25'
22" x 34" - 1" = 12.5'

PROJECT NUMBER:
25975

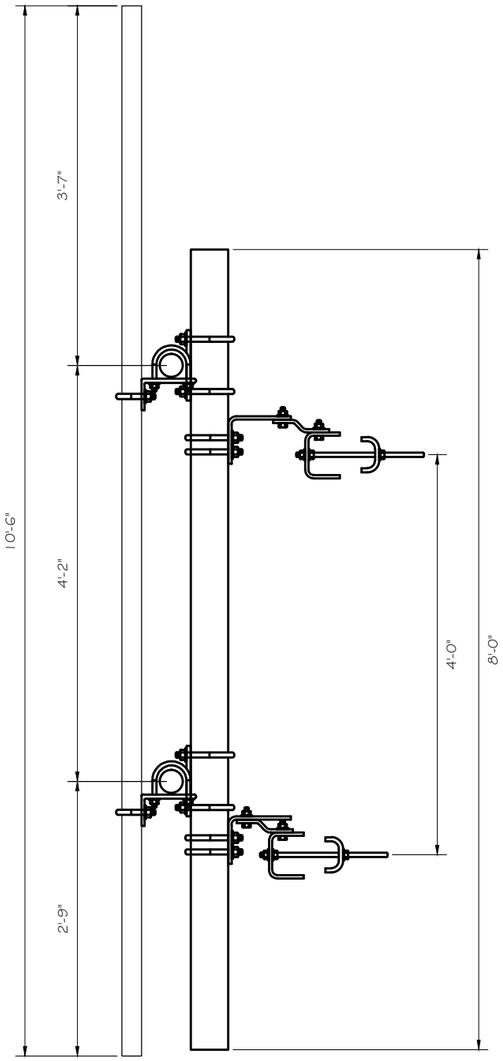
# ANDREW MODEL #MTC989 1 HDA
## DOUBLE ANTENNA MOUNT
## (LATTICE TOWERS)



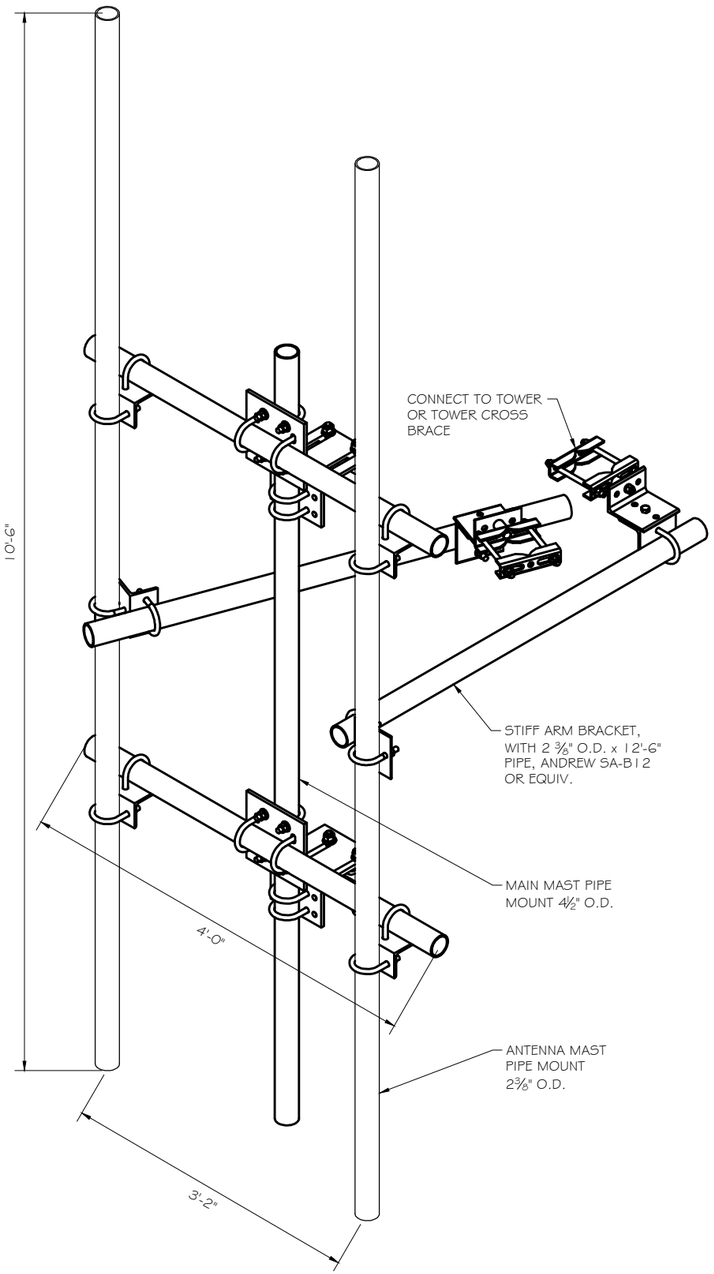

PLAN VIEW




ELEVATION VIEW




SIDE ELEVATION VIEW




ISOMETRIC VIEW

ANTENNA MOUNTING DETAIL (1)
SCALE: NTS

Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
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Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

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COLORADO LICENSED
JAMES R. SKOWRONSKI
36936
PROFESSIONAL ENGINEER
8/08/2013

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| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

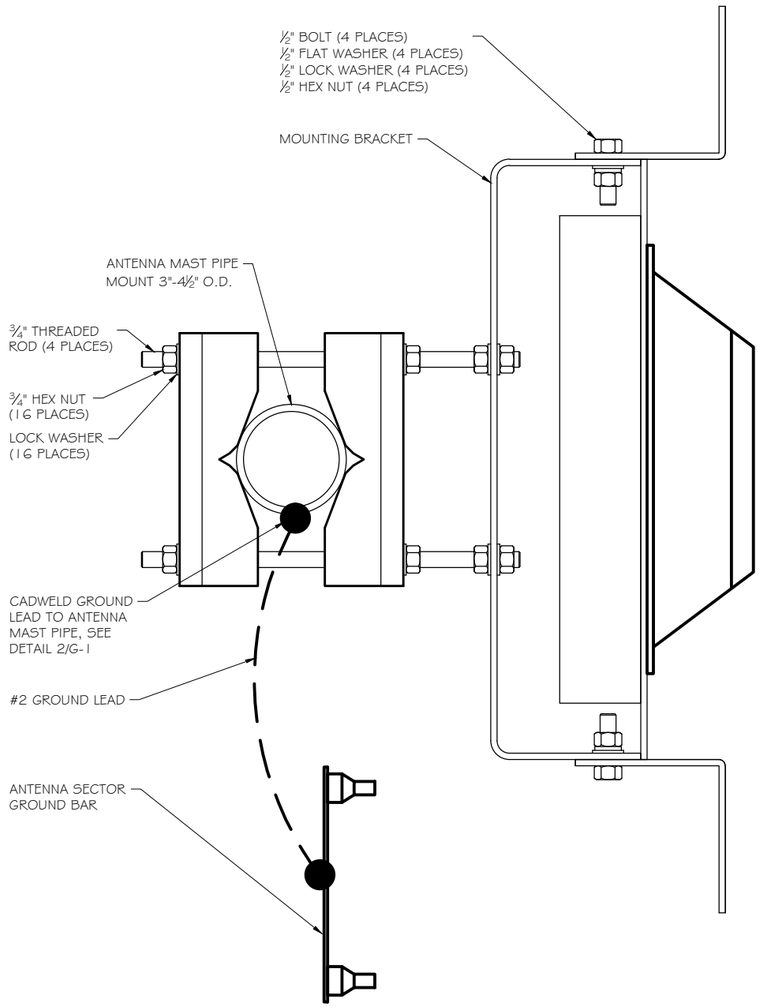
SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SITE DETAILS

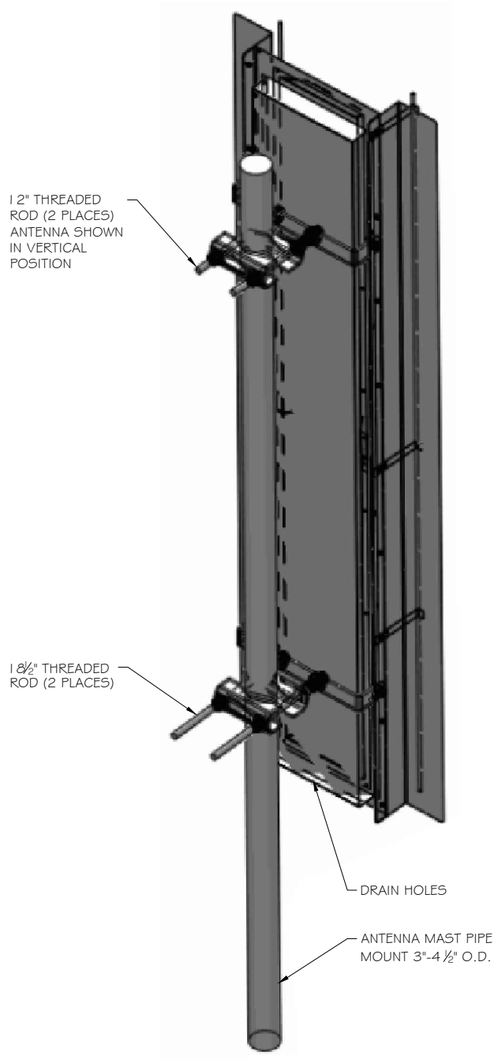
SHEET NUMBER:
C-4

SCALE: NONE

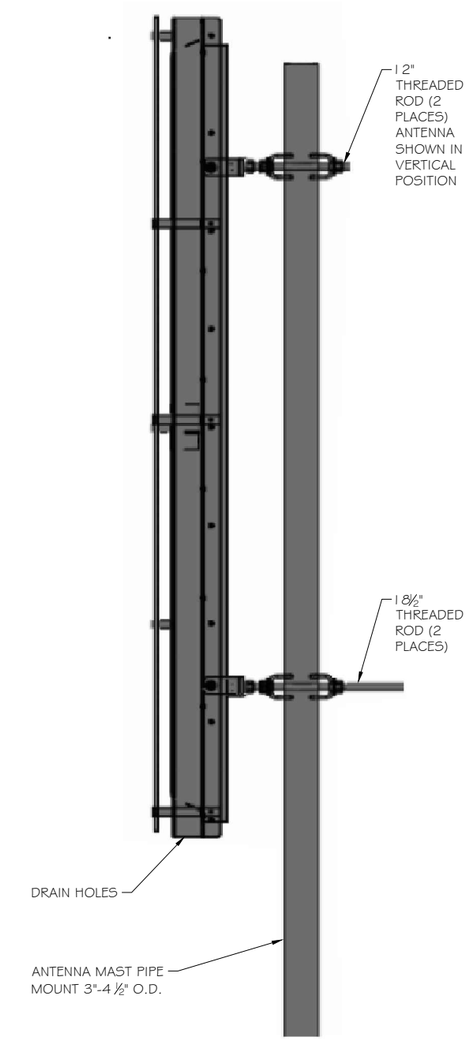
PROJECT NUMBER:
25975




PLAN VIEW




ISOMETRIC DRAWING WITH ANTENNAS




SIDE ELEVATION VIEW

HARDWARE KIT TA-819-10 MOUNTING DIAGRAM 1
SCALE: NTS

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Itasca, Illinois 60143

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GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SITE DETAILS

SHEET NUMBER:
C-5

SCALE: NONE

PROJECT NUMBER:
25975

KAVVERI TELECOM PRODUCTS LIMITED | TIL-TEK

# TA-819-10H-39B

**Sector**

## Details

849-896 MHz

The TA-819-10H-39B is a horizontally polarized sector antenna, designed for ground to air communication applications. This antenna is custom designed for specified roll-off azimuth pattern. Up-tilt is achieved electrically with a cosecant-squared beamshape for elevation pattern and a specified roll-off at the horizon. The antenna is at DC ground to aid in lightning protection.

### Electrical Specifications

| | |
|---|---|
| Freq Range: | 849-896 MHz |
| Gain: | 17 dBi +/- .5 |
| VSWR: | 1.4:1 max |
| Front Back: | 25 dB min. |
| Pol: | Horizontal |
| Power: | 150 Watts |
| H Plane BW: | 9.0 +/- .5 degrees |
| E Plane BW: | 42° |
| Electrical Downtilt: | 8 ° of uptilt @ 849 MHz |
| Null Fill: | Cosecant-squared approx. |
| X Pol: | 20 dB min. |
| 3rd Order IM 2 20W: | -150 dBc |
| Imp: | 50 ohms |
| Termination: | 7/16 female |

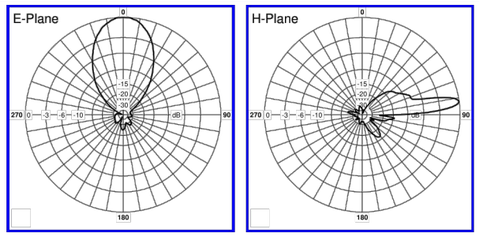
### Mechanical Specifications

| | |
|---|---|
| Length: | 96 in. (2438 mm) |
| Width: | 18 in.(457.2 mm) |
| Depth: | 6.5 in. (165.1 mm) |
| Weight: | 94 lb. (42.6 kg) incl mounting kit |
| Rated Wind Vel: | 130 mph (209.2 km/h) |
| Hor Thrust: | 812 lb. (368.3 kg) |
| Mech tilt: | 0 +/- 3 degrees on 4.5" O.D. Pipe |
| Mounting Pipe: | 3.0 - 4.5 in (76 - 114 mm) |

### Material Specifications

| | |
|---|---|
| Radiating Elements: | Plated copper on PCB |
| Reflector: | Irridited aluminum |
| Radome: | Gray UV stabilized ASA |
| Clamps: | EDZ steel |

## Antenna Patterns






500 Van Buren Street
P.O. Box 550
Kemptville, ON K0G 1J0
Canada

Specifications subject to change without notice

ISO 9001:2000
CGSB Registered
Certificate 961004

T: 613-258-5928
T: 877-ANTENNA
F: 613-258-7418
www.tiltek.com

KAVVERI TELECOM PRODUCTS LIMITED | TIL-TEK

# TA-819-10V-39B

**Sector**

## Details

849-896 MHz

The TA-819-10V-39B is a vertically polarized sector antenna, designed for ground to air communication applications. This antenna is custom designed for specifiied roll-off in azimuth pattern. Uptilt is achieved electrically with a cosecant-squared beamshape for elevation pattern and a specified roll-off at the horizon. The antenna is at DC ground to aid in lightning protection.

### Electrical Specifications

| | |
|---|---|
| Freq Range: | 849-896 MHz |
| Gain: | 17 dBi +/- .5 |
| VSWR: | 1.4:1 max. |
| Front Back: | 30 dB min. |
| Pol: | Vertical |
| Power: | 150 Watts |
| H Plane BW: | 42° |
| E Plane BW: | 9 +/- .5 degrees |
| Electrical Downtilt: | 7 ° of uptilt @ 849 MHz |
| Null Fill: | Cosecant-squared approx. |
| X Pol: | 25 dB min. |
| 3rd Order IM 2 20W: | -150 dBc |
| Imp: | 50 ohms |
| Termination: | 7/16 female |

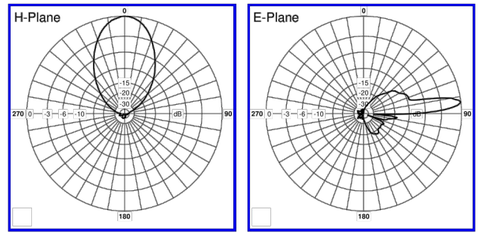
### Mechanical Specifications

| | |
|---|---|
| Length: | 96 in. (2438 mm) |
| Width: | 24 in.(610 mm) |
| Depth: | 8.0 in. (203.2 mm) |
| Weight: | 107 lb. (48.5 kg) incl mounting hardware |
| Rated Wind Vel: | 130 mph (209.2 km/h) |
| Hor Thrust: | 1081.6 lb. (490.6 kg) |
| Mech tilt: | 0 +/- 3° on 4.5" O.D. Pipe |
| Mounting Pipe: | 3.0 - 4.5 in (76 - 114 mm) |

### Material Specifications

| | |
|---|---|
| Radiating Elements: | Plated copper on PCB |
| Reflector: | Irridited aluminum |
| Radome: | Gray UV stabilized ASA |
| Clamps: | EDZ steel |

## Antenna Patterns



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COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER

8/08/2013

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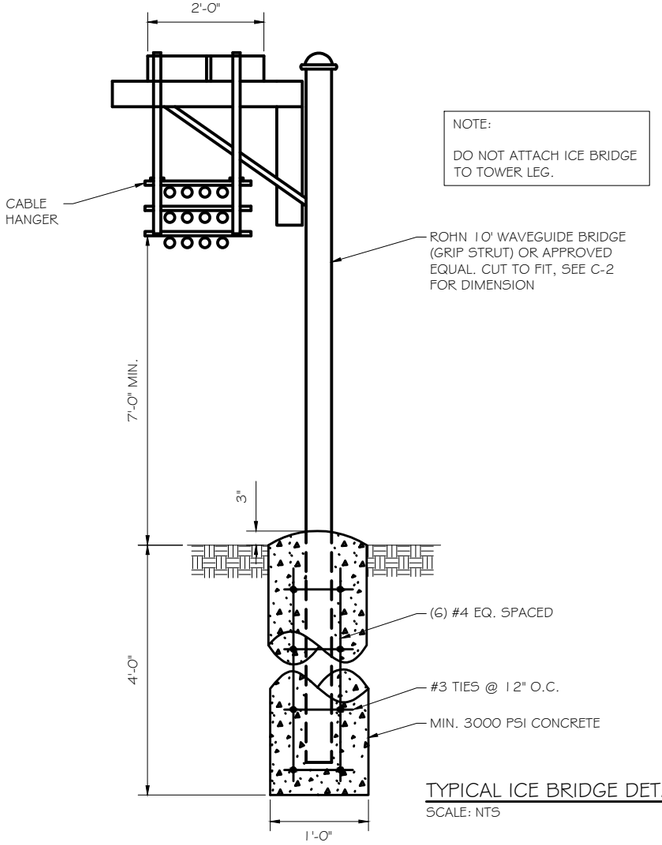
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
ANTENNA SPECIFICATIONS

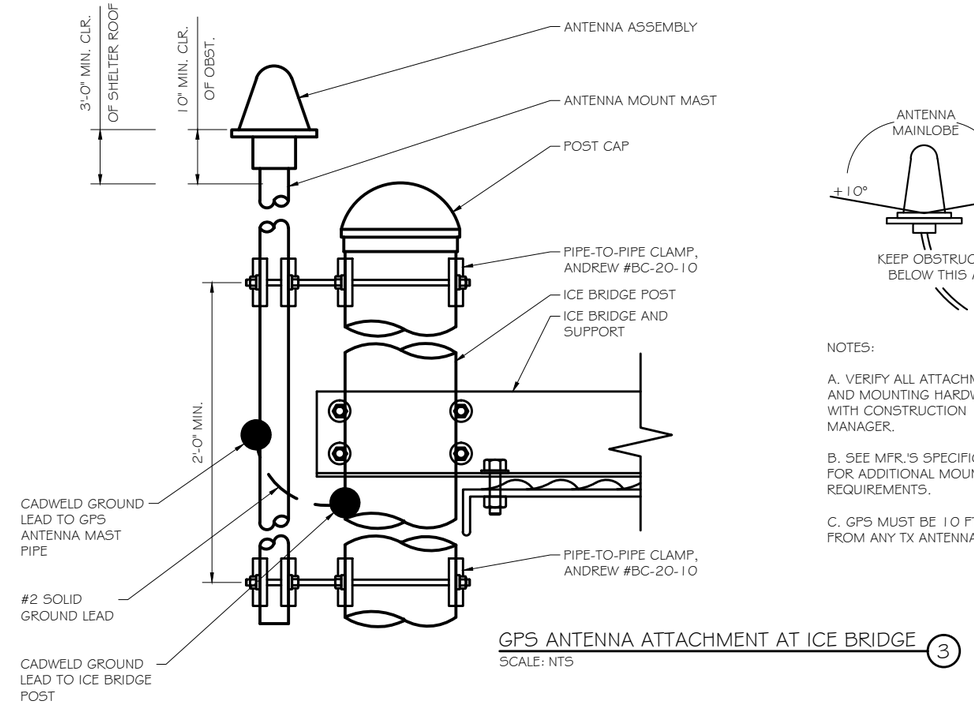
SHEET NUMBER:
C-6

SCALE: NONE

PROJECT NUMBER:
25975




TYPICAL ICE BRIDGE DETAIL (1)
SCALE: NTS







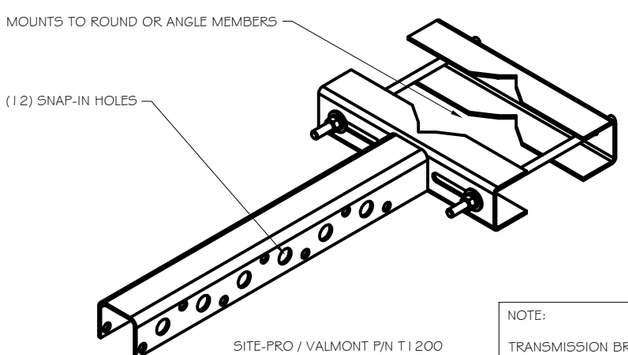
NOTES:

A. VERIFY ALL ATTACHMENT AND MOUNTING HARDWARE WITH CONSTRUCTION MANAGER.

B. SEE MFR.'S SPECIFICATIONS FOR ADDITIONAL MOUNTING REQUIREMENTS.

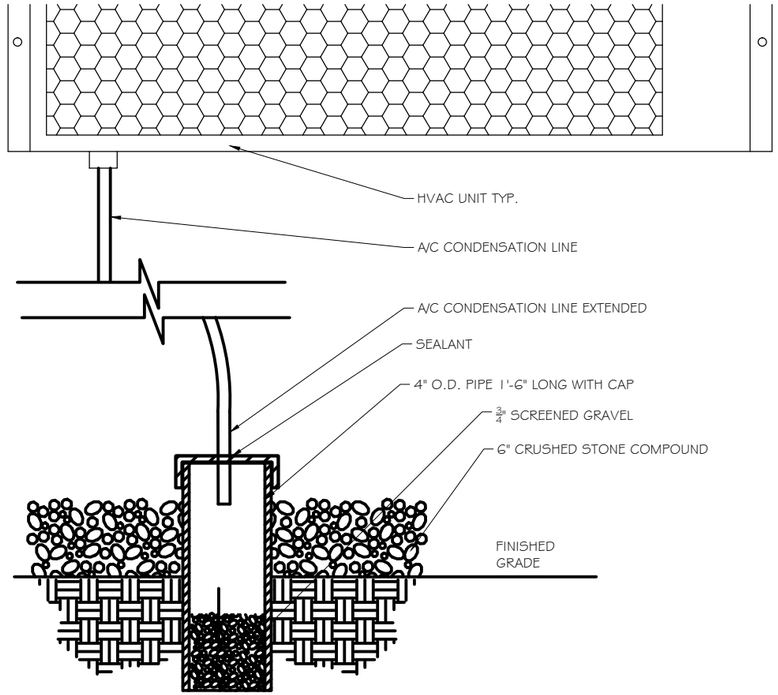
C. GPS MUST BE 10 FT AWAY FROM ANY TX ANTENNA.

GPS ANTENNA ATTACHMENT AT ICE BRIDGE (3)
SCALE: NTS




NOTE:
TRANSMISSION BRACKET TO BE VERIFIED WITH STRUCTURAL ANALYSIS.

TRANSMISSION LINE HANGER (GUY) (2)
SCALE: NTS




HVAC DRYWELL DETAIL (4)
SCALE: NTS

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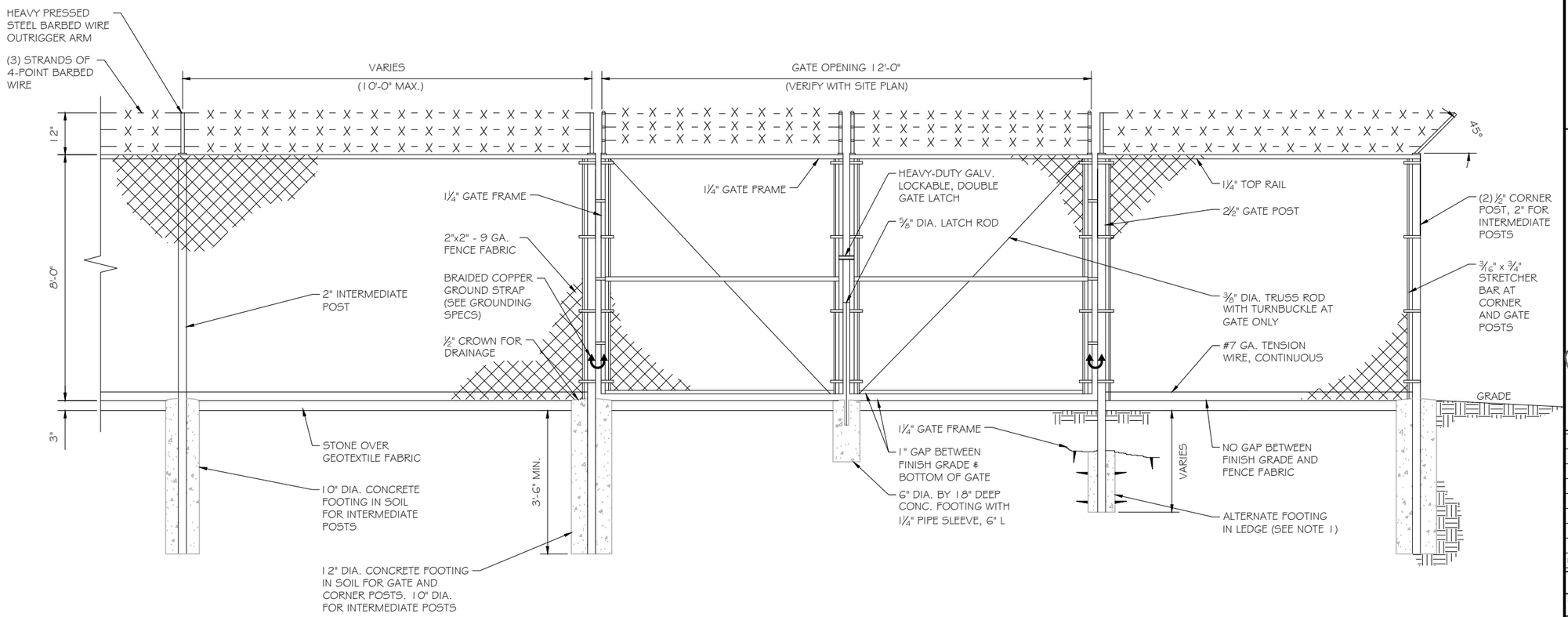
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SITE DETAILS

SHEET NUMBER:
C-7

SCALE: NONE

PROJECT NUMBER:
25975




NOTES:

1. ALTERNATE FOOTINGS FOR ALL FENCE POSTS IN LEDGE: IF LEDGE 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.

2. ATTACH GATE WITH (1) ½ PAIR OF NON-LIFT-OFF TYPE, MALLEABLE IRON OR FORGING, PIN-TYPE HINGES. ASSEMBLIES SHALL ALLOW FOR 180° OF GATE TRAVEL.

## CHAIN LINK FENCE & ACCESS GATE DETAIL 1

SCALE: NTS

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Itasca, Illinois 60143

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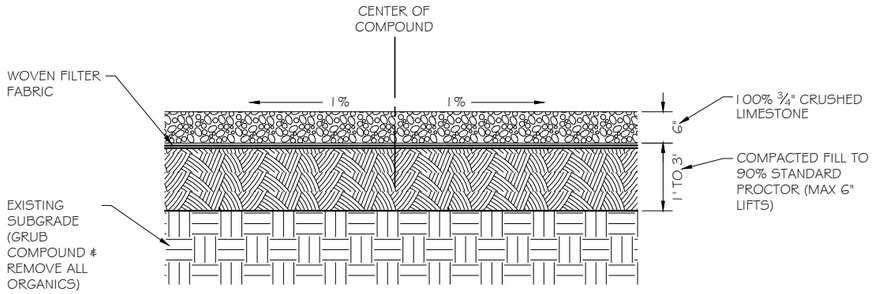
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SITE DETAILS

SHEET NUMBER:
C-8

SCALE: NONE

PROJECT NUMBER:
25975




GENERAL NOTE:

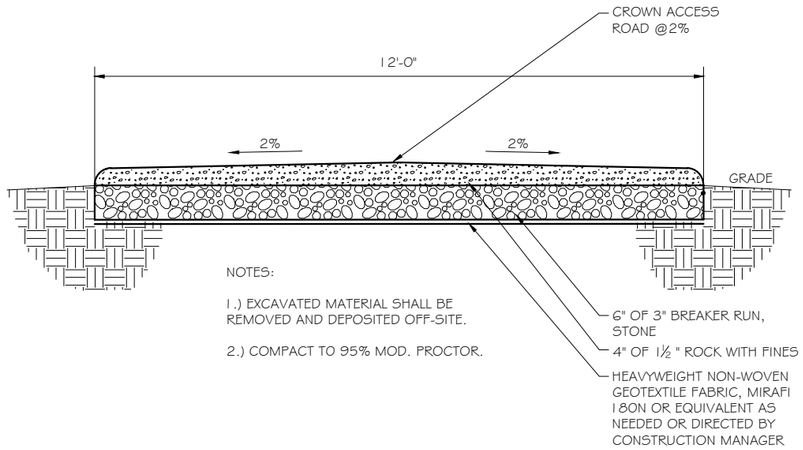
REFER TO THE PROJECT MANUAL FOR ADDITIONAL INFORMATION AND REQUIREMENTS RELATED TO CONSTRUCTION.

| GEOTEXTILE PARAMETERS | | |
|---|---|---|
| PROPERTY | MINIMUM VALUE (a) | |
| GRAB STRENGTH | 180 LBS. | |
| PUNCTURE STRENGTH | 75 LBS. | |
| BURST STRENGTH | 290 LBS. | |
| TRAPEZOIDAL TEAR | 50 LBS. | |
| (a) ALL VALUES REPRESENT MINIMUM ROLL VALUES | | |

NOTES:

THE FABRIC SHOULD BE PLACED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. INTERSECTIONS OF SHEETS MUST BE SEWN OR SUFFICIENTLY OVERLAPPED (AT LEAST 24 INCHES OR AS SPECIFIED BY THE MANUFACTURER). THE GEOTEXTILE SHEETS SHOULD ALSO BE PLACED TAUT TO REDUCE WRINKLES OR FOLDS. CARE MUST BE EXERCISED TO PREVENT PHYSICAL DAMAGE OF THE GEOTEXTILE PRIOR TO, DURING AND AFTER INSTALLATION. UTILITIES SHOULD BE INSTALLED BEFORE PLACING THE FABRIC.

TYPICAL GRAVEL COMPOUND (1)
SCALE: NTS




NOTES:

1.) EXCAVATED MATERIAL SHALL BE REMOVED AND DEPOSITED OFF-SITE.

2.) COMPACT TO 95% MOD. PROCTOR.

TYPICAL GRAVEL DRIVEWAY SECTION (2)
SCALE: NTS

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GUNNISON COUNTY

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SITE DETAILS

SHEET NUMBER:
C-9

SCALE: NONE

PROJECT NUMBER:
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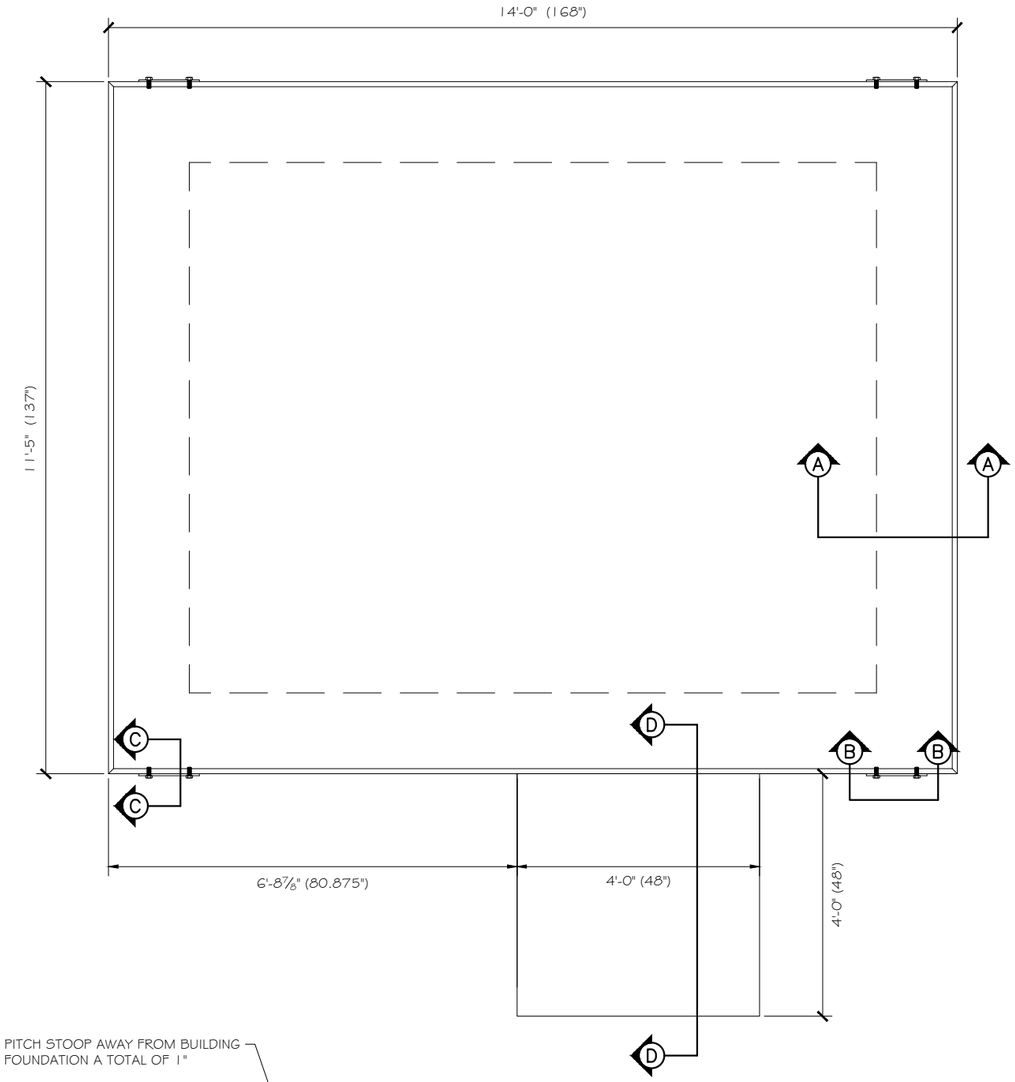
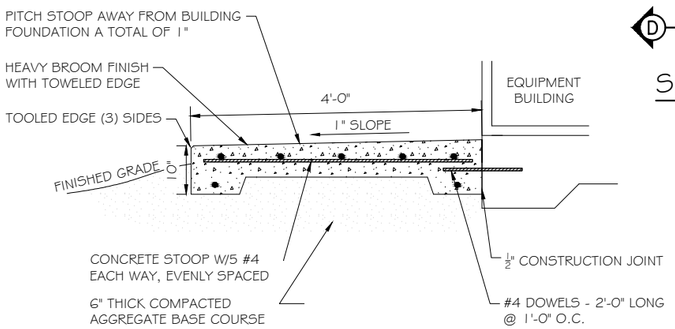
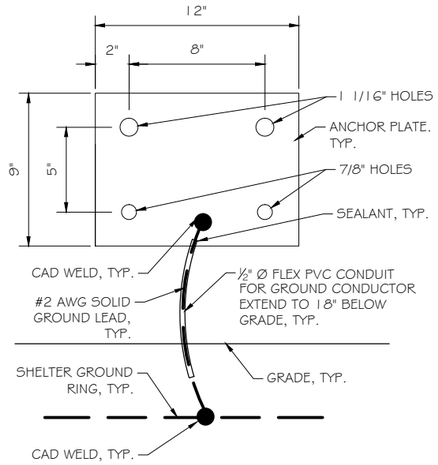


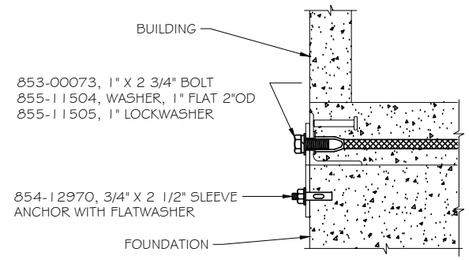

## SLAB FOUNDATION
NTS



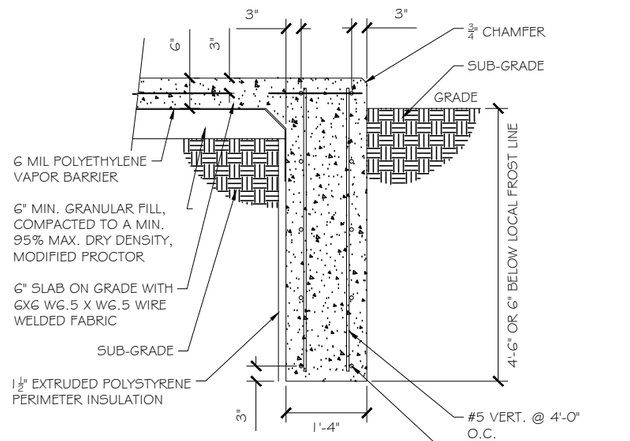

## SECTION "D-D"
N.T.S.




## SECTION "B-B"
197786 TIE DOWN PLATE
RAW MATERIAL 3/8" PLATE
N.T.S.




## SECTION "C-C"
N.T.S.




## SECTION "A-A"
N.T.S.

gogo

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1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

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GUNNISON COUNTY

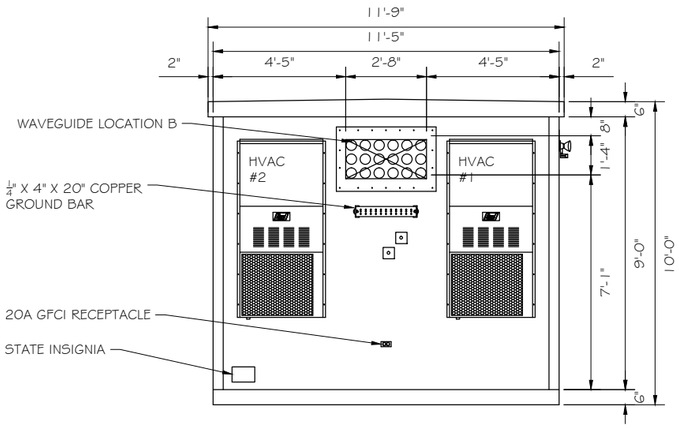
SHEET NAME:
SHELTER FOUNDATION & DETAILS

SHEET NUMBER:
S-1

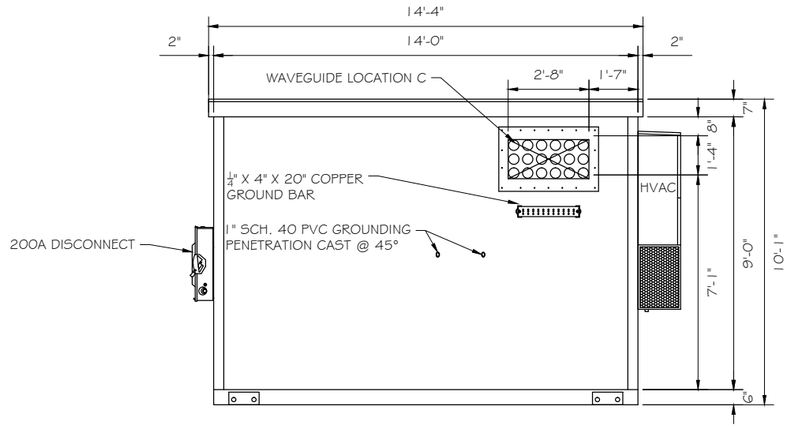
SCALE: NONE

PROJECT NUMBER:
25975

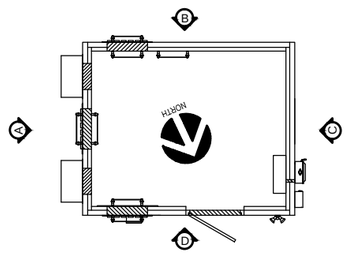
# FIBREBOND SHELTER
# MODEL #D-8953

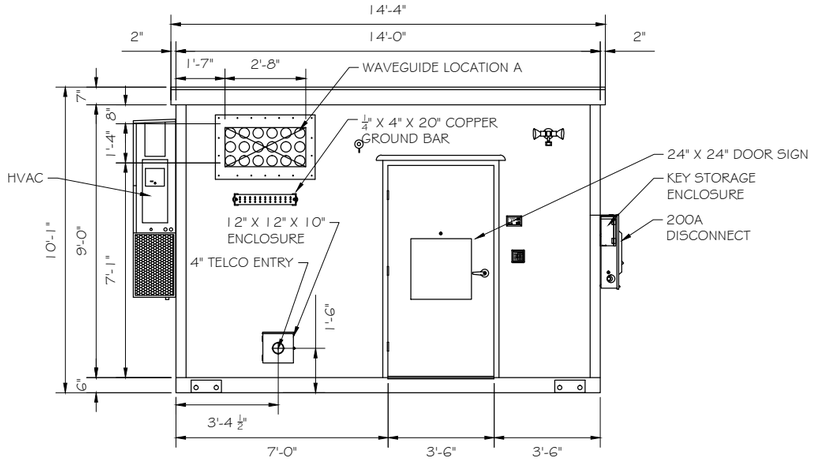



SHELTER ELEVATION "A"
SCALE: 1" = 5'
1

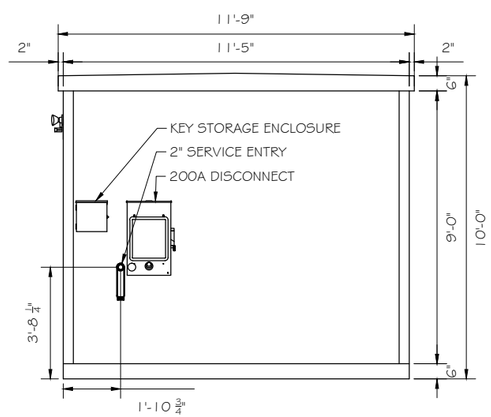



SHELTER ELEVATION "B"
SCALE: 1" = 5'
2




SHELTER ELEVATION "C"
SCALE: 1" = 5'
3




SHELTER ELEVATION "D"
SCALE: 1" = 5'
4


Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com


Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED
JAMES R. SKOWRONSKI
36936
PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SHELTER ELEVATION

SHEET NUMBER:
S-2

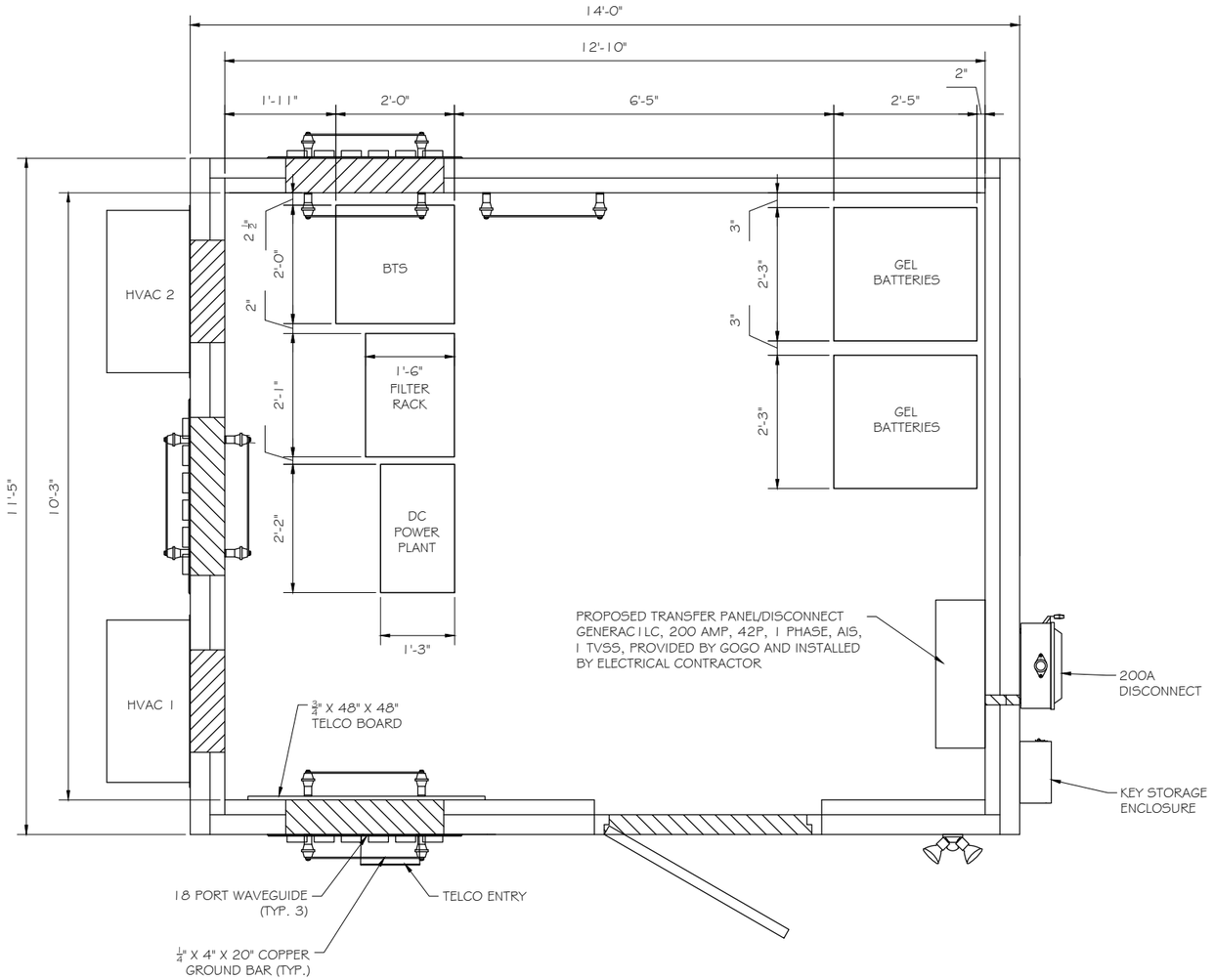
0 2.5' 5' 10'
11" x 17" - 1" = 5'
22" x 34" - 1" = 2.5'

PROJECT NUMBER:
25975



I:\25900\25975\CAD\TelecomAutoCAD\Construction Drawings\25975 CO011-B Gunnison-Pilgrim Tower COLO CDs.dwg Printed by: steves on Aug 08, 2013 - 12:47pm

# FIBREBOND SHELTER
# MODEL #D-8953




NOTES:

1. EQUIPMENT ENCLOSURE IS MANUFACTURED BY FIBREBOND.
2. EPS BOARD INSULATION IS LISTED TO HAVE A FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPED OF 450 OR LESS WITH A MAXIMUM THICKNESS OF 2 INCHES AT 1 PCF DENSITY. POLYISOCYANURATE FOAM INSULATION HAS BEEN TESTED TO A MAXIMUM THICKNESS OF 3 INCHES AT 1.9 PCF AND HAS A FLAMESPREAD OF 25 AND A SMOKE PRODUCT OF 395.
3. INTERIOR PANELING IS LISTED TO HAVE A FLAMESPREAD OF 200 OR LESS.
4. THIS ENCLOSURE IS CLASSIFIED AS USE GROUP B, TYPE V CONSTRUCTION; PER 1999 BOCA AND IS IN COMPLIANCE WITH 1999 BOCA BUILDING CODE, 1996 INTERNATIONAL MECHANICAL CODE AND 1999 NEC.
5. DESIGN CRITERIA
   ROOF LIVE LOAD = 105 PSF
   FLOOR LIVE LOAD = 150 PSF
   WIND VELOCITY = 135 MPH
   SEISMIC ZONE = 4
6. F c' = 5000 PSI @ 28 DAYS (EQUIPMENT ENCLOSURE)
7. ENCLOSURE AND ASSOCIATED EQUIPMENT IS PROVIDED BY OWNER UNDER SEPARATE CONTRACT. EQUIPMENT ENCLOSURE INFORMATION INDICATED HEREIN IS PROVIDED FOR REFERENCE ONLY AND IS TAKEN FROM MANUFACTURER'S AVAILABLE DATA. REFER TO CIVIL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR WORK TO BE PERFORMED UNDER THIS CONTRACT.

## SHELTER EQUIPMENT LAYOUT (1)
SCALE: 1"= 2'-6"

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Itasca, Illinois 60143

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SITE NUMBER:
C0011-B

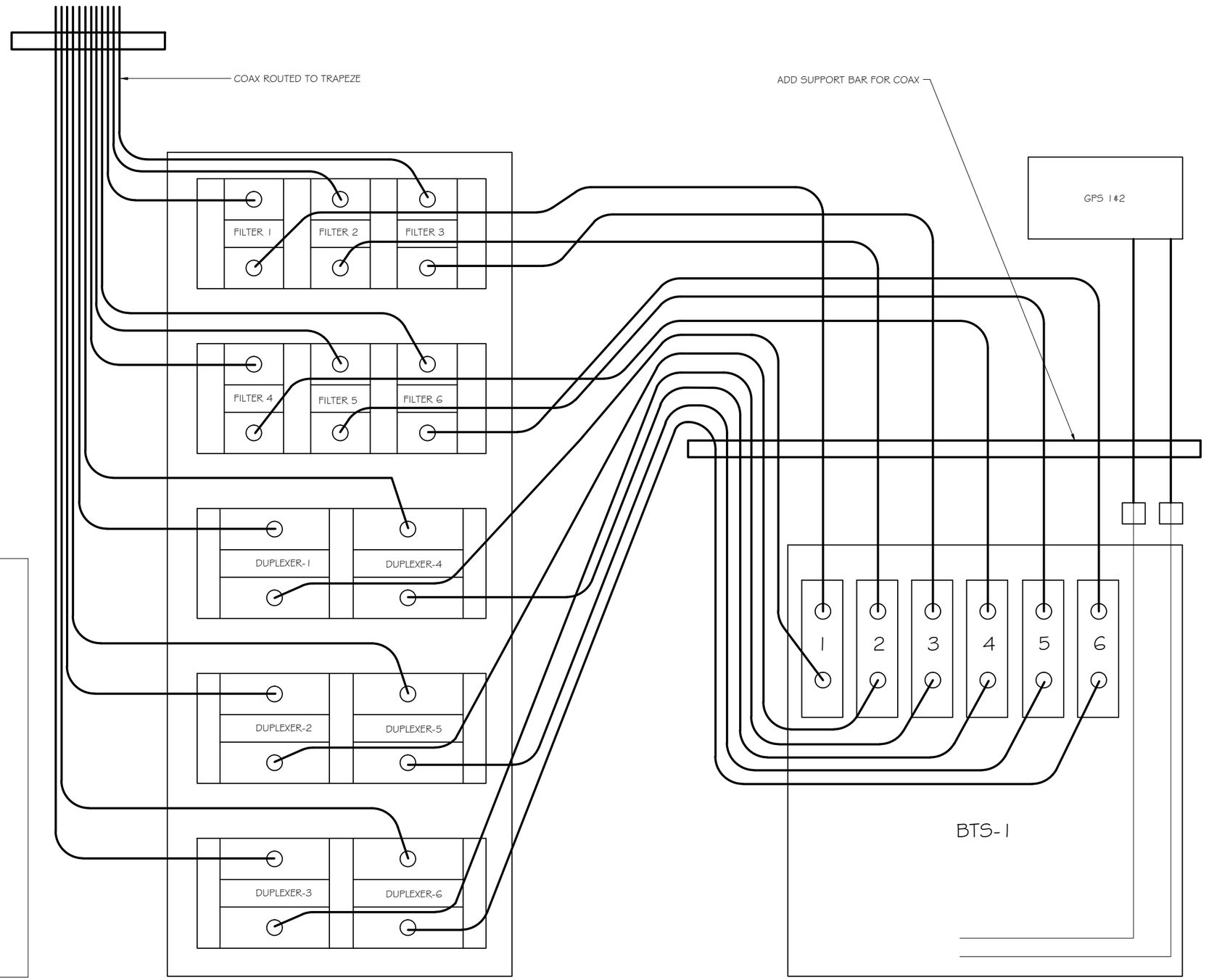
SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SHELTER EQUIPMENT LAYOUT

SHEET NUMBER:
S-3

0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER:
25975




DUPLEXER 1 - OR/BROWN
CARD 1 LOWER

DUPLEXER 2 - BLUE/BROWN
CARD 2 LOWER

DUPLEXER 3 - GREEN/BROWN
CARD 3 LOWER

DUPLEXER 4 - YELL/BROWN
CARD 4 LOWER

DUPLEXER 5 - GRAY/BROWN
CARD 5 LOWER

DUPLEXER 6 - RED/BROWN
CARD 6 LOWER

FILTER 1 - OR/WHITE
1 UPPER

FILTER 2 - BLUE/WHITE
2 UPPER

FILTER 3 - GREEN/WHITE
3 UPPER

FILTER 4 - YELL/WHITE
4 UPPER

FILTER 5 - GRAY/WHITE
5 UPPER

FILTER 6 - RED/WHITE
6 UPPER

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1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SHELTER EQUIPMENT LAYOUT (FILTER RACK)

SHEET NUMBER:
S-4

SCALE: NONE

PROJECT NUMBER:
25975

## GENERAL NOTES

WORK INCLUDES:
THESE NOTES AND ACCOMPANYING DRAWINGS COMPLEMENT THE PROVISIONS AND INSTALLATIONS BY THE ELECTRICAL CONTRACTOR, OF ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED TO INSTALL THE ELECTRICAL WORK COMPLETE IN CONNECTION WITH THIS GOGO SITE AND SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

1. THE PROVISIONS, INSTALLATION, AND CONNECTION OF A GROUNDING ELECTRODE SYSTEM COMPLETE WITH A BUILDING AND SECONDARY GROUNDING, CELLULAR TELEPHONE COMMUNICATIONS TOWER AND CONNECTIONS TO THE INCOMING ELECTRICAL DISTRIBUTION EQUIPMENT.
2. THE PROVISION AND INSTALLATION OF AN OVERHEAD ELECTRICAL SERVICE OR UNDERGROUND ELECTRICAL SERVICE AND ALL ASSOCIATED WIRE AND CONDUIT AS REQUIRED AND/OR INDICATED ON PLANS.
3. THE PROVISION, INSTALLATION OF CONDUIT AND CONNECTIONS FOR LOCAL TELEPHONE SERVICE.
4. THE FURNISHING AND INSTALLATION OF THE ELECTRICAL SERVICE ENTRANCE CONDUCTORS, CONDUITS, METER SOCKET, AND CONNECTIONS TO THE SERVICE EQUIPMENT WITHIN THE ENCLOSURE.
5. TWO INCH (2") AND THREE INCH (3") DIAMETER PVC CONDUITS SCHEDULE 40.
6. ALL PVC CONDUITS SHOULD BE LEFT WITH NYLON PULL CORD FOR FUTURE USE.
7. EXCAVATION, TRENCHING, AND BACKFILLING FOR CONDUIT(S), CABLE(S), AND EXTERNAL GROUNDING SYSTEM.

CODES, PERMITS, AND FEES:
1. ALL REQUIRED PERMITS, LICENSES, INSPECTIONS AND APPROVALS SHALL BE SECURED AND ALL FEES FOR SAME PAID BY CONTRACTOR.
2. THE INSTALLATION SHALL COMPLY WITH ALL APPLICABLE CODES: STATE, LOCAL AND NATIONAL, AND THE DESIGN, PERFORMANCE CHARACTERISTICS AND METHODS OF CONSTRUCTION OF ALL ITEMS AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF THE VARIOUS APPLICABLE STANDARD SPECIFICATIONS OF THE FOLLOWING AUTHORITIES:
   - N.E.C. - NATIONAL ELECTRIC CODE
   - A.N.S.I. - AMERICAN NATIONAL STANDARDS INSTITUTE
   - I.E.E.E. - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
   - A.S.T.M. - AMERICAN SOCIETY FOR TESTING MATERIALS
   - N.E.M.A. - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
   - U.L. - UNDERWRITERS LABORATORIES, INC.
   - N.F.P.A. - NATIONAL FIRE PROTECTION ASSOCIATION

GROUNDING ELECTRODE SYSTEM:
1. CONNECTIONS:
   ALL GROUNDING CONNECTIONS SHALL BE MADE BY THE "CADWELD" PROCESS CONNECTIONS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, ETC. ALL CABLE TO GROUND RODS, GROUND RODS SPLICES AND LIGHTNING PROTECTION SYSTEM AS INDICATED. GROUND FOUNDATION ONLY AS INDICATED BY PM. ALL MATERIALS USED (MOLDS, WELDING, METAL, TOOLS, ETC.) SHALL BE BY "CADWELD" PROCESS AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND PROCEDURES. GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS.
2. ALL CADWELD CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF SHERWIN-WILLIAMS GALVITE (WHITE) PAINT B50W3 (OR EQUAL) OR SHERWIN-WILLIAMS SILVERBRITE (ALUMINUM) B59511 (OR EQUAL).
3. ALL ELECTRICAL & MECHANICAL GROUND CONNECTIONS SHALL HAVE ANTI-OXIDANT COMPOUND APPLIED TO CONNECTION
4. FENCE/GATE:
   GROUND FENCE POSTS WITHIN 6 FEET OF ENCLOSURE AND 25 FEET OF TOWER AS INDICATED ON DRAWINGS. GROUND EACH GATE POST AND CORNER POST. GROUND CONNECTIONS TO FENCE POSTS SHALL BE MADE BY THE "CADWELD" PROCESS AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND PROCEDURES. ALL OTHER CONNECTIONS FOR THE GROUND GRID SYSTEM SHALL BE MADE BY THE "CADWELD" PROCESS, AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND PROCEDURES.
5. GROUND TEST:
   GROUND TESTS SHALL BE PERFORMED AS REQUIRED BY GOGO STANDARD PROCEDURES. GROUND GRID RESISTANCE SHALL NOT EXCEED 5 OHMS.
6. CONTRACTOR SHALL SUBMIT THE GROUND RESISTANCE TEST REPORT AS FOLLOWS:
   1. ONE (1) COPY TO OWNER REPRESENTATIVE
   2. ONE (1) COPY TO ENGINEER
   3. ONE (1) COPY TO KEEP INSIDE EQUIPMENT ENCLOSURE

RACEWAYS AND WIRING:
1. WIRING OF EVERY KIND MUST BE INSTALLED IN CONDUIT, UNLESS NOTED OTHERWISE, OR AS APPROVED BY THE ENGINEER.
2. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE COPPER (CU) TYPE THWN, SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
3. RACEWAYS SHALL BE GALVANIZED STEEL, SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, UNLESS OTHERWISE NOTED. ALL RACEWAYS SHALL BE APPROVED FOR THE INSTALLATION.
4. PULL OR JUNCTION BOXES SHALL BE PROVIDED AS REQUIRED TO FACILITATE INSTALLATION OF RACEWAYS AND WIRING. PROVIDE JUNCTION AND PULLBOXES FOR CONDUIT RUNS WITH MORE THAN (360) DEGREES OF BENDS.
5. PROVIDE A COMPLETE RACEWAY AND WIRING INSTALLATION, PERMANENTLY AND EFFECTIVELY GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE AND LOCAL CODES.
6. ELECTRICAL PANELBOARD SHALL BE FURNISHED AND INSTALLED BY OTHERS. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION.
7. ALL STEEL CONDUIT SHALL BE BONDED AT BOTH ENDS WITH GROUNDING BUSHING.

GENERAL NOTES:
SEE DETAILS AND SCHEDULES ON DRAWINGS AND SPECIFICATIONS FOR MEANING OF ABBREVIATIONS AND ADDITIONAL REQUIREMENTS AND INFORMATION. CHECK ARCHITECTURAL, STRUCTURAL AND OTHER MECHANICAL AND ELECTRICAL DRAWINGS FOR SCALE, SPACE LIMITATIONS, COORDINATION, AND ADDITIONAL INFORMATION, ETC. REPORT ANY DISCREPANCIES, CONFLICTS, ETC. TO ENGINEER BEFORE SUBMITTING BID. ALL EQUIPMENT FURNISHED BY OTHERS (FBO) SHALL BE PROVIDED WITH PROPER MOTOR STARTERS, DISCONNECTS, CONTROLS, ETC. BY THE ELECTRICAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE. THE ELECTRICAL CONTRACTOR SHALL INSTALL AND COMPLETELY WIRE ALL ASSOCIATED EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S WIRE DIAGRAMS AND AS REQUIRED FOR A COMPLETE OPERATING INSTALLATION. ELECTRICAL CONTRACTOR SHALL VERIFY AND COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF (FBO) EQUIPMENT PRIOR TO ROUGH-IN OF CONDUIT AND WIRING TO AVOID CONFLICTS.

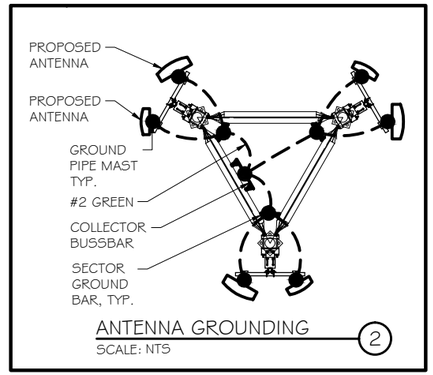
COORDINATION WITH UTILITY COMPANY:
THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN THE BID ANY OPTIONAL OR EXCESS FACILITY CHARGES ASSOCIATED WITH PROVIDING ELECTRICAL SERVICE FROM LOCAL UTILITY COMPANY AS OUTLINED IN CONSTRUCTION DRAWINGS. VERIFY BEFORE BIDDING

LEGEND

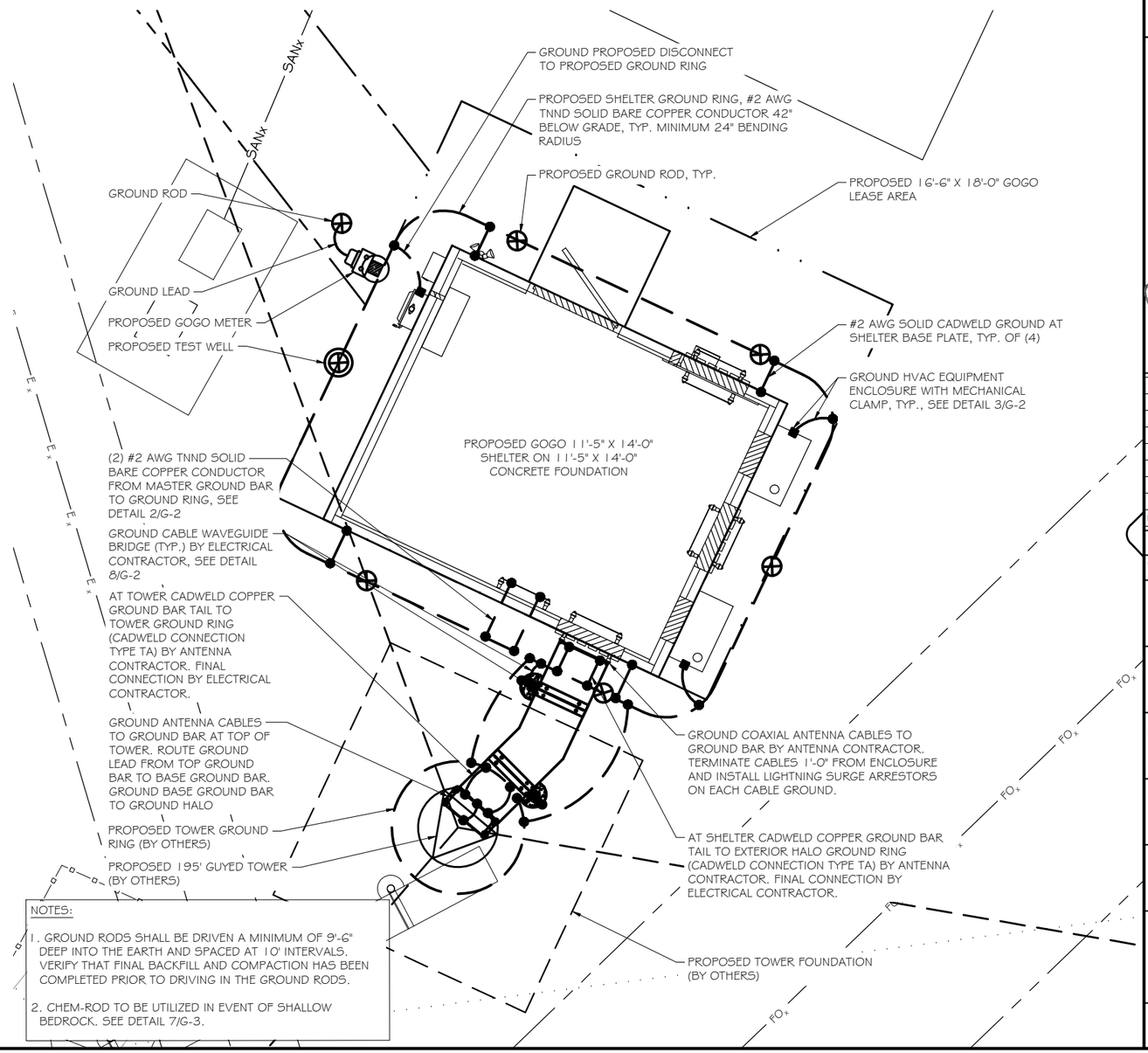
| SYMBOL | DESCRIPTION |
|---|---|
| ⊗ | ⅝" DIA. x 10'-0" LONG COPPER CLAD GROUND ROD (HARGER-5810) |
| ⊗ | ⅝" DIA. x 10'-0" LONG COPPER CLAD GROUND ROD W/ INSPECTION WELL |
| ------ | #2 AWG TNND SOLID BARE COPPER WIRE MIN. 42" BELOW GRADE (HARGER-L2) |
| ● | CADWELD |
| ■ | MECHANICAL CONNECTION |
| ⊗⊏⊐ | 10' LONG L-SHAPED CHEM-ROD WITH INSPECTION WELL |

NORTH

GROUNDING PLAN 1
SCALE: 1"= 5'-0"




ANTENNA GROUNDING 2
SCALE: NTS




NOTES:
1. GROUND RODS SHALL BE DRIVEN A MINIMUM OF 9'-6" DEEP INTO THE EARTH AND SPACED AT 10' INTERVALS. VERIFY THAT FINAL BACKFILL AND COMPACTION HAS BEEN COMPLETED PRIOR TO DRIVING IN THE GROUND RODS.
2. CHEM-ROD TO BE UTILIZED IN EVENT OF SHALLOW BEDROCK. SEE DETAIL 7/G-3.

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GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
GROUNDING PLAN

SHEET NUMBER:
G-1

0 2.5' 5' 10'
11" x 17" - 1" = 5'
22" x 34" - 1" = 2.5'

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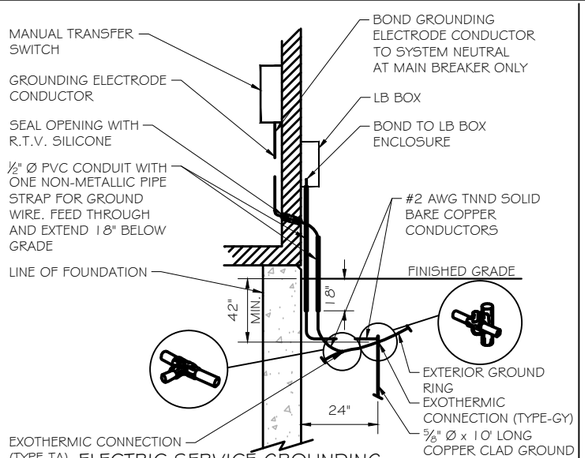
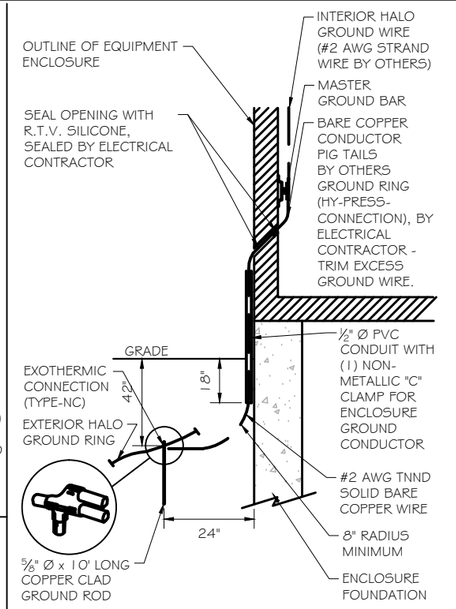



ELECTRIC SERVICE GROUNDING DETAIL (1)
SCALE: NTS




ENCLOSURE GROUNDING DETAIL (2)
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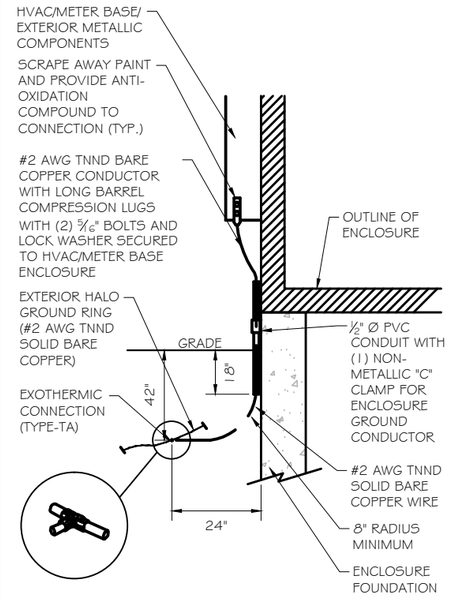
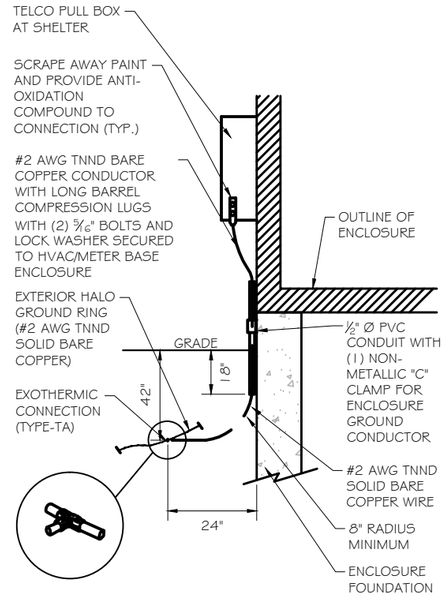
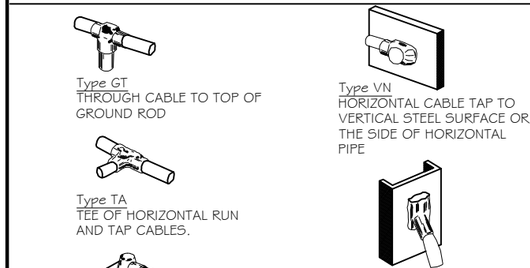


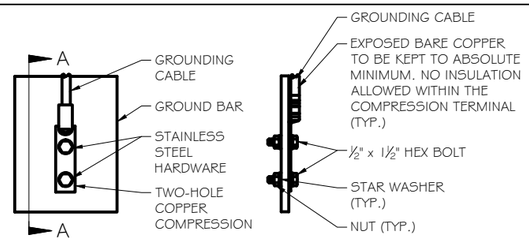

HVAC/METERBASE/METALIC COMPONENTS GROUNDING DETAIL (3)
SCALE: NTS



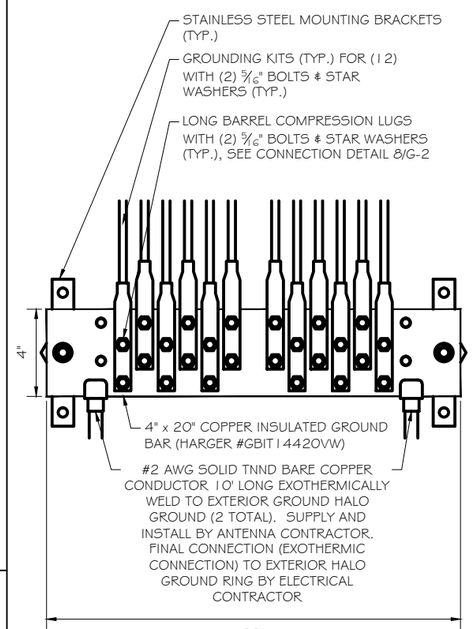

TELCO PULL BOX AT SHELTER GROUNDING DETAIL (4)
SCALE: NTS




EXOTHERMIC WELD DETAILS (5)
SCALE: NTS



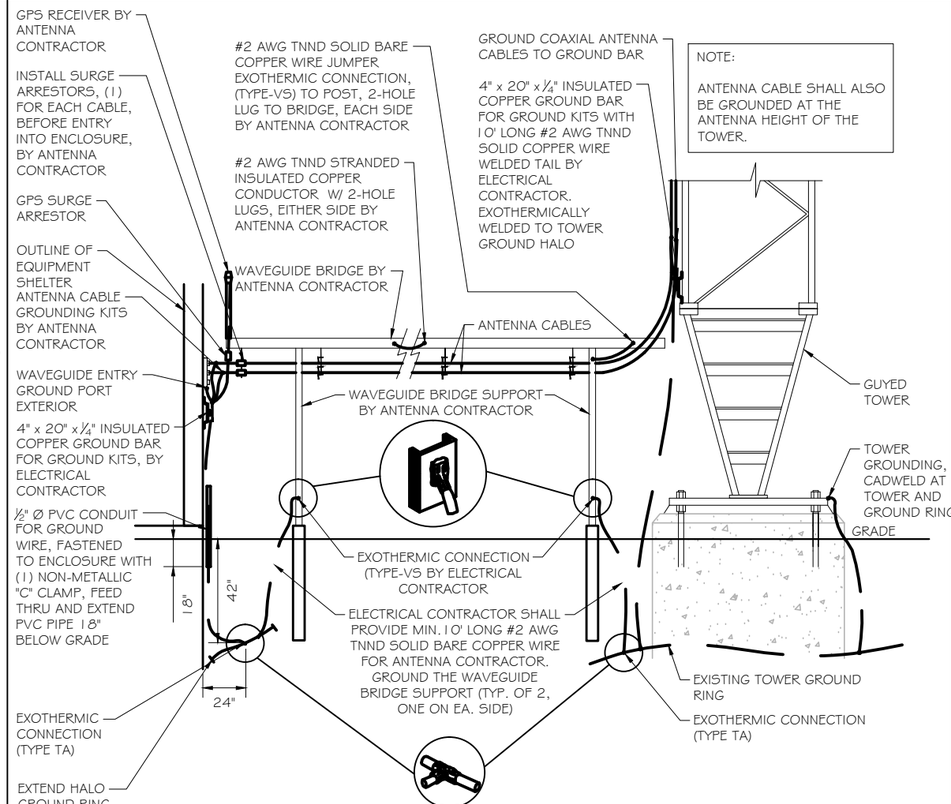

2-HOLE LUG CONNECTION DETAIL (6)
SCALE: NTS




NOTES:

1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
2. COAT WIRE END WITH NON-OX (ANTI-OXIDATION COMPOUND) PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3. APPLY NON-OX (ANTI-OXIDATION COMPOUND) BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

EXTERIOR GROUND BAR DETAIL (7)
SCALE: NTS




ANTENNA CABLE AND ICE BRIDGE GROUNDING DIAGRAM (8)
SCALE: NTS

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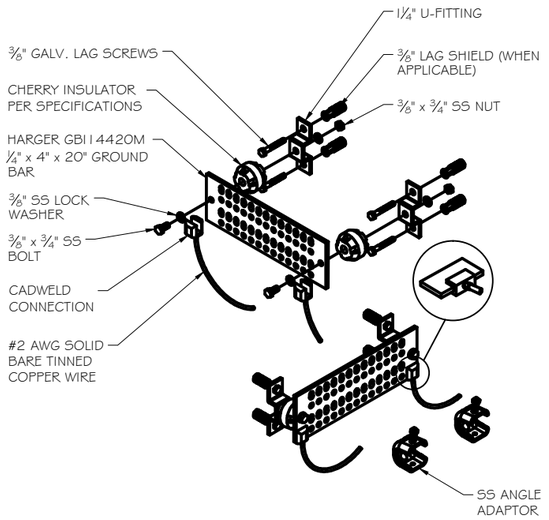
GUNNISON COUNTY

SHEET NAME:
GROUNDING DETAILS

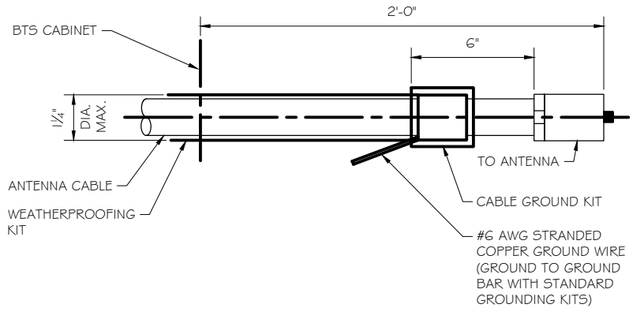
SHEET NUMBER:
G-2

SCALE: NONE

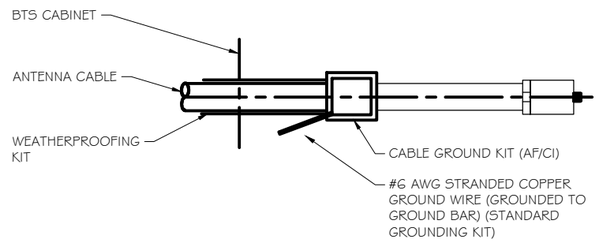
PROJECT NUMBER:
25975



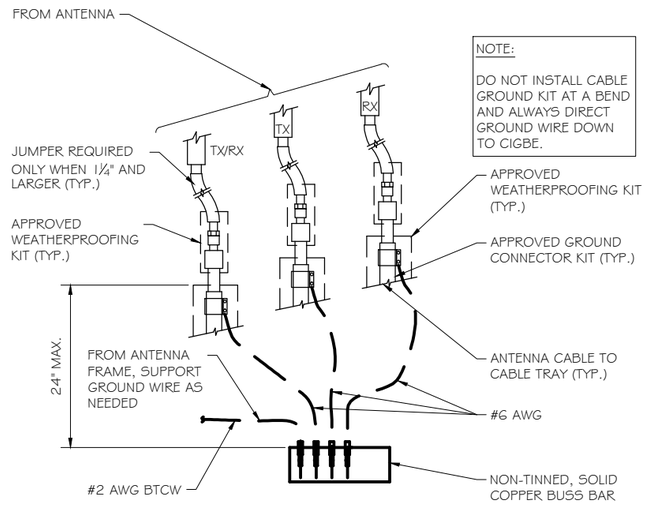

TYP. GROUND BAR DETAIL 1
SCALE: NTS



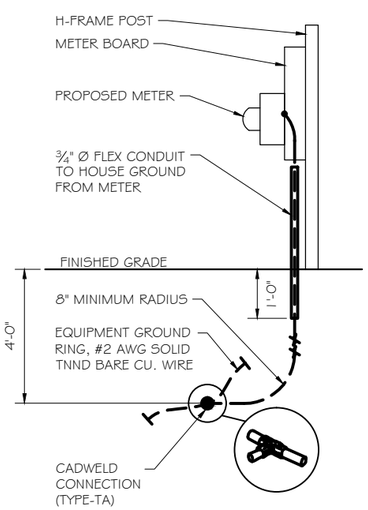

CONNECTION OF CABLE GROUND TO GPS ANTENNA CABLE 2
SCALE: NTS



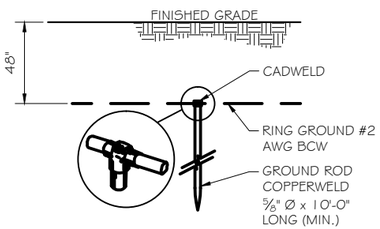

CONNECTION OF CABLE GROUND TO GPS ANTENNA CABLE 3
SCALE: NTS



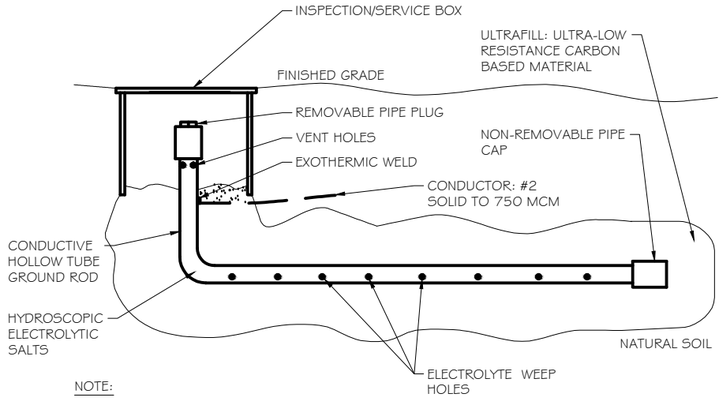

CONNECTION OF GROUND WIRES TO TOP GROUND BAR (UGB) 4
SCALE: NTS




METER GROUNDING DETAIL 5
SCALE: NTS




TYP. GROUND ROD DETAIL 6
SCALE: NTS




NOTE:

1.) CHEM-ROD TO BE UTILIZED IN EVENT OF SHALLOW BEDROCK.

2.) OVERLAYING SHALLOW FOUNDATION WHERE CONVENTIONAL RODS CANNOT BE INSTALLED.

3.) WHERE GROUND SYSTEM NEEDS TO BE SUPPLEMENTED TO ACHIEVE 5 OHM OR LESS RESISTANCE.

PRODUCT NUMBER:

LYNCOLE #K2L-10CS

L-SHAPED CHEMICAL GROUND ROD 7
SCALE: NTS

Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
C0011-B

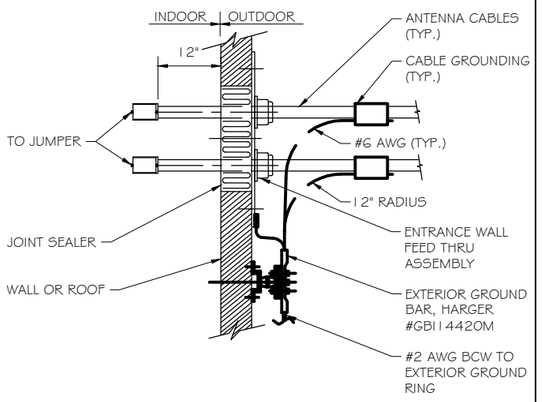
SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
GROUNDING DETAILS

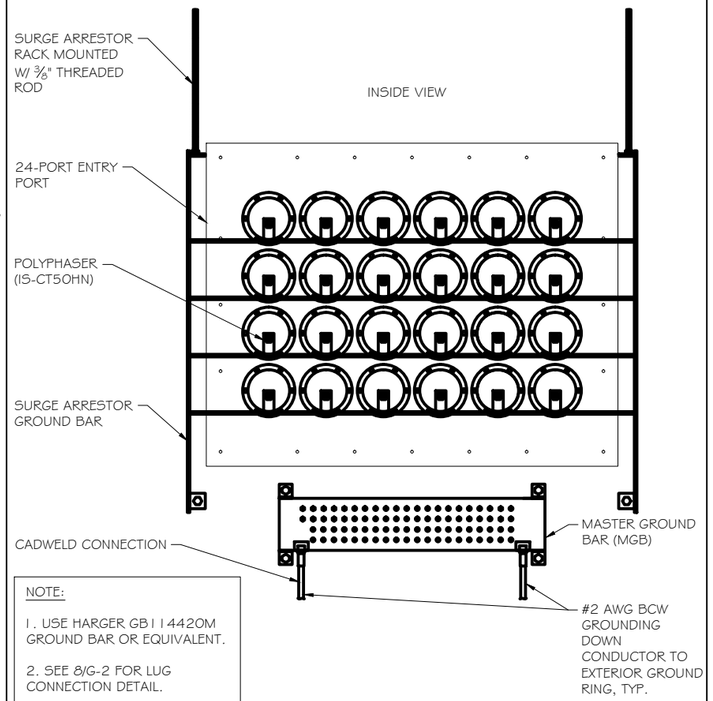
SHEET NUMBER:
G-3

SCALE: NONE

PROJECT NUMBER:
25975




EXTERIOR GROUND BAR DETAIL (1)
SCALE: NTS

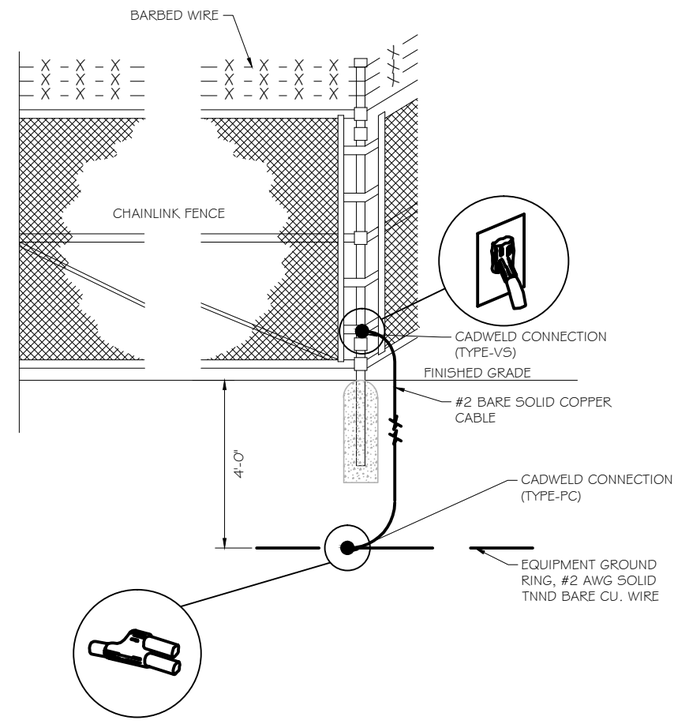



NOTE:

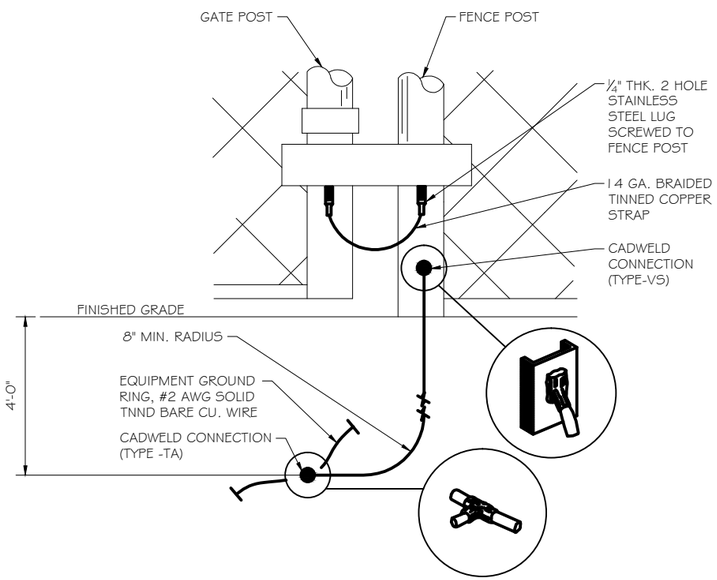
1. USE HARGER GB1144420M GROUND BAR OR EQUIVALENT.

2. SEE 8/G-2 FOR LUG CONNECTION DETAIL.

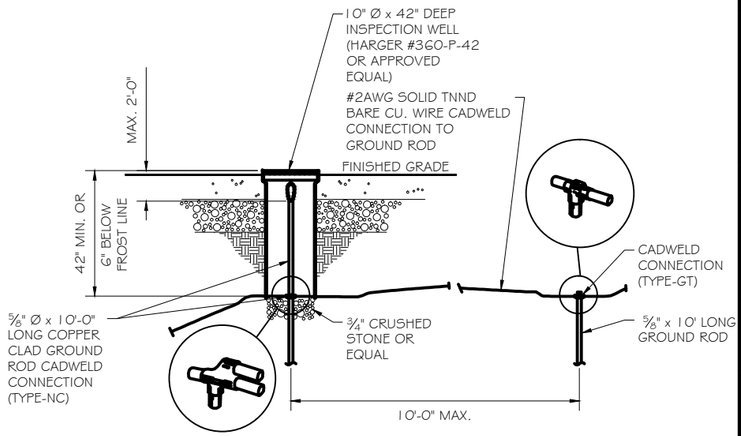
SURGE ARRESTOR/MASTER GROUND BAR DETAIL (2)
SCALE: NTS




FENCE POST GROUNDING DETAIL (3)
SCALE: NTS




GATE GROUNDING DETAIL (4)
SCALE: NTS




INSPECTION WELL AND GROUND ROD (7)
SCALE: NTS

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GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
GROUNDING DETAILS

SHEET NUMBER:
G-4

SCALE: NONE

PROJECT NUMBER:
25975

EXISTING ELECTRICAL BOXES

EXISTING CABLE TV PEDESTAL

EXISTING CONCRETE VAULT

EXISTING ELECTRICAL TRANSFORMER

PROPERTY LINE

EXISTING WELL

PROPOSED RIGID CONDUIT RUN ABOVE GROUND FROM COW/TOW DEMARCATION POINT TO TELCO PEDESTAL (BY CONTRACTOR)

PROPOSED RIGID CONDUIT RUN ABOVE GROUND FROM ELECTRICAL TRANSFORMER TO METER & DISCONNECT ASSEMBLY AT COW/TOW SERVICE POINT. (BY CONTRACTOR)

TEMPORARY GOGO SHELTER ON WHEELS LOCATION WITH 7'-0" X 7'-6" SHELTER (TO BE REMOVED AT COMPLETION OF PERMANENT SITE)

TEMPORARY GOGO TOWER ON WHEELS LOCATION WITH 100' TOWER (TO BE REMOVED AT COMPLETION OF PERMANENT SITE)

EXISTING 5' WIDE VERIZON UTILITY EASEMENT

PROPOSED 5' WIDE GOGO UTILITY EASEMENT

PROPOSED TEMPORARY 200A, 120/240V, SINGLE PHASE, 3 WIRE SINGLE METER & SERVICE DISCONNECT TO BE LOCATED AT COW/TOW SERVICE POINT WITH A 5' RISER OF SCHEDULE 80 PVC CONDUIT FROM METER & DISCONNECT ASSEMBLY

EXISTING 12' WIDE NON-EXCLUSIVE VERIZON ACCESS & UTILITY EASEMENT IN EXISTING GRAVEL DRIVE

EXISTING TELCO PEDESTAL

EXISTING LOG BUILDING

EXISTING ELECTRICAL METERS

EXISTING WOOD DECK

PROPOSED GOGO 16'-6" X 18'-0" LEASE AREA WITH 11'-5" X 14'-0" FIBREBOND SHELTER MODEL #D-8953 ON 11'-5" X 14'-0" CONCRETE FOUNDATION

EXISTING SEPTIC TANK

NORTH

COW/TOW UTILITY PLAN

SCALE: 1"= 10'-0"

1

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CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
TEMPORARY UTILITY PLAN

SHEET NUMBER:
E-1A

0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER:
25975

I:\25900\25975\CAD\TelecomAutoCAD\Construction Drawings\25975 C0011-B Gunnison-Pilgrim Tower COLO CDs.dwg Printed by: steves on Aug 08, 2013 - 12:47pm

EXISTING ELECTRICAL TRANSFORMER

PROPOSED U/G ELECTRICAL SERVICE FROM EXISTING ELECTRICAL TRANSFORMER TO PROPOSED GOGO SHELTER VIA METER (61'±) IN 2" DIAMETER SCHEDULE 40 PVC CONDUIT 30" BELOW GRADE WITH FULL LENGTH PULL ROPE SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR. CONTRACTOR TO INSTALL PULL BOXES AS NECESSARY. (CONDUIT INSTALLED BY CONTRACTOR)

PROPOSED 5' WIDE GOGO UTILITY EASEMENT

PROPOSED GOGO 200 AMP, 120/240V, SINGLE PHASE 3 WIRE SINGLE METER AT NEW METER PEDESTAL WITH 200 AMP BREAKER

EXISTING SEPTIC TANK

EXISTING 5' WIDE VERIZON UTILITY EASEMENT

EXISTING LEACH FIELD

PROPOSED 195' GUYED TOWER (BY OTHERS)

EXISTING TOWER TO BE REMOVED (BY OTHERS)

EXISTING VERIZON EQUIPMENT SHELTER & LEASE AREA

EXISTING TELCO PEDESTAL

EXISTING LOG BUILDING

EXISTING ELECTRICAL METERS

PROPOSED TELEPHONE SERVICE (TO SERVE GOGO SHELTER WITH 25 PAIR) IN 4" DIAMETER SCHEDULE 40 PVC PIPE MINIMUM 30" BELOW GRADE FROM EXISTING TELCO PEDESTAL TO PROPOSED TELCO BOARD IN PROPOSED GOGO SHELTER (55'±) WITH (2) FULL LENGTH PULL ROPES SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE 24 GAUGE ANMW-25 JELLY-FILLED CABLE. CONTRACTOR TO ADD PULL BOXES AS NECESSARY. (INSTALLATION OF CONDUIT BY CONTRACTOR)

NOTE: CONTRACTOR TO PROVIDE AN ADDITIONAL 12 FEET OF CABLE WITHIN THE GOGO SHELTER

PROPOSED GOGO COW/TOW EQUIPMENT & UTILITY ROUTING, SEE SHEET E-1A FOR DETAILS

EXISTING WOOD DECK

PROPOSED FIBER OPTIC SERVICE IN 2" DIAMETER SCHEDULE 40 PVC PIPE MINIMUM 30" BELOW GRADE FROM PROPOSED HAND HOLE AT ROW TO PROPOSED GOGO SHELTER VIA HAND HOLE NEAR SHELTER (585'±) WITH (2) FULL LENGTH PULL ROPES SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR. CONTRACTOR TO ADD PULL BOXES AS NECESSARY. (INSTALLATION OF CONDUIT BY CONTRACTOR)

NOTE: CONTRACTOR TO PROVIDE AN ADDITIONAL 6 FEET OF CABLE AT PROPOSED HAND HOLE AND AN ADDITIONAL 12 FEET OF CABLE WITHIN THE GOGO SHELTER.

EXISTING 12' WIDE NON-EXCLUSIVE VERIZON ACCESS & UTILITY EASEMENT IN EXISTING GRAVEL DRIVE

PROPOSED 24" X 36" HAND HOLE FOR FIBER OPTIC SERVICE

PROPOSED 11'-5" X 14'-0" GOGO SHELTER ON 11'-5" X 14'-0" CONCRETE FOUNDATION

NORTH

COMPOUND UTILITY PLAN
SCALE: 1"= 10'-0"

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GUNNISON, CO 81230
GUNNISON COUNTY

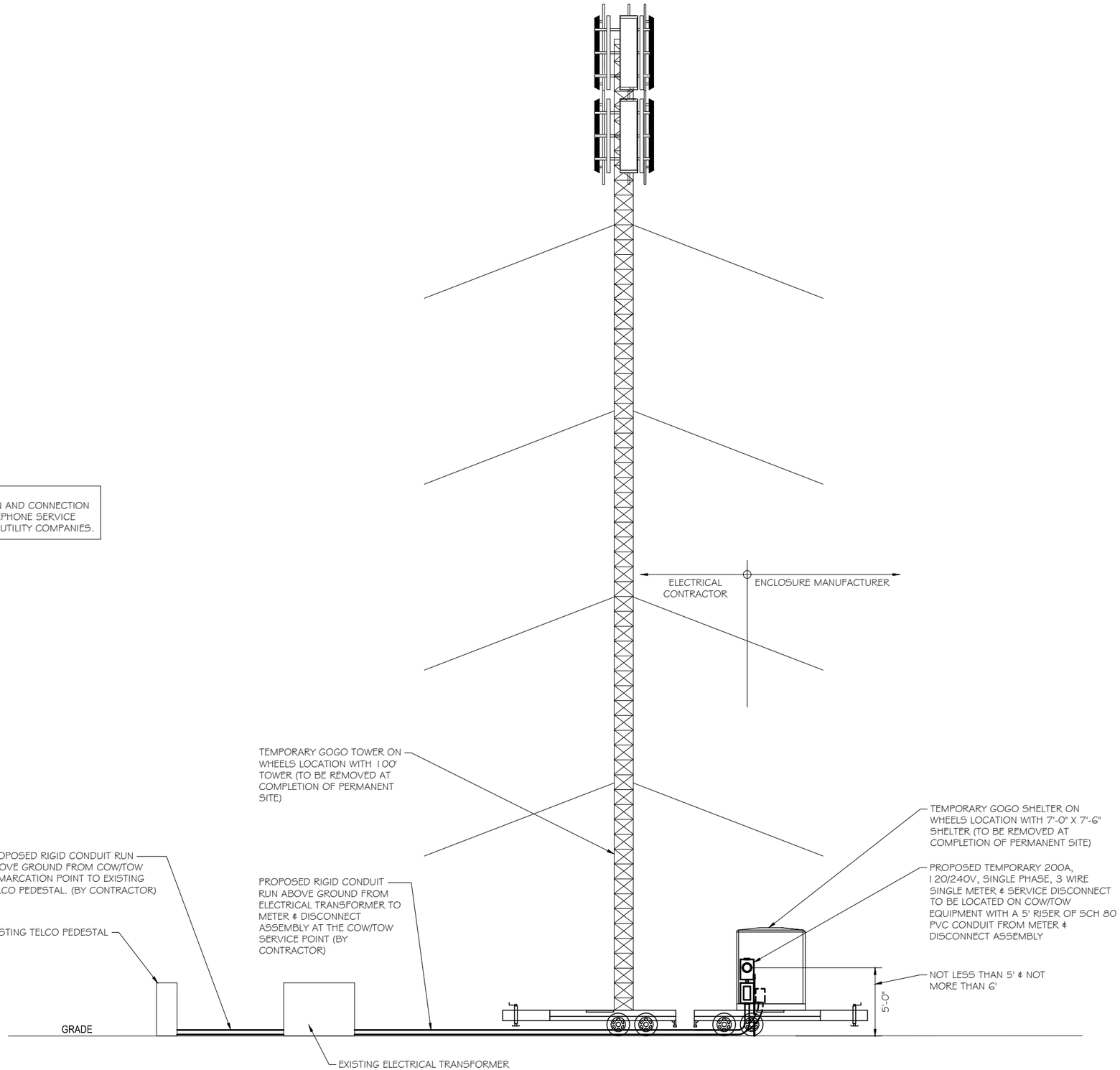
SHEET NAME:
PERMANENT UTILITY PLAN

SHEET NUMBER:
E-1B

0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER:
25975

NOTE:
FOR CONTINUATION AND CONNECTION OF ELECTRIC & TELEPHONE SERVICE COORDINATE WITH UTILITY COMPANIES.

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GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
TEMPORARY UTILITY DETAILS

SHEET NUMBER:
E-2A

SCALE: NONE

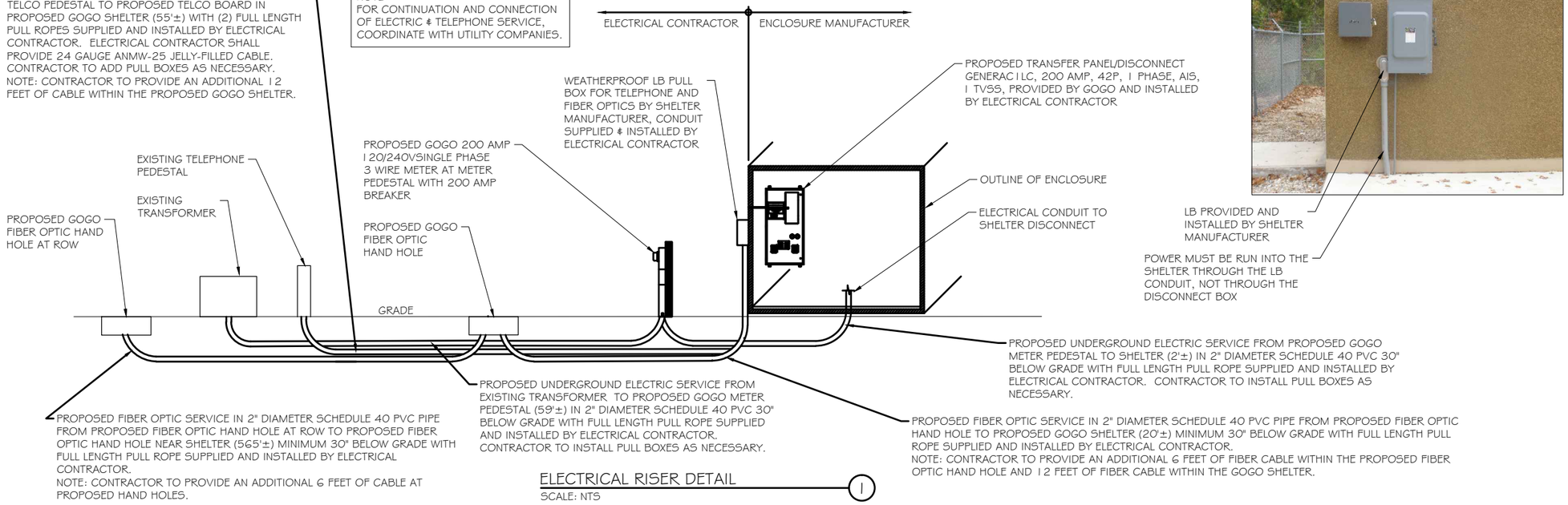
PROJECT NUMBER:
25975

ELECTRICAL SERVICE: 200 AMP 120/240V SINGLE PHASE 3 WIRE

PROPOSED TELEPHONE SERVICE (TO SERVE GOGO SHELTER WITH 25 PAIR) IN 4" DIAMETER SCHEDULE 40 PVC PIPE MINIMUM 30" BELOW GRADE FROM EXISTING TELCO PEDESTAL TO PROPOSED TELCO BOARD IN PROPOSED GOGO SHELTER (55'±) WITH (2) FULL LENGTH PULL ROPES SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE 24 GAUGE ANMW-25 JELLY-FILLED CABLE. CONTRACTOR TO ADD PULL BOXES AS NECESSARY.
NOTE: CONTRACTOR TO PROVIDE AN ADDITIONAL 12 FEET OF CABLE WITHIN THE PROPOSED GOGO SHELTER.

NOTE:
FOR CONTINUATION AND CONNECTION OF ELECTRIC & TELEPHONE SERVICE, COORDINATE WITH UTILITY COMPANIES.

ELECTRICAL CONTRACTOR | ENCLOSURE MANUFACTURER

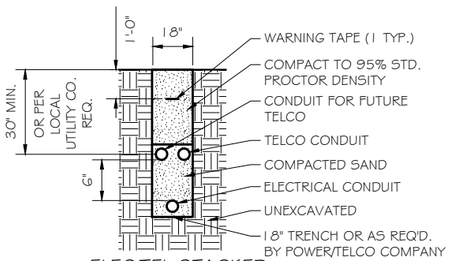




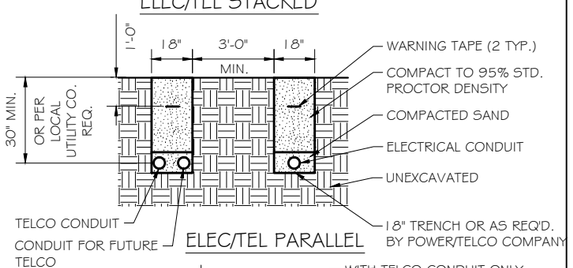

LB PROVIDED AND INSTALLED BY SHELTER MANUFACTURER

POWER MUST BE RUN INTO THE SHELTER THROUGH THE LB CONDUIT, NOT THROUGH THE DISCONNECT BOX

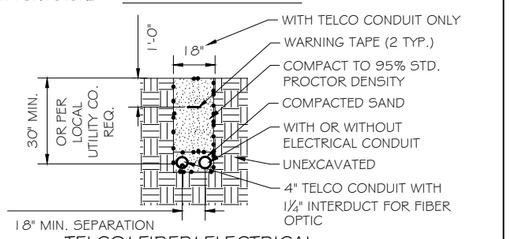
## ELECTRICAL RISER DETAIL (1)
SCALE: NTS




ELEC/TEL STACKED

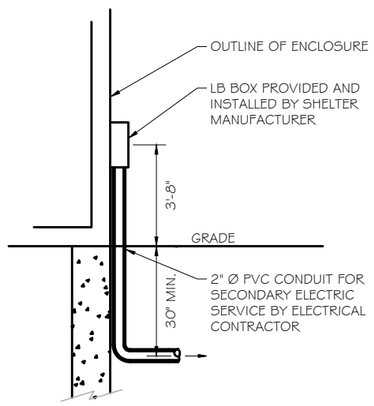



ELEC/TEL PARALLEL

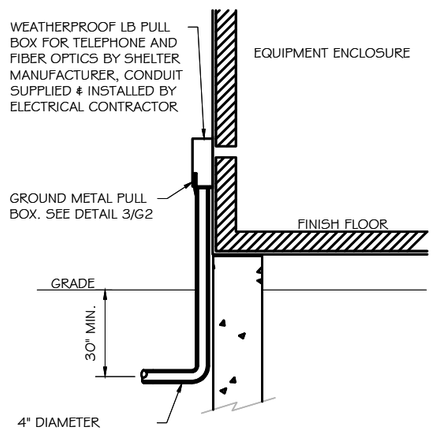



TELCO/ FIBER/ ELECTRICAL

## TYP. UTILITY TRENCH (2)
SCALE: NTS




## ELECTRICAL SERVICE DETAIL (3)
SCALE: NTS




## TELCO/FIBER SERVICE DETAIL (4)
SCALE: NTS

Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

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8/08/2013

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GUNNISON COUNTY

SHEET NAME:
PERMANENT UTILITY DETAILS

SHEET NUMBER:
E-2B

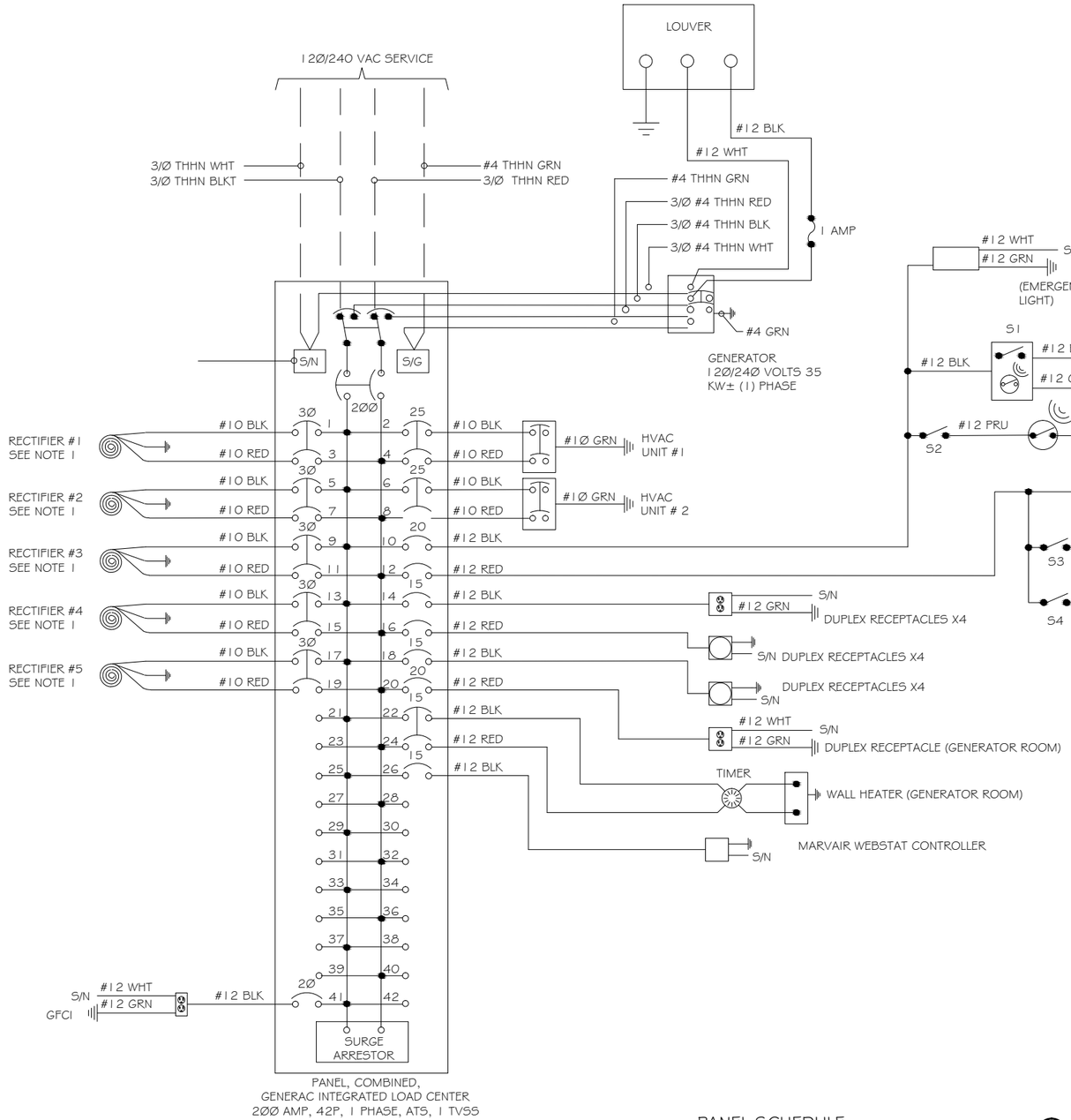
SCALE: NONE

PROJECT NUMBER:
25975

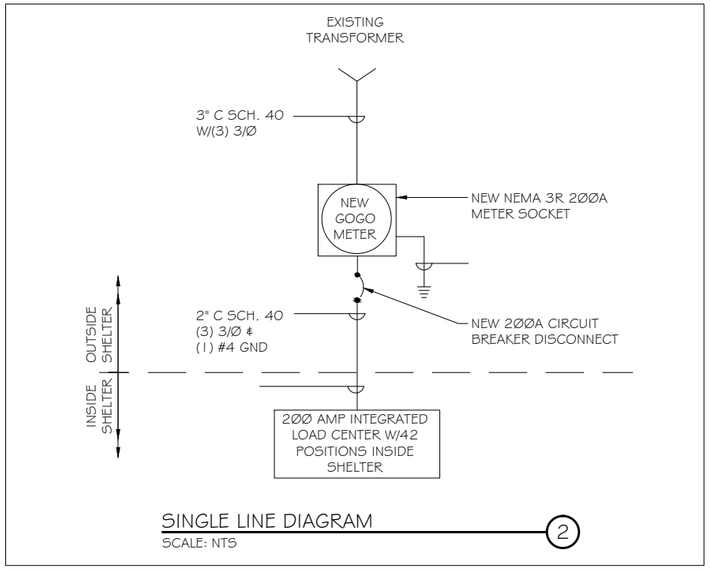
NOTES:

1. PULL TO END OF LFMC, COIL AND TAG 3'-0" EXTRA.

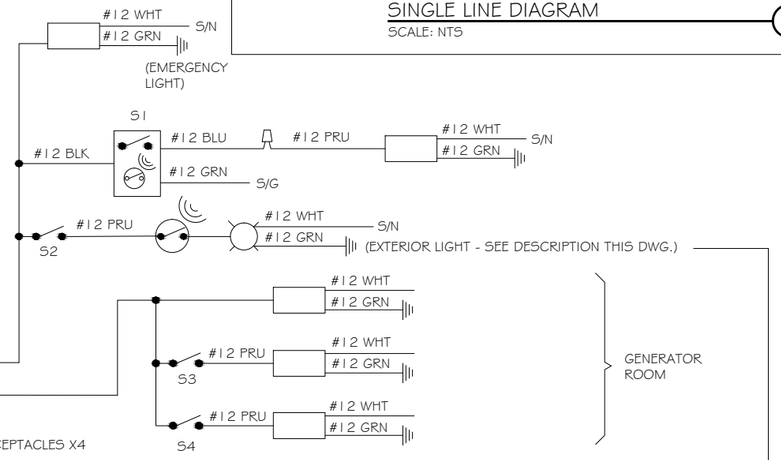
2. ALL METALLIC ELECTRICAL BOXES (SWITCH BOXES, DUPLEX BOXES, LIGHTS JUNCTION BOXES, ETC.) SHALL BE CONNECTED TO THE PROTECTED GROUND ACG DISTRIBUTION PANEL WITH A #12 GREEN INSULATED STRANDED CONDUCTOR WHICH SHALL BE RUN INTERNAL TO THE CONDUIT.




PANEL SCHEDULE
SCALE: NTS
1




SINGLE LINE DIAGRAM
SCALE: NTS
2







HUBBLE OUTDOOR LIGHTING NRG-111-B 100 WATT
PULSE START METAL HALIDE FULL CUTOFF
COMPACT WALL PACK BRONZE:

TECHNICAL DETAILS:
- WATTAGE/SOURCE: 100 WATT/PS
- VOLTAGE: 120 VOLT
- FINISH: BRONZE
- UL LISTED FOR USE IN WET LOCATIONS
- STAR VIEW COMPLIANT APPROVED: OPTIC ALLOWS NO UP LIGHT SAVING ENERGY AND KEEPING THE NEIGHBORS HAPPY

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1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
UTILITY DETAILS

SHEET NUMBER:
E-3

SCALE: NONE

PROJECT NUMBER:
25975

GOGO CLOSEOUT REQUIREMENTS

CLOSEOUTS TO BE SUBMITTED ON DISC ONLY TO INCLUDE THE FOLLOWING:

1. COPY OF RFA DATA SHEET SIGNED BY GC.
2. COPY OF CONSTRUCTION AS-BUILT DRAWINGS SIGNED BY GC WITH ALL REDLINES AS-BUILT.
3. APS REPORT ONE DOCUMENT OR PDF NOT MULTIPLE DOCUMENTS SEE APS TAB 1MULTIWAVE REPORT MUST BE WITHIN. 5 DEGREE OF AZIMUTH USING SITE MANAGER SOFTWARE. 12 DATA FILES FROM PDA.
4. PIM REPORT ONE DOCUMENT OR PDF NOT MULTIPLE DOCUMENTS SPEC -145 DBC SEE PIM EXAMPLE TAB FOR DETAILS.
5. GROUND TEST FORM (MINIMUM 5 OHMS).
6. SWEEP TEST FORM, SWEEPS PDF FORMAT.
7. PHOTOS OF ALL PHOTOS IN CLOSEOUT PHOTOS CHECKLIST.
8. PHOTOS OF ALL SIDES OF THE SHELTER OUTSIDE WALLS.
9. TAPE DROP FORM AND PHOTOS.
10. RETURNED PERMITS SIGNED OFF AS NECESSARY ORIGINALS MAILED BACK TO GOGO WITH CLOSEOUTS.
11. CONCRETE BREAK TESTS.
12. COPIES OF ANY GC WARRANTIES.
13. LIEN WAIVER SIGNED.
14. COPY OF GOGO PUNCHLIST WITH PHOTOS OF ITEMS FIXED.
15. CLOSE-UP PHOTO OF METER WITH METER NUMBER VISIBLE AND METER LABELED GOGO.
16. PHOTO OF ALL GATE COMBO LOCKS SET TO GATE COMBO.
17. LABEL DISC WITH SITE ID NUMBER AND GC NAME DATE.
18. ALL DOCUMENTS AND IN SOFT COPY ON DISC.
19. ANTENNA UPTILT PHOTOS WITH SMART LEVEL WITH ANTENNA MARKINGS AND COLOR CODE VISIBLE TO IDENTIFY SECTOR AND ANTENNA MUST BE WITHIN 0.5 DEGREE OF SPEC ON RFA.
20. ANTENNA PLUMB PHOTOS WITH SMART LEVEL ON SIDE OF ANTENNA WITH ANTENNA MARKINGS VISIBLE OR COLOR CODING VISIBLE AND LEVEL MUST BE ACCURATE WITHIN 0.5 DEGREES PLUMB 90 DEGREES.
21. PHOTOS OF APS TOOL ON ANTENNA SHOWING CLEAR SPACE IN FRONT OF ANTENNAS.
22. PHOTOS OF SHELTER LOCK BOXES WITH COMBOS SET TO 1225 AND 1250 WITH KEY INSIDE.
23. ALL ANGLE STEEL TOWER LEGS WILL REQUIRE PIPES IN ANGLE CHANNEL TO SECURE ANTENNA MOUNTS PHOTO REQUIRED FOR NON ROUND TOWER STEEL SITES.

CLOSEOUT DISC FOLDERS LABELED SITE ID AND GC NAME AND DATE:

1. APS FOLDER WITH APS FILES AND APS REPORT PDF.
2. PIM FOLDER WITH PIM FILES AND PIM REPORT PDF.
3. PHOTOS PRE CONSTRUCTION FOLDER.
4. PHOTOS POST CONSTRUCTION GROUND PHOTOS FOLDER COMPOUND, H-FRAME TELCO CONDUITS , TRENCHING WITH PULL BOXES ETC.
5. PHOTOS POST CONSTRUCTION SHELTER PHOTOS FOLDER ALL 4 SIDES OUTSIDE, AND INSIDE SHELTER PHOTOS, SHELTER FOUNDATION WITH POUR FOLDER.
6. PHOTOS POST CONSTRUCTION TEST RESULTS FOLDER PHOTOS OF APS TOOL ON ANTENNAS DURING APS, UPTILT AND PLUMB PHOTOS FOLDER.
7. PHOTOS POST CONSTRUCTION TOWER PHOTOS FOLDER ANTENNAS AND LINES FROM SHELTER TO ANTENNAS, TAPE DROP PHOTOS ETC.
8. SWEEP FOLDER TO INCLUDE RAW SWEEPS AND SWEEP PDF.
9. DOCUMENTS IN SITE FOLDER GO AFTER SUB FOLDERS ABOVE TO INCLUDE TAPE DROP FORM, GROUND FORM, SWEEP FORM, LIEN RELEASE, WARRANTY FORM , AS BUILT REDLINE DRAWING SIGNED, CONCRETE BREAK TESTS FORM COPIES OF PERMITS SIGNED OFF SCANNED, RFA SIGNED BY GC, CERTIFICATES OF OCCUPANCY OR OTHER JURISDICTION DOCUMENTS OR APPROVAL FORMS SCANNED.

ADDITIONAL GC RESPONSIBILITIES:

CREWS MUST HAVE COPY OF CONSTRUCTION DRAWINGS, RFA AND JOB SAFETY FORM ON SITE AT ALL TIMES. PRINTED FOR REDLINE NOTES WHILE ON SITE.
GC HAS PM/CM SINGLE POINT OF CONTACT FOR THE PROJECT AND WILL PROVIDE DAILY COMMUNICATION TO CREWS ON SITE AND TO GOGO CM.
GC PM/CM WILL SUPPLY DAILY PHOTO LOG REPORTS AND PHOTOS WITH CONSTRUCTION UPDATES AT MINIMUM EVERY 2 DAYS.
GC PM/CM WILL VISIT THE SITE MINIMUM OF 1-2 SITE VISITS TO INSURE QUALITY OF CREWS.
MAKE SURE ANTENNAS HAVE NO BLOCKAGE FROM TOWER AT TIME OF MOUNTING AZIMUTHS.
MAKE SURE TOWER AND SITE INCLUDING ACCESS IS IN GOOD CONDITION REPORT ALL UNSAFE ISSUES TO GOGO, HAVE JSA SAFETY FORMS ON SITE.
PULL STRINGS IN ALL CONDUITS .
POWER COORDINATION AND METER SET AT CONSTRUCTION COMPLETION, CONTACT INFORMATION AND POWER ACCOUNT WILL BE SET UP BY GOGO AND GIVEN TO GC.
ALL SITE VISITS SCHEDULED WITH INSPECTORS ARE MANDATORY UNLESS WE APPROVE OTHERWISE .
MAKE SURE CREW LABELS AND COLOR CODES LINES AS YOU SWEEP LINES SO THERE ARE NO COLOR CODE PROBLEMS WITH LINES.
PURCHASE OR RENT MULTIWAVE APS TOOL FOR AZIMUTH ALIGNMENT, REQUIRES PDF APS REPORT USING SITE MANAGER SOFTWARE.
MULTIWAVE APS TOOL REQUIRES SPECIAL TOP MOUNTING BRACKET IN ORDER TO ALIGN GOGO ANTENNAS AS UNIVERSAL MOUNTING BRACKETS WILL NOT WORK WITH ALL 12 ANTENNAS.
PURCHASE OR RENT PIM GEAR 850 FOR PIM, ALL SWEEPS MUST BE DONE PRIOR TO PIM TESTING PIM SPECS ARE -145DBC OR -102DBM PASSING -144DBC OR -101DBM FAIL.
GC SUPPLIES ALL ELECTRICAL CONDUIT WIRE, PULL STRINGS, INTERDUCT, HAND HOLES, COLORED TAPE, AND MISC MATERIALS PER DRAWING.

NOT LISTED AS GOGO SUPPLIED BELOW:

ALL ANGLE STEEL TOWER LEGS WILL REQUIRE PIPES IN ANGLE CHANNEL TO SECURE ANTENNA MOUNTS PHOTO REQUIRED FOR NON ROUND TOWER LEG SITES.
ELECTRICIAN WILL VERIFY SHELTER AC AND DC WIRING FOR SHELTER POWER UP, GC RESPONSIBLE FOR METER SET INSPECTIONS BY JURISDICTION AND STATE ELECTRICAL INSPECTIONS IF NEEDED.
GENERATOR FUELING IF NEEDED IS A CHANGE ORDER AND 211 GALLONS DIESEL UNLESS PROPANE TANK IN DRAWING.
PLEASE ESTIMATE CRANE COST IN BID AS A LINE ITEM, IF ACTUAL COSTS EXCEED BID WE WILL DO CHANGE ORDER, ON OR OFF LOADING AND SHELTER DELIVERY COSTS OUT OF THE AVERAGE WILL ALSO BE A CHANGE ORDER.
SHELTER WEIGHTS 12'X14' SHELTER 36,000 LBS 12'X24' SHELTER 60,000 LBS WITH GENERATOR.
GC MUST TAKE PRECON PHOTOS OF ANY EXISTING TRASH AND DEBRIS THAT LANDLORD MAY CONSIDER LEFT ON SITE BY GOGO GC.
GC MUST TAKE PHOTOS OF SITE CLEAN AND OWNS ANY TRASH LEFT BY OTHERS UNLESS APPROVED TO LEAVE IN PRECONSTRUCTION CALL.
GC TO TAKE PHOTOS OF SURROUNDING SITE AREA AND ROCK TO SHOW CLEAN ROCK INSIDE FENCE AREA ADD ROCK AS NEEDED.
GC MUST REMOVE EXCESS SOIL FROM TRENCHING AND FOUNDATION EXCAVATING FROM SITE, NOT DUMP AT SITE.
GC TO RESTORE TRENCHING AREA LEVEL NO RAISED OR SUNKEN TRENCH AREAS WITH ASPHALT, CEMENT OR GRASS RESTORED TO ORIGINAL CONDITION.

GOGO SUPPLIES:

SHELTER DELIVERED TO SITE WITH EQUIPMENT INSTALLED.

ITEMS BELOW DELIVERED TO SITE OR GC WAREHOUSE:

ANTENNAS
ANTENNA MOUNTS
RF MATERIALS, COAX JUMPERS, HANGERS, WEATHER PROOFING, CABLE LADDERS, ICE BRIDGE GROUND BARS.
TWO GPS ANTENNAS ARE IN SHELTER IN WOOD ZTE BOX TO BE MOUNTED ON ICE BRIDGE OR PER DRAWING.

Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED
JAMES R. SKOWRONSKI
36936
PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SPECIFICATIONS (CLOSEOUT)

SHEET NUMBER:
SP-1

SCALE: NONE

PROJECT NUMBER:
25975

## GENERAL

THE CONSTRUCTION DOCUMENT DRAWINGS ARE INTERRELATED. WHEN PERFORMING THE WORK, EACH CONTRACTOR MUST REFER TO ALL DRAWINGS. COORDINATION IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

## DIVISION 1: GENERAL REQUIREMENTS

### SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1. OBTAIN AND SUBMIT RELEASES ENABLING THE OWNER UNRESTRICTED USE OF THE WORK AND ACCESS TO SERVICES AND UTILITIES; INCLUDE OCCUPANCY PERMITS, OPERATING CERTIFICATES AND SIMILAR RELEASES

2. SUBMIT RECORD DRAWINGS, DAMAGE OR SETTLEMENT SURVEY, PROPERTY SURVEY, AND ACCESS TO SERVICES AND UTILITIES; INCLUDE OCCUPANCY PERMITS, OPERATING

3. COMPLETE FINAL CLEAN UP REQUIREMENTS, INCLUDING TOUCH-UP PAINTING. TOUCH UP AND OTHERWISE REPAIR AND RESTORE MARRED EXPOSED FINISHES.

PART 2 - FINAL CLEANING

1. COMPLETE THE FOLLOWING CLEANING OPERATIONS BEFORE REQUESTING INSPECTION FOR CERTIFICATION OF COMPLETION.
   A. CLEAN THE PROJECT SITE, YARD AND GROUNDS, IN AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, INCLUDING LANDSCAPE DEVELOPMENT AREAS, OF RUBBISH, WASTE MATERIALS, LITTER AND FOREIGN SUBSTANCES. SWEEP PAVED AREAS BROOM CLEAN. REMOVE PETRO-CHEMICAL SPILLS, STAINS AND OTHER FOREIGN DEPOSITS. RAKE GROUNDS THAT ARE NEITHER PLANTED NOR PAVED, TO A SMOOTH EVEN-TEXTURED SURFACE.
   B. REMOVE TOOLS, CONSTRUCTION EQUIPMENT, MACHINERY AND SURPLUS MATERIAL FROM THE SITE.
   C. REMOVE SNOW AND ICE TO PROVIDE SAFE ACCESS TO THE SITE AND EQUIPMENT ENCLOSURE.
   D. CLEAN EXPOSED EXTERIOR AND INTERIOR HARD-SURFACED FINISHES TO A DIRT FREE CONDITION, FREE OF STAINS, FILMS AND SIMILAR FOREIGN SUBSTANCES. AVOID DISTURBING NATURAL WEATHERING OF EXTERIOR SURFACES.
   E. REMOVE DEBRIS FROM LIMITED ACCESS SPACES, INCLUDING ROOFS, EQUIPMENT ENCLOSURE, MANHOLES, AND SIMILAR SPACES.
   F. REMOVE LABELS THAT ARE NOT PERMANENT LABELS.
   G. TOUCH-UP AND OTHERWISE REPAIR AND RESTORE MARRED EXPOSED FINISHES AND SURFACES. REPLACE FINISHES AND SURFACES THAT CAN NOT BE SATISFACTORILY REPAIRED OR RESTORED, OR THAT SHOW EVIDENCE OF REPAIR OR RESTORATION. DO NOT PAINT OVER "UL" AND SIMILAR LABELS, INCLUDING ELECTRICAL NAME PLATES.
   H. LEAVE THE PROJECT CLEAN AND READY FOR OCCUPANCY.
   I. DUST-OFF ALL EQUIPMENT, INCLUDING BATTERY PACKS, WITHIN EQUIPMENT ENCLOSURE.
   J. WASH AND WAX FLOOR WITHIN EQUIPMENT ENCLOSURE.

2. REMOVAL OF PROTECTION: REMOVE TEMPORARY PROTECTION AND FACILITIES INSTALLED DURING CONSTRUCTION TO PROTECT PREVIOUSLY COMPLETED INSTALLATIONS DURING THE REMAINDER OF THE CONSTRUCTION PERIOD.

## DIVISION 2: SITE WORK

### SECTION 02200 - EARTHWORK AND DRAINAGE

PART 1 - GENERAL

1. WORK INCLUDED: SEE SITE PLAN.

2. DESCRIPTIONS
   LEASE AREA, AND IF APPLICABLE ACCESS DRIVE / TURNAROUND AREA, AND UNDERGROUND UTILITY EASEMENTS ARE TO BE CONSTRUCTED TO PROVIDE A WELL DRAINED, EASILY MAINTAINED, EVEN SURFACE FOR MATERIAL AND EQUIPMENT DELIVERIES AND MAINTENANCE PERSONNEL ACCESS.

3. QUALITY ASSURANCE
   A. APPLY SOIL STERILIZER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS (AS NEEDED).
   B. APPLY AND MAINTAIN GRASS SEED AS RECOMMENDED BY THE SEED PRODUCER (IF REQUIRED).
   C. PLACE AND MAINTAIN VEGETATION LANDSCAPING, IF INCLUDED WITHIN THE CONTRACT, RECOMMENDED BY NURSERY INDUSTRY STANDARDS.

4. SEQUENCING
   A. CONFIRM SURVEY STAKES AND SET ELEVATION STAKES PRIOR TO ANY CONSTRUCTION.
   B. COMPLETELY GRUB THE ACCESS DRIVE W/ TURNAROUND, UNDERGROUND UTILITY EASEMENTS, (IF APPLICABLE) AND LEASE AREA PRIOR TO FOUNDATION CONSTRUCTION, PLACEMENT OF BACKFILL AND SUB-BASE MATERIAL.
   C. CONSTRUCT TEMPORARY CONSTRUCTION AREA ALONG ACCESS DRIVE.
   D. BRING THE LEASE AREA AND ACCESS DRIVE W/ TURNAROUND TO BASE COURSE ELEVATION PRIOR TO INSTALLING FOUNDATION.
   E. APPLY SOIL STERILIZER PRIOR TO PLACING BASE MATERIALS.
   F. GRADE, SEED, FERTILIZE, AND MULCH ALL AREAS DISTURBED BY CONSTRUCTION (INCLUDING UNDERGROUND UTILITY EASEMENTS) IMMEDIATELY AFTER BRINGING LEASE AREA AND ACCESS DRIVE W/ TURNAROUND TO BASE COURSE ELEVATION, WATER TO ENSURE GROWTH.
   G. REMOVE GRAVEL FROM TEMPORARY CONSTRUCTION ZONE TO AN AUTHORIZED AREA OR AS DIRECTED BY PROJECT MANAGER.
   H. AFTER APPLICATIONS OF FINAL SURFACES, APPLY SOIL STERILIZER TO STONE SURFACES.

PART 2 - PRODUCTS

1. MATERIALS
   A. SOIL STERILIZER SHALL BE EPA-REGISTERED, PRE-EMERGENCE LIQUID:
      TOTAL KILL (PRODUCT 910) - EPA 10292-7
      PHASAR CORPORATION
      P.O. BOX 5123
      DEARBORN, MI 48128
      (313) 563-8000
      AMBUSH HERBICIDE - EPA REGISTERED
      FRAMAR INDUSTRIAL PRODUCTS
      1435 MORRIS AVE.
      UNION, NJ 07083
      (800) 526-4924
   B. ROAD AND SITE MATERIALS SHALL CONFORM TO MDOT SPECIFICATIONS FILL MATERIAL (UNLESS OTHERWISE NOTED) - ACCEPTABLE SELECT FILL SHALL STANDARD SPECIFICATIONS... BE IN ACCORDANCE WITH STATE DEPARTMENT OF HIGHWAY AND TRANSPORTATION.
   C. SOIL STABILIZER FABRIC SHALL BE MIRAFI - 500X.

PART 3 - EXECUTION

1. INSPECTIONS
   LOCAL BUILDING INSPECTORS SHALL BE NOTIFIED NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, UNLESS OTHERWISE SPECIFIED BY JURISDICTION.

2. PREPARATION
   A. CLEAR TREES, BRUSH AND DEBRIS FROM LEASE AREA, ACCESS DRIVE W/ TURN-AROUND AND UNDER GROUND UTILITY EASEMENTS AS REQUIRED FOR CONSTRUCTION.
   B. PRIOR TO OTHER EXCAVATION AND CONSTRUCTION, GRUB ORGANIC MATERIAL TO A MINIMUM OF SIX (6) INCHES BELOW GRADE.
   C. UNLESS OTHERWISE INSTRUCTED BY CARRIER, TRANSPORT ALL REMOVED TREES, BRUSH AND DEBRIS FROM THE PROPERTY TO AN AUTHORIZED LANDFILL.
   D. PRIOR TO PLACEMENT OF FILL OR BASE MATERIALS, ROLL THE SOIL.
   E. WHERE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, LINE THE AREAS WITH STABILIZER MAT PRIOR TO PLACEMENT OF FILL OR BASE MATERIAL.

3. INSTALLATION
   A. GRADE OR FILL THE LEASE AREA AND ACCESS DRIVE W/TURNAROUND AS REQUIRED IN ORDER THAT UPON DISTRIBUTION OF SPOILS, RESULTING FROM EXCAVATIONS, THE RESULTING GRADE WILL CORRESPOND WITH SAID SUB-BASE COURSE. ELEVATIONS ARE TO BE CALCULATED FROM BENCHMARK, FINISHED GRADES, OR INDICATED SLOPES.
   B. CLEAR EXCESS SPOILS, IF ANY, FROM JOB SITE AND DO NOT SPREAD BEYOND THE LIMITS OF PROJECT AREA UNLESS AUTHORIZED BY PROJECT MANAGER AND AGREED TO BY LANDOWNER.
   C. BRING THE ACCESS DRIVE W/ TURNAROUND TO BASE COURSE ELEVATION TO FACILITATE CONSTRUCTION AND OBSERVATION DURING CONSTRUCTION OF THE SITE.
   D. AVOID CREATING DEPRESSIONS WHERE WATER MAY POND.
   E. THE CONTRACT SHALL INCLUDE GRADING, BANKING, AND DITCHING, UNLESS OTHERWISE INDICATED.
   F. WHEN IMPROVING AN EXISTING ACCESS DRIVE, GRADE THE EXISTING DRIVE TO REMOVE ANY ORGANIC MATTER AND SMOOTH THE SURFACE BEFORE PLACING FILL OR STONE.
   G. PLACE FILL OR STONE IN SIX (6) INCH MAXIMUM LIFTS, AND COMPACT BEFORE PLACING NEXT LIFT.
   H. THE TOP SURFACE COURSE SHALL EXTEND A MINIMUM OF ONE (1) FOOT BEYOND THE SITE FENCE (UNLESS OTHERWISE NOTED) AND SHALL COVER THE AREA AS INDICATED.
   I. APPLY RIPRAP TO THE SIDE SLOPES OF ALL FENCED SITE AREAS, PARKING AREAS, AND ALL OTHER SLOPES GREATER THAN 2:1.
   J. APPLY RIPRAP TO THE SIDES OF DITCHES OR DRAINAGE SWALES.
   K. RIPRAP ENTIRE DITCH FOR SIX (6) FEET IN ALL DIRECTIONS AT CULVERT OPENINGS.
   L. APPLY SEED, FERTILIZER, AND STRAW COVER TO ALL OTHER DISTURBED AREAS, DITCHES, AND DRAINAGE SWALES, NOT OTHERWISE RIP RAPPED.
   M. UNDER NO CIRCUMSTANCES WILL DITCHES, SWALES, OR CULVERTS BE PLACED SO THAT THEY DIRECT WATER TOWARDS, OR PERMIT STANDING WATER IMMEDIATELY ADJACENT TO SHELTER OR EQUIPMENT. IF DESIGNS OR ELEVATIONS ARE IN CONFLICT WITH THIS, ADVISE CONSTRUCTION MANAGER IMMEDIATELY.
   N. IN DITCHES WITH SLOPES GREATER THAN 10%, MOUND DIVERSIONARY HEADWALLS IN THE DITCH AT CULVERT ENTRANCES. POSITION THE HEADWALL AT AN ANGLE NO GREATER THAT 60° OFF THE DITCH LINE. RIPRAP THE UPSTREAM SIDE OF THE HEADWALL AS WELL AS THE DITCH FOR SIX (6) FEET ABOVE THE CULVERT ENTRANCE.
   O. APPLY SEED AND FERTILIZER TO SURFACE CONDITIONS WHICH WILL ENCOURAGE ROOTING. RAKE AREAS TO BE SEEDED TO EVEN THE SURFACE AND LOOSEN THE SOIL.
   P. SOW SEED IN TWO DIRECTIONS IN TWICE THE QUANTITY RECOMMENDED BY THE SEED PRODUCER.
   Q. ENSURE GROWTH OF SEEDED AND LANDSCAPED AREAS, BY WATERING, UP TO THE POINT OF RELEASE FROM THE CONTRACT. CONTINUE TO REWORK THE BARE AREAS UNTIL COMPLETE COVERAGE IS OBTAINED.

4. FIELD QUALITY CONTROL
   COMPACT SOILS TO MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D-1557. AREAS OF SETTLEMENT WILL BE EXCAVATED AND REFILLED AT CONTRACTOR'S EXPENSE. INDICATE PERCENTAGE OF COMPACTION ACHIEVED ON AS-BUILT DRAWINGS.

5. PROTECTION
   A. PROTECT SEEDED AREAS FROM EROSION BY SPREADING STRAW TO A UNIFORM LOOSE DEPTH OF 1-2 INCHES, STAKE AND TIE DOWN AS REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET WILL BE AN ACCEPTABLE ALTERNATE.
   B. ALL TREES PLACED IN CONJUNCTION WITH A LANDSCAPE CONTRACT WILL BE WRAPPED, TIED WITH HOSE PROTECTED WIRE, AND SECURED TO 2" X 2" X 4'-0" WOODEN STAKES EXTENDING TWO-FEET INTO THE GROUND ON FOUR SIDES OF THE TREE.
   C. PROTECT ALL EXPOSED AREAS AGAINST WASHOUTS AND SOIL EROSION. PLACE STRAW BALES AT THE INLET APPROACH TO ALL NEW OR EXISTING CULVERTS. WHERE THE SITE OR ROAD AREAS HAVE BEEN ELEVATED IMMEDIATELY ADJACENT TO THE RAIL LINE, STAKE EROSION CONTROL FABRIC FULL LENGTH IN THE SWALE TO PREVENT CONTAMINATION OF THE RAIL BALLAST. ALL EROSION CONTROL METHODS SHALL CONFORM TO APPLICABLE BUILDING CODE REQUIREMENTS.

### SECTION 02830 - FENCING AND GATE(S)

PART 1 - GENERAL

1. WORK INCLUDED
   SEE PLAN FOR SITE AND LOCATION OF FENCE AND GATE(S).

2. QUALITY ASSURANCE
   ALL STEEL MATERIALS UTILIZED IN CONJUNCTION WITH THIS SPECIFICATION WILL BE GALVANIZED OR STAINLESS STEEL. WEIGHT OF ZINC COATING ON THE FABRIC SHALL NOT BE LESS THAN 12 OUNCES PER SQUARE FOOT OF MATERIAL COVERED. POSTS SHALL BE HOT-DIPPED IN GRADE 'E' ZINC, 18 OUNCES PER SQUARE FOOT.

3. SEQUENCING
   IF THE SITE AREA HAS BEEN BROUGHT UP TO SURFACE COURSE ELEVATION (PRIOR TO THE FENCE CONSTRUCTION), FENCE POST EXCAVATION SPOILS MUST BE CONTROLLED TO PRECLUDE CONTAMINATION OF SAID SURFACE COURSE.

4. SUBMITTALS
   A. MANUFACTURER'S DESCRIPTIVE LITERATURE.
   B. CERTIFICATE OR STATEMENT OF COMPLIANCE WITH THE SPECIFICATIONS.

PART 2 - PRODUCTS

1. FENCE MATERIAL
   A. ALL FABRIC WIRE, RAILS, HARDWARE, AND OTHER STEEL MATERIALS SHALL BE HOT-DIPPED GALVANIZED.
   B. FABRIC SHALL BE SEVEN-FOOT HIGH OR TO MATCH EXISTING FENCE TWO-INCH CHAIN LINK MESH OF NO. 9 GAUGE (0.148") WIRE. THE FABRIC SHALL HAVE A KNUCKLED FINISH FOR THE TOP SELVAGES. FABRIC SHALL CONFORM TO THE SPECIFICATIONS OF ASTM A-392 CLASS 1.
   C. BARBED WIRE SHALL BE DOUBLE-STRAND, 12-1/2 GAUGE TWISTED WIRE, WITH 14-GAUGE, 4-POINT ROUND BARBS SPACED ON FIVE-INCH CENTERS.
   D. ALL POSTS SHALL BE SCHEDULE - 40 MECHANICAL SERVICE PIPE AND SHALL BE TYPE 1 ASTM A-128 AND OF THE FOLLOWING DIAMETER LINE 2" SCHEDULE 40 (23#8" O.D.)
      GATE 3" SCHEDULE 40 (31#2" O.D.)
      CORNER 3" SCHEDULE 40 (31#2" O.D.)
   E. GATE POSTS SHALL BE EXTENDED 12 INCHES, INCLUDING DOME CAP, TO PROVIDE FOR ATTACHMENT OF BARBED WIRE.
   F. ALL TOP AND BRACE RAILS SHALL BE 1" DIAMETER SCHEDULE 40 MECHANICAL-SERVICE PIPE.
   G. GATE FRAMES AND BRACES SHALL BE 1.90 INCH DIAMETER SCHEDULE 40 MECHANICAL-SERVICE PIPE. FRAMES SHALL HAVE WELDED CORNERS.
   H. GATE FRAMES SHALL HAVE A FULL-HEIGHT VERTICAL BRACE, AND A FULL-WIDTH HORIZONTAL BRACE, SECURED IN PLACE BY USE OF GATE BRACE CLAMPS.
   I. GATE HINGES SHALL BE MERCHANTS METAL MODEL 64386 HINGE ADAPTER WITH MODEL 6409, 188-DEGREE ATTACHMENT.
   J. THE GUIDE (LATCH ASSEMBLY) SHALL BE HEAVY INDUSTRIAL DOUBLE GATE LATCH. SEE DETAIL.
   K. LATCHES AND STOPS SHALL BE PROVIDED FOR ALL GATES.
   L. PLUNGER ROD COMPLETE WITH RECEPTOR TO BE PROVIDED AT THE INACTIVE LEAF OF ALL DOUBLE GATE INSTALLATIONS.
   M. ALL STOPS SHALL HAVE KEEPERS CAPABLE OF HOLDING THE GATE LEAF IN THE OPEN POSITION.
   N. A NO. 7 GAUGE ZINC COATED TENSION WIRE SHALL BE USED AT THE BOTTOM OF THE FABRIC, TERMINATED WITH BAND CLIPS AT CORNER AND GATE POSTS.
   O. A SIX-INCH BY 1/2-INCH DIAMETER EYEBOLT TO HOLD TENSION WIRE SHALL BE PLACED AT LINE POSTS.
   P. STRETCHER BARS SHALL BE 3/16-INCH BY 3/4-INCH OR HAVE EQUIVALENT CROSS-SECTIONAL AREA.
   Q. ALL CORNER GATE AND PANELS SHALL HAVE A 3/8-INCH TRUSS ROD WITH TURNBUCKLES.
   R. ALL POSTS EXCEPT GATE POSTS SHALL HAVE A COMBINATION CAP AND BARBED WIRE SUPPORTING ARM. GATE POSTS SHALL HAVE A DOME CAP.
   S. OTHER HARDWARE INCLUDES BUT MAY NOT BE LIMITED TO TIE CLIPS, BAND CLIPS AND TENSION BAND CLIPS.
   T. BARBED WIRE GATE GUARDS SHALL BE FITTED WITH DOME CAPS.
   U. BARBED WIRE SUPPORT ARMS SHALL BE PRESSED STEEL COMPLETE WITH SET BOLT AND LOCK WIRE IN THE ARM.
   V. ALL CAPS SHALL BE MALLEABLE IRON, DOME OR ACORN SHAPED AS REQUIRED BY PIPE SIZE.
   W. WHERE THE USE OF CONCERTINA HAS BEEN SPECIFIED, 24-INCH DIAMETERS COIL. BARBED TAPE, STAINLESS STEEL, CYCLONE FENCE MODEL G8P TO TYPE III SHALL BE FURNISHED. IT SHALL BE SUPPORTED ABOVE THE TOP RAIL BY USE OF SIX (6) WIRE BARBED WIRE ARMS POSITIONED ATOP EACH LINE/CORNER POST.

1. INSPECTION
   TO CONFIRM PROPER DEPTH AND DIAMETER OF POST HOLE EXCAVATIONS. ALL POST HOLES WILL BE EXCAVATED AS PER CONSTRUCTION DOCUMENTS.

2. INSTALLATION
   A. FOUNDATIONS SHALL HAVE A MINIMUM SIX (6) INCH CONCRETE COVER UNDER POST.
   B. ALL FENCE POSTS SHALL BE VERTICALLY PLUMB; ONE QUARTER (1/4) INCH
   C. AT CORNER POSTS, GATE POSTS, AND SIDES OF GATE FRAME, FABRIC SHALL BE ATTACHED WITH STRETCHER AND TENSION BAND-CLIPS AT FIFTEEN(15) INCH INTERVALS.
   D. AT LINE POSTS, FABRIC SHALL BE ATTACHED WITH BAND-CLIPS AT FIFTEEN (15) INCH INTERVALS.
   E. FABRIC SHALL BE ATTACHED TO BRACE RAILS, TENSION WIRE AND TRUSS RODS WITH TIE-CLIPS AT TWO (2) FOOT INTERVALS.
   F. A MAXIMUM GAP OF ONE INCH WILL BE PERMITTED BETWEEN TIE CHAIN LINE FABRIC AND THE FINAL GRADE.
   G. GATE SHALL BE INSTALLED SO LOCKS ARE ACCESSIBLE FROM BOTH SIDES.
   H. GATE HINGE BOLTS SHALL HAVE THEIR THREADS PEENED OR WELDED TO PREVENT UNAUTHORIZED REMOVAL.
   I. CONCRETE TO BE A MINIMUM OF 4,000 PSI AT 7 DAYS. CEMENT SHALL EXCEED ASTM C150, TYPE IIIA.

3. PROTECTION
   UPON COMPLETION OF ERECTION, INSPECT FENCE MATERIAL AND PAINT FIELD CUTS OR GALVANIZING BREAKS WITH ZINC-BASED PAINT, COLOR TO MATCH THE GALVANIZED METAL.

APPLICABLE STANDARDS

ASTM-A120 SPECIFICATION FOR PIPE, STEEL BLACK AND HOT-DIPPED ZINC COATED (GALVANIZED) WELDED AND SEAMLESS, FOR ORDINARY USES.
ASTM-A123 ZINC (HOT-DIP GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM-A153 STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE.
ASTM-A392 SPECIFICATION FOR ZINC-COATED STEEL CHAIN LINK FENCE FABRIC.
ASTM-A491 SPECIFICATION FOR ALUMINUM-COATED STEEL CHAIN LINK FENCE FABRIC
ASTM-A525 STANDARD SPECIFICATION FOR STEEL SHEET ZINC COATED (GALVANIZED) BY THE HOT-DIPPED PROCESS. ASTM-A570 SPECIFICATION FOR HOT-ROLLED CARBON STEEL SHEET AND STRIP. STRUCTURAL QUALITY.
ASTM-A535 SPECIFICATION FOR ALUMINUM COATED STEEL BARBED WIRE.

FEDERAL SPECIFICATION RR-F-191- FENCING, WIRE AND POST METAL (AND GATES, CHAIN LINK FENCE FABRIC, AND ACCESSORIES)

gogo
Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SPECIFICATIONS

SHEET NUMBER:
SP-2

SCALE: NONE

PROJECT NUMBER:
25975

# DIVISION 3: CONCRETE

## SECTION 03000 - BASIC CONCRETE MATERIALS AND METHODS

PART 1 - GENERAL

1. 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.
   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 MANAGER/ENGINEER. 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 SHEETS, 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 (1) 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

4. 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.

# DIVISION 5: METALS

## SECTION 05000 - METALS

PART 1 - GENERAL

1. SECTION INCLUDES:
   STRUCTURAL STEEL FRAMING MEMBERS, BASE PLATES, PLATES, BARS AND GROUTING UNDER BASE PLATES.
2. SUBMITTALS:
   SHOP DRAWINGS: INDICATE SIZES, SPACING, AND LOCATIONS OF STRUCTURAL MEMBERS, OPENINGS, CONNECTIONS, CAMBERS, LOADS, AND WELDED SECTIONS.
3. QUALITY ASSURANCE:
   A. FABRICATE STRUCTURAL STEEL MEMBERS IN ACCORDANCE WITH AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.
   B. PERFORM DESIGN UNDER DIRECT SUPERVISION OF A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE.

PART 2 - PRODUCTS

1. MATERIALS:
   A. STRUCTURAL STEEL MEMBERS: ASTM A572, GRADE 50
   B. STRUCTURAL TUBING: ASTM A500, GRADE B
   C. PIPE: ASTM A53, TYPE E OR S, GRADE B
   D. BOLTS, NUTS, AND WASHERS: ASTM A325
   E. ANCHOR BOLTS: ASTM A307
   F. WELDING MATERIALS: AWS D1.1, TYPE REQUIRED FOR MATERIALS BEING WELDED
   G. GROUT: NON-SHRINK TYPE, PREMIXED COMPOUND CONSISTING OF NONMETALLIC AGGREGATE, CEMENT, WATER REDUCING AND PLASTICIZING ADDITIVES, CAPABLE OF DEVELOPING MINIMUM COMPRESSIVE STRENGTH OF 7000 psi AT 28 DAYS.
   H. SHOP AND TOUCH-UP PRIMER: SSPC 15, TYPE 1, RED OXIDE
   I. TOUCH-UP PRIMER FOR GALV. SURFACES: ZINC RICH TYPE
2. FABRICATION: CONTINUOUSLY SEAL JOINTED MEMBERS BY CONTINUOUS WELDS. GRIND EXPOSED WELDS SMOOTH.
3. FINISH:
   A. PREPARE STRUCTURAL COMPONENT SURFACES IN ACCORDANCE WITH SSPC SP-1 TO SP-10 PROCEDURES.
   B. STRUCTURAL STEEL MEMBERS SHALL BE HOT DIPPED GALVANIZED.

PART 3 - EXECUTION

1. EXAMINATION AND PREPARATION:
VERIFY THAT THE FIELD CONDITIONS ARE ACCEPTABLE.
2. ERECTION:
   A. ALLOW FOR ERECTION LOADS. PROVIDE TEMPORARY BRACING TO MAINTAIN FRAMING IN ALIGNMENT UNTIL COMPLETION OF ERECTION AND INSTALLATION OF PERMANENT BRIDGING AND BRACING.
   B. FIELD WELD COMPONENTS INDICATED ON SHOP DRAWINGS.
   C. DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER.
   D. AFTER ERECTION, TOUCH-UP WELDS, ABRASIONS, AND SURFACES NOT SHOP PRIMED OR GALVANIZED WITH TOUCH-UP PRIMERS AS SPECIFIED UNDER SECTION 05000,-METALS, PART 2 - PRODUCTS, H & I. SURFACES TO BE IN CONTACT WITH CONCRETE NOT INCLUDED.
3. FIELD QUALITY CONTROL: FIELD INSPECTION OF MEMBERS, CONNECTIONS, WELDS AND TORQUING.

# DIVISION 16: ELECTRICAL

## SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

1. CONTRACTOR SHALL REVIEW THE CONTRACT DOCUMENTS PRIOR TO ORDERING THE ELECTRICAL EQUIPMENT AND STARTING THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ARCHITECT LISTING ANY DISCREPANCIES OR CONFLICTING INFORMATION.
2. ELECTRICAL PLANS, DETAILS AND DIAGRAMS ARE DIAGRAMMATIC ONLY. VERIFY EXACT LOCATIONS AND MOUNTING HEIGHTS OF ELECTRICAL EQUIPMENT WITH OWNER PRIOR TO INSTALLATION.
3. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX, JUNCTION BOX, SWITCH BOX, ETC. THE TYPE OF TAGGING METHODS SHALL BE IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.).
4. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN GOOD WORKING CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED "U" WHERE APPLICABLE. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA, NBFU AND "UL" LISTED.
5. ALL CONDUIT SHALL HAVE A PULL CORD.
6. PROVIDE PROJECT MANAGER WITH ONE SET OF COMPLETE ELECTRICAL "AS INSTALLED" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROUTINGS, AND CIRCUITS.
7. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
8. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY UBC, NEC AND ALL APPLICABLE CODES.
9. PATCH, REPAIR AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.
10. PLASTIC PLATES FOR ALL SWITCHES, RECEPTACLES, TELEPHONE AND BLANKED OUTLETS SHALL HAVE ENGRAVED LETTERING WHERE INDICATED ON THE DRAWINGS. WEATHERPROOF RECEPTACLES SHALL HAVE SIERRA #WPD-8 LIFT COVER PLATES.

## SECTION 16400 - SERVICE AND DISTRIBUTION

1. WIRE AND CABLE CONDUCTORS SHALL BE COPPER, 600V, TYPE THHN OR THWN, WITH A MIN. SIZE OF #12 AWG, COLOR CODED. ALL RECTIFIER DROPS SHALL BE STRANDED TO ACCEPT CRIMP CONNECTORS.
2. ALL CHEMICAL GROUND RODS SHALL BE "UL" APPROVED.
3. METER SOCKET AMPERES, VOLTAGE, NUMBER OF PHASES SHALL BE A NOTED ON THE DRAWINGS. MANUFACTURED BY MILBANK OR APPROVED EQUAL, AND SHALL BE UTILITY COMPANY APPROVED.
4. CONDUIT:
   A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH GALVANIZED ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 2/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.
   B. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL, FITTING SHALL BE GLAND RING COMPRESSION TYPE.
   C. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE. ALL FLEXIBLE CONDUITS SHALL HAVE FULL LENGTH GROUND WIRE.
   D. ALL UNDERGROUND CONDUIT SHALL BE AS NOTED ON THE DRAWINGS AT A MINIMUM DEPTH OF 30" BELOW GRADE. IT IS REQUIRED AND WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO NOTIFY THE UTILITY CLEARANCE HOTLINE (DIGGER'S HOTLINE OR OTHER SUCH NOTIFYING AGENCY) SEVENTY-TWO (72) BUSINESS HOURS PRIOR TO DIGGING.
5. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS ARE TO BE PAID BY THE CONTRACTOR.
6. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS WITH WHITE ON BLUE BACKGROUND LETTERING (MINIMUM LETTER HEIGHT SHALL BE 1/4-INCH). NAMEPLATES SHALL BE FASTENED WITH STAINLESS STEEL SCREWS, NOT ADHESIVE.
7. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL POTENTIAL GROUNDING TESTS BY AN INDEPENDENT TESTING SERVICE ENGAGED BY THE CONTRACTOR SHALL BE SUBMITTED FOR APPROVAL. SUBMIT TEST REPORTS TO PROJECT MANAGER. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION.
8. GROUNDING ELECTRODE SYSTEM
   A. PREPARATION
      1. SURFACE PREPARATION: ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FIELD INSPECTED AND MODIFIED TO ENSURE PROPER CONTACT. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLATION.
      2. GROUND BAR PREPARATION: ALL COPPER GROUND BARS SHALL BE CLEANED, POLISHED AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
      3. SLEEVES: ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
   B. GROUND BARS
      1. ALL GROUND BARS SHALL BE 1/4-INCH THICK TINNED COPPER PLATE AND OF SIZE INDICATED ON DRAWINGS.
      2. ALL CONNECTIONS TO THE GROUND BARS SHALL OBSERVE THE FOLLOWING SEQUENCE:
         A. BOLT-HEAD
         B. 2-HOLE LUG
         C. NON-OX (ANTI-OXIDATION COMPOUND)
         D. TINNED COPPER BUSS BAR
         E. NON-OX (ANTI-OXIDATION COMPOUND)
         F. STAR WASHER
         G. NUT
   C. EXTERNAL CONNECTIONS
      1. ALL BURIED GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS. CONNECTIONS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, TEE'S, CROSSES, ETC. ALL CABLE TO GROUND RODS, GROUND ROD SPLICES AND LIGHTNING PROTECTION SYSTEMS ARE TO BE AS INDICATED. ALL MATERIALS USED (MOLDS, WELDING METAL, TOOLS, ETC.) SHALL BE BY "CADWELD" AND INSTALLED PER MANUFACTURER'S RECOMMENDED PROCEDURES.
      2. ALL ABOVE GRADE GROUNDING AND BONDING CONDUCTORS SHALL BE CONNECTED BY TWO HOLE CRIMP TYPE (COMPRESSION) CONNECTIONS (EXCEPT FOR THE ACEG AND GROUND ROD) MECHANICAL CONNECTIONS, FITTINGS OR CONNECTIONS THAT DEPEND SOLELY ON SOLDER SHALL NOT BE USED. ALL CABLE TO CABLE CONNECTIONS SHALL BE HIGH PRESSURE DOUBLE CRIMP TYPE CONNECTIONS.CONNECTIONS TO STRUCTURAL STEEL SHALL BE EXOTHERMIC WELDS.
   D. GROUND RODS ALL GROUND RODS SHALL BE 5/8-INCH DIAMETER X 10'-0" LONG "COPPERED" OR APPROVED EQUAL, OF THE NUMBER AND LOCATIONS INDICATED. GROUND RODS SHALL BE DRIVEN FULL LENGTH VERTICAL IN UNDISTURBED EARTH.
   E. GROUND CONDUCTORS ALL GROUND CONDUCTORS SHALL BE STANDARD TINNED SOLID BARE COPPER ANNEALED, AND OF SIZE INDICATED ON DRAWINGS UNLESS NOTED OTHERWISE.
   F. LUGS
      1. LUGS SHALL BE 2-HOLE, LONG BARREL, STRAND COPPER UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS. LUGS SHALL BE THOMAS AND BETTS SERIES #548 BE OR EQUIVALENT MINIMUM BENDING

| | |
|---|---|
| A. 535 MCM DLO | 54880BE |
| B. 262 MCM DLO | 54872BE |
| C. #1/0 DLO | 54862BE |
| D. #4/0 THWN AND BARE | 54866BE |
| E. #2/0 THWN | 54862BE |
| F. #2 THHN | 54207BE |
| G. #6 DLO | 54205BE |

      2. WHEN THE DIRECTION OF THE CONDUCTOR MUST CHANGE, IT SHALL BE DONE GRADUALLY. THE CURVATURE OF THE TURN SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING CHART:

| GROUNDING CONDUCTOR SIZE | RADIUS TO INSIDE EDGE |
|---|---|
| NO. 6 AWG TO NO. 4 AWG | 6 INCHES |
| NO. 2 AWG TO NO. 1/0 AWG | 8 INCHES |
| NO. 2/0 AWG TO 4/0 MCM | 12 INCHES |
| 250 MCM TO 750 MCM | 24 INCHES |

   G. GROUND RING
      1. THE EXTERNAL GROUND RING ENCIRCLING THE TOWER (IF APPLICABLE) AND BETWEEN THE EQUIPMENT SHELTER PLATFORM ANCHORS SHALL BE MINIMUM NO. 2 A.W.G. SOLID TINNED BARE COPPER CONDUCTORS IN DIRECT CONTACT WITH THE EARTH AT THE DEPTH INDICATED ON THE DRAWINGS. CONDUCTOR BENDS SHALL HAVE A MINIMUM BENDING RADIUS OF EIGHT (8) INCHES.
      2. ALL EXTERNAL GROUND RINGS ARE TO BE JOINED TOGETHER AND ALL CONNECTIONS MUST BE CADWELDED. NO LUGS OR CLAMPS WILL BE ACCEPTED.
   H. FENCE/GATE GROUND EACH GATE POST, CORNER POST AND GATE AS INDICATED ON DRAWING GROUND CONNECTIONS TO FENCE POSTS AND ALL OTHER CONNECTIONS FOR THE GROUND GRID SYSTEM SHALL BE MADE BY EXOTHERMIC WELD PROCESS, AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND PROCEDURES, AND SPRAYED WITH COLD GALVANIZED PAINT.
9. I.E.E.E. FALL POTENTIAL TESTS
   A. FOR RAW LAND SITE
      1. GROUND TESTS SHALL BE PERFORMED AS INDICATED ON DRAWINGS. A BIDDLE GROUND OHMER OR THE METHOD OF USING TWO AUXILIARY GROUND RODS (AS DESCRIBED IN I.E.E.E. STANDARDS NO. 81-1983, PART 1) MAY BE USED. THE I.E.E.E. METHOD REQUIRES THE USE OF AN A.C. TEST CURRENT. THE AUXILIARY TEST RODS MUST BE SUFFICIENTLY FAR AWAY FROM THE ROD UNDER TEST SO THAT THE REGIONS IN WHICH THEIR RESISTANCE IS LOCALIZED DO NOT OVERLAP. THE TEST POINT WILL BE THE GROUND ROD AND WILL CONSIST OF THE THREE POINT FALL OF POTENTIAL MEGGER TEST METHOD, USING THE BIDDLE NULL-BALANCE EARTH TESTER (MEGGER #250220-2 OR EQUIVALENT)
      2. CONTRACTOR TO CONDUCT GROUND RESISTANCE TEST IN THE FORMAT AS FOLLOWS:

gogo
Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL — DATE ISSUED: 08.08.2013
CHECK BY: KAB — DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SPECIFICATIONS

SHEET NUMBER:
SP-3

SCALE: NONE

PROJECT NUMBER:
25975

A. EQUIPMENT PAD
   1. FIRST TEST - SHALL BE WITH FOUR GROUND RODS INSTALLED, ONE AT EACH CORNER OF THE PAD BUT NOT CONNECTED TO THE MAIN GROUNDING BUS. FURNISH WIRE TO CONNECT (TEMPORARY CLAMP) ALL FOUR GROUND RODS TOGETHER TO MAKE A SYSTEM TEST AFTER EACH ROD IS INDIVIDUALLY TESTED. IF ANY INDIVIDUAL ROD TESTS 25 OHMS OR MORE, THE ELECTRICAL CONTRACTOR AND OWNER'S REPRESENTATIVE SHOULD BE NOTIFIED SO THAT THE ROD CAN BE DRIVEN DEEPER UNTIL ALL FOUR RODS HAVE A RESISTANCE OF 10 OHMS OR LESS ON A DRY DAY.
   2. SECOND TEST - SHALL BE WITH THE GROUND RODS CONNECTED, WITH DRY SOIL AND WHEN NO STANDING WATER HAS BEEN PRESENT FOR THE PAST TEN (10) DAYS. THE MAXIMUM ALLOWABLE READING IS 5 OHMS TO GROUND. IF THE RESISTANCE OF THE ENTIRE SYSTEM EXCEEDS 5 OHMS, NOTIFY THE CONTRACTOR AND OWNER'S REPRESENTATIVE SO THAT ADDITIONAL AND/OR DEEPER RODS CAN BE INSTALLED.

B. TOWER
   1. FIRST TEST - SHALL BE WITH THREE GROUND RODS INSTALLED (MINIMUM), EQUALLY SPACED AROUND THE TOWER FOUNDATION, BUT NOT CONNECTED TO THE SHELTER PAD EXTERNAL GROUND RING. FURNISH WIRE TO CONNECT (TEMPORARY CLAMP) ALL THREE GROUND RODS TOGETHER TO MAKE A SYSTEM TEST AFTER EACH ROD IS INDIVIDUALLY TESTED. IF ANY INDIVIDUAL ROD TESTS 25 OHMS OR MORE, NOTIFY THE CONTRACTOR AND OWNER'S REPRESENTATIVE SO THAT THE ROD CAN BE DRIVEN DEEPER UNTIL ALL THREE (3) RODS HAVE A RESISTANCE OF 10 OHMS OR LESS ON A DRY DAY.
   2. SECOND TEST - SHALL BE WITH THE GROUND RODS CONNECTED, WITH DRY SOIL AND WHEN NO STANDING WATER HAS BEEN PRESENT FOR THE PAST TEN (10) DAYS , THE MAXIMUM ALLOWABLE READING IS 5 OHMS TO GROUND. IF THE RESISTANCE OF THE ENTIRE SYSTEM EXCEEDS 5 OHMS THE ELECTRICAL CONTRACTOR AND OWNER'S REPRESENTATIVE SHOULD BE NOTIFIED SO THAT EITHER ADDITIONAL AND/OR DEEPER RODS CAN BE INSTALLED.

C. EQUIPMENT PAD AND TOWER
   1. AFTER THE EQUIPMENT PAD AND TOWER GROUND RESISTANCE TEST IS COMPLETED, CONTRACTOR SHALL TIE EQUIPMENT PAD EXTERNAL GROUND RING AND TOWER EXTERNAL GROUND RING TOGETHER. AFTER FIRST AND SECOND TEST ALL CONNECTIONS MUST BE MADE USING EXOTHERMIC WELD. NO LUGS OR CLAMPS WILL BE ACCEPTED.
   2. AFTER ALL THE EXTERNAL GROUND RINGS ARE TIED TOGETHER, COMPLETE A MEGGER CHECK OF THE GROUND SYSTEM SHOULD BE DONE. THE MAXIMUM ALLOWABLE LEADING IS 5 OHMS TO GROUND. 10. GROUNDING RESISTANCE TEST REPORT UPON COMPLETION OF THE TESTING FOR EACH SITE, A TEST REPORT SHOWING RESISTANCE IN OHMS WITH AUXILIARY POTENTIAL ELECTRODES AT 5 FEET AND 10 FEET INTERVALS UNTIL THE AVERAGE RESISTANCE STARTS INCREASING AND ALSO NOTE THAT 10-15 PHOTOS MUST BE TAKEN TO PROOF ENTIRE EXTERNAL GROUND RING SYSTEM BEFORE BACKFILL. TWO (2) SETS OF TEST DOCUMENTS ARE OF THE INDEPENDENT TESTING SERVICE TO BE BOUND AND SUBMITTED WITHIN ONE (1) WEEK OF WORK COMPLETION.

10. GROUNDING RESISTANCE TEST REPORT UPON COMPLETION OF THE TESTING FOR EACH SITE, A TEST REPORT SHOWING RESISTANCE IN OHMS WITH AUXILIARY POTENTIAL ELECTRODES AT 5 FEET AND 10 FEET INTERVALS UNTIL THE AVERAGE RESISTANCE STARTS INCREASING AND ALSO NOTE THAT 10-15 PHOTOS MUST BE TAKEN TO PROOF ENTIRE EXTERNAL GROUND RING SYSTEM BEFORE BACKFILL. TWO (2) SETS OF TEST DOCUMENTS ARE OF THE INDEPENDENT TESTING SERVICE TO BE BOUND AND SUBMITTED WITHIN ONE (1) WEEK OR WORK COMPLETION.

## SECTION 16503 - POLES, POSTS, AND STANDARDS (SINGLE MAST AND SELF SUPPORTING TOWERS)

1. GENERAL
   A. LIGHTNING ROD AND EXTENSION PIPE INCLUDING ALL APPURTENANCES, TO BE FURNISHED BY OWNER, IF REQUIRED.
   B. PROVIDE TEMPORARY LIGHTING FOR TOWER AS PER FAA REGULATIONS DURING CONSTRUCTION, IF REQUIRED.
   C. GROUNDING: GROUND TOWER WITH A MINIMUM OF #2 AWG TINNED SOLID BARE COPPER CONDUCTOR CADWELDED TO TOWER BASE PLATE. TWO (2) GROUNDING LEADS PER TOWER BASE PLATE. NON-EXOTHERMIC WELDS SHALL BE ATTACHED DIRECTLY TO THE MONOPOLE TOWER SHAFT.

## SECTION 16745 - TELECOMMUNICATIONS WIRING COMPONENTS (COAXIAL ANTENNA CABLE)

1. GENERAL
   A. ALL MATERIALS, PRODUCTS OR PROCEDURES INCORPORATED INTO WORK SHALL BE NEW AND OF STANDARD COMMERCIAL QUALITY.
   B. CERTAIN MATERIALS AND PRODUCTS WILL BE SUPPLIED BY THE OWNER (REFER TO GENERAL CONDITIONS FOR THE LIST OF OWNER FURNISHED EQUIPMENT, MATERIALS AND SUPPLIES FOR THESE ITEMS). THE CONTRACTOR IS RESPONSIBLE FOR PICKUP AND DELIVERY OF ALL SUCH MATERIALS
   C. ALL OTHER MATERIALS AND PRODUCTS SPECIFIED IN THE CONTRACT DOCUMENTS SHALL BE SUPPLIED BY THE CONTRACTOR.
2. MATERIALS:
   A. COAXIAL CABLE:
      1. INSTALL COAXIAL CABLE AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS WITH COAXIAL CABLES SUPPORTED AT NO MORE THAN 3'-0" O.C. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURERS' REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF EQUIPMENT LOCATION UNLESS OTHERWISE STATED.
      2. ALL COAX RUN LENGTHS SHALL BE PER RF APPROVED DESIGN.
3. ANTENNA AND COAXIAL CABLE GROUNDING
   A. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS)
4. COAXIAL CABLE IDENTIFICATION
   A. TO PROVIDE EASY IDENTIFICATION AND UNIFORM MARKING OF ANTENNA CABLING, MARK CABLE:
      1. FIRST LOCATION IS AT THE END OF THE COAX NEAREST THE ANTENNA (WHERE THE COAXIAL CABLE AND JUMPER ARE CONNECTED).
      2. SECOND LOCATION IS INSIDE THE EQUIPMENT SHELTER NEAR THE WAVEGUIDE ENTRY PORT.
      3. THIRD LOCATION IS OUTSIDE THE EQUIPMENT SHELTER NEAR THE WAVEGUIDE ENTRY PORT.
5. TESTING THE CONTRACTOR IS REQUIRED TO COMPLETE COAX SWEEPS PER CARRIER REQUIRED GUIDANCE. THE CONTRACTOR TO PROVIDE 96 HOUR ADVANCED NOTIFICATION TO CARRIER CONSTRUCTION MANAGER SO THAT OPERATIONS STAFF CAN BE ON-SITE TO SUPERVISE SWEEPS, IF REQUIRED.





Gogo LLC
1250 N Arlington Heights Rd., Suite 500
Itasca, Illinois 60143

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Colorado.

COLORADO LICENSED JAMES R. SKOWRONSKI 36936 PROFESSIONAL ENGINEER
8/08/2013

| MARK | DATE | DESCRIPTION |
|---|---|---|
| B | 8.8.13 | FINAL CONSTRUCTION DRAWINGS |
| A | 7.30.13 | PRELIM CONSTRUCTION DRAWINGS |

ISSUE PHASE: FINAL
DATE ISSUED: 08.08.2013
CHECK BY: KAB
DRAWN BY: TDN

SITE NAME:
GUNNISON - PILGRIM TOWER COLO

SITE NUMBER:
CO011-B

SITE ADDRESS:
1445 STATE HIGHWAY 135
GUNNISON, CO 81230
GUNNISON COUNTY

SHEET NAME:
SPECIFICATIONS

SHEET NUMBER:
SP-4

SCALE: NONE

PROJECT NUMBER:
25975