U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

TABLE OF CONTENTS

Cahto – Section 01 11 00 – Summary of Work 2
PART 1: General 3
PART 2: Products 6
PART 3: Execution 13
PART 4: Cahto – Drawings 24
PART 5: Cahto – Contractor Bid Document 25

CAHTO PEAK – SECTION 01 11 00 – SUMMARY OF WORK

Latitude: 39°41'10.50"N
Longitude: 123°34'55.80"W

Top View of Facility

Image of Facility

CAHTO – SECTION 01 11 00 – SUMMARY OF WORK

PART 1: GENERAL

1.1 PROJECT OVERVIEW

A. The Bureau of Land Management (Government) is seeking proposals for the remediation of an existing communications facility located at the Cahto radio facility in California. The facility is located at Latitude 39°41'10.50"N, Longitude 123°34'55.80"W. The elevation at the facility is 4,200 feet AMSL.

B. The Project consists of furnishing labor, equipment, supplies, and materials to remediate an existing radio communications facility.

C. The BLM shares the facility with Mendocino County and US Geological Survey (USGS). Mendocino County operates numerous microwave systems at this site, in addition to the BLM LMR systems and USGS' radio operations for its seismograph system.

1.2 FACILITY DESCRIPTION

A. The BLM owns the communications facility at this site and shares the building and self-supporting lattice tower with Mendocino County and USGS.

B. The building is a 40-foot wide, 40-foot long concrete block structure that was built in the 1940s as a radar site. It became BLM property after the WWII, and was converted into a communications site. The building is in serious disrepair and is unsafe to house BLM and cooperator equipment. The entire building is crumbling, the concrete and grout is coming off in chunks, and the cinder blocks are coming loose from the exterior walls. Coatings are flaking off, ports used by BLM are not sealed, and doors need repair. The metal roof is rusted through in some places, and the roof supports are weakened as well.

1.3 GOVERNMENT RESPONSIBILITIES

A. The Government has provided preliminary design drawings of the proposed work for each radio communications facility contained in this RFP. The preliminary design drawings provide a detailed overview of the radio facility layout to include the location of existing infrastructure, radio equipment, grounding systems, and electrical systems. These preliminary design drawings are not to be used for construction. They are intended to be used by the Construction Contractor as a visual aid during the bidding process. The following preliminary design drawings are included with this RFP:

1. T1 – Title Sheet
2. A1 – Preliminary Shelter Configuration
3. A2 – Shelter Foundation Details (Blank to be developed by Contractor)
4. A3 – Preliminary Shelter Elevation Details
5. C2 – Preliminary Facility Layout Plan
6 C3 – Preliminary Shelter Layout
7. E1 – Electrical Site Plans (Blank to be developed by Contractor)
8. E2 – Electrical One-Line (Blank to be developed by Contractor)
9. E3 – Preliminary External Grounding Plan
10. E4 – Preliminary Internal Grounding Plan
11. E5 – Lightning Protection Plan (Blank to be developed by Contractor)
12. G1 – Key Notes

B. The Government will supply CAD drawing templates for the selected Contractor to use in the development of final design drawings.

1.4 CONTRACTOR RESPONSIBILITIES

A. The Construction Contractor shall be responsible for the construction and remediation of a compliant radio communications facility in accordance with details provided in this Summary of Work, relevant specification Sections incorporated in this RFP, and applicable City, County, State, and Federal Codes and Regulations.

1. The Contractor shall coordinate its work with BLM, Mendocino County and the USGS.
2. In general, the Contractor shall relocate all BLM radio equipment from the old shelter to the new shelter, including all appurtenances including but not limited to: duplexers, filters, RF cables, surge protection devices, grounding jumpers and power supplies, batteries and battery charge controllers and associated facilities and equipment.
3. Mendocino County and USGS shall each relocate its own equipment and appurtenances of whatever kind, including their batteries and charge controllers.
4. The contractor shall relocate the existing backup generator owned by Mendocino County into the new generator housing, but Mendocino County will be responsible for re-wiring the generator and installing the fuel system, for installing the propane piping from the propane tanks (moved to a new location by the BLM's contractor), and all propane valving and controls necessary to provide a complete workable system.
5. The BLM Contractor will provide any foundations required for the propane tanks in the relocated location, subject to approval of Mendocino County.
6. The BLM Contractor shall also plan and coordinate the location of the underground conduit to connect the existing USGS seismographs to the new shelter with USGS as part of the plan development process.
    a. Thereafter, the BLM contractor shall construct the trench immediately before USGS is prepared to install the new conduit, and will effectively coordinate such trenching effort with the USGS schedule at the site.
    b. USGS will install the conduit, wire and backfill the trench, and will re-connect its seismographs to the new wiring.
7. The BLM Contractor will coordinate its other site work and the demolition of the old shelter with BLM, Mendocino County and USGS and not unnecessarily interfere with the operations of the cooperators and/or their duly authorized agents or contractors who may be performing work at the site associated with this project.

B. Utility Location Service: The Construction Contractor shall identify location of existing belowground utilities to include but not limited to Telephone Company copper and fiber optic lines, gas lines and electrical transmission lines.

1. Identification and markings of belowground utilities must be performed by a local professional Utility Locator service prior to final design and prior to excavation at the facility.

C. The Construction Contractor shall prepare a facility design package for construction of the communications facility as detailed in Paragraph 2.3 of this Section.

D. Final design package shall be submitted to the Government for approval four (4) weeks prior to commencement of the installation.

E. The Construction Contractor shall prepare electrical designs, drawings for modifications to existing utilities as required for obtaining permits, and inspections by the local jurisdiction as required.

F. The Construction Contractor shall provide three Third-party Inspector candidates as outlined in Paragraph 1.4, Section 01 45 23 - Third-Party Testing and Inspecting Services.

1. A qualified Third-Party Inspector shall be selected by the Government and hired by The Construction Contractor to inspect the work at the intervals specified under this contract in accordance with Section 01 45 23 - Third-Party Testing and Inspecting Services.
2. The Government can provide The Construction Contractor with a list of pre-qualified Third-Party Companies.

G. The Construction Contractor shall provide pre-construction design drawings to a Third-Party Inspector in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.
   1. The Construction Contractor shall coordinate with the Government and the Third-party Inspector to review and approve the final Facility Development Plans and Installation/Construction Drawings.

H. The Construction Contractor shall provide photographs of all below grade, encased, or otherwise concealed grounding systems to a Third-Party Inspector in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.

I. The Construction Contractor shall perform ground resistance to Earth testing in accordance with Section 33 79 83.53 – Grounding Electrode System Resistance.

J. The Construction Contractor shall notify the Government and the Third-Party inspector of the planned completion date three weeks in advance to allow adequate time for the Third Party Inspector to make travel arrangements.

K. The grounding system resistance to earth shall have a design goal of 10 Ohms with a minimally acceptable final ground resistance of 25 Ohms or less in accordance with NEC 250.56 – Resistance of Rod, Pipe, and Plate Electrodes.

1.5 THIRD-PARTY INSPECTION REQUIREMENTS

A. The Third-party Inspector shall review design drawings provided by The Construction Contractor prior to the start of construction to ensure compliance with the requirements included in specification Sections of this RFP, general industry standards and best practices, and other local, State or Federal codes and standards in accordance with Paragraph 3.3 A, Section 01 45 23 - Third-Party Testing and Inspecting Services.

B. The Third-Party Inspector shall review photographs of all below grade, encased, or otherwise concealed grounding systems provided by The Construction Contractor during construction in accordance with Paragraph 3.3 B, Section 01 45 23 - Third-Party Testing and Inspecting Services.
   1 The Third-Party Inspector shall complete the relevant photo inspection table for the facility type in accordance with Paragraph 4.1, Section 01 45 23 - Third-Party Testing and Inspecting Services.

C. The Third-party Inspector shall perform an on-site inspection of the radio facility after construction work is complete in accordance with Paragraph 3.3 C, Section 01 45 23 - Third-Party Testing and Inspecting Services.
   1. The Third-Party Inspector shall verify the completed construction of the facility is in conformance and compliant with the original facility design, comparing the redlined drawings with field observations and contractor supplied photographs.
   2. The Third-party Inspector shall complete the DOI Radio Communication Site Inspection Checklist providing notes describing each identified deficiency. Field measurements and tests results will also be noted on the checklist.
   3. A checklist for inspecting photovoltaic installations can be found in Attachment 4.2.A – Section 01 45 23 - Third-Party Testing and Inspecting Services.

D. The Third-Party Inspector shall verify the final ground resistance to earth in accordance with Paragraphs 3.3 and 3.4, Section 01 45 23 - Third-Party Testing and Inspecting Services.

E. The Third-Party Inspector shall complete the Fall-of-Potential Ground Resistance Field Report as required in Paragraph 4.3, Section 01 45 23 - Third-Party Testing and Inspecting Services.

F. The Third-party Inspector shall provide a punch-list report describing each identified deficiency.
   1. The report shall include a summary of punch list items with references to the specification section(s), down to the subparagraph level, and photos of each deficiency.
   2. Field measurements and tests results will also be noted on the punch-list.

3. Each punch list item must have a corrective action that would comply with the Contract requirements.
4. An example of the Punch-List report is provided as Attachment 4.5 B, Section 01 45 23 - Third-Party Testing and Inspecting Services

1.6 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions apply to this Section.
B. Government and Contractor provided drawings and design plans.
C. Applicable specification Divisions and Sections included with this RFP.

1.7 APPLICABLE SPECIFICATIONS, CODES, AND STANDARDS

A. The work shall be performed in compliance with applicable codes, and generally accepted standards as described in specification Sections included with this RFP as amended and adopted by BLM.
   1. In the occurrence of conflicting codes and or standards, the most stringent shall apply, unless otherwise specifically required by the Government's engineer.
   2. BLM has not adopted the Motorola R-56 Guidelines in their entirety. DOI DD 2009-008 has specific instructions addressing how to implement certain requirements that deviate from the R-56 Guidelines. Those requirements are reflected in the specification sections included with this RFP.
B. The work shall be performed in compliance with applicable City, County, and State Codes, including but not limited to building and environmental where required.
   1. In the occurrence of conflicting codes and or standards, the most stringent shall apply, unless otherwise specifically required by the Government's engineer.
C. The work shall be performed in compliance with Occupational Safety and Health Administration - Occupation Safety laws.
D. The work shall be performed in compliance with Prevailing Labor Laws and Wage Rates.

PART 2: PRODUCTS

2.1 GENERAL

A. All products shall comply with Section 01 60 00 – Product Requirements and in accordance with applicable Sections contained in this RFP.

2.2 OWNERSHIP OF DRAWINGS, DOCUMENTS, AND SPECIFICATIONS

A. All drawings and documents submitted by The Construction Contractor to the Government shall become the property of the Government.
B. Proprietary information provided by The Construction Contractor shall be clearly labeled.

2.3 RADIO FACILITY DESIGNS

A. The Government has provided detailed preliminary drawings of the proposed work with this RFP as described in Paragraph 1.2 of this Summary of Work.
B. The Construction Contractor's A&E Firm shall be responsible for the preparation of a complete facility design package. The A&E design package shall include the following:
   1. Site Layout Plan (Drawing C2) will include Earthwork details on the following:
      a. Grubbing, grading, demolition and erosion control plans
      b. Excavation details
      c. Trenching details
      d. Backfilling and compaction details

e. Identification and location of existing and proposed utilities - both underground and overhead
f. Location of existing and proposed external grounding systems
g. Existing and proposed structures

2. Electrical Site Plan (Drawing E1) including the following:
   a. Identification and location of existing and proposed utilities - both underground and overhead
   b. Identification and location of existing and proposed external grounding systems
3. Electrical One-Line (Drawing E2) including the following:
   a. Identification and location of existing and proposed electrical devices, wiring, panels, surge protection, and other related components
   b. Identification and location of relevant internal and external grounding devices, wiring, and other relevant components
4. External Grounding (Drawing E3)
5. Internal Grounding (Drawing E4)

C. Designs shall include details based on the Government provided preliminary design drawings.
D. Plans and Drawings shall include details for obtaining permits, and inspections as required by the local jurisdiction if applicable.
E. Final Designs and Plans must be approved by the Government prior to construction.
F. The Construction Contractors A&E Firm shall work with the shelter vendor to incorporate the minimum shelter design drawings listed below”
   1. Shelter Layout - (Drawing A1)
   2. Shelter Foundation - (Drawing A2)
   3. Shelter Elevation Details - (Drawing A3)

2.4 KEY NOTES

A. Key Note symbols are used throughout this summary of work, Construction Contractor Bid Document, and on the Preliminary Design drawings. The Key Notes provide reference between the work required and the preliminary designs. Each symbol represents a separate area of concern. The Construction Contractor shall include these Keynotes in the Facility Design Package to provide reference to this Summary of Work and the Preliminary Design drawings.
   1. Circle – Infrastructure (Access Road, Shelter, and Tower)
   2. Oval – External Grounding Device
   3. Hexagon – Internal Grounding Device
   4. Triangle – Electrical Device
   5. Square – Radio or Ancillary Equipment

2.5 COMMUNICATIONS TOWER REMEDIATION

A. The Construction Contractor shall design, procure, and install a safety climb device to the climbing access ladder.
   1. Safety climb cable system shall meet *ANSI Z359.6-2009 requirements*.

2.6 NEW COMMUNICATIONS EQUIPMENT SHELTER

A. The Construction Contractor shall procure and install a communications equipment shelter for this project and a generator shelter.

B. The communications equipment shelter shall be a twelve (12)-foot wide, twenty-eight (28)-foot long, and eight (9)-foot tall (Accommodating a minimum of twenty (20) Equipment Racks/Cabinets).

1. (2) The communications equipment shelter shall be installed and meet the specifications as detailed in Section 13 34 18 – Prefabricated Communications Shelter.
2. The Construction Contractor shall work with the Shelter Manufacturer (Vendor) to provide installation drawings, instructions, and specifications, stamped by a professional engineer licensed in the State of California for the following:
   a. Shelter foundation design drawings, specifications, and installation instructions.
   b. The shelter structure to include one-line electrical drawings.
   c. Shelter internal features such as but not limited to, equipment racks, power systems, cable trays/ladders, lighting, HVAC and other furnishings to be supplied by the Shelter Vendor.
3. Per the International Building Code (IBC), the Shelter specified in this section shall be classified as follows:
   a. Occupancy Classification: Utility
   b. Risk Category: IV (critical facility)
   c. Type Category: IB;
   d. Fire Rating: 2 hour

C. Exterior Finish: The exterior walls of the shelter shall be washed and sealed exposed aggregate.

D. Shelter Exterior Color: The shelter's exterior color shall be Mesa Tan for the exposed non-concrete trim metals.

E. Interior Finish: The interior finished walls of the shelter shall be shall be high density FRP or PE over 5/8" plywood or OSB with suitable finished edges and trim, such as, but not limited to, corner guards and baseboards.

F. Shelter Loads: Shelter construction will meet listed loads.

1. Wind loads
   a. Ultimate Wind Speed (V_{ult}), for a Risk Category IV structure = 115 mph.
   b. Nominal Wind Speed (V_{asd}) = 89 mph.
   c. Wind Exposure Class for this site is Exposure B, with a Surface Roughness Category B for all directions.
   d. The Topographic Factor for this site (K_{zt}) = 2.4025
   e. Wind Load Importance factor is 1.15.
2. Flat-roof snow load (Pf) = 12 PSF; Snow exposure factor (Ce) = 0.9; Snow load importance factor (I) = 1.2; Thermal Factor (Ct) = 1.0 (Refer to ASCE 7-10, Chapters 1, 7 and appendices)
3. Roof Live Load: (Lr) 300 psf. per IBC Chapter 16
4. Floor Load
   a. Live Floor Load: 100 psf.
   b, Concentrated floor load for equipment racks and batteries: 250 psf.
   c. Additional spreader plates may be required to distribute the battery rack loading.
5. Earthquake Design Loading:
   a. "Risk Category for this facility is IV (essential facility). Therefore, the Importance factor to be applied to the seismic calculations is 1.5.
   b. Site Class (soil type) is Class D, Stiff Soil (since we do not have site-specific soil information). The following are the parameters to be used in designing the facility and supports for internal equipment:
      1) SS = 1.840g;

2) S_{MS} = 1.840 g;
3) S_{DS} = 1.227 g;
4) S_1 = 0.738 g;
5) S_{M1} = 1.107 g;
6) S_{D1} = 0.738g.
7) F_A = 1.000
8) F_X =1.500
9) Seismic Risk Category from Table 11.6-1 or 11.6-2 = D. This site was formerly classified as Zone 4 under the earlier version of the IBC."
10) Note that had S_1 value been greater than 0.75, this facility would be classified under Seismic Risk Category F
11) Note that had S_1 value been greater than 0.75, this facility would be classified under Seismic Risk Category F

6. Soil Bearing Capacity:
   a. Use results from the site-specific soil investigation report. If no report is available, use a maximum surface soil bearing capacity of 1,500 PSF.
7. Flood Design
   a. The site is not located in any known flood hazard zones and is not subject to localized flooding.
8. The shelter design shall include accommodations for special loads, not previously mentioned, to include:
   a. Photovoltaic panel supports/racks to be mounted on the shelter roof as specified in Paragraph 3.5 of this Section.
9. Ballistic Loads:
   a. The shelter door shall be bulletproof using UL752 listed materials (Level 9 UL752 Bullet-Resistance rating)

G: Shelter Insulation Values:
1. Wall = R-26
2. Roof = R-36
3. Floor = R-26

H: Commercial Electrical Equipment
1. Electrical equipment shall be manufactured by the following manufacturers or equivalent:
   a. General Electric
   b. Square D
   c. Cutler Hammer.
2. Electrical installation and wiring shall conform to the latest edition of the National Electric Code and shall consist of the following as a minimum:
   a. Factory Wiring: The entire housing and all internal and external electrical devices and components shall be completely factory circuited and wired.
   b. Provide conduit, conductors, boxes, etc as required for a complete assembly.
   c. Materials and Installation: All electrical wiring and circuiting shall be installed in EMT conduit.
      1) Fittings and connectors shall be steel compression type with insulated throats; die-cast fittings are not acceptable.
      2) Conduit shall be supported every four feet minimum, using steel straps.
      3) Conduit bends shall be made with a manufactured mechanical bender, or factory made elbows shall be used.

4) All conduit shall be routed exposed, and attached to the inside surface of the shelter.
5) All wire shall be copper, with THWN insulation; aluminum conductors are not acceptable. Minimum wire size to be #12 AWG.
6) All wire runs shall be continuous, splices are not allowed.
7) An equipment grounding conductor shall be installed in every conduit, for every circuit run.
8) Metallic conduit shall not be solely relied upon for grounding.
9) Equipment grounding conductors shall be sized per NEC.

3. Service-Disconnect panel: Service-Disconnect and metering panels shall comply with Section 26 27 13 – Electricity Metering.
   a. Provide a combination meter socket with main service-disconnect:
      1) Meter Socket Type: Comply with requirements of local electrical power utility company.
      2) Service-Disconnect Panel shall be a 120/240 VAC, Single Phase – 3 Wire, [125-ampere or 250-ampere] -rated, service-disconnect panel with a [100-ampere or 200-ampere] circuit breaker in a NEMA 250, Type 3R enclosure.
      3) Meter shall be furnished by the local power utility company.
   b. Service disconnect shall be installed on the exterior wall of the shelter opposite of the primary distribution panel board.
   c. Provide nameplate engraved "Service-Disconnect".
4. Panel board: 120/240 V, 1 Phase – 3 Wire, 250 Ampere, with a 200 Amp /2P Main Circuit Breaker.
   a. Panel boards rated at 250-amperes shall have a minimum of 42 circuits.
   b Bolt-On circuit breakers. Provide with circuit breakers as required to feed all of the equipment specified or installed.
   c. The surge protection device (SPD) requires a minimum 60-ampere/2-pole circuit breaker installed in the top most slot on the panel board.
5. Simplex Receptacles: The shelter manufacturer shall provide simplex/single receptacles suspended above each potential equipment rack space.
   a. The shelter is designed for twenty (20) equipment racks/cabinets in two equipment rows.
   b. All simplex receptacles shall be 20A, NEMA L5-20R specification grade.
   c. Each receptacle shall be on an individual 20A, dedicated circuit (only one receptacle on a 20A circuit).
6. Duplex Receptacles: Provide duplex receptacles every four (4) feet inside the shelter along the walls.
   a. All receptacles shall be 15A, NEMA 5-15R specification grade.
   b. Each receptacle shall be on an individual 15A, dedicated circuit (only one receptacle on a 15A circuit).
7. Ground fault circuit interrupter (GFCI) Receptacle: Provide one (1) weatherproof GFCI receptacle on the external wall of the shelter located near the [shelter electrical entrance] or [where deemed most accessible].
   a. Receptacle shall be 15A, 5-15R specification grade and work in wet weather.
   b. Receptacle shall come equipped with a weatherproof outdoor cover.
   c. Receptacle shall be on an individual 15A, dedicated circuit (only one receptacle on a 15A circuit).
   d. Provide specification grade switch inside housing to control the receptacle.
8. The electrical surge-protection device (SPD) shall be provided and installed on the internal wall of the shelter within 24 linear, electrical inches from the panel board.

a. The SPD shall be a Type 1 (SAD/MOV).
b. Transtector APEX 111-X5 120 TMR, 120/240V, 1P-3W, or equivalent.
c. Wire length from circuit breaker to TVSS shall be less than 24 inches.
d. SPD shall be installed per device Manufacturer's instructions.

I: Exhaust and Ventilation System

1. The shelter shall be equipped with an exhaust fan and intake vent as specified in Section 13 34 18 – Prefabricated Communications Shelter, Paragraph 2.7.

J: Commercial Grade HVAC System.

1. The shelter shall be equipped with a redundant commercial grade HVAC system as specified in Section 13 34 18 – Prefabricated Communications Shelter, Paragraph 2.8.

L. RF Cable Entrances

1. The shelter shall be equipped with two 12-port RF cable entrances.
2. RF cable entrances shall be installed in accordance with Paragraph 3.15, Section 27 05 10 – Cable and Wire Installation.
3. 24 blank cable entry caps to be provided for ports that are not placed into immediate use.

M. SITE MONITOR

1. All of the integrated sub components (HVAC, fire suppression, access control/security, AC & DC power) to be monitored and controlled utilizing a custom supervisory control and data acquisition (SCADA) system located inside the shelter.

N. Equipment Racks

Mendocino County has requested space on 10 equipment racks and is in the process of making some changes to its systems. USGS has indicated that 2 racks will be sufficient for their equipment, but has been looking at and testing satellite systems as well. BLM is currently using 3 equipment racks, and has no immediate plans for additional radios or equipment.

1. [1] The Shelter Vendor shall provide and install eighteen (18) new 84-inch high, 19-inch wide equipment racks into two rows as indicated on the preliminary shelter layout drawing.
2. Equipment racks shall meet requirements provided in Section 27 11 16 – Equipment Rack.
3. [4] Equipment racks shall be installed and fastened to the floor meeting seismic anchoring requirements in accordance with Paragraphs 3.5 and 3.6, Section 27 11 16.13 – Equipment Rack/Cabinet Installation.

O. (17) The Shelter Vendor shall provide and install a rack ground bus bar in each equipment rack/cabinet as outlined in Section 27 11 16.13 – Equipment Cabinet and Rack Installation.

1. Rack ground bus bars shall meet specifications outlined in Section 33 79 84.16 – Rack Ground Bus Bar.

2.7 NEW GENERATOR SHELTER

A. The Construction Contractor shall procure and install a new generator shelter.

B The generator shelter shall be a twelve (10)-foot wide, ten (10)-foot long, and eight (9)-foot high.

1. (2) The generator shelter shall be installed and meet the specifications as detailed in Section 13 34 18 – Prefabricated Communications Shelter.
2. The Construction Contractor shall work with the Shelter Manufacturer (Vendor) to provide installation drawings, instructions, and specifications, stamped by a professional engineer licensed in the State of installation for the following:
   a. Shelter foundation design drawings, specifications, and installation instructions.
   b. The shelter structure to include one-line electrical drawings.
3. The Construction Contractor shall relocate the existing generator from the existing communications shelter into the new generator shelter.

C. Exterior Finish: The exterior walls of the shelter shall be washed and sealed exposed aggregate.

D. Shelter Exterior Color: The shelter's exterior color shall be Mesa Tan for the exposed non-concrete trim metals.

E. Interior Finish: The interior finished walls of the shelter shall be shall be high density FRP or PE over 5/8" plywood or OSB with suitable finished edges and trim, such as, but not limited to, corner guards and baseboards.

F. Commercial Electrical Equipment

1. Electrical equipment shall be manufactured by the following manufacturers or equivalent:
   a. General Electric
   b. Square D
   c. Cutler Hammer.
2. Electrical installation and wiring shall conform to the latest edition of the National Electric Code and shall consist of the following as a minimum:
   a. Factory Wiring: The entire housing and all internal and external electrical devices and components shall be completely factory circuited and wired.
   b. Provide conduit, conductors, boxes, etc as required for a complete assembly.
   c. Materials and Installation: All electrical wiring and circuiting shall be installed in EMT conduit.
      1) Fittings and connectors shall be steel compression type with insulated throats; die-cast fittings are not acceptable.
      2) Conduit shall be supported every four feet minimum, using steel straps.
      3) Conduit bends shall be made with a manufactured mechanical bender, or factory made elbows shall be used.
      4) All conduit shall be routed exposed, and attached to the inside surface of the shelter.
      5) All wire shall be copper, with THWN insulation; aluminum conductors are not acceptable. Minimum wire size to be #12 AWG.
      6) All wire runs shall be continuous, splices are not allowed.
      7) An equipment grounding conductor shall be installed in every conduit, for every circuit run.
      8) Metallic conduit shall not be solely relied upon for grounding.
      9) Equipment grounding conductors shall be sized per NEC.
3. Service-Disconnect panel: Service-Disconnect and metering panels shall comply with Section 26 27 13 – Electricity Metering.
   a. Provide a combination meter socket with main service-disconnect:
      1) Meter Socket Type: Comply with requirements of local electrical power utility company.
      2) Service-Disconnect Panel shall be a 120/240 VAC, Single Phase – 3 Wire, [125-ampere or 250-ampere] -rated, service-disconnect panel with a [100-ampere or 200-ampere] circuit breaker in a NEMA 250, Type 3R enclosure.
      3) Meter shall be furnished by the local power utility company.
   b. Service disconnect shall be installed on the exterior wall of the shelter opposite of the primary distribution panel board.
   c. Provide nameplate engraved "Service-Disconnect".
4. Panel board: 120/240 V, 1 Phase – 3 Wire, 60 Ampere, with a 50 Amp /2P Main Circuit Breaker.
   a. Panel boards rated at 60-amperes shall have a minimum of 12 circuits.
   b Bolt-On circuit breakers. Provide with circuit breakers as required to feed all of the equipment specified or installed.

5. Duplex Receptacles: Provide duplex receptacles every four (4) feet inside the shelter along the north and south walls.
   a. All receptacles shall be 15A, NEMA 5-15R specification grade.
   b. Each receptacle shall be on an individual 15A, dedicated circuit (only one receptacle on a 15A circuit).
6. Ground fault circuit interrupter (GFCI) Receptacle: Provide one (1) weatherproof GFCI receptacle on the external wall of the shelter located near the [shelter electrical entrance] or [where deemed most accessible].
   a. Receptacle shall be 15A, 5-15R specification grade and work in wet weather.
   b. Receptacle shall come equipped with a weatherproof outdoor cover.
   c. Receptacle shall be on an individual 15A, dedicated circuit (only one receptacle on a 15A circuit).
   d. Provide specification grade switch inside housing to control the receptacle.

PART 3: EXECUTION

3.1 CONTRACTOR USE OF PREMISES:

A. During the construction period, The Construction Contractor shall have full use of the premises for construction operations, including use of the facility. The Construction Contractor's use of the premises is limited by the Government's ongoing operations.

B. The Construction Contractor shall limit operations to areas within Contract limits indicated to allow for Government occupancy.

3.2 GOVERNMENT OCCUPANCY:

A. Full Government Occupancy: Government will occupy facility during entire construction period. Cooperate with Government during construction operations to minimize conflicts and facilitate Government usage. Perform the Work so as not to interfere with Government day-to-day operations. Maintain existing exits, unless otherwise indicated.

3.3 SPECIAL INSTRUCTIONS:

A. Site Access: To be provided by BLM

B. Seasonal: To be provided by BLM

C. Work Hours: To be provided by BLM

D. Point(s) of Contact: To be provided by BLM

3.4 CIVIL DEVELOPMENT

A. Civil development requirements:
   1. Site clearing shall be performed in accordance with Section 31 10 00 – Site Clearing.
   2. Excavation shall be performed in accordance with Section 31 23 16 – Excavation and Fill.
   3. Trenching shall be performed in accordance with Section 31 23 17 – Trenching.
   4. Backfilling and compaction shall be performed in accordance with Section 31 23 23 – Utility Backfill Materials.

B. Facility Work
   1. The Construction Contractor shall take precautions not to needlessly disrupt existing facility ground cover.
   2. The Construction Contractor shall take precautions to prevent soil erosion from water or wind during construction.
   3. The Construction Contractor shall import to the facility only clean material from a known source and provide documentation of sources and quantities.

4. The Construction Contractor shall provide a plan for the removal of excess facility material. On site and off site methods will be considered.
5. The Construction Contractor shall leave the facility free from work generated debris, ruts, hazards, and materials used during the work.

C. Concrete Foundations: The Construction Contractor shall be responsible for the construction of foundations for the communications equipment and generator shelters.
1. Foundations are to be installed, according to the manufacturer's requirements and specifications.
2. The Construction Contractor shall perform a geotechnical investigation at the radio site to include bore samples required to design the foundations.
3. Shelter foundations shall be designed based on actual soil conditions as detailed in the Geotechnical Report.
4. Foundation designs shall reference the Geotechnical Report number provided by and the report date.
5. The Construction Contractor shall work with the shelter vendor to provide installation drawings, instructions, and specifications, stamped by a professional engineer licensed in the State of California for the following:
6. Concrete Minimum Design Strength at 30 Days shall be a minimum of 4000 psi.

D. The Construction Contractor shall be responsible for installation of the shelters and anchoring the shelters to the foundation per manufacturer's specifications.

E. The Construction Contractor shall demolish the existing communications shelter and foundation to at least 18" below finished grade. All materials shall be removed from the site and the area rehabilitated to pre-construction conditions following completion of demolition and construction.

F. Propane Tanks
1. Construction Contractor shall install foundations for two propane tanks on the south side of the generator shelter.
2. Construction Contractor shall disconnect and move the two Mendocino county owned propane tanks from the existing location to the new foundation.
3. Mendocino County will be responsible for reconnecting the propane system to the new generator housing as part of the relocation of its equipment.

G. The Construction Contractor shall re-condition the existing perimeter fence, including replacing specific portions of the fence which are too deteriorated to repair and repair of the existing gates.

H. The Construction Contractor shall clear the interior of the fenced perimeter of all weeds, brush and other plant materials to reduce fire hazards.

I. The Construction Contractor shall clear at least a 6-foot wide corridor measured from the existing fenced perimeter outward of all vegetation for fire protection and wild fire control.

J. The Construction Contractor shall provide a trench for the re-connection of the USGS seismograph equipment to the new shelter.
1. The routing and other details of the trench will be coordinated with USGS.
2. USGS will be responsible for installing the wiring, re-connecting the seismographs, backfilling the trench and relocating its radio equipment to the new shelter.

3.5 ELECTRICAL SERVICE

A.  The Shelter Vendor shall install a new 200-Ampere service-disconnect panel on the exterior eastern side of the communications equipment shelter.
1. The Main Service Disconnect shall be installed as specified in Section 26 27 13 – Electricity Metering and Section 26 05 00 – Basic Electrical Materials and Methods.

B. ⚠2 The Construction Contractor shall verify and install a neutral-to-ground bond in the electrical service-entrance equipment panels in accordance with Paragraph 3.3, Section 26 27 13 – Electricity Metering.

C. ⚠4 The Shelter Vendor shall install a new interior distribution panel in the communications shelter.

1. Install a 250-Ampere distribution panel in the shelter located on the interior east wall.
2. The distribution panel shall have a main circuit breaker rated at 200-Amperes.
3. The distribution panel shall be installed as specified in Section 26 24 16 – Panel Boards and Section 26 05 00 – Basic Electrical Materials and Methods.

D. ⚠4 The Shelter Vendor shall install a new interior distribution panel in the generator shelter.

1. Install a 60-Ampere distribution subpanel in the shelter located on the interior east wall.
2. The distribution panel shall have a main circuit breaker rated at 50-Amperes.
3. The distribution panel shall be installed as specified in Section 26 24 16 – Panel Boards and Section 26 05 00 – Basic Electrical Materials and Methods.

E. ⚠5 The Construction Contractor install below grade service wiring in conduit between the communications shelter and the generator shelter:

1. Belowground 120/240 Volt, single phase, 60-Ampere service is required between the distribution panel in the communications shelter to feed the subpanel in the generator shelter.
2. Belowground 120/240 Volt, single phase, 200-Ampere service is required for the generator to provide power to the generator transfer switch in the communications equipment shelter.

F. ⚠5 The Construction Contractor shall new electrical service wiring from the transformer to the new electrical service-disconnect on the communications equipment shelter:

1. Belowground 120/240 Volt, single phase, 200-Ampere service is required.
2. The Construction Contractor shall be required to provide belowground electrical service wiring between the electrical transformer (located approximately 215 feet southeast of the compound) and the meter/service disconnect panel on the exterior eastern side of the communications shelter. Will we need service to the gen shelter?
3. The Construction Contractor shall assume the distance from the electrical transformer and the meter/service disconnect panel shall be 250 feet.
4. The electrical service shall be installed as specified in Section 26 21 13 – Low-Voltage Electrical Service Entrance.

G. ⚠6 The Shelter Vendor shall install a dedicated, 20-Ampere circuit for each radio/equipment rack in accordance with Paragraph 3.3, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets.

1. The Shelter Vendor shall install a simplex L520R receptacle above each equipment rack.
2. The Construction Contractor shall procure 20 L520 power plugs and to install for each cooperators equipment.

H. ⚠7 The Shelter Vendor shall install interior lighting in the shelter/equipment room in accordance with Paragraph 2.1 to 2.7, Section 26 50 00 – Lighting.

I. ⚠8 The Shelter Vendor shall install and exterior light near the entrance to the shelter in accordance with Paragraph 3.3, Section 26 50 00 – Lighting.

J. ⚠5 The Construction Contractor shall install electrical service wiring between the primary distribution panel in the communications shelter and the subpanel installed in the generator shelter:

1. Belowground 120/240 Volt, single phase, 60-Ampere service is required.

2. The electrical service shall be installed as specified in Section 26 21 13 – Low-Voltage Electrical Service Entrance.

K. 4 The Construction Contractor shall install a new interior distribution subpanel in the generator shelter to facilitate lights and standard duplex outlets.
   1. Install a 60-Ampere distribution panel in the shelter located on the interior east wall.
   2. The distribution panel shall have a main circuit breaker rated at 30-Amperes.
   3. The distribution panel shall be installed as specified in Section 26 24 16 – Panel Boards and Section 26 05 00 – Basic Electrical Materials and Methods.

L. The Construction Contractor shall coordinate installation and remediation of existing electrical service with the Government and the local power utility company.

M. The Construction Contractor shall provide equipment, and method of installation as provided in the facility plan.
   1. All electrical work shall be performed by a licensed electrician.
   2. The electrical service may be used by the installation contractor during construction.

3.5 BATTERY BACKUP SYSTEM

A. Each cooperator will install, operate, and maintain its own battery backup system.

3.6 LIGHTNING PROTECTION SYSTEM REQUIREMENTS

A. NOT APPLICABLE

3.7 RADIO EQUIPMENT SHELTER

A. The Construction Contractor shall be responsible for procurement, delivery, and installation of the shelter foundation per the shelter manufacturer's specifications.

3.8 GENERATOR SHELTER

A. NOT APPLICABLE

3.9 DISPATCH OPERATOR WORKSTATIONS

A. NOT APPLICABLE

3.10 ELECTRICAL SURGE PROTECTION DEVICE REQUIREMENTS

A. 3 The Shelter Vendor shall design, furnish, and install a Type 1 or Type 2 surge protection device (SPD), at electrical service entrance to the shelter in accordance with Section 26 43 13 – Surge Protection Devices.
   1. SPDs shall meet UL-1449 – Standard for Safety for Surge Protective Devices, 3rd Edition.
   2. SPDs shall be equipped with a redundant protection module/phase.
   3. The two SPD Types detailed below shall be included in design considerations for SPD installations within the office building.
      a. SPD Type 1: Permanently connected SPDs installed on the line/supply side just after the meter.
         1) This type closely relates to the devices referred to in previous versions of UL-1449 as secondary surge arrestors.
      b. SPD Type 2: Permanently connected SPD installed on the load side of the service panel.
         1) This type most closely relates to devices that were classified in previous versions of UL-1449 as Transient Voltage Surge Suppression (TVSS).
         2) These applications include integrated panel devices and branch panel units.

B. (22) The Construction Contractor shall provide and install a surge protection device in line on each RF cable within 24 inches of the entrance to the shelter in accordance with Paragraph 3.13, Section 27 05 10 – Cable and Wire Installation.

1. Each surge protection device shall be bonded to the SSGB/MGB with a #6 AWG, green-jacketed, stranded, copper grounding conductor using UL 467-listed, single-hole connectors, and stainless steel hardware.

3.11 RF CABLE & WAVEGUIDE INSTALLATION

A. [11] The Construction Contractor shall install external cabling attached to walls as outlined in Paragraph 3.12 Section 27 05 10 – Cabling and Wire Install.

B. [13] The Construction Contractor shall install external cabling below ice-bridges as outlined in Paragraph 3.4, Section 33 82 33.23 – RF Cable Ice-Bridge

C. [17] The Shelter Vendor shall provide and install two, 12-port manufactured RF cable entrance panels in accordance with Paragraph 3.15A, Section 27 05 10 – Cable, and Wire Installation.

D. [17] The Construction Contractor shall relocate the BLM's RF cables from the entrance to the existing shelter to the entrance of the new shelter.

1. The Construction Contractor shall not relocate any cooperator's RF cables. Each cooperator will relocate its own equipment and RF cables.

E. [17] The Construction Contractor shall install an all-weather boot on each RF cable in accordance with Paragraph 3.15B, Section 27 05 10 – Cable and Wire Installation.

F. [17] (24) The Construction Contractor shall ground the RF cable entrance panel in accordance with Paragraph 3.15E, Section 27 05 10 – Cable and Wire Installation.

G. [13] The Construction Contractor shall form a minimum 6-inch drip loop for each RF cable and waveguide at the tower-end of the ice bridge in accordance with Paragraph 3.5, Section 33 82 33.23 - RF Cable Ice Bridge.

E. (19) The Construction Contractor shall install two new self-supporting ice bridges between the tower and each RF cable entrance to the shelter in accordance with Paragraph 3.5, Section 33 82 33.23 - RF Cable Ice Bridge.

1. The estimated length of ice bridge one is 15 feet.
2. The estimated length of ice bridge two is 15 feet.

3.12 ANTENNA SYSTEMS

A. Mendocino County shall be responsible for relocation of two microwave antennas install on pipe-masts attached to the existing shelter to the tower.

3.13 GROUNDING SYSTEM DESIGN

A. The Government has provided a preliminary design drawing, E3 of the desired facility grounding electrode system to use as a minimum design requirement.

B. The Construction Contractor shall provide a final design drawing in CAD format (.dwg) including details on the products to be used in the installation. The grounding design plans shall be as follows:

1. E3 – External Grounding Plan (Government's preliminary design provided with this proposal)
2. E4 – Internal Grounding Plan (Government's preliminary design provided with this proposal)

C. The Construction Contractor shall provide a common building grounding system in accordance with Paragraph 3.2, Section 33 79 86.13 – Ground Bus Bars at Occupied Facility.

1. The common grounding system shall further meet the minimum requirements in accordance with NEC 250.50 - Grounding Electrode System.

D. (25Ω) The grounding system resistance to earth shall have a design goal of 10 Ohms with a minimally acceptable final ground resistance of 25 Ohms or less in accordance with NEC 250.56 – Resistance of Rod, Pipe, and Plate Electrodes.

E. A final design shall be submitted to the Government for approval four (4) weeks prior to commencement of the installation.

F. The Construction Contractor shall perform ground resistance to Earth testing in accordance with Section 33 79 83.53 – Grounding Electrode System Resistance.

G. The Construction Contractor shall provide pre-construction design drawings to a Third-Party Inspector in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.

1. The third The Third-Party Inspector shall review design drawings and provide recommended changes to the design to ensure compliance with Standards and Specifications outlined in this RFP.

H. The Construction Contractor shall provide pre-construction design drawings and photographs of all below grade or encased grounding systems to a Third-Party Inspector in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.

I. A Third-Party Inspector shall verify the final ground resistance to earth in accordance with Paragraphs 3.3 and 3.4, Section 01 45 23 - Third-Party Testing and Inspecting Services.

3.14 COMMON EXTERNAL GROUNDING SYSTEM – REMOTE FACILITIES

A. The remote tower and shelter external grounding system shall be configured as a common single-point ground system with two interconnected ring in accordance with Paragraph 3.1, Section 33 79 86 – Ground Bus Bars at Remote Facilities.

1. The Construction Contractor shall remove all existing grounding components from the facility that are not incorporated in the new grounding system design.

B. (1) Ground rods shall meet specifications in accordance with Section 33 79 83.13 – Grounding Electrodes.

1. Grounding electrodes shall further meet the minimum requirement in accordance with NEC 250.52 – Grounding Electrodes
2. Grounding electrodes shall further be installed in accordance with NEC 250.53 – Grounding Electrode System Installation.

C. (4) (5) (6) Grounding conductors shall meet specifications in accordance with Section 33 79 83 – External Ancillary Device Grounding Conductors.

1. Grounding conductors shall further meet the minimum requirement in accordance with NEC 250.62 – Grounding Electrode Conductor Material
2. Grounding conductors shall further be installed in accordance with NEC 250.64 – Grounding Electrode Conductor Installation.

D. (2) The Construction Contractor shall provide and install a new external ground bus bar (EGB) below each RF cable entrance in accordance with Paragraph 3.2, Section 33 79 86 – Ground Bus Bars at Remote Facility.

E. (7) The Construction Contractor shall install an external Shelter Ground Ring (SGR) around the communications equipment shelter and generator shelter foundations in accordance with Section 33 79 15 – Communications Shelter Grounding.

F. (8) The Construction Contractor shall install a Tower Ground Ring (TGR) around the tower foundation in accordance with Section 33 79 16 – Tower Grounding.

G. (9) The Construction Contractor shall ground each leg of the self-supporting tower to the exterior common grounding ring tower ground ring in accordance with Paragraph 3.3, Section 33 79 16 – Tower Grounding

H. (5) The Construction Contractor shall interconnect the tower ground ring to the shelter ground ring with a minimum, #2 AWG, solid, tinned copper grounding conductor.

I. (3) The Construction Contractor shall provide and install a minimum 24-inch wide, 4-inch high, ¼-inch thick tower ground bus bar (TGB) at the base of the tower in accordance with Paragraph 3.3, Section 33 79 86.13 – Ground Bus Bars.

J. (21) The Construction Contractor shall provide and install a ground kit on each RF cable and waveguide near the base of the tower, within 24 inches above the horizontal transition toward the shelter in accordance with Paragraph 3.12, Section 27 05 10 – Cable and Wire Installation

1. Each RF cable ground kit will be bonded to the TGB using UL 467-listed, single-hole connectors and stainless steel hardware.
2. Antioxidant shall be applied to each grounding connection to the bus bar in accordance with Paragraph 3.12 F, Section 27 05 10 – Cable and Wire Installation.

H. (21) The Construction Contractor shall provide and install a ground kit on each RF cable and waveguide within 24 inches before the cable enters the shelter in accordance with Paragraph 3.12, Section 27 05 10 – Cable and Wire Installation.

1. Each RF cable ground kit will be bonded to the EGB using UL 467-listed, single-hole connectors and stainless steel hardware.
2. Antioxidant shall be applied to each grounding connection to the bus bar in accordance with Paragraph 3.12 F, Section 27 05 10 – Cable and Wire Installation.

I. (13) The Construction Contractor shall ground each external metal ancillary device to the common grounding system in accordance with Paragraphs 3.2 and 3.3, Section 33 79 20 - Bonding Metallic Ancillary Devices to Ground. Ancillary devices include but are not limited to the following:

1. Vent covers on the shelter
2. External HVAC unit chassis
3. Vent covers
4. LPG Storage tanks

J. (14) The Construction Contractor shall ground the self-supporting ice bridge in accordance with Paragraphs 3.2 and 3.4, Section 33 79 20 - Bonding Metallic Ancillary Devices to Ground.

K. (18) The Construction Contractor shall ground each gate and gatepost in accordance with Paragraphs 3.2 and 3.3 D, Section 33 79 20 - Bonding Metallic Ancillary Devices to Ground.

L. All grounding systems shall be tested using a three-point or four-point ground resistance tester in accordance with Section 33 79 83.53 – Grounding Electrode System Resistance

1. The resistance to ground of all tie-in connections to the building's ground sources shall measure 25 Ohms or less.

3.15 COMMON INTERNAL GROUNDING AND SURGE PROTECTION – REMOTE FACILITIES

A. (1) The facility internal grounding system shall be configured as a common single-point ground system bonded to the master ground bus bar located below the RF cable entrance.

B. Internal grounding conductors shall meet specifications in accordance with Section 33 79 84 – Internal Shelter Grounding Conductors.

1. Grounding conductors shall further meet the minimum requirement in accordance with NEC 250.62 – Grounding Electrode Conductor Material
   a. (7) #6 AWG, green-jacketed, stranded, copper grounding conductors shall not exceed 13 feet in length.
   b. (8) #2 AWG, green-jacketed, stranded, copper grounding conductors shall not exceed 33 feet in length.

c. (9) #1/0 AWG, green-jacketed or bare, stranded, copper grounding conductors shall not exceed 52 feet in length.

2. Grounding conductors shall further be installed in accordance with NEC 250.64 – Grounding Electrode Conductor Installation.
3. Bare grounding conductors shall be marked with green tape at each end.
4. (15) Bonding connections for grounding conductors shall be made in accordance with Paragraph 2.2 and 3.3, Section 33 79 84 – Internal Grounding and Bonding Conductors.

C. (2) The Shelter Vendor shall provide and install a master ground bus bar (MGB) within 24 inches below the RF cable entrance in accordance with Paragraph 3.4, Section 33 79 86.13 – Ground Bus Bars at Remote Facilities.

1. (9) The MGB shall be grounded to the shelter ground ring with #1/0 AWG, bare, stranded, tinned copper grounding conductor.

D. (4) The Shelter Vendor shall provide and install a subsystem ground bus bar (SSGB) within 24 inches below each secondary RF cable entrance in accordance with Paragraph 3.5, Section 33 79 86.13 – Ground Bus Bars at Remote Facilities.

1. (9) The SSGB shall be grounded to the shelter ground ring with #1/0 AWG, bare, stranded, , tinned copper grounding conductor.

E. (16) The Shelter Vendor shall provide and install an internal perimeter ground (IPG) in the shelter in accordance with Section 33 79 85 – Internal Perimeter Ground Bus.

1. (9) The two independent internal perimeter grounding conductors shall be #1/0 AWG, green-jacketed or bare, stranded, copper grounding conductors and shall not exceed 52 feet in length.
2. A minimum 4-inch gap shall be provided between the two internal perimeter grounding conductors on the opposite wall from the MGB.

F. (12) The Shelter Vendor shall ground all internal metal ancillary devices installed in the shelter, in accordance with Section 33 79 84.13 – Bonding Equipment to Internal Ground. These devices include but are not limited to the following:

1. Generator Transfer Switch
2. Electrical junction boxes
4. Air intake vent
5. Air conditioner vent covers
6. Waveguide dehydrator chassis
7. Metal door and doorframe

G. (13) The Shelter Vendor shall ground the cable runway to the MGB in accordance with Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System.

H. (14) The Shelter Vendor shall bond each cable runway segment together in accordance with Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System.

I. (22) The Construction Contractor install a surge protection device on each RF cable within 24 inches of the entrance to the building in accordance with Paragraph 3.13, Section 27 05 10 – Cable and Wire Installation.

1. Each surge protection device shall be fastened directly to the SSGB or shall be bonded to the SSGB in accordance with Paragraph 3.13, Section 27 05 10 – Cable and Wire Installation.

3.16 EQUIPMENT RACKS AND CABINETS

A. [1] The Shelter Vendor shall provide and install eighteen (20) new 84-inch high, 19-inch wide equipment racks into two rows as indicated on the preliminary shelter layout drawing.
   1. Equipment racks shall meet requirements provided in Section 27 11 16 – Equipment Rack.

B. (17) The Shelter Vendor shall provide and install a rack ground bus bar in each equipment rack/cabinet as outlined in Section 27 11 16.13 – Equipment Cabinet and Rack Installation.
   1. Rack ground bus bars shall meet specifications outlined in Section 33 79 84.16 – Rack Ground Bus Bar.

C. [5] The Construction Contractor shall relocate and install the BLM-owned radio equipment and ancillary devices into three equipment racks as specified on the Preliminary Design Drawings.

D. [5] Mendocino County technicians shall relocate and install the County-owned microwave radio equipment and ancillary devices into equipment racks as specified on the Preliminary Design Drawings.

E. [5] The USGS technicians shall relocate and install the USGS-owned radio equipment and ancillary devices into two equipment racks as specified on the Preliminary Design Drawings.

F. (18) The Construction Contractor shall ground the BLM radio equipment and ancillary equipment to the rack ground bus bar as specified in Paragraph 3.5, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets.

G. (18) Mendocino County and USGS technicians shall ground their radio equipment and ancillary equipment to the rack ground bus bar as specified in Paragraph 3.5, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets.

3.17 INTERNAL CABLE INSTALLATION

A. The Construction Contractor shall provide a ½-inch diameter (Andrew LDF4-50) cable jumper between each BLM and USGS equipment rack/radio and the surge protection devices installed within 24-inches of the RF cable entrance.

B. [7] The Construction Contractor shall install internal cabling as outlined in Section 27 05 10 – Cabling and Wire Install.

C. [8] The Construction Contractor shall route and fasten cabling to the internal cable ladder as outlined in Paragraphs 3.4, 3.5, and 3.6, Section 27 05 10 – Cabling and Wire Install.

D. [10] The Construction Contractor shall route and fasten cabling to racks and cabinets as outlined in Paragraphs 3.7 through 3.11, Section 27 05 10 – Cabling and Wire Install.

E. [11] The Construction Contractor shall install internal cabling attached to walls as outlined in Paragraph 3.12 Section 27 05 10 – Cabling and Wire Install.

3.18 INSTALLATION INSPECTION

A. An inspection of the radio facility will be provided by a Third-party, hired by the Construction Contractor as specified in Section 01 45 23 – Third-Party Testing and Inspecting Services.

B. The Construction Contractor is required to provide the third-party inspector and the government with photographs of all below grade and encased work.

3.19 SECURITY FENCING

A. The Construction Contractor shall provide pricing estimates to recondition the existing fencing to the extent that all rust shall be removed and the fence components refinished with a protective coating.

B. The Construction Contractor shall provide alternative pricing to install new chain link fencing and gates with deterrent wiring in lieu of reconditioning the existing fence.

1. The fence shall be installed in accordance with Section 32 31 13 – Chain-Link Fences and Gates.

C. (17) The Construction Contractor shall ground each fence corner post, fabric, and deterrent wiring in accordance with Paragraphs 3.2 and 3.3 A, 3.3 B, 3.3 C. Section 33 79 20 - Bonding Metallic Ancillary Devices to Ground.

D. (18) The Construction Contractor shall ground each gate and gatepost in accordance with Paragraphs 3.2 and 3.3 D, Section 33 79 20 - Bonding Metallic Ancillary Devices to Ground.

3.20 FINAL ACCEPTANCE & PROOF OF PERFORMANCE

A. Operational Performance Tests
   1. Following final installation of all components, performance and operational tests shall be performed by the installation Contractor to verify proper operation of all subsystems and equipment features. The Government will witness operational performance testing prior to final acceptance, and successful passage of the performance tests shall be a condition of final acceptance and final payment.
   2. The Construction Contractor shall submit a preliminary test plan detailing the procedures to be followed, the equipment to be used, and the pass/fail criteria to be used to verify equipment performance.
   3. Performance tests shall be completed on the following equipment and systems at a minimum:
      1. New electrical panels
      2. Surge protection devices
      3. Common grounding system

B. The Construction Contractor shall verify that all equipment is delivered and installed in accordance with best industry accepted standard practices and specification Sections included in this RFP.
   1. The Construction Contractor shall demonstrate that all equipment meets specifications.
   2. The Construction Contractor shall demonstrate that all functions and features are operational.

C. The Construction Contractor shall provide pre-construction design drawings to the Government and Third-Party Inspector prior to construction in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.
   1. The Construction Contractor shall coordinate with the Government and the Third-party Inspector to review and approve the final Facility Development Plans and Installation/Construction Drawings.
   3. The third The Third-Party Inspector shall review design drawings and provide recommended changes to the design to ensure compliance with Standards and Specifications outlined in this RFP.

D. During construction, The Construction Contractor shall provide photographs of all below grade and encased grounding systems to a Third-Party Inspector in accordance with Paragraph 3.2, Section 01 45 23 - Third-Party Testing and Inspecting Services.

E. The Construction Contractor shall test the resistance of the facility grounding electrode system resistance with a three or four-point ground resistance test instrument in accordance with Section 33 79 83.53 – Grounding Electrode System Resistance.
   1. The grounding system shall not be greater than 25 Ohms.
   2. If the resistance to earth is greater than this amount, The Construction Contractor shall supply and install supplemental ground rods, ground plates, electrolytic ground rods, and grounding radials required to achieve the minimum required ground resistance at no additional cost to the Government.
   3. Supplemental grounding components shall be installed in accordance with Section 33 79 83.20 – Supplemental Grounding Electrodes.
   4. The use of soil treating chemicals to lower the resistance is specifically not allowed.

F. The Third-Party Inspector shall perform a physical inspection of the facility for conformity to these specifications and to the standards of good engineering practice.

G. The Third-Party Inspector shall verify the final ground resistance to earth in accordance with Paragraphs 3.3 and 3.4, Section 01 45 23 - Third-Party Testing and Inspecting Services.

PART 4: CAHTO – DRAWINGS

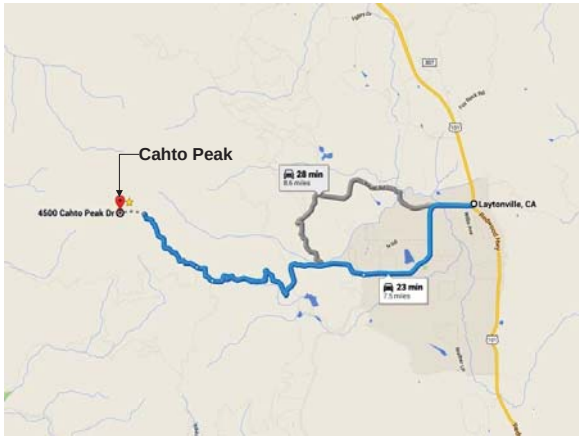
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ARCATA FIELD OFFICE
CAHTO PEAK

AREA REFERENCE MAP

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
5	INTERSTATE HIGHWAY	★	STATE CAPITOL
20	U.S. HIGHWAY	◆	BLM FIELD OFFICE
78	STATE HIGHWAY	●	FACILITY LOCATION

Preliminary Design

FACILITY IMAGE



VICINITY MAP

SHEET INDEX

SHEET NO.	TITLE	DWG. NO.	Revision Date
1	Title Sheet	T1	11/20/2015
2	Communications Shelter Configuration (Shelter Vendor)	A1	11/20/2015
3	Generator Shelter Configuration (Shelter Vendor)	A1-1	11/20/2015
4	Communications Shelter Foundation (Shelter Vendor)	A2	11/20/2015
5	Generator Shelter Foundation (Shelter Vendor)	A2-1	11/20/2015
6	Communications Shelter Elevation Detail (Shelter Vendor)	A3	11/20/2015
7	Generator Shelter Elevation Detail (Shelter Vendor)	A3-1	11/20/2015
8	Preliminary Site Layout Plan	C2	11/20/2015
9	Preliminary Communications Shelter Layout	C3	11/20/2015
10	Preliminary Generator Shelter Layout	C3-1	11/20/2015
11	Electrical Site Plan (Blank to be Developed by Contractor)	E1	11/20/2015
12	Electrical One-Line (Blank to be Developed by Contractor)	E2	11/20/2015
13	External Grounding	E3	11/20/2015
14	Internal Grounding	E4	11/20/2015
15	Key Notes	Key Notes	11/20/2015
16	Grounding Typical Drawings	G1	11/20/2015
17	Installation Typical Drawings	G2	11/20/2015
18	Installation Typical Drawings	G4	11/20/2015

Directions to Cahto Peak
From US-101 South and Branscomb Rd Laytonville, CA

1. Turn right on Branscomb Road go 2.4 mi
2. Turn right onto Cahto Drive/Cahto Peak Road go 3.4 mi
3. Continue onto Cahto Peak Road go 0.4 mi
4. Turn right slight right go 1.3 mi to facility
5. Continue onto W Bumble Bee Springs Rd go 2.9 mi

Lat: 39°41'10.50"N
Long: 123°34'55.80"W
Elevation: 4,200 feet AMSL

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CAHTO PEAK
DISTRICT Arcata Field Office STATE California

MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO: Call 0052 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation and Development Services, LLC
DRAWN BY: Ted Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

T1
SHEET 1 OF 18

Communications Shelter Configuration
(To Be Provided By Shelter Vendor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

A1

SHEET 2 OF 18

Generator Shelter Configuration
(To Be Provided By Shelter Vendor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

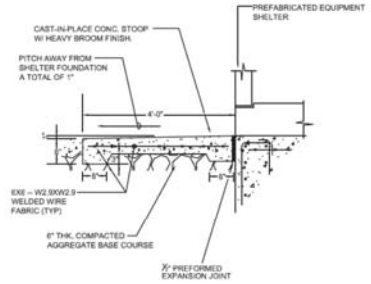
PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

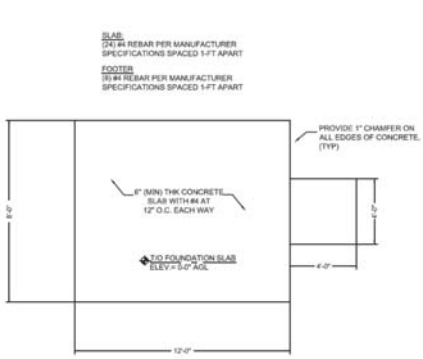
A1 -1

SHEET 3 OF 18

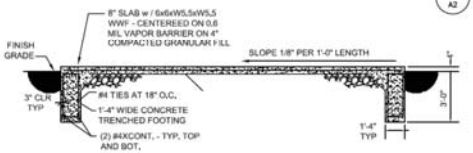
Communications Shelter Foundation
(To Be Provided By Shelter Vendor/Contractor)



1/A2 CONCRETE STOOP DETAIL

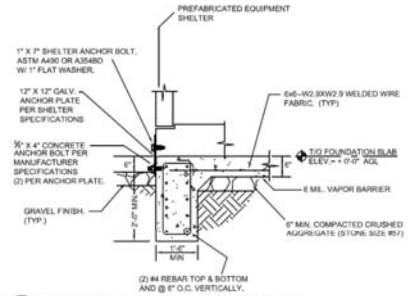


1/A2 SHELTER FOUNDATION PLAN



2/A2 FOUNDATION SECTION

SEE SECTION 133423



4/A2 SECTION AT FOUNDATION WALL

EXAMPLE

FOUNDATION PREPARATION

A SUBSURFACE SOIL INVESTIGATION (GEOTECHNICAL) SHALL BE BEEN MADE AT THE PROJECT SITE. LOCATIONS OF EACH EXPLORATION AND INFORMATION OBTAINED WILL BE PROVIDED TO THE GOVERNMENT ASSIGNED CONSTRUCTION/PROJECT MANAGER. INFORMATION OBTAINED WILL BE USED IN PREPARING THE FOUNDATION DESIGN; HOWEVER, IT WILL ALSO BE MADE AVAILABLE FOR GENERAL INFORMATION TO BIDDERS. BIDDERS ARE EXPECTED TO EXAMINE THE SITE AND RECORD OF INVESTIGATIONS AND THEN DECIDE FOR THEMSELVES THE CHARACTER OF MATERIALS TO BE ENCOUNTERED. THE GOVERNMENT DOES NOT GUARANTEE THAT MATERIALS OTHER THAN THOSE DISCLOSED BY THE BORINGS WILL NOT BE ENCOUNTERED OR THAT THE PROPORTIONS AND CHARACTER OF THE VARIOUS MATERIALS WILL NOT VARY FROM THOSE INDICATED ON THE BORING LOGS.

WORK REQUIRED CONSISTS OF ALL STRIPPING, SURFACE COMPACTION, EXCAVATING, COMPACTING, BACKFILLING, FILLING AND RELATED ITEMS NECESSARY TO COMPLETE WORK INDICATED ON DRAWINGS AND DESCRIBED IN THESE SPECIFICATIONS.

PRIOR TO ANY BACKFILLING OR FILLING OPERATIONS, REPRESENTATIVE SAMPLES OF EACH PROPOSED FILL MATERIAL SHALL BE COLLECTED AND TESTED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER. ALL BACKFILL AND FILL MATERIAL USED IN THIS PROJECT SHALL BE APPROVED BY THE TESTING LABORATORY.

FIELD DENSITY CONTROL TESTS SHALL BE MADE AS DIRECTED BY THE OWNER. DENSITY TESTS SHALL BE MADE FOR THE COMPACTED SUBGRADE AND FOR EACH LAYER OF FILL. TESTS SHALL BE PERFORMED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER.

THE CONTRACTOR SHALL MAINTAIN SITE OF WORK AND ADJACENT GROUNDS IN WELL DRAINED CONDITION.

THE ENTIRE BUILDING CONSTRUCTION AREA EXTENDING TO AT LEAST FIVE FEET OUTSIDE CONSTRUCTION LINES SHALL BE STRIPPED TO A DEPTH NECESSARY TO REMOVE ALL TOPSOIL, VEGETATION, ORGANIC SOIL, DEBRIS OR OTHER DELETERIOUS MATERIAL.

FOLLOWING STRIPPING OPERATIONS, THE ENTIRE SURFACE WITHIN THE BUILDING AREAS SHALL BE COMPACTED WITH A SELF–PROPELLED VIBRATORY COMPACTOR. SIZE OF COMPACTOR SHALL BE APPROVED BY THE TESTING LABORATORY. SUFFICIENT PASSES OF THE COMPACTION EQUIPMENT SHALL BE MADE TO PRODUCE A DENSITY OF AT LEAST 95% OF THE MODIFIED PROCTOR MAXIMUM DENSITY TO A DEPTH OF 12 INCHES BELOW THE STRIPPED SURFACE.

ALL BACKFILL AND FILL MATERIAL SHALL BE A RELATIVELY CLEAN SAND CONTAINING LESS THAN 10%, BY WEIGHT, OF SILT OR CLAY–SIZED MATERIAL PASSING THE #200 SIEVE AND WHICH HAS BEEN APPROVED BY THE TESTING LABORATORY.

BACKFILL AND FILL MATERIAL SHALL BE PLACED IN UNIFORM LOOSE LAYERS NOT EXCEEDING 8 INCHES IN THICKNESS AND COMPACTED WITH THE VIBRATORY COMPACTOR SPECIFIED ABOVE. ALL BACKFILL AND FILL MATERIAL SHALL BE COMPACTED TO A DENSITY OF 95% OF THE MAXIMUM MODIFIED PROCTOR DENSITY.

WHERE THE SUBGRADE OR THE LAYERS OF SOIL MATERIAL MUST BE MOISTURE CONDITIONED BEFORE COMPACTION, UNIFORMLY APPLY WATER TO SURFACE OF THE SUBGRADE OR LAYERS OF SOIL MATERIAL TO PREVENT FREE WATER FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.

EXCAVATIONS SHALL NOT EXTEND BELOW THE EXACT LINES OF FOOTINGS AND FLOOR SLABS. SHOULD THE EXCAVATION BE CARRIED BELOW SUCH LINES, THE CONTRACTOR SHALL FILL IN THE RESULTING EXCESS EXCAVATION WITH CONCRETE UNDER FOOTINGS, AND WITH APPROVED GRANULAR MATERIAL UNDER SLABS AT NO COST TO THE OWNER.

ALL EXCAVATIONS SHALL BE KEPT FREE OF STANDING WATER UNTIL CONCRETE FOUNDATIONS ARE PLACED. WHERE PRACTICAL, CONCRETE SHALL BE PLACED IMMEDIATELY AFTER FOUNDATION EXCAVATIONS, FORMWORK AND REINFORCING HAVE BEEN REVIEWED BY THE OWNER.

EXCAVATIONS FOR FOOTINGS AND TRENCHES MAY BE CUT TO ACCURATE SIZES AND SIDE FORMS OMITTED, IF CONCRETE IS PLACED IN CLEAN CUT TRENCHES WITHOUT CAVE–INS.

ALL BACKFILL AROUND FOUNDATION EXCAVATIONS AND IN PLUMBING AND ELECTRICAL TRENCHES BENEATH SLABS ON GRADE MUST BE PROPERLY BACKFILLED AND COMPACTED. DENSIFICATION OF BACKFILL IN THESE RESTRICTED WORKING AREAS SHALL BE ACCOMPLISHED BY USE OF MANUALLY OPERATED VIBRATORY COMPACTION EQUIPMENT. LIFTS OF FILL SHALL NOT EXCEED A MAXIMUM OF 4 INCHES IN THICKNESS AND ALL SUCH FILL SHALL BE COMPACTED TO PREVIOUSLY SPECIFIED DENSITY.

NOTES:

1) MATERIALS
   A) CONCRETE – REGULAR WT. AGGREGATES – f'_c = 3000 PSI @ 28 DAYS
   B) REINFORCING STEEL – ASTM A–615, GRADE 60
2) SEE CIVIL DRAWINGS FOR LOCATION OF EQUIPMENT BUILDING ON THE SITE.
3) SEE SPECIFICATIONS "FOUNDATION PREPARATION" FOR PREPARATION OF SUBGRADE BELOW EQUIPMENT BUILDING.
4) DESIGN SOIL BEARING PRESSURE ---------- 2000 PSF
5) SLAB TOLERANCE IS ± 1/4".
6) * = 24" MINIMUM, BUT MAY VARY AS REQUIRED PER: LOCAL CODE, AND/OR SOIL BEARING CAPACITY.
7) ALL REBAR TO BE GRADE 40 MINIMUM UNLESS OTHERWISE SPECIFIED.
8) W5.5 AS SPECIFIED FOR THE WWF HAS 0.288" DIAMETER.
9) WWF IS 60 KSI MINIMUM.
10) OVERLAP SPLICES ARE ALLOWED FOR REINFORCING BAR, USE 18" MINIMUM LAP.
11) ALL REQUIRED TIE DOWN PLATES, SHIMS, BOLTS, AND ANCHORS SHALL BE PLACED INSIDE SHELTER PRIOR TO SHIPMENT FROM MANUFACTURER.
12) SHELTER FOUNDATION HAS BEEN DESIGNED IN ACCORDANCE WITH LOCAL BUILDING CODES AND BASIC WIND SPEEDS OF 130 mph.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

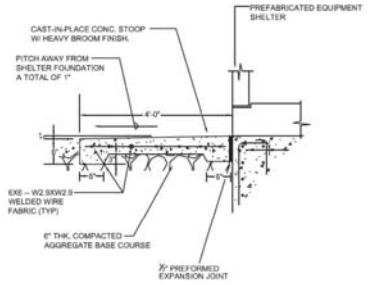
ORG UNIT Arcata Field Office STATE California

MARK	DESCRIPTION	DATE	APPROVED

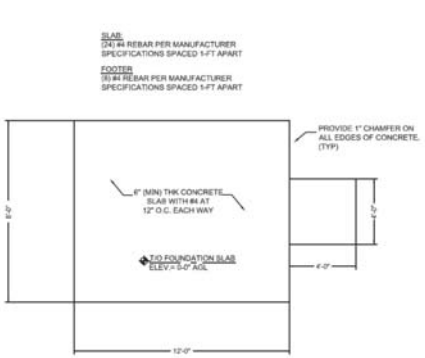
PROJECT NO: Call 0062 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation & Development Services, LLC
DRAWN BY: Tod Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

A2
SHEET 4 OF 18

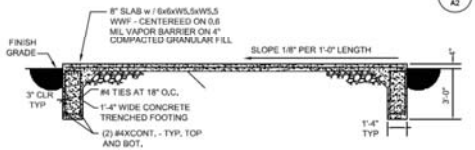
Generator Shelter Foundation
(To Be Provided By Shelter Vendor/Contractor)



3 / A2 CONCRETE STOOP DETAIL

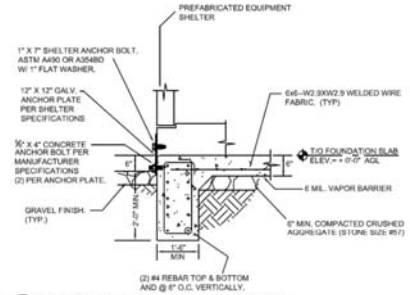


1 / A2 SHELTER FOUNDATION PLAN



3 / A2 FOUNDATION SECTION

SEE SECTION 133423



4 / A2 SECTION AT FOUNDATION WALL

FOUNDATION PREPARATION

A SUBSURFACE SOIL INVESTIGATION (GEOTECHNICAL) SHALL BE BEEN MADE AT THE PROJECT SITE. LOCATIONS OF EACH EXPLORATION AND INFORMATION OBTAINED WILL BE PROVIDED TO THE GOVERNMENT ASSIGNED CONSTRUCTION/PROJECT MANAGER. INFORMATION OBTAINED WILL BE USED IN PREPARING THE FOUNDATION DESIGN; HOWEVER, IT WILL ALSO BE MADE AVAILABLE FOR GENERAL INFORMATION TO BIDDERS. BIDDERS ARE EXPECTED TO EXAMINE THE SITE AND RECORD OF INVESTIGATIONS AND THEN DECIDE FOR THEMSELVES THE CHARACTER OF MATERIALS TO BE ENCOUNTERED. THE GOVERNMENT DOES NOT GUARANTEE THAT MATERIALS OTHER THAN THOSE DISCLOSED BY THE BORINGS WILL NOT BE ENCOUNTERED OR THAT THE PROPORTIONS AND CHARACTER OF THE VARIOUS MATERIALS WILL NOT VARY FROM THOSE INDICATED ON THE BORING LOGS.

WORK REQUIRED CONSISTS OF ALL STRIPPING, SURFACE COMPACTION, EXCAVATING, COMPACTING, BACKFILLING, FILLING AND RELATED ITEMS NECESSARY TO COMPLETE WORK INDICATED ON DRAWINGS AND DESCRIBED IN THESE SPECIFICATIONS.

PRIOR TO ANY BACKFILLING OR FILLING OPERATIONS, REPRESENTATIVE SAMPLES OF EACH PROPOSED FILL MATERIAL SHALL BE COLLECTED AND TESTED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER. ALL BACKFILL AND FILL MATERIAL USED IN THIS PROJECT SHALL BE APPROVED BY THE TESTING LABORATORY.

FIELD DENSITY CONTROL TESTS SHALL BE MADE AS DIRECTED BY THE OWNER. DENSITY TESTS SHALL BE MADE FOR THE COMPACTED SUBGRADE AND FOR EACH LAYER OF FILL. TESTS SHALL BE PERFORMED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER.

THE CONTRACTOR SHALL MAINTAIN SITE OF WORK AND ADJACENT GROUNDS IN WELL DRAINED CONDITION.

THE ENTIRE BUILDING CONSTRUCTION AREA EXTENDING TO AT LEAST FIVE FEET OUTSIDE CONSTRUCTION LINES SHALL BE STRIPPED TO A DEPTH NECESSARY TO REMOVE ALL TOPSOIL, VEGETATION, ORGANIC SOIL, DEBRIS OR OTHER DELETERIOUS MATERIAL.

FOLLOWING STRIPPING OPERATIONS, THE ENTIRE SURFACE WITHIN THE BUILDING AREAS SHALL BE COMPACTED WITH A SELF-PROPELLED VIBRATORY COMPACTOR. SIZE OF COMPACTOR SHALL BE APPROVED BY THE TESTING LABORATORY. SUFFICIENT PASSES OF THE COMPACTION EQUIPMENT SHALL BE MADE TO PRODUCE A DENSITY OF AT LEAST 95% OF THE MODIFIED PROCTOR MAXIMUM DENSITY TO A DEPTH OF 12 INCHES BELOW THE STRIPPED SURFACE.

ALL BACKFILL AND FILL MATERIAL SHALL BE A RELATIVELY CLEAN SAND CONTAINING LESS THAN 10%, BY WEIGHT, OF SILT OR CLAY-SIZED MATERIAL PASSING THE #200 SIEVE AND WHICH HAS BEEN APPROVED BY THE TESTING LABORATORY.

BACKFILL AND FILL MATERIAL SHALL BE PLACED IN UNIFORM LOOSE LAYERS NOT EXCEEDING 8 INCHES IN THICKNESS AND COMPACTED WITH THE VIBRATORY COMPACTOR SPECIFIED ABOVE. ALL BACKFILL AND FILL MATERIAL SHALL BE COMPACTED TO A DENSITY OF 95% OF THE MAXIMUM MODIFIED PROCTOR DENSITY.

WHERE THE SUBGRADE OR THE LAYERS OF SOIL MATERIAL MUST BE MOISTURE CONDITIONED BEFORE COMPACTION, UNIFORMLY APPLY WATER TO SURFACE OF THE SUBGRADE OR LAYERS OF SOIL MATERIAL TO PREVENT FREE WATER FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.

EXCAVATIONS SHALL NOT EXTEND BELOW THE EXACT LINES OF FOOTINGS AND FLOOR SLABS. CARE IS TO THE EXCAVATION BE CARRIED BELOW SUCH LINES. THE CONTRACTOR SHALL FILL IN THE RESULTING EXCESS EXCAVATION WITH CONCRETE UNDER FOOTINGS, AND WITH APPROVED GRANULAR MATERIAL UNDER SLABS AT NO COST TO THE OWNER.

ALL EXCAVATIONS SHALL BE KEPT FREE OF STANDING WATER UNTIL CONCRETE FOUNDATIONS ARE PLACED. WHERE PRACTICAL, CONCRETE SHALL BE PLACED IMMEDIATELY AFTER FOUNDATION EXCAVATIONS, FORMWORK AND REINFORCING HAVE BEEN REVIEWED BY THE OWNER.

EXCAVATIONS FOR FOOTINGS AND TRENCHES MAY BE CUT TO ACCURATE SIZES AND SIDE FORMS OMITTED, IF CONCRETE IS PLACED IN CLEAN CUT TRENCHES WITHOUT CAVE-INS.

ALL BACKFILL AROUND FOUNDATION EXCAVATIONS AND IN PLUMBING AND ELECTRICAL TRENCHES BENEATH SLABS ON GRADE MUST BE PROPERLY BACKFILLED AND COMPACTED. DENSIFICATION OF BACKFILL IN THESE RESTRICTED WORKING AREAS SHALL BE ACCOMPLISHED BY USE OF MANUALLY OPERATED VIBRATORY COMPACTION EQUIPMENT. LIFTS OF FILL SHALL NOT EXCEED A MAXIMUM OF 4 INCHES IN THICKNESS AND ALL SUCH FILL SHALL BE COMPACTED TO PREVIOUSLY SPECIFIED DENSITY.

NOTES

1) MATERIALS
   A) CONCRETE – REGULAR WT. AGGREGATES – f'_c = 3000 PSI @ 28 DAYS
   B) REINFORCING STEEL – ASTM A-615, GRADE 60
2) SEE CIVIL DRAWINGS FOR LOCATION OF EQUIPMENT BUILDING ON THE SITE.
3) SEE SPECIFICATIONS "FOUNDATION PREPARATION" FOR PREPARATION OF SUBGRADE BELOW EQUIPMENT BUILDING.
4) DESIGN SOIL BEARING PRESSURE ---------- 2000 PSF
5) SLAB TOLERANCE IS ± 1/4".
6) * = 24" MINIMUM, BUT MAY VARY AS REQUIRED PER: LOCAL CODE, AND/OR SOIL BEARING CAPACITY.
7) ALL REBAR TO BE GRADE 40 MINIMUM UNLESS OTHERWISE SPECIFIED.
8) W6.5 AS SPECIFIED FOR THE WWF HAS 0.288" DIAMETER.
9) WWF IS 60 KSI MINIMUM.
10) OVERLAP SPLICES ARE ALLOWED FOR REINFORCING BAR, USE 18" MINIMUM LAP.
11) ALL REQUIRED TIE DOWN PLATES, SHIMS, BOLTS, AND ANCHORS SHALL BE PLACED INSIDE SHELTER PRIOR TO SHIPMENT FROM MANUFACTURER.
12) SHELTER FOUNDATION HAS BEEN DESIGNED IN ACCORDANCE WITH LOCAL BUILDING CODES AND BASIC WIND SPEEDS OF 130 mph.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO: Call 0052 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation & Development Services, LLC
DRAWN BY: Tod Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

A2-2
SHEET 5 OF 18

Communications Shelter Elevation Details
(To Be Provided By Shelter Vendor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

PROJECT NO:	Call 0052 - California Construction Specifications				
DESIGN OFFICE:	Contractor				
DESIGNED BY:	Technical Evaluation & Development Services, LLC				
DRAWN BY:	Ted Sumers				
CHK'D BY:					
APPROVED BY:					
DATE:	11/20/2015	MARK	DESCRIPTION	DATE	APPROVED

A3

SHEET 6 OF 18

Generator Shelter Elevation Details
(To Be Provided By Shelter Vendor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

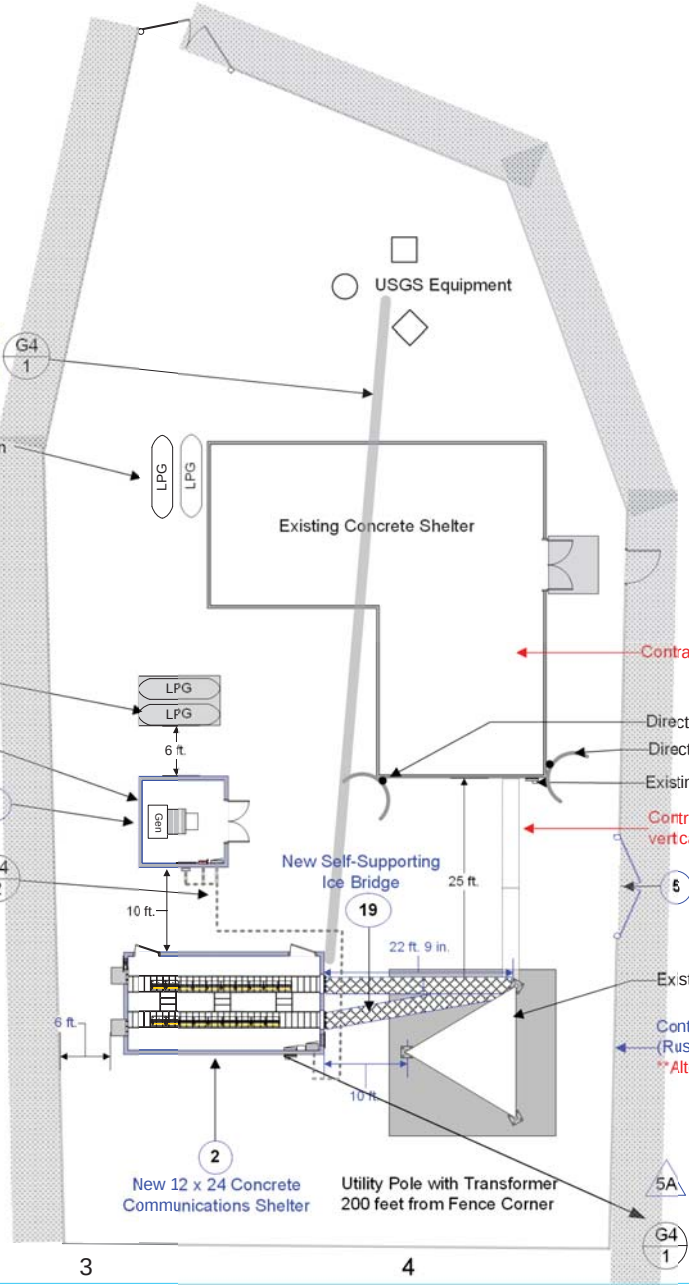
PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Sumners
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

A3-1

SHEET 7 OF 18

Site Layout



Contractor to Provide 30-inch Deep Trench Between USGS Equipment and NW Corner of Communications Shelter
USGS to install wiring and Backfill Trench
G4 / 1

Existing Propane Tank Location

Contractor to Relocate Two Propane Tanks onto Concrete Slab (10-ft x 6 ft. x 4-inch thick)

Mendocino County to Reconnect Propane Tanks to Generator

New 10 x 10 Generator Shelter
2

Joint Trench: Electrical Conduits (x2) and Data Conduit (x1) Between Generator Shelter and Communications Shelter
G4 / 2

Contractor to Demo Existing Concrete Building and Foundation

Directional Antenna on Pipe-Mast to be Relocated to Tower by Owner

Directional Antenna on Pipe-Mast to be Relocated to Tower by Owner

Existing Electrical Meter

Contractor to Demo Existing Ice Bridge including vertical support posts and foundations

5 Contractor to Install New 12-foot Access Gate

Existing Tower

Contractor to Remediate Existing Perimeter Fence
(Rusted Fabric, Posts and Deterrent Wire)
Alternative Pricing to be provided to replace fence

5A New 200 Ampere Below Ground Electrical Service From Transformer
BLM to Contact Utility Company to Finalize Service Delivery

G4 / 1

0 9 15 30
1" = 15'

Preliminary Design

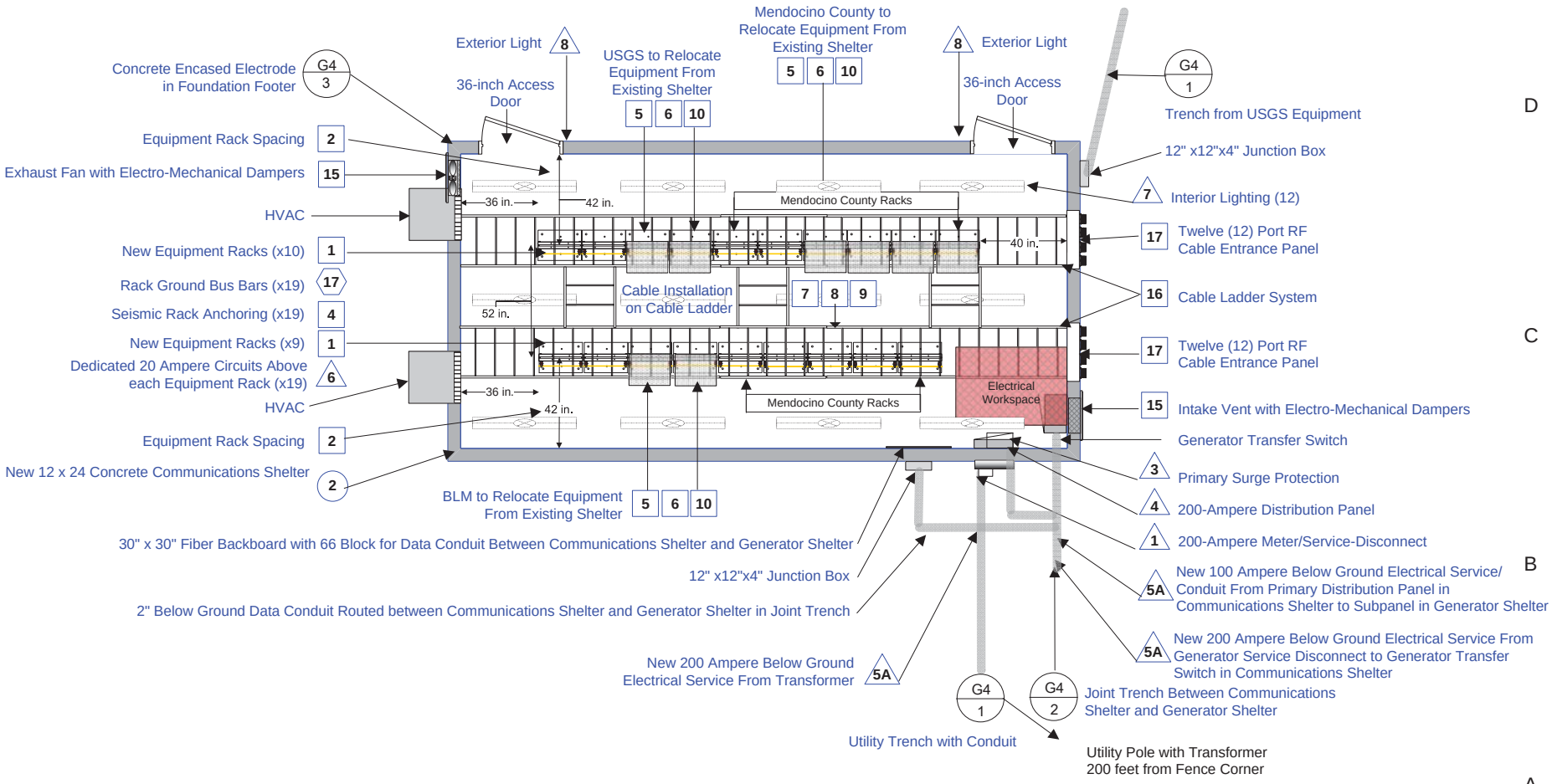
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CAHTO PEAK
ORG UNIT Arcata Field Office
STATE California

MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO: Cali 0052 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation and Development Services, LLC
DRAWN BY: Ted Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

C2
SHEET 8 OF 18

Communications Shelter Layout



0 3 5 10

1/4" = 1'

N

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

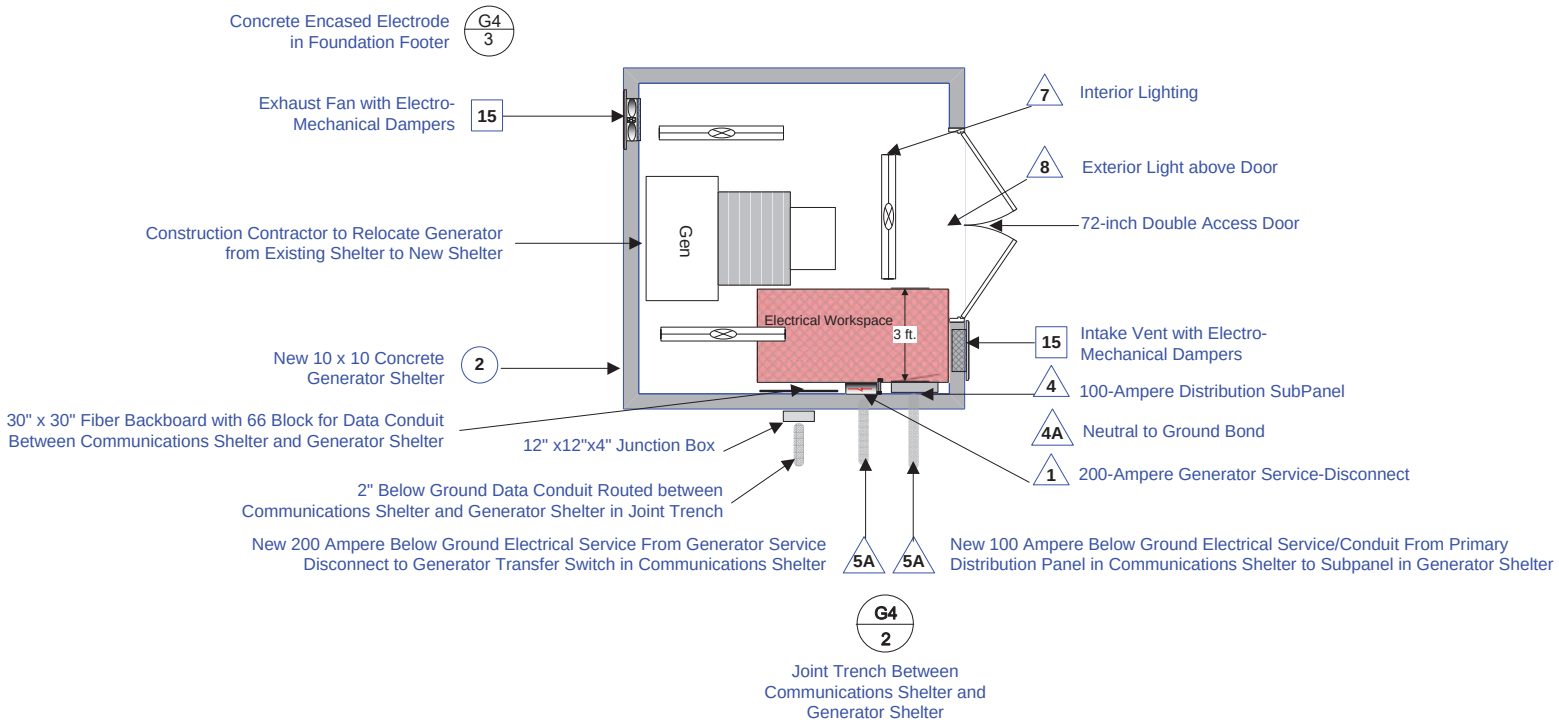
MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO: Cal 0052 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation and Development Services, LLC
DRAWN BY: Ted Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

C3

SHEET 9 OF 18

Generator Shelter Layout



0 3 5 10

1/4" = 1'

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

PROJECT NO:	Cal 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation and Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

C3-1

SHEET 10 OF 18

Electrical Site Plan
(To Be Provided By Contractor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

E1

SHEET 11 OF 18

Electrical One-Line
(To Be Provided By Contractor)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office

STATE California

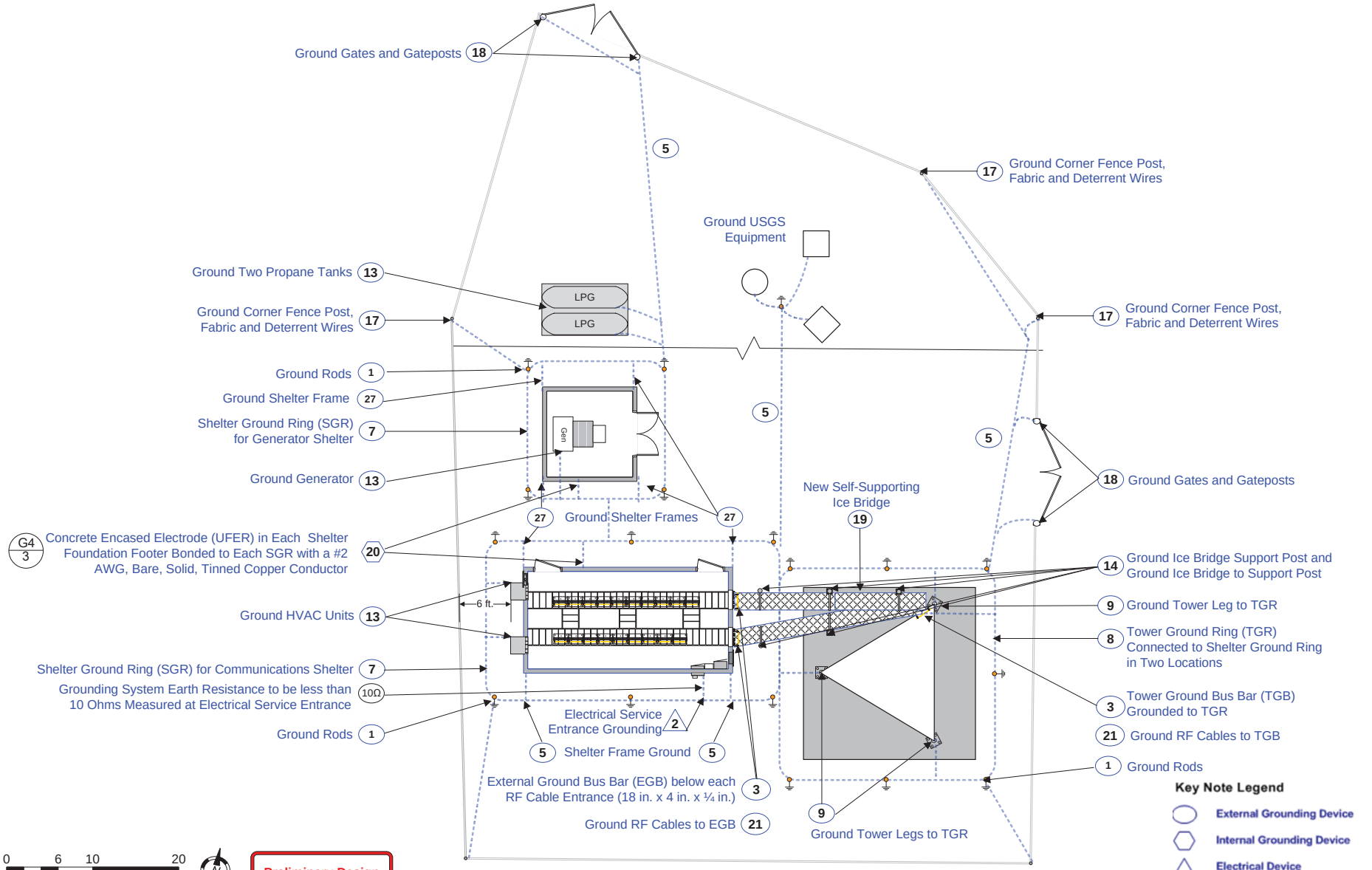
PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

E2

SHEET 12 OF 18

External Grounding



0 6 10 20

3/32" = 1'

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

ORG UNIT Arcata Field Office STATE California

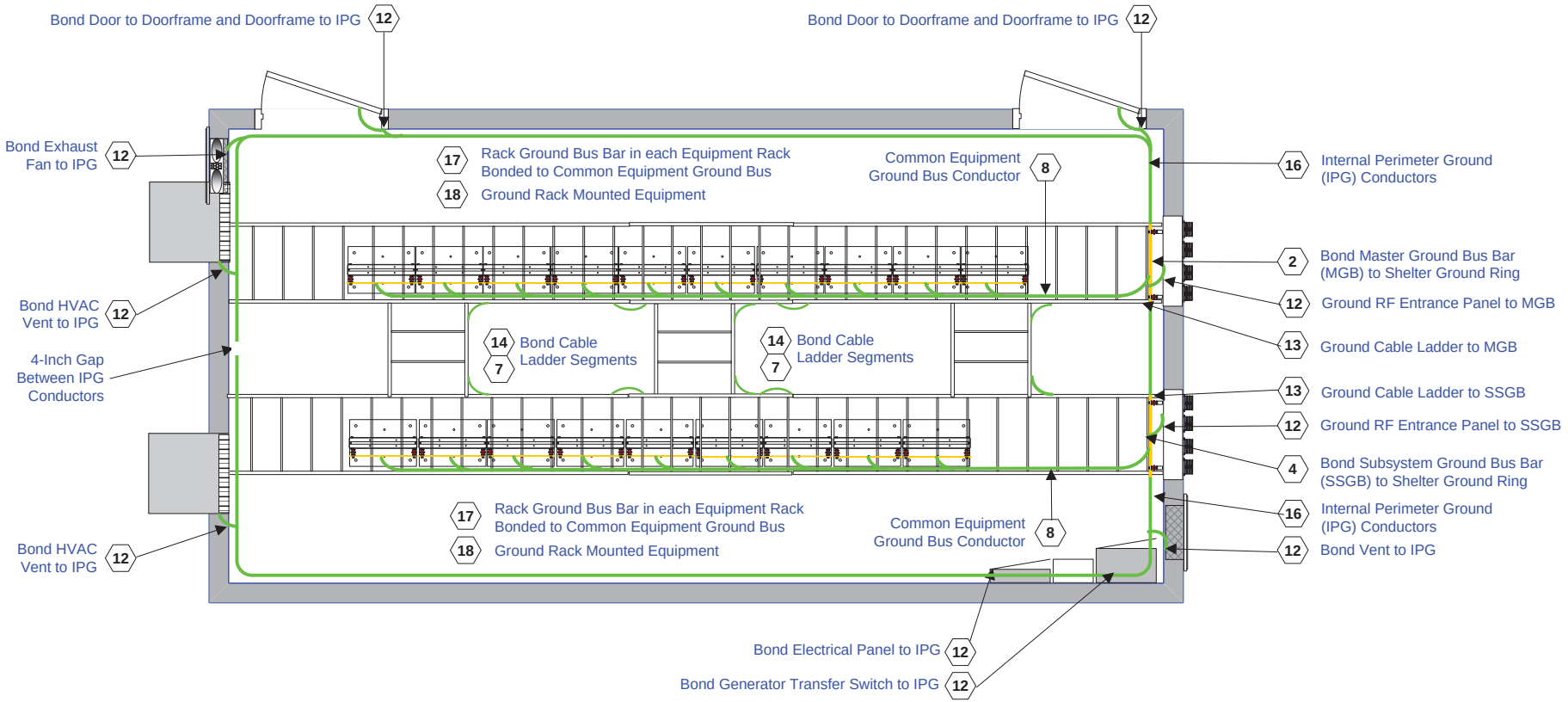
PROJECT NO:	Call 0052 - California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation and Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK | DESCRIPTION | DATE | APPROVED

E3

SHEET 13 OF 18

Internal Grounding



0 3 5 10

3/8" = 1'

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CAHTO PEAK

DISTRICT Arcata Field Office STATE California

MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO: Cali 0062 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation and Development Services, LLC
DRAWN BY: Ted Summers
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

E4

SHEET 14 OF 18

KEY NOTES – Remote Facilities

KEY NOTES: RADIO FACILITY INFRASTRUCTURE

1	New Communications Tower shall be provided and installed as specified in Section 33 81 13 – Communications Transmission Towers
2	New Prefabricated Communications Equipment Shelter shall be provided and installed as specified in Section 13 34 18 – Prefabricated Communications Shelter
3	New Pepro Communications Equipment Shelter shall be provided and installed as specified in Section 13 34 18.13 – Alum Shelter with Articulating Mast
4	New Outdoor Equipment Cabinet shall be provided and installed as specified in Section 13 34 18.33 – Outdoor Equipment Cabinet
5	Perimeter Compound Fencing shall be provided and installed as specified in Section 32 31 13 – Chain-Link Fences and Gates

KEY NOTES: EXTERNAL GROUNDING (Remote Facility)

10Ω	Ground Resistance shall be 10 Ohms or Less. Ground resistance testing shall be as specified in *Section 33 79 83.53 – Grounding Electrode System Resistance*
1	Ground Rod: 5/8" diameter, 8-foot long, *Paragraph 2.2 and 3.1, Section 33 79 83.13 – Grounding Electrodes*
2	External Ground Bus Bar (EGB): *Paragraph 3.2, Section 33 79 86 – Ground Bus Bars at Remote Facility* (4"x12"x¼" Typical)
3	Tower Ground Bus Bar (TGB): *Paragraph 3.3, Section 33 79 86 – Ground Bus Bars at Remote Facility* (4"x12"x¼" Typical)
4	External Grounding Conductor: # 6 AWG, bare, solid, tinned copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
5	External Grounding Conductor: # 2 AWG, bare, solid, tinned, copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
6	External Grounding Conductor: # 1/0 AWG, bare, solid, tinned, copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
7	Shelter Ground Ring: *Section 33 79 15 – Communications Shelter Grounding*
8	Tower Ground Ring: *Paragraph 3.2, Section 33 79 16 – Tower Grounding*
9	Self-Supporting Tower Leg Grounding: *Paragraph 3.3, Section 33 79 16 – Tower Grounding*
10	Monopole Tower Grounding: *Paragraph 3.4, Section 33 79 16 – Tower Grounding*
11	Guyed Tower Leg Grounding: *Paragraph 3.5, Section 33 79 16 – Tower Grounding*
12	Guy Anchor and Guy Wire Grounding: *Paragraph 3.6, Section 33 79 16 – Tower Grounding*
13	Ground External Ancillary Device: *Paragraphs 3.1 and 3.2, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
14	Self-Supporting Ice Bridge Grounding: *Paragraph 3.4, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
15	Non-Self-Supporting Ice Bridge Grounding: *Paragraph 3.5, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
16	Non-Self-Supporting Ice Bridge Isolators: *Paragraph 3.5, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
17	Ground Fence Corner Posts, Fabric and Deterrent Wiring: Paragraphs 3.2 and 3.3, *Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
18	Ground Gate and Gate Posts: *Paragraph 3.2 and 3.3, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
19	Install New Self-Supporting Ice Bridge: *Section 33 82 33.23 – RF Cable Ice-Bridge*
20	Ground Solar Panels and Support Framework: *Paragraphs 3.2 and 3.6, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
21	RF Cable Grounding: *Paragraph 3.12, Section 27 05 10 – Cable and Wire Installation.*
22	RF Cable Surge Protection: *Paragraph 3.13, Section 27 05 10 – Cable and Wire Installation.*
23	Spare/Unused RF Cable Termination: *Paragraph 3.14, Section 27 05 10 – Cable and Wire Installation.*
24	RF Cable Entrance Panel Grounding: *Paragraph 3.15 E, Section 27 05 10 – Cable and Wire Installation.*
25	Ground Radial Conductor: *Section 33 79 83.20 – Supplemental Grounding Electrodes.*
26	DC Power Surge Protection: *Paragraph 3.3G, Section 26 31 00 – Photovoltaic Collector System*
27	Shelter Frame Grounding: *Paragraph 3.3 A Section,* 33 79 15 – Communications Shelter Grounding
28	Shelter Siding Grounding: *Paragraph 3.3 B Section,* 33 79 15 – Communications Shelter Grounding

KEY NOTES: INTERNAL GROUNDING (Remote Facility)

1	Common Building Grounding System: *Paragraph 3.1, Section 33 79 86 – Ground Bus Bars at Remote Facilities*
2	Master Ground Bus Bar (MGB): *Paragraph 3.4, Section 33 79 86 – Ground Bus Bars at Remote Facilities* (4"x12"x¼ Typical")
3	Not Applicable
4	Subsystem Ground Bus Bar at RF Entrance (SSGB): *Paragraph 3.5, Section 33 79 86 – Ground Bus Bars at Remote Facilities* (4"x12"x¼ Typical")
5	Not Applicable
6	Not Applicable
7	Internal Grounding Conductor: #6 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
8	Internal Grounding Conductor: #2 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
9	Internal Grounding Conductor: #1/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
10	Internal Grounding Conductor: # 2/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
11	Internal Grounding Conductor: # 3/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
12	Ground Internal Ancillary Device: *Paragraph 3.1 to 3.2, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
13	Ground Cable Runway: *Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
14	Bond Cable Runway Segments: *Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
15	Bonding Connection: *Paragraph 2.2 and 3.3, Section 33 79 84 – Internal Grounding and Bonding Conductors*
16	Internal Perimeter Ground: *Paragraph 3.2, Section 33 79 84 – Internal Grounding and Bonding Conductors*
17	Rack Ground Bus Bar (RGB): *Section 33 79 84.16 – Rack Ground Bus Bars*
18	Ground Rack-Mounted Equipment: *Paragraph 3.5, Section 27 11 16.20 – Equipment Installation in Racks and Cabinets*
19	Ground Telephone Service Entrance: *Paragraph 3.4, Section 33 79 86.13 – Ground Bus Bars at Occupied Facility*
20	Concrete Encased Electrode (Ufer): *Paragraph 3.2 C, Section 33 79 86.13 – Ground Bus Bars at Occupied Facility*

Symbols

- Existing Below Grade Grounding Conductor
- New Below Grade Grounding Conductor
- Existing Above Grade Grounding Conductor
- New Above Grade Grounding Conductor
- Bus Bar
- Ground Rod (typical 5/8" diameter x 8' long)
- Vertical Structural Steel
- RF Surge Protection Device
- Existing Indoor Grounding Conductor
- New Indoor Grounding/Bonding Conductor
- New Dedicated 20-Ampere Circuit
- Electrical Meter
- Electrical Service-Disconnect
- Electrical Distribution Panel
- Equiipment Rack

KEY NOTES: ELECTRICAL (Remote Facility)

1	New Electrical Service Disconnect Panel as specified in Paragraphs 2.2 and 3.2, Section 26 27 13 – Electricity Metering
2	Electrical Service-Entrance Grounding - Neutral-to-ground bond at service-entrance: *Paragraph 3.3,* Section 26 27 13 – Electricity Metering
3	New Primary Surge Protection Device at service-entrance as specified in Section 26 43 13 – Surge Protection Devices
4	New Electrical Panel Board: Section 26 24 16 – Panel Boards (200-Ampere)
4A	Electrical Panel Board Grounding: Paragraphs 2.5 and 3.3, Section 26 24 16 – Panel Boards
5A	Belowground Electrical Service: Paragraph 3.2, Section 26 21 13 – Low-Voltage Electrical Service-Entrance (200-Ampere) (Trench Paragraph 3.2F)
5B	Aboveground Electrical Service: Paragraph 3.2, Section 26 21 13 – Low-Voltage Electrical Service-Entrance (200-Ampere) (Clearance Paragraph 3.2 E)
6	Dedicated 20-Ampere Circuit for Radio Equipment: *Paragraph 3.3, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
7	Interior Lighting: Paragraph 2.1 to 2.7, Section 26 50 00 – Lighting
8	Exterior Lighting: Paragraph 3.3, Section 26 50 00 – Lighting
9	Facility Lightning Protection System: Section 26 41 00 – Facility Lightning Protection

KEY NOTES: RADIO EQUIPMENT (Remote Facility)

1	New Equipment Rack: *Section 27 11 16 – Equipment Rack*
2	Equipment Rack Spacing Requirements: *Paragraph 3.2, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
3	Equipment Rack Anchoring (Standard): *Paragraphs 3.3 and 3.4, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
4	Equipment Rack Anchoring (Seismic): *Paragraph 3.1, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
5	Radio Equipment Installation in Racks and Cabinets: *Paragraph 3.1, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
6	Ancillary Equipment Installation in Racks and Cabinets: *Paragraph 3.2, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
7	Cable Separation and Grouping: Paragraphs 3.4 *Section 27 05 10 – Cable and Wire Installation.*
8	Cable Installation in Trays and Ladders: Paragraphs 3.5 *Section 27 05 10 – Cable and Wire Installation.*
9	Securing Cables within Trays and Ladders: Paragraphs 3.6 *Section 27 05 10 – Cable and Wire Installation.*
10	Cable Installation in Racks and Cabinets: *Paragraphs 3.7 to 3.11, Section 27 05 10 – Cable and Wire Installation.*
11	Securing Cables to Walls and Pipe-Masts: Paragraph 3.12, *Section 27 05 10 – Cable and Wire Installation.*
12	Antenna Pipe-Masts: Shall be designed and installed in accordance with *ANSI TIA/EIA-222-G – Steel Antenna Towers and Antenna Supporting Structures*
13	RF Cable Routing and Support Below Ice Bridge: *Paragraph 3.4, Section 33 82 33.23 – RF Cable Ice Bridge*
14	RF Cable Routing and Support on Tower: *Paragraph 3.8, Section 33 81 13 – Communications Transmission Towers*
15	Exhaust Fan and Intake Vent: *Paragraph 2.7, Section 13 34 18 – Prefabricated Communications Shelters*
16	New Cable Ladder: *Paragraph 2.10, Section 13 34 18-54 – Prefabricated Communications Shelters*
17	RF Cable Entrance: *Paragraph 3.15, Section 27 05 10 – Cable and Wire Installation.*

Active Key Notes Highlighted

- Infrastructure
- External Grounding Device
- Internal Grounding Device
- Electrical Device
- Radio Equipment or Ancillary

NOTE: Use only those Key Notes specifically referenced on the drawings and/or specifications. Active Key Notes have been highlighted on this Key Note reference sheet.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
STATE
DISTRICT

PROJECT NO:	Call 0052 California Construction Specifications
DESIGN OFFICE:	Contractor
DESIGNED BY:	Technical Evaluation & Development Services, LLC
DRAWN BY:	Ted Summers
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK | DESCRIPTION | DATE | APPROVED

Keynotes

SHEET 15 OF 18

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

PART 5: CAHTO – CONTRACTOR BID DOCUMENT

Organization Unit: Arcata Field Office
Facility State: California
Contractor Name:
Bid Date:

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
DESIGNS						
The Contractor shall hire a Third-party Inspector	1.3 D	N/A	**1**			
Utility Location Service	1.3 B					
Civil Site Survey and Drawings	2.3 B	Drawing C1				
Facility Layout Plan	2.3 C2	Drawing C2	**1**			
Electrical Site Plans and Drawings for Modification to Existing Electrical Service	2.3 C3	Drawing E1	**1**			
Electrical One-Line for Modification to Existing Electrical Service	2.3 C4	Drawing E2	**1**			
External Grounding Plan	1.2 A	Drawing E3	**1**			
Internal Grounding Plan	1.2 A	Drawing E4	**1**			
Lightning Protection System Design and Installation	2.3 C4 3.6	Drawing E5				
			DESIGN SUBTOTALS	**$**	**$**	**$**
SHELTER						
Design and Install New Shelter	2.4					
Shelter Layout Drawings	2.3 E1	Drawing A1				
Shelter Foundation Drawings	2.3 E2	Drawing A2				
Shelter Elevation Detail Drawings	2.3 E3	Drawing A3				
Structural Analysis of Existing Shelter Foundation	2.4					
Shelter Repairs	2.4					
			SHELTER SUBTOTALS	**$**	**$**	**$**

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
TOWER						
Design and Install New Tower	2.5					
Verify Tower Foundation Distance from the Building (30 feet standard, 10 feet minimum)	2.5					
Structural Analysis of Tower Foundation	2.5					
Tower Foundation Repairs	2.5					
Structural Analysis of Tower	2.5					
Structural Modifications of Existing Tower	2.5					
			TOWER SUBTOTALS	**$**	**$**	**$**
TOWER SAFETY						
Install Anti-Climb Panels	2.6	Callout				
Install Safety-Climb Device	2.6	Callout				
			TOWER SAFETY SUBTOTALS			
CIVIL IMPROVEMENT - DEVELOPMENT						
Site clearing	3.4 A	Drawing C2				
Excavation	3.4 B	Drawing C2				
Trenching	3.4 C	Drawing C2				
Backfilling	3.4 D	Drawing C2				
			CIVIL IMPROVEMENT SUBTOTALS	**$**	**$**	**$**
ELECTRICAL						
Electrical Service-Disconnect Installation	3.5					
Electrical Service-Entrance Grounding	3.5					
Neutral-To-Ground Bond installed	3.5					
Electrical Service Cable Installation (Below Grade)	3.5					
Electrical Distribution Panel Installation at Service-Entrance	3.5					

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
Electrical Subpanel (Radio Equipment Room)	3.5	4				
Electrical Subpanel (Telecommunications Equipment Room)	3.5	4				
Electrical Subpanel (Dispatch)	3.5	4				
Interior Lighting Installation with Timer	3.5	7				
Exterior Lighting Installation with Timer	3.5	8				
Photovoltaic Power System (including solar panels, wiring, charger/controller)	3.5	10				
Battery Backup System	3.5	11				
20-Amp Dedicated Circuit for Each Equipment Rack (Quantity based on configuration details)	3.5	6				
20-Amp Dedicated Circuit at Dispatch Operator Workstation (Quantity based on configuration details)	3.5	6				
20-Amp Dedicated Circuit(s) at Radio Operator Workstation (Quantity based on configuration details)	3.5	6				
		ELECTRICAL SUBTOTALS		**$**	**$**	**$**
LIGHTNING PROTECTION						
Lightning Protection System Design	3.6	Drawing E5				
Lightning Protection System Installation	3.6	9				
		LIGHTNING PROTECTION SUBTOTALS		**$**	**$**	**$**
RADIO EQUIPMENT ROOM/SHELTER						
Verify Equipment Room/Shelter Dimensions	3.7	Drawing C3				
Exhaust Fan with Thermal Timer	3.7	15				
Install Cable Runway	3.7	16				
Add Item	3.7					
		RADIO EQUIPMENT ROOM/SHELTER SUBTOTALS		**$**	**$**	**$**

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
PRIMARY ELECTRICAL SURGE PROTECTION						
Primary Surge Protection Device (SPD) at Electrical Service-Entrance - Type 1 or Type 2	3.10	3				
PRIMARY ELECTRICAL SURGE PROTECTION SUBTOTAL				**$**	**$**	**$**
EXTERNAL CABLE INSTALLATION						
RF Cable Routing and Support (Pipe-Masts)	3.11	11				
RF Cable Routing and Support (Below Ice Bridge)	3.11	13				
RF Cable Routing and Support (on Towers)	3.11	14				
RF Cable Entrance Installation and Sealing	3.11	17				
RF Cable Entrance Panel Grounding	3.11	24				
RF Cable Entrance - Removing Other Cable Types	3.11	17				
EXTERNAL CABLE INSTALLATION SUBTOTALS				**$**	**$**	**$**
ANTENNA SYSTEMS						
Antenna Installation (Secured, Plumb, RF Cable Weather Seal)	3.12					
Antenna Pipe-Masts (Verify Quantity, Locations and Installation)	3.12	12				
Add Item	3.12					
Add Item	3.12					
Add Item	3.12					
Add Item	3.12					
ANTENNA SYSTEMS SUBTOTALS				**$**	**$**	**$**
EXTERNAL GROUNDING - REMOTE FACILITIES						
Ground Resistance (25 Ohms or Less): Remote Facility and Occupied Facility without Tower	3.14	25Ω				
Ground Rod: (minimum 5/8" diameter, 8-foot long)	3.14	1				

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
External Ground Bus Bar (EGB) Installation - Remote Facilities	3.14	2				
Tower Ground Bus Bar (TGB) Installation - Remote Facilities	3.14	3				
External Grounding Conductor: # 6 AWG, bare, solid, tinned copper	3.14	4				
External Grounding Conductor: # 2 AWG, bare, solid, tinned, copper	3.14	5				
External Grounding Conductor: # 1/0 AWG, bare, solid, tinned, copper	3.14	6				
Shelter Ground Ring (SGR) Installation	3.14	7				
Tower Ground Ring (TGR) Installation	3.14	8				
Self-Supporting Tower Leg Grounding	3.14	9				
Monopole Tower Grounding	3.14	10				
Guyed Tower Leg Grounding	3.14	11				
Guy Anchor and Guy Wire Grounding	3.14	12				
External Ancillary Device Grounding	3.14	13				
Antenna Pipe-Mast Grounding	3.14	13				
Self-Supporting Ice-Bridge Grounding	3.14	14				
Non-Self-Supporting Ice-Bridge Grounding	3.14	15				
Non-Self-Supporting Ice-Bridge Isolators	3.14	16				
Ground Fence Corner Posts, Fabric and Deterrent Wiring	3.14	17				
Ground Gate and Gate Posts	3.14	18				
Self-Supporting Ice-Bridge Installation	3.14	19				
Solar Panel and Framework Grounding	3.14	20				
RF Cables Grounded Near Antenna	3.14	21				
RF Cables Grounded at Base of Tower	3.14	21				

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
RF Cable Grounding Prior to Entering the Building	3.14	21				
RF Cable Surge Protection	3.14	22				
Spare/Unused RF Cable Termination	3.14	23				
EXTERNAL GROUNDING - REMOTE FACILITIES SUBTOTAL				**$**	**$**	**$**
INTERNAL GROUNDING - REMOTE FACILITIES						
Master Ground Bus Bar (MGB) within 24 inches Below RF Cable Entrance (Remote Facilities): (2"x12"x¼" minimum)	3.15	2				
Subsystem Ground Bus Bar (SSGB) within 24 inches Below RF Cable Entrance (Remote Facilities): (2"x12"x¼" minimum)	3.15	4				
Internal Grounding Conductor: #6 AWG, green-jacketed, stranded, copper	3.15	7				
Internal Grounding Conductor: #2 AWG, green-jacketed, stranded, copper	3.15	8				
Internal Grounding Conductor: #1/0 AWG (green-jacketed or bare, stranded, copper)	3.15	9				
Internal Grounding Conductor: # 2/0 AWG, (green-jacketed or bare, stranded, copper)	3.15	10				
Internal Grounding Conductor: # 3/0 AWG, (green-jacketed or bare, stranded, copper)	3.15	11				
Ground Internal Ancillary Device in Shelter	3.15	12				
Ground Cable Runway in Shelter	3.15	13				
Bond Cable Runway Segments in Shelter	3.15	14				
Bonding Connection	3.15	15				
Internal Perimeter Ground in Telecommunications Room, Radio Equipment Room, or Shelter	3.15	16				
INTERNAL GROUNDING - REMOTE FACILITIES SUBTOTALS				**$**	**$**	**$**
EQUIPMENT RACKS AND CABINETS						
New Radio Equipment Rack	3.16	1				
Radio Equipment Rack and Cabinet Relocation - Workspace	3.16	2				

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT
RADIO FACILITY CONSTRUCTION AND REMEDIATION
Bid Package 2

BID ITEM	SUMMARY OF WORK PARAGRAPH	DRAWING REFERENCE	QUANTITY	LABOR	MATERIALS	TOTAL
Radio Equipment Rack Anchoring (Standard)	3.16	3				
Radio Equipment Rack Anchoring (Seismic Zones 3 and 4)	3.16	4				
Radio Equipment Installation in Racks and Cabinets	3.16	5				
Ancillary Equipment Installation in Racks and Cabinets	3.16	6				
Rack Ground Bus Bar (RGB)	3.16	17				
Ground Rack-Mounted Equipment	3.16	18				
Add Item	3.16					
Add Item	3.16					
EQUIPMENT RACKS AND CABINETS SUBTOTALS				**$**	**$**	**$**
INTERNAL CABLE INSTALLATION						
RF Cabling Installation between Radio Equipment and RF Cable Entrance (Separation and Grouping)	3.17	7				
RF Cabling Installation between Radio Equipment and RF Cable Entrance (Cable Tray and Ladder Installation)	3.17	8				
RF Cabling Installation between Radio Equipment and RF Cable Entrance (Securing Cables to Trays and Ladders)	3.17	9				
RF Cabling Installation (Racks and Cabinets)	3.17	10				
RF Cabling Installation (Walls)	3.17	11				
EQUIPMENT RACKS AND CABINETS SUBTOTALS				**$**	**$**	**$**
TOTAL LABOR AND MATERIALS				**$**	**$**	**$**
MOBILIZATION FEES						
OTHER DIRECT COSTS						
PROJECT MANAGEMENT FEES						
TOTAL ESIMATED COST				**$**	**$**	**$**