

**ATHOL SUBSTATION
BREAKER UPGRADE, REGULATOR BYPASS
SWITCH INSTALLATION, AND SECONDARY
SERVICE CONSTRUCTION
CONTRACT & SPECIFICATION**

KEC PROJECT No. 513

KEC Contract No. 20240715

**Kootenai Electric Cooperative, Inc.
Rathdrum, Idaho**

July 2024



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U.S. Department of Agriculture Rural Utilities Service

ELECTRIC SYSTEM CONSTRUCTION CONTRACT PROJECT CONSTRUCTION

NOTICE AND INSTRUCTIONS TO BIDDERS

1. **Sealed proposals** for the construction, including the supply of necessary labor, materials and equipment, of a rural electric project of Kootenai Electric Cooperative, Inc., (hereinafter called the "Owner") will be received by Owner on or before 4:30 p.m. on **July 31, 2024** at its office at 9014 W LANCASTER RD., RATHDRUM ID 83858 at which time and place the proposals will be privately opened and read. Any proposals received subsequent to the time specified will be promptly returned to the Bidder unopened.
2. **Owner Furnished Materials.** The unit prices in Contractor's Proposal are to include provisions for Owner Furnished Materials since as stated in Article I, Section 3 of Contractor's Proposal, the value of Owner Furnished Materials, if any, will be deducted from payments to the Bidder for completed Construction Units.
3. **Obtaining Documents.** The Plans, Specifications and Construction Drawings, together with all necessary forms and other documents for bidders may be obtained at www.kec.com. Additionally, requests for supplemental forms and documents can be obtained from Owner's Engineer.
4. **Manner of Submitting Proposals.** Proposals and all supporting instruments must be submitted on the forms furnished by Owner and delivered in a sealed envelope addressed to Owner to the Attention of Phillip Evander. The name and address of the Bidder, its license number if a license is required by the State, and the date and hour of the opening of bids must appear on the envelope in which the Proposal is submitted. Proposals must be completed in ink or typewritten. No alterations or interlineations will be permitted, unless made before submission, and initialed and dated. The successful Bidder will be required to execute two additional counterparts of the Proposal. A Microsoft Excel file summarizing the bidder's proposal must be supplied as well and can be emailed to bids@kec.com.
5. **Due Diligence.** Prior to the submission of the Proposal, the Bidder shall make and shall be deemed to have made a careful examination of the site of the project and of the Plans, Specifications, Construction Drawings, and forms of Contractor's Proposal and Contractor's Bond, and shall review the location and nature of the proposed construction, the transportation facilities, the kind and character of soil and terrain to be encountered, the kind of facilities required before and during the construction of the project, general local conditions, environmental and historic preservation considerations, and all other matters that may affect the cost and time of completion of the project. Bidder will be required to comply with all federal, state, and local laws, rules, and regulations applicable to its performance, including those pertaining to the licensing of contractors, and the Anti Kick-Back Act of 1986 (41 U.S.C. 51 et seq).
6. **Proposals** will be accepted only from those prequalified bidders invited by Owner to submit a proposal.
7. **The Time for Completion of Construction** of the project is of the essence of the Contract and shall be as specified by the Engineer in the Proposal.
8. **Bid Bond.** Each Proposal must be accompanied by a Bid Bond in the form attached hereto or a certified check on a bank that is a member of the Federal Deposit Insurance Corporation, payable to the order of Owner, in an amount equal to ten percent (10%) of the maximum bid price. Each Bidder agrees, provided its Proposal is one of the three low Proposals, that, by filing its Proposal together with such Bid Bond or check in consideration of Owner's receiving and considering such Proposals, said Proposal shall be firm and binding upon each such Bidder and such Bid Bond or check shall be held by Owner until a Proposal is accepted and a satisfactory Contractor's Bond is furnished (where required) by the successful Bidder and such acceptance has been

approved by the Administrator, or for a period not to exceed thirty (30) days from the date hereinbefore set for the opening of Proposals, whichever period shall be the shorter. If such Proposal is not one of the three low Proposals, the Bid Bond or check will be returned in each instance within a period of ten (10) days to the Bidder furnishing same.

9. **Contractor's Bond.** For a Contract in excess of \$100,000, the Bidder agrees to furnish a Contractor's Bond in triplicate in the form attached hereto with sureties listed by the United States Treasury Department as Acceptable Sureties, in a penal sum not less than the contract price.
10. **Failure to Furnish Contractor's Bond.** Should the successful Bidder fail or refuse to execute such counterparts or to furnish a Contractor's Bond (where required) within ten (10) days after written notification of the acceptance of the Proposal by Owner, the Bidder will be considered to have abandoned the Proposal. In such event, Owner shall be entitled (a) to enforce the Bid Bond in accordance with its terms, or (b) if a certified check has been delivered with the Proposal, to retain from the proceeds of the certified check, the difference (not exceeding the amount of the certified check) between the amount of the Proposal and such larger amount for which Owner may in good faith contract with another party to construct the project. The term "Successful Bidder" shall be deemed to include any Bidder whose Proposal is accepted after another Bidder has previously refused or has been unable to execute the counterparts or to furnish a satisfactory Contractor's Bond (where required.)
11. **Debarment Certification.** The Bidder must provide to Owner a suspension and debarment certificate in the form attached hereto.
12. **Contract is Entire Agreement.** The Contract to be effected by the acceptance of the Proposal shall be deemed to include the entire agreement between the parties thereto, and the Bidder shall not claim any modifications thereof resulting from any representation or promise made at any time by any officer, agent or employee of Owner or by any other person.
13. **Minor Irregularities.** Owner reserves the right to waive minor irregularities or minor errors in any Proposal, if it appears to Owner that such irregularities or errors were made through inadvertence. Any such irregularities or errors so waived must be corrected on the Proposal in which they occur prior to the acceptance thereof by Owner.
14. **Bid Rejection.** Owner reserves the right to reject any or all Proposals.
15. **Discrepancy in Unit Prices.** Where the unit prices in Contractor's Proposal are separated into three columns designated as "Labor" "Materials," and "Labor and Materials," and where a discrepancy appears between the sum shown in the "Labor and Materials" column and the correct addition of the sums appearing in the "Labor" column and the "Materials" column, the correct addition of the sums appearing in the "Labor" column and the "Materials" column shall control. Similarly, the quantities appearing in the "No. of Units" column multiplied by the correct addition of the sums in the "Labor" column and the "Materials" shall control the amounts appearing in the "Extended Price - Labor & Materials" column. Likewise, the correct extensions shall control the amounts appearing in the "Total, Part" line for each respective part.
16. **Definition of Terms.** The terms "Administrator," "Engineer," "Completion of Construction," and "Completion of the Project" as used throughout this Contract shall be as defined in Article VI Section 1, of the Proposal.
17. **Owner Represents:**
 - a. If by provisions of the Proposal Owner shall have undertaken to furnish any materials for the construction of the project, such materials are on hand at locations specified or if such materials are not on hand they will be made available by Owner to the successful Bidder at the locations specified before the time such materials are required for construction.
 - b. All titles, easements and rights-of-way, except as shown on maps included in the Plans and Specifications, have been obtained from the owners of the properties on which the project is to be constructed (including tenants who may reasonably be expected to object to such construction). The

remaining easements and rights-of-way, if any, will be obtained as required to avoid delay in construction.

- c. All staking, except as shown on the maps included in the Plans and Specifications, has been completed and sufficient staking crews will be available to maintain stakes at all times in advance of construction.
- d. Where underground distribution construction is required, permission has been obtained from state and local highway and road authorities to install underground distribution power facilities and set pedestals, if any, on the highway and road right-of-way in the project area. Notwithstanding such permission granted to Owner, each Bidder is responsible for ascertaining that the equipment, methods of construction, and repair proposed to be used on the project will meet all requirements of public authorities having jurisdiction over highway and road right-of-way. The successful Bidder will be required to furnish proof satisfactory to Owner of compliance with this requirement. If required by highway or road authorities, the successful Bidder will furnish to such authorities a bond or meet other guaranty requirements to assure the prompt repair of all damages to highways and roads and their associated rights-of-way caused by the Bidder during construction of the project. This requirement is in addition to and independent of Contractor's Bond required under this Contract. The acceptance of a bid from any Bidder is not to be construed as approval of the Bidder's equipment or proposed construction methods by or on behalf of the highway and road authorities. Bidders may obtain information concerning the requirements of highway and road authorities by communicating with the following:

Idaho Transportation Department

- e. All funds necessary for prompt payment for the construction of the project will be available.

If Owner shall fail to comply with any of the undertakings contained in the foregoing representation or if any of such representations shall be incorrect, the Bidder will be entitled to an extension of time of completion for a period equal to the delay, if any, caused by the failure of Owner to comply with such undertakings or by any such incorrect representation; provided the Bidder shall have promptly notified Owner in writing of its desire to extend the time of completion in accordance with the foregoing; provided, however, that such extension, if any, of the time of completion shall be the sole remedy of the Bidder for Owner's failure, because of conditions beyond the control and without the fault of Owner, to furnish materials in accordance with subparagraph a. above.

Kootenai Electric Cooperative, Inc.

Owner

By

General Manager

Date

CONTRACTOR'S PROPOSAL

TO: Kootenai Electric Cooperative, Inc. (hereinafter called the "Owner")

ARTICLE I – GENERAL

Section 1. Offer to Construct. The undersigned (hereinafter called the "Bidder") hereby proposes to receive and install such materials and equipment as may hereinafter be specified to be furnished by Owner, and to furnish all other materials and equipment, all machinery, tools, labor, transportation and other means required to construct the project in strict accordance with the Plans, Specifications and Construction Drawings for the prices hereinafter stated. The total length of the project lines shall be determined by taking the sum of all straight horizontal span distances between pole stakes or from center to center of poles, or centerline of structures, carrying conductors, plus the length of service drops, if any, measured horizontally from center of last pole to the point of attachment to the consumer's building.

Section 2. Materials and Equipment. ~~The Bidder agrees to furnish and use in the construction of the project under this Proposal, in the event the Proposal is accepted, only such "fully accepted," "conditionally accepted," and "technically accepted" materials and equipment which have been accepted by RUS as indicated in the current RUS Informational Publication 202-1, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers," including revisions adopted prior to the Bid Opening. The use of "conditionally accepted" or "technically accepted" materials and equipment requires prior consent by the Owner or Engineer.~~

The Bidder agrees that the prices for wood poles, wood crossarms, and other timber products set forth herein shall include the cost of preservative treatment and inspection, insured warranty, or quality assurance. The Bidder further agrees to obtain from the supplier inspection and treatment reports or insured warranties, for checking against the delivered timber, and to submit such reports or warranties to Owner as one of the prerequisites to monthly and final payments.

The Bidder will purchase all materials and equipment (other than Owner Furnished Materials) outright and not subject to any conditional sales agreements, bailment, lease or other agreement reserving unto the seller any right, title or interest therein. All such materials and equipment shall be new and shall become the property of Owner when erected in place.

Section 3. Owner Furnished Materials. The Bidder understands and agrees that, if this Proposal is accepted, Owner will furnish to the Bidder the material set forth in the attached "List of Owner Furnished Materials." For those items not yet delivered, the Bidder will, on behalf of Owner, accept delivery of such of the materials as may be subsequently delivered and will promptly forward to Owner for payment the supplier's invoice. The Bidder will acknowledge in writing the receipt of all materials received as indicated on the List. The materials referred to are on hand at, or will be delivered to, the locations specified in the List and the Bidder will use such materials in constructing the project.

The value of the completed Construction Units certified by the Bidder each month pursuant to Article III, Section 1.a of the Proposal shall be reduced by an amount equal to the value of the materials installed by the Bidder during the preceding month which have been furnished by Owner or the delivery of which has been accepted by the Bidder on behalf of Owner. Only ninety percent (90%) of the remainder shall be paid prior to the Completion of the project. The value of such materials shall be computed on the basis of the unit prices stated in the Lists. Materials, if any, not required for the project, which have been furnished to the Bidder by Owner or delivery of which has been accepted by the Bidder on behalf of Owner, shall be returned to Owner by the Bidder upon completion of construction of the project. The value of all materials not installed in the project nor returned to Owner shall be deducted from the final payment to the Bidder.

Owner shall not be obligated to furnish materials in excess of the quantities, size, kind and type set forth in the attached List. If Owner furnishes, and the Bidder accepts, materials in excess thereof the values of such excess materials shall be their actual cost as stated by Owner.

Information on the shipping schedules of materials on the "List of Owner Furnished Materials" will be furnished to the Bidder as necessary during progress of the work.

Upon delivery, the Bidder shall promptly receive, unload, transport and handle all materials and equipment on the "List of Owner Furnished Materials" at its expense and shall be responsible for demurrage, if any.

Section 4. Proposal on Unit Basis. The Bidder understands and agrees that the various Construction Units on which bids are made are defined by symbols and descriptions in this Proposal, that all said bids are on a unit basis, and that Owner may specify any number or combination of Construction Units that Owner may deem necessary for the construction of the project. Separate Construction Units are designated for each different arrangement which may be used in the construction of the project. This Proposal is based on a consideration of each unit in place and includes only the materials listed on the corresponding Construction Drawings or description of unit where no drawing exists.

Section 5. Description of Contract. The Notice and Instructions to Bidders, Plans, Specifications, and Construction Drawings, which by this reference are incorporated herein, together with the Proposal and Acceptance constitute the Contract. The Plans, Specifications, and Construction Drawings, including maps, special drawings, and approved modifications in standard specifications are attached hereto.

Athol Substation: The installation of three vacuum breakers after the removal of three existing reclosers and controls. Installation of new concrete breaker foundations. Testing of breakers following installation as described herein. Installation of secondary electrical service cable and conduit from existing transformer south of substation to substation vault and cable from riser to control building for termination by Owner personnel. Installation of conduit from outside of substation to vault for fiber installation. Replacement of twelve regulator bypass switches and re-termination of existing tubular bus connections.

Section 6. Due Diligence. The Bidder has made a careful examination of the site of the project to be constructed and of the Plans, Specifications, Construction Drawings, and form of Contractor's Bond attached hereto, and has become informed as to the location and nature of the proposed construction, the transportation facilities, the kind and character of soil and terrain to be encountered, and the kind of facilities required before and during the construction of the project, and has become acquainted with the labor conditions, federal, state, and local laws, rules, and regulations applicable to its performance.

Section 7. License. The Bidder warrants that a Contractor's License is is not required and, if required, it possesses Contractor's License No. _____ for the State of Idaho in which the project is located and said license expires on _____, 20____.

Section 8. Warranty of Good Faith. The Bidder warrants that this Proposal is made in good faith and without collusion or connection with any person or persons bidding on the same work.

Section 9. Financial Resources.

- a. The Bidder warrants that it has or will obtain the financial resources necessary to ensure completion of the project.
- b. The Bidder agrees that in the event this Proposal is accepted, and a Contractor's Bond is required, it will furnish a Contractor's Bond in the form attached hereto, in a penal sum not less than the maximum Contract price, with a surety or sureties listed by the United States Department of Treasury as Acceptable Sureties.

Section 10. Taxes. The unit prices for Construction Units in this Proposal include provisions for the payment of all monies which will be payable by the Bidder or Owner in connection with the construction of the project on account of taxes imposed by any taxing authority upon the sale, purchase or use of materials, supplies and equipment, or services or labor of installation thereof to be incorporated in the project as part of such Construction Units. The Bidder agrees to pay all such taxes, except taxes upon the sale, purchase or use of Owner Furnished Materials and it is understood that, as to Owner Furnished Materials, the values stated in the attached "List of Owner Furnished Materials include taxes upon the sale, purchase or use of Owner Furnished Materials, if

applicable. The Bidder will furnish to the appropriate taxing authorities all required information and reports pertaining to the project, except as to Owner Furnished Materials.

Section 11. Changes in Quantities. The Bidder understands and agrees that the quantities called for this Proposal are approximate, and that the total number of units upon which payment shall be made shall be as set forth in the inventory. If Owner changes the quantity of any unit or units specified this Proposal by more than twenty five percent (25%) and the materials cost to the Bidder is increased thereby to an extent which would not be adequately compensated by application of the unit prices in this Proposal to the revised quantity of such unit or units, such change, to the extent of the quantities of such units in excess of such twenty five percent (25%) shall be regarded as a change in the construction within the meaning of Article II, Section 1(d) of this proposal.

ARTICLE II-CONSTRUCTION

Section 1. Time and Manner of Construction.

- a. The Bidder agrees to commence construction of the project on a date (hereinafter called the "Commencement Date") which shall be determined by the Engineer after notice to the bidder in writing of approval of the contract by the Administrator, if approval of the Administrator is required, and notice in writing from the Bidder that the Bidder has sufficient materials to warrant commencement and continuation of construction, but in no event will the Commencement Date be later than Twelve (12) calendar days after date of approval of the contract by the Administrator, if approval of the Administrator is required. The Bidder further agrees to prosecute diligently and to complete construction in strict accordance with the Plans, Specifications and Construction Drawings no later than August 30, 2024. ~~Provided, however, that the Bidder will not be required to dig holes, set poles, install anchors, install underground conduit, perform any plowing for the installation of underground cable, or dig trenches if there are more than six (6) inches of frost on the ground nor to perform any construction on such days when in the judgment of the Engineer snow, rain, or wind, or the results of snow, rain, or frost make it impracticable to perform any operation of construction; provided further that the Bidder will not be required to perform any plowing for the installation of underground cable on public roads or highways if there are more than two (2) inches of frost in the ground. To the extent of the time lost due to the conditions described herein and approved in writing by the Engineer, the time of completion set out above will be extended if the Bidder makes a written request therefore to the Owner as provided in subsection b of this Section 1.~~
- b. The time for Completion of Construction shall be extended for the period of any reasonable delay which is due exclusively to causes beyond the control and without the fault of the Bidder, including Acts of God, fires, floods, inability to obtain materials and acts or omissions of Owner with respect to matters for which Owner is solely responsible: Provided, however that no such extension of time for completion shall be granted the Bidder unless within ten (10) days after the happening of any event relied upon by the Bidder for such an extension of time the Bidder shall have made a request therefore in writing to Owner, and provided further that no delay in such time of completion or in the progress of the work which results from any of the above causes except acts or omissions of Owner, shall result in any liability on the part of Owner.
- c. The sequence of construction shall be as set forth below, the number or names being the designations of extensions or areas (hereinafter called the "Sections") corresponding to the numbers or names shown on the maps attached hereto, or if no Sections are set forth below, the sequence of construction shall be as determined by the Bidder, subject to the approval of the Engineer.

As coordinated with Kootenai Electric Cooperative, Inc.

- d. Owner, acting through the Engineer with the approval of the Administrator, if approval of the Administrator is required, may from time to time during the progress of the construction of the project make such changes, additions or subtractions from the Plans, Specifications, Construction Drawings, List of Materials and sequence of construction provided for in the previous paragraph which are part of Contractor's Proposal as conditions may warrant., Provided, however, that if any change in the construction to be done shall require an extension of time, a reasonable extension will be granted if the Bidder shall make a written request therefore to Owner within (10) days after any such change is made.

And provided further, that if the cost to the Bidder of construction of the project shall be materially increased by any such change or addition, Owner shall pay the Bidder for the reasonable cost thereof in accordance with a Construction Contract Amendment signed by Owner and the Bidder and approved by the Administrator, if approval by the Administrator is required, but no claim for additional compensation for any such change or addition will be considered unless the Bidder shall have made a written request therefore to Owner prior to the commencement of work in connection with such change or addition.

- e. Owner shall comply with the Contract Work Hours and Safety Standards Act as follows:
- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
 - (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.
 - (3) Withholding for unpaid wages and liquidated damages. The Federal Emergency Management Agency (FEMA) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
 - (4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

Section 2. Environmental Protection. The Bidder shall perform the work in compliance with all applicable Federal, State, and local Environmental Laws. For purposes of this Agreement, the term "Environmental Laws" shall mean all Federal, state, and local laws including statutes, regulations ordinances, codes, rules, and other governmental restriction and requirements relating to the environment or solid waste, hazardous substances, hazardous waste, toxic or hazardous material, pollutants or contaminants including, but not limited to the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9601, et seq., the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251, et seq., the Clean Air Act, as amended, 42 U.S.C. . . §§ 7401 et seq. and the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901, et seq., now or at any time hereafter in effect.

Contractor agrees to report each violation to both Owner and understands and agrees that Owner will, in turn report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

Section 3. Tools, Equipment, and Qualified Personnel. The Bidder agrees that in the event this Proposal is accepted it will make available for use in connection with the proposed construction all necessary tools and equipment and qualified supervisors and workers.

Section 4. Changes in Construction. The Bidder agrees to make such changes in construction previously installed in the project by the Bidder as required by Owner for prices arrived at as follows:

- a. For substations and other units where only a portion of the complete unit is affected by the change, the compensation for such change shall be as agreed upon in writing by the Bidder and Owner and approved by the Administrator, if approval by the Administrator is required, prior to the commencement of work in connection with such change.
- ~~b. For all other units, the compensation for such change shall be the reasonable cost thereof as agreed upon by the Bidder and the Owner, but in no event shall it exceed two (2) times the labor price quoted in the Proposal for the installation of the unit to be changed. Such compensation shall be in lieu of any other payment for the installation and removal of the original unit. (If a new or replacing unit is installed, payment for such new or replacing unit shall be made as shown in the final inventory.)~~

No payment shall be made to the Bidder for materials or labor involved in correcting errors or omissions on the part of the Bidder which result in construction not in accordance with the Plans and Specifications.

Section 5. Construction Not in Proposal. ~~The Bidder also agrees that when it is necessary to construct units not shown in the Proposal, in absence of other mutual agreement, it will construct such units for a price arrived at as follows:~~

All construction not listed in the proposal must be approved by Owner in writing prior to any additional work being completed. Work done by the Bidder which is not approved by Owner and which is not in the construction proposal is not the responsibility nor will be paid for by Owner.

Section 6. Supervision and Inspection.

- a. The Bidder shall give sufficient supervision to the work, using its best skill and attention. The Bidder will carefully study and compare all drawings, specifications and other instructions and will at once report to Owner any error, inconsistency or omission which it may discover. The Bidder shall cause the construction work on the project to receive constant supervision by a competent superintendent (hereinafter called the "Superintendent") who shall be present at all times during working hours where construction is being carried on. The Bidder shall also employ, in connection with the construction of the project, capable, experienced and reliable supervisors and such skilled workers as may be required for the various classes of work to be performed. The Bidder shall be solely responsible for the means and methods of construction and for the supervision of the Bidder's employees.
- b. Owner reserves the right to require the removal from the project of any employee of the Bidder if in the judgment of Owner such removal shall be necessary in order to protect the interest of Owner. Owner shall have the right to require the Bidder to increase the number of its employees and to increase or change the amount or kind of tools and equipment if at any time the progress of the work shall be unsatisfactory to Owner; but the failure of Owner to give any such directions shall not relieve the Bidder of its obligations to complete the work within the time and in the manner specified in this Proposal.
- c. The construction of the project and all materials and equipment used therein, shall be subject to the inspection, tests, and acceptance by Owner and the Administrator and the Bidder shall furnish all information required by Owner or by the Administrator concerning the nature or source of any materials incorporated or to be incorporated in the project. All Bidder procedures and records pertaining to the work shall be made available to Owner and the Administrator for review prior to such inspections and tests. The Bidder shall provide all reasonable facilities necessary for such inspection and tests and shall maintain an office at the site of the project, with telephone service where obtainable and at least one office employee to whom communications from Owner may be delivered. Delivery of such communications in writing to the employee of the Bidder at such office shall constitute delivery to the

Bidder. The Bidder shall have an authorized agent accompany the Engineer when final inspection is made and, if requested by Owner, when any other inspection is made. The performance of such inspections or tests by Owner or the Administrator shall not relieve the Bidder of its obligations to perform the work in accordance with the requirements of this Contract.

- d. In the event that Owner, or the Administrator, shall determine that the construction contains or may contain numerous defects, it shall be the duty of the Bidder and the Bidder's Surety or Sureties, if any, to have an inspection made by an engineer approved by Owner and the Administrator, if approval by the Administrator is required, for the purpose of determining the exact nature, extent and location of such defects.
- e. The Engineer may recommend to Owner that the Bidder suspend the work wholly or in part for such period or periods as the Engineer may deem necessary due to unsuitable weather or such other conditions as are considered unfavorable for satisfactory prosecution of the work or because of the failure of the Bidder to comply with any of the provisions of the Contract: Provided, however, that the Bidder shall not suspend work pursuant to this provision without written authority from Owner so to do. The time of completion hereinabove set forth shall be increased by the number of days of any such suspension, except when such suspension is due to the failure of the Bidder to comply with any of the provisions of this Contract. In the event that work is suspended by the Bidder with the consent of Owner, the Bidder before resuming work shall give Owner at least twenty-four (24) hours' notice thereof in writing.

Section 7. Defective Materials and Workmanship.

- a. The acceptance of any materials, equipment (except Owner Furnished Materials) or any workmanship by Owner or the Engineer shall not preclude the subsequent rejection thereof if such materials, equipment, or workmanship shall be found to be defective after delivery or installation, and any such materials, equipment or workmanship found defective before final acceptance of the construction shall be replaced or remedied, as the case may be, by and at the expense of the Bidder. Any such condemned material or equipment shall be immediately removed from the site of the project by the Bidder at the Bidder's expense. The Bidder shall not be entitled to any payment hereunder so long as any defective materials, equipment or workmanship in respect to the project, of which the Bidder shall have had notice, shall not have been replaced or remedied, as the case may be.
- b. Notwithstanding any certificate which may have been given by Owner or the Engineer, if any materials, equipment (except Owner Furnished Materials) or any workmanship which does not comply with the requirements of this Contract shall be discovered within one (1) year after Completion of Construction of the project, the Bidder shall replace such defective materials or equipment or remedy any such defective workmanship within thirty (30) days after notice in writing of the existence thereof shall have been given by Owner. If any such defective materials, equipment, or workmanship so replaced or repaired is found to be defective within one year after the completion of the replacement or repair, the Bidder shall replace or remedy such defective materials, equipment, or workmanship. If the Bidder shall be called upon to replace any defective materials or equipment or to remedy defective workmanship as herein provided, Owner, if so requested by the Bidder shall deenergize that section of the project involved in such work. In the event of failure by the Bidder so to do, Owner may replace such defective materials or equipment or remedy such defective workmanship, as the case may be, and in such event the Bidder shall pay to Owner the cost and expense thereof.

ARTICLE III--PAYMENTS AND RELEASE OF LIENS

Section 1. Payments to Bidder.

- a. On or before the fifth (5) day of each calendar month, the Bidder will make application for payment, and Owner, shall make partial payment to the Bidder for construction accomplished during the preceding calendar month on the basis of completed Construction Units furnished and certified to by the Bidder, recommended by the Engineer and approved by Owner solely for the purposes of payment, provided, however, that such approval shall not be deemed approval of the workmanship or materials. Invoices submitted by Bidder shall become due upon presentation and shall be considered past due if not paid within thirty (30) calendar days of the date presented to KEC. Only ninety percent (90%) of each such

estimate approved during the construction of the project shall be paid by Owner to the Bidder prior to Completion of the project. Upon completion by the Bidder of the construction of the project, the Engineer will prepare an inventory of the project showing the total number and character of Construction Units and, after checking such inventory with the Bidder, will certify it to Owner. Upon the approval by Owner and the Administrator, if the approval of the Administrator is required, of a Certificate of Completion in the form attached hereto, showing the total cost of the construction performed, Owner shall make payment to the Bidder of all amounts to which the Bidder shall be entitled thereunder which shall not have been paid, provided, however, that such final payment shall be made not later than ninety (90) days after the date of Completion of Construction of the project, as specified in the Certificate of Completion, unless withheld because of the fault of the Bidder.

- b. The Bidder shall be paid on the basis of the number of Construction Units actually installed at the direction of Owner shown by the inventory based on the staking sheets or structure lists.
- c. Notwithstanding the provisions of Section 1.a above, the Bidder may, by giving written notice thereof to Owner, elect to receive payment in full for any Section of the project upon:
 - 1. completion of construction of such Section as certified by the Engineer and approved by Owner and the Administrator, if approval by the Administrator is required;
 - 2. submission to Owner and the Administrator, if (submission to the Administrator is required, of the releases of lien and the certificate referred to in Section 2 of this Article;
 - 3. approval by Owner and the Administrator, if approval by the Administrator is required, of the inventory in respect of such Section; and
 - 4. submission to Owner and the Administrator, if submission to the Administrator is required, of the consent in writing by the Surety or Sureties, if any, on Contractor's Bond to payment in full for such Section prior to Completion of the project.

If no Sections are designated in Article II, Section 1c, the term "Section" shall mean for purposes of this subsection c and Article IV Section 3b only, a part of the project as designated by Owner which represents at least twenty-five percent (25%) of the contract price, and which is capable of being energized and operated by Owner

- d. Interest at the rate of eight point five percent¹ (8.5%) per annum shall be paid by Owner to the Bidder on all unpaid balances due on monthly estimates, commencing fifteen (15) days after the due date; provided the delay in payment beyond the due date is not caused by any condition within the control of the Bidder. The due date for purposes of such monthly payment or interest on all unpaid balances shall be the fifteenth (15) day of each calendar month provided (1) the Bidder on or before the fifth (5) day of such month shall have submitted its certification of Construction Units completed during the preceding month and (2) Owner on or before the fifteenth (15) day of such month shall have approved such certification. If, for reasons not due to the Bidder's fault, such approval shall not have been given on or before the fifteenth (15) day of such month, the due date for purposes of this subsection d shall be the fifteenth (15) day of such month notwithstanding the absence of the approval of the certification.
- e. Interest at the rate of eight point five percent² (8.5%) per annum shall be paid by Owner to the Bidder on the final payment for the project or any completed Section thereof commencing fifteen (15) days after the due date. The due date for purposes of such final payment or interest on all unpaid balances shall be the date of approval by Owner of all of the documents requiring such approval, as a condition precedent to the making of final payment, or ninety (90) days after the date of Completion of Construction of the project, as specified in the Certificate of Completion, whichever date is earlier.

¹ The Owner shall insert a rate equal to the lowest "Prime Rate" listed in the "Money Rates" section of the Wall Street Journal on the date such invitation to bid is issued.

² See Footnote 1.

- f. No payment shall be due while the Bidder is in default in respect of any of the provisions of this Contract and Owner may withhold from the Bidder the amount of any claim by a third party against either the Bidder or Owner based upon an alleged failure of the Bidder to perform the work hereunder in accordance with the provisions of this Contract.
- g. Owner and the Administrator shall have the right to inspect all payrolls, invoices of materials, and other data and records of the Bidder and of any subcontractor, relevant to the construction of the project.

Section 2. Release of Liens and Certificate of Contractor. Upon the completion by the Bidder of the construction of the project (or any Section thereof if the Bidder shall elect to receive payment in full for any Section when completed as provided above) but prior to final payment to the Bidder, the Bidder shall deliver to Owner, in duplicate, releases of all liens and of rights to claim any lien, in the form attached hereto from all manufacturers, material suppliers, and subcontractors furnishing services or materials for the project or such Section and a certificate in the form attached hereto to the effect that all labor used on or for the project or such Section has been paid and that all such releases have been submitted to Owner.

Section 3. Payments to Material Suppliers and Subcontractors. The Bidder shall pay each material supplier, if any, within five (5) days after receipt of any payment from Owner, the amount thereof allowed the Bidder for and on account of materials furnished or construction performed by each material supplier or each subcontractor.

ARTICLE IV--PARTICULAR UNDERTAKINGS OF THE BIDDER

Section I. Protection to Persons and Property. The Bidder shall at all times take all reasonable precautions for the safety of employees on the work and of the public, and shall comply with all applicable provisions of federal, state, and local laws, rules, and regulations and building and construction codes, in addition to the safety rules and procedures of Owner. The following provisions shall not limit the generality of the above requirements.

- a. The Bidder shall at no time and under no circumstances cause or permit any employee of the Bidder to perform any work upon energized lines, or upon poles carrying energized lines, unless otherwise specified in the Notice and Instructions to Bidders.
- b. The Bidder shall transport and store all material in facilities and vehicles which are designed to protect the material from damage. The Bidder shall ensure that all vehicles, trailers, and other equipment used comply with all applicable licensing, traffic, and highway requirements.
- c. The Bidder shall so conduct the construction of the project as to cause the least possible obstruction of public and private roadways.
- d. The Bidder shall provide and maintain all such guard lights and other protection for the public as may be required by applicable statutes, ordinances and regulations or by local conditions.
- e. The Bidder shall do all things necessary or expedient to properly protect any and all parallel, converging and intersecting lines, joint line poles, highways, and any and all property of others from damage, and in the event that any such parallel, converging and intersecting lines, joint line poles, highways or other property are damaged in the course of the construction of the project the Bidder shall at its own expense restore any or all of such damaged property immediately to as good a state as before such damage occurred.
- f. Where the right-of-way of the project traverses cultivated or grazing lands, the Bidder shall limit the movement of its crews and equipment so as to cause as little damage as possible to crops, orchards or property and shall endeavor to avoid marring the lands. All fences which are necessarily opened or moved during the construction of the project shall be replaced in as good condition as they were found and precautions shall be taken to prevent the escape of livestock. Except as otherwise provided in the descriptions of underground plowing and trenching assembly units, the Bidder shall not be responsible for loss of or damage to crops, orchards or property (other than livestock) on the right-of-way necessarily incident to the construction of the project and not caused by negligence or inefficient operation of the Bidder. The Bidder shall be responsible for all other loss of or damage to crops, orchards, or property,

whether on or off the right-of-way, and for all loss of or damage to livestock caused by the construction of the project.

The right-of-way for purposes of this said section shall consist of an area extending 15 feet either side of area staked route if not in existing road right of way. In that case, it will be between the road bed and edge of the established road right of way.

- g. The project, from the commencement of work to completion, or to such earlier date or dates when Owner may take possession and control in whole or in part as hereinafter provided shall be under the charge and control of the Bidder and during such period of control by the Bidder all risks in connection with the construction of the project and the materials to be used therein shall be borne by the Bidder. The Bidder shall make good and fully repair all injuries and damages to the project or any portion thereof under the control of the Bidder by reason of any act of God or other casualty or cause whether or not the same shall have occurred by reason of the Bidder's negligence.
 - i. To the maximum extent permitted by law, Bidder shall defend, indemnify, and hold harmless Owner and Owner's directors, officers, and employees from all claims, causes of action, losses, liabilities, and expenses (including reasonable attorney's fees) for personal loss, injury, or death to persons (including but not limited to Bidder's employees) and loss, damage to or destruction of Owner's property or the property of any other person or entity (including but not limited to Bidder's property) in any manner arising out of or connected with the Contract, or the materials or equipment supplied or services performed by Bidder, its subcontractors and suppliers of any tier. But nothing herein shall be construed as making Bidder liable for any injury, death, loss, damage, or destruction caused by the sole negligence of Owner.
 - ii. To the maximum extent permitted by law, Bidder shall defend, indemnify, and hold harmless Owner and Owner's directors, officers, and employees from all liens and claims filed or asserted against Owner, its directors, officers, and employees, or Owner's property or facilities, for services performed or materials or equipment furnished by Bidder, its subcontractors and suppliers of any tier, and from all losses, demands, and causes of action arising out of any such lien or claim. Bidder shall promptly discharge or remove any such lien or claim by bonding, payment, or otherwise and shall notify Owner promptly when it has done so. If Bidder does not cause such lien or claim to be discharged or released by payment, bonding, or otherwise, Owner shall have the right (but shall not be obligated) to pay all sums necessary to obtain any such discharge or release and to deduct all amounts so paid from the amount due Bidder.
 - iii. Bidder shall provide to Owner's satisfaction evidence of Bidder's ability to comply with the indemnification provisions of subparagraphs i and ii above, which evidence may include but may not be limited to a bond or liability insurance policy obtained for this purpose through a licensed surety or insurance company.
- h. Any and all excess earth, rock, debris, underbrush and other useless materials shall be removed by the Bidder from the site of the project as rapidly as practicable as the work progresses.
- i. Upon violation by the Bidder of any of the provisions of this section, after written notice of such violation given to the Bidder by the Engineer or Owner, the Bidder shall immediately correct such violation. Upon failure of the Bidder so, Owner may correct such violation at the Bidder's expense: Provided, however, that Owner may, if it deems it necessary or advisable, correct such violation at the Bidder's expense without such prior notice to the Bidder.
- j. The Bidder shall submit to Owner monthly reports in duplicate of all accidents, giving such data as may be prescribed by Owner.
- k. The Bidder shall not proceed with the cutting of trees or clearing of right-of-way without written notification from Owner that proper authorization has been received from Owner of the property, and the Bidder shall promptly notify Owner whenever any landowner objects to the trimming or felling of any

trees or the performance of any other work on its land in connection with the project and shall obtain the consent in writing of Owner before proceeding in any such case.

1. The Bidder will furnish, prior to the commencement of underground distribution construction, proof satisfactory to Owner, of compliance with requirements of highway and road authorities having jurisdiction, including without limitation, the furnishing of a bond or other guaranty, and approval by such authorities of the equipment and methods of construction and repair to be used by the Bidder.

Section 2. Insurance. The Bidder shall take out and maintain throughout the period of this Agreement the following types and minimum amounts of insurance:

- a. Workers' compensation and employers' liability insurance, as required by law, covering all its employees who perform any of the obligations of the Bidder under the contract. If any employer or employee is not subject to the workers' compensation laws of the governing state, then insurance shall be obtained voluntarily to extend to the employer and employee coverage to the same extent as though the employer or employee were subject to the workers' compensation laws.
- b. Public liability insurance covering all operations under the contract shall have limits for bodily injury or death of not less than \$1 million each occurrence, limits for property damage of not less than \$1 million each occurrence, and \$1 million aggregate for accidents during the policy period. A single limit of \$1 million of bodily injury and property damage is acceptable. This required insurance may be in a policy or policies of insurance, primary and excess including the umbrella or catastrophe form.
- c. Automobile liability insurance on all motor vehicles used in connection with the contract, whether owned, non-owned, or hired, shall have limits for bodily injury or death of not less than \$1 million per person and \$1 million each occurrence, and property damage limits of \$1 million for each occurrence. A single limit of \$1 million of bodily injury and property damage is acceptable. This required insurance may be in a policy or policies of insurance, primary and excess including the umbrella or catastrophe form.

Owner shall have the right at any time to require public liability insurance and property damage liability insurance greater than those required in subsection "b" and "c" of this Section. In any such event, the additional premium or premiums payable solely as the result of such additional insurance shall be added to the Contract price.

Owner shall be named as Additional Insured on all policies of insurance required in subsections "b" and "c" of this Section.

The policies of insurance shall be in such form and issued by such insurer as shall be satisfactory to Owner. The Bidder shall furnish Owner a certificate evidencing compliance with the foregoing requirements which shall provide not less than (30) days prior written notice to Owner of any cancellation or material change in the insurance.

Section 3. Delivery of Possession and Control to Owner.

- a. Upon written request of Owner the Bidder shall deliver to Owner full possession and control of any portion of the project provided the Bidder shall have been paid at least ninety percent (90%) of the cost of construction of such portion. Upon such delivery of the possession and control of any portion of the project to Owner, the risk and obligations of the Bidder as set forth in Article IV Section 1.g hereof with respect to such portion of the project so delivered to Owner shall be terminated; Provided, however, that nothing herein contained shall relieve the Bidder of any liability with respect to defective materials and workmanship as contained in Article II, Section 7 hereof.
- b. Where the construction of a Section as herein before defined in Article II, Section 1.c and Article III, Section 1.c shall have been completed by the Bidder, Owner agrees, after receipt of a written request from the Bidder, to accept delivery of possession and control of such Section upon the issuance by the Engineer of a written statement that the Section has been inspected and found acceptable by the Engineer. Upon such delivery of the possession and control of any such Section to Owner, the risk and

obligations of the Bidder as set forth in Article IV, Section 1.g hereof with respect to such Section so delivered to Owner shall be terminated: Provided, however, that nothing herein contained shall relieve the Bidder of any liability with respect to defective materials or workmanship as contained in Article II, Section 7 hereof.

Section 4. Energizing the Project.

- a. Prior to Completion of the project Owner, upon written notice to the Bidder, may test the construction thereof by temporarily energizing any portion or portions thereof. During the period of such test the portion or portions of the project so energized shall be considered as within the possession and control of Owner and governed by the provisions of Section 3 of this Article. Upon written notice to the Bidder by Owner of the completion of such test and upon deenergizing the lines involved therein said portion or portions of the project shall be considered as returned to the possession and control of the Bidder unless Owner shall elect to continue possession and control in the manner provided in Section 3 of this Article.
- b. Owner shall have the right to energize permanently any portion or portions of the project delivered to its possession and control pursuant to the provisions of Section 3 of this Article.

Section 5. Assignment of Guarantees. All guarantees of materials and workmanship running in favor of the Bidder shall be transferred and assigned to Owner prior to the time the Bidder receives final payment.

ARTICLE V--REMEDIES

Section 1. Completion on Bidder's Default. If default shall be made by the Bidder or by any subcontractor in the performance of any of the terms of this Proposal, Owner, without in any manner limiting its legal and equitable remedies in the circumstances, may serve upon the Bidder and the Surety or Sureties, if any, upon Contractor's Bond or Bonds a written notice requiring the Bidder to cause such default to be corrected forthwith. Unless within twenty (20) days after the service of such notice upon the Bidder such default shall be corrected or arrangements for the correction thereof satisfactory to both Owner and the Administrator shall be made by the Bidder or its Surety or Sureties, if any, Owner may take over the construction of the project and prosecute the same to completion by Contract or otherwise for the account and at the expense of the Bidder, and the Bidder and its Surety or Sureties, if any, shall be liable to Owner for any cost or expense in excess of the Contract price occasioned thereby. In such event Owner may take possession of and utilize, in completing the construction of the project, any materials, tools, supplies, equipment, appliances, and plant belonging to the Bidder or any of its subcontractors, which may be situated at the site of the project. Owner in such contingency may exercise any rights, claims or demands which the Bidder may have against third persons in connection with this Contract and for such purpose the Bidder does hereby assign, transfer and set over unto Owner all such rights, claims and demands.

Section 2. Liquidated Damages. The time of the Completion of Construction of the project is of the essence of the Contract. Should the Bidder neglect, refuse or fail to complete the construction within the time herein agreed upon, after giving effect to extensions of time, if any, herein provided, then, in that event and in view of the difficulty of estimating with exactness damages caused by such delay, Owner shall have the right to deduct from and retain out of such moneys which may be then due, or which may become due and payable to the Bidder the sum of One Thousand dollars (\$1,000.00) per day for each and every day that such construction is delayed in its completion beyond the specified time, as liquidated damages and not as a penalty if the amount due and to become due from the Owner to the Bidder is insufficient to pay in full any such liquidated damages, the Bidder shall pay to Owner the amount necessary to affect such payment in full: Provided, however, that Owner shall promptly notify the Bidder in writing of the manner in which the amount retained, deducted or claimed as liquidated damages was computed.

Section 3. Cumulative Remedies. Every right or remedy herein conferred upon or reserved to Owner or the Government or the Administrator shall be cumulative, shall be in addition to every right and remedy now or hereafter existing at law or in equity or by statute and the pursuit of any right or remedy shall not be construed as an election: Provided, however, that the provisions of Section 2 of this Article shall be the exclusive measure of damages for failure by the Bidder to complete the construction of the Project within the time herein agreed upon.

Section 4. Termination. Owner may terminate this agreement with 10 days written notice to Contractor. Should the contract be terminated Contractor shall immediately render an invoice detailing all work completed by Contractor up to the date of termination. Within 30 days Owner will pay Contractor for all work performed up to the date of termination notwithstanding the remedies specified in Sections 1 through 3 of this Article.

ARTICLE VI-MISCELLANEOUS

Section 1. Definitions.

- a. The term "Administrator " shall mean the Administrator of the Rural Utilities Service of the United States of America and his or her duly authorized representative or any other person in whom or authority in which may be vested the duties and functions which the Administrator is now authorized by law to perform.
- b. The term "Engineer " shall mean the Engineer employed by Owner, to provide engineering services for the project and said Engineer's duly authorized assistants and representatives.
- c. The term "Completion of Construction " shall mean full performance by the Bidder of the Bidder's obligations under the Contract and all amendments and revisions thereof except the Bidder's obligations in respect of (1) Releases of Liens and Certificate of Contractor under Article III, Section 2 hereof (2) the inventory referred to in Article III, Section 1 hereof and (3) other final documents. The term "Completion of the Project" shall mean full performance by the Bidder of the Bidder's obligations under the Contract and all amendments and revisions thereof. The Certificate of Completion, signed by the Engineer and approved in writing by Owner and the Administrator, if approval by the Administrator is required, shall be the sole and conclusive evidence as to the date of Completion of Construction and as to the fact of Completion of the Project.

Section 2. Materials and Supplies. In the performance of this contract there shall be furnished only such unmanufactured articles, materials, and supplies as have been mined or produced in the United States or in any eligible country, and only such manufactured articles, materials, and supplies as have been manufactured in the United States or in any eligible country substantially all from articles, materials, or supplies mined, produced or manufactured, as the case may be, in the United States or in any eligible country; provided that other articles, materials, or supplies may be used in the event and to the extent that the Administrator shall expressly in writing authorize such use pursuant to the provisions of the Rural Electrification Act of 1938, being Title IV of Public Resolution No. 122, 75th Congress, approved June 21, 1938. For the purposes of this section, an "eligible country" is any country that applies with respect to the United States an agreement ensuring reciprocal access for United States products and services and suppliers to the markets of that country, as determined by the United States Trade Representative. The Bidder agrees to submit to Owner such certificates with respect to compliance with the foregoing provision as the Administrator from time to time may require.

Section 3. Patent Infringement. The Bidder shall hold harmless and indemnify Owner from any and all claims, suits and proceedings for the infringement of any patent or patents covering any materials or equipment used in construction of the project.

Section 4. Permits for Explosives. All permits necessary for the handling or use of dynamite or other explosives in connection with the construction of the project shall be obtained by and at the expense of the Bidder.

Section 5. Compliance with Laws. The Bidder shall comply with all federal, state, and local laws, rules, and regulations applicable to its performance under the contract and the construction of the project. The Bidder acknowledges that it is familiar with the Rural Electrification Act of 1936, as amended, the Anti Kick-Back Act of 1986 (41 U.S.C. 51 et seq), and 18 U.S.C. §§ 286, 287, 641, 661, 874, 1001, and 1366, as amended.

The Bidder represents that to the extent required by Executive Orders 12549 (3 CFR, 1985-1988 Comp., p. 189) and 12689 (3 CFR, 1989 Comp., p. 235). Debarment and Suspension, and 7 CFR part 3017, it has submitted to Owner a duly executed certification in the form prescribed in 7 CFR part 3017.

The Bidder represents that, to the extent required, it has complied with the requirements of Pub. L. 101-121, Section 319, 103 Stat. 701, 750-765 (31 U.S. C. 1352), entitled "Limitation on use of appropriated funds to

influence certain Federal contracting and financial transactions," and any rules and regulations issued pursuant thereto.

Section 6. Equal Opportunity Provisions.

a. Kootenai Electric Cooperative, Inc. is an equal opportunity employer and federal contractor or subcontractor. Consequently, the parties agree that, as applicable, they will abide by the requirements of 41 CFR 60-1.4(a), 41 CFR 60-300.5(a) and 41 CFR 60-741.5(a) and that these laws are incorporated herein by reference. These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. These regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, protected veteran status or disability. The parties also agree that, as applicable, they will abide by the requirements of Executive order 13496 (20 CFR Part 471, Appendix A to Subpart A), relating to the notice of employee rights under federal labor laws.

b. During the performance of this contract, Contractor agrees as follows:

(1) Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) Contractor will, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with Contractor's legal duty to furnish information.

(4) Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary

of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

- (7) In the event of Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (8) Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, Contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

e. ~~Bidder's Representations.~~

The Bidder represents that:

It has ~~_____~~, does not have ~~_____~~, 100 or more employees, and if it has, that it has ~~_____~~, has not ~~_____~~, furnished the Equal Employment Opportunity Employers Information Report EEO-1, Standard Form 100, required of employers with 100 or more employees pursuant to Executive Order 11246 of September 24, 1965, and Title VII of the Civil Rights Act of 1964.

The Bidder agrees that it will obtain, prior to the award of any subcontract for more than \$10,000 hereunder to a subcontractor with 100 or more employees, a statement, signed by the proposed subcontractor, that the proposed subcontractor has filed a current report on Standard Form 100.

The Bidder agrees that if it has 100 or more employees and has not submitted a report on Standard Form 100 for the current reporting year and that if this Contract will amount to more than \$10,000, the Bidder will file such report, as required by law, and notify the owner in writing of such filing prior to the Owner's acceptance of this Proposal.

d. ~~Equal Opportunity Clause. During the performance of this Contract, the Bidder agrees as follows:~~

1. ~~The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Bidder will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotions or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this Equal Opportunity Clause.~~
2. ~~The Bidder will, in all solicitations or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.~~
3. ~~The Bidder will send to each labor union or representative of workers, with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the Bidder's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.~~
4. ~~The Bidder will comply with all provisions of Executive Order 11246 of September 24, 1965, and the rules, regulations and relevant orders of the Secretary of Labor.~~
5. ~~The Bidder will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.~~
6. ~~In the event of the Bidder's noncompliance with the Equal Opportunity Clause of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part, and the Bidder may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as provided by law.~~

7. ~~The Bidder will include this Equal Opportunity Clause in every subcontractor purchase order unless exempted by the rules, regulations, or order of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Bidder will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance; Provided, however, that in the event Bidder becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Bidder may request the United States to enter into such litigation to protect the interests of the United States.~~
- e. ~~Certificate of Nonsegregated Facilities. The Bidder certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Bidder certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause, and that it will retain such certifications in its files.~~

Section 7. Franchises and Rights-of-Way. The Bidder shall be under no obligation to obtain or assist in obtaining: Any franchises, authorizations, permits or approvals required to be obtained by Owner from Federal, State, County, Municipal or other authorities; any rights-of-way over private lands; or any agreements between Owner and third parties with respect to the joint use of poles, crossings, or other matter incident to the construction and operation of the project.

Section 8. Nonassignment of Contract. The Bidder shall perform directly and without subcontracting not less than twenty-five percent (25%) of the construction of the project, to be calculated on the basis of the total Contract price. The Bidder shall not assign the Contract effected by an acceptance of this Proposal or any interest in any funds that may be due or become due hereunder or enter into any contract with any person, firm or corporation for the performance of the Bidder's obligations hereunder or any part thereof without the approval in writing of Owner and of the Surety or Sureties, if any, on any bond furnished by the Bidder for the faithful performance of the Bidder's obligations hereunder. If the Bidder, with the consent of Owner and any Surety or Sureties on Contractor's Bond or Bonds, shall enter into a subcontract with any subcontractor for the performance of any part of this Contract, the Bidder shall be as fully responsible to Owner and the Government for the acts and omissions of such subcontractor and of persons employed by such subcontractor as the Bidder would be for its own acts and omissions and those of persons directly employed by it.

Section 9. Successors and Assigns. Each and all of the covenants and agreements herein contained shall extend to and be binding upon the successors and assigns of the parties hereto. Owner and Bidder acknowledge that this Contract is assigned to the Government acting through the Administrator, for security purposes under Owner's mortgage and security instrument.

Section 10. Independent Contractor. The Bidder shall perform the work as an independent contractor, not as a subcontractor, agent, or employee of Owner. Upon acceptance of this Proposal, the successful Bidder shall be Contractor and all references in the Proposal to the Bidder shall apply to Contractor.

Section 11. Right to Auditing. Contractor shall maintain complete records relating to any cost-based (i.e. Work not covered by firm prices) components of the Work billed under this Agreement or relating to the quantity of units billed under any unit price provisions of this Agreement (all the foregoing hereinafter referred to as "Records") for

a minimum of five years following the latest performance of, delivery to Owner of, or payment by Owner for, such Work units. All such Records shall be open to inspection and subject to audit and reproduction during normal working hours, by Owner or its authorized representatives to the extent necessary to adequately permit evaluation and verification of any invoices, payments, time sheets, or claims based on Contractor's actual costs incurred in the performance or delivery of Work under this Agreement. For the purpose of evaluating or verifying such actual or claimed costs, Owner or its authorized representative shall have access to said Records at any time, including any time after final payment by Owner to Contractor pursuant to this Agreement. All non-public information obtained in the course of such audits shall be held in confidence except pursuant to judicial and administrative order. Owner or its authorized representative shall have access, during normal working hours, to all necessary Contractor facilities and shall be provided adequate and appropriate work space to conduct audits in compliance with the provisions of this Article. Owner shall give Contractor reasonable notice of intended audits. The rights of Owner set forth in this paragraph shall survive the termination or expiration of this agreement.

Section 12. Approval by the Administrator: This contract does___, does not XX, require approval of the Administrator. No acceptance of a Proposal for a contract upon which approval of the Administrator is required shall become effective until the contract has been approved by the Administrator; provided that no obligation shall arise hereunder unless such approval is given within one-hundred twenty (120) days after the date set for the opening of the proposals. The acceptance of a Proposal for a contract upon which approval of the Administrator is not required shall become effective the date of acceptance by Owner.

ATTEST

	_____	Bidder
_____	Secretary	_____
		President
Dated _____		_____
		Address

The Proposal must be signed with the full name of the Bidder. If the Bidder is a partnership, the Proposal must be signed in the partnership name by a partner. If the Bidder is a corporation, the Proposal must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the Secretary of the Corporation.

ACCEPTANCE

Subject to the approval of the Administrator, if approval of the Administrator is required, Owner hereby accepts the foregoing Proposal of the Bidder:

for the construction of the following:

Conduit, cable and equipment installation for Capital Project 513 Athol Substation Breaker Upgrade, Regulator Bypass Switch Installation and Secondary Service Construction, Contract No. 20240715, as described in the contract specifications contained herein.

For a total contract price of \$ _____, (_____)

Kootenai Electric Cooperative, Inc.

Owner

By _____

*Douglas A. Elliott
General Manager*

_____ 20

Date of Contract

Notary of the Public

State of Idaho

Subscribed and sworn before me this

_____ day of _____ 20

Residing in _____ Idaho

Commission expires _____

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0107. The time required to complete this information collection is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

U.S. Department of Agriculture Rural Utilities Service

BID BOND

1. KNOW ALL PERSONS that we, _____

as Principal and Surety, are held and firmly bound unto Kootenai Electric Cooperative, Inc., (hereafter called the "Owner") in the penal sum of ten percent (10%) of the amount of the bid referred to in paragraph 2 below but to exceed _____ dollars (\$ _____) as hereinafter set forth and for the payment of which sum well and truly to be made we bind ourselves, our executors, administrators, successors and assigns, jointly and severally, by these presents;

2. WHEREAS, the Principal has submitted a bid to Owner for the construction of the Rural Utilities Service project known as KEC Capital Project 513, 20240715.

3. NOW, THEREFORE, the condition of this obligation is such that if Owner shall accept the bid of the Principal, and

a. the Principal shall execute such contract documents, if any, as may be required by the terms of the bid and give such Contractor's Bond or Bonds for the performance of the contract and for the prompt payment of labor and material furnished for the project as may be specified in the bid, or

b. in the event of the failure of the Principal to execute such contract documents, if any, and give such Contractor's Bond or Bonds, if the Principal shall pay to Owner the difference, not to exceed the penal sum hereof, between the amount specified in the bid and such larger amount for which Owner may in good faith contract with another party to construct the project, then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the undersigned have caused this instrument to be executed and their respective corporate seals to be affixed and attested by their duly authorized representatives this

_____ day of _____ 20

(Seal)

Principal

ATTEST:

By _____

Secretary

Title

(Seal)

Surety

ATTEST:

By _____

Secretary

Title

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0107. The time required to complete this information collection is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing burden to: USDA-RUS, Attn.: Director, PDRA, 1400 Independence Ave., S.W., STOP, 1522, Washington, DC 20250-1522; and to the Office of Information and Regulatory Affairs, Paperwork Reduction Project (1910-1800), Office of Management and Budget, Washington, DC 20503

U.S. Department of Agriculture Rural Utilities Service

CONTRACTOR'S BOND

1. Know all persons that we, _____, as Principal, and _____, as Surety, are held and firmly bound unto Kootenai Electric Cooperative, Inc (hereinafter called the "Owner") and unto the United States of America (hereinafter called the "Government") and unto all persons, firms and corporations who or which may furnish materials for or perform labor on a Project known as

_____ KEC Capital Project 513, 20240715 _____
and to their successors and assigns, in the penal sum of _____ dollars (\$ _____), as hereinafter set forth and for the payment of which sum well and truly to be made we bind ourselves, our executors, administrators, successors and assigns jointly and severally by these presents. Said project is described in a certain construction contract (hereinafter called the "Construction Contract") between Owner and the Principal, dated _____, 20____, pursuant and subject to a certain loan contract (hereinafter called the "Loan Contract") between Owner and the Government, acting through the Administrator of the Rural Utilities Service (hereinafter called the "Administrator").
2. The condition of this obligation is such that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of the Construction Contract and any amendments thereto, whether such amendments are or additions, decreases, or changes in materials, their quantity, kind or price, labor costs, mileage, routing or any other purpose whatsoever, and whether such amendments are made with or without notice to the Surety, and shall fully indemnify and save harmless Owner and the Government from all costs and damages which they, or either of them, shall suffer or incur by reason of any failure so to do, and shall fully reimburse and repay Owner and the Government for all outlay and expense which they, or either of them shall incur in making good any such failure of performance on the part of the Principal, and shall promptly make payment to all persons working on or supplying labor or materials for use in the construction of the project contemplated in the Construction Contract and any amendments thereto, in respect of such labor or materials furnished and used therein, to the full extent thereof, and in respect of such labor or materials furnished but not so used, to the extent of the quantities estimated in the Construction Contract and any amendments thereto to be required for the construction of the project, and shall well and truly reimburse Owner and the Government, as their respective interests may appear, for any excess in cost of construction of said project over the cost of such construction as provided in the Construction Contract and any amendments thereto, occasioned by any default of the Principal under the Construction Contract and any amendments thereto, then this obligation shall be null and void, but otherwise shall remain in full force and effect.
3. It is expressly agreed that this bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon any amendment to the Construction Contract, so as to bind the Principal and the Surety to the full and faithful performance of the Construction Contract as so amended, provided only that the total amount of all increases in the cost of construction shall not exceed 20 percent of the amount of the maximum price set forth in the Construction Contract. The term "Amendment," wherever used in this bond, and whether referring to this bond, the Construction Contract or the Loan Contract shall include any alteration, addition, extension, modification, amendment, rescission, waiver, release or annulment, of any character whatsoever.
4. It is expressly agreed that any amendment which may be made by agreement or otherwise between the Principal and Owner in the terms, provisions, covenants and conditions of the Construction Contract, or in the terms, provisions, covenants and conditions of the Loan Contract (including, without limitation, the granting by the

Administrator to Owner of any extension of time for the performance of the obligations of Owner under the Loan Contract or the granting by the Administrator or Owner to the Principal of any extension of time for the performance of the obligations of the Principal under the Construction Contract, or the failure or refusal of the Administrator or Owner to take any action, proceeding or step to enforce any remedy or exercise any right under either the Construction Contract or the Loan Contract, or the taking of any action, proceeding or step by the Administrator or Owner, acting in good faith upon the belief that the same is permitted by the provisions of the Construction Contract or the Loan Contract) shall not in any way release the Principal and the Surety, or either of them or their respective executors, administrators, successors or assigns, from liability hereunder. The Surety hereby acknowledges receipt of notice of any amendment, indulgence or forbearance, made, granted or permitted.

5. This bond is made for the benefit of all persons, firms and corporations who or which may furnish any materials or perform any labor for or on account of the construction to be performed under the Construction Contract and any amendments thereto, and they, and each of them, are hereby made obligees hereunder with the same force and effect as if their names were written herein as such, and they and each of them may sue hereon.

In witness whereof, the undersigned have caused this instrument to be executed and their respective corporate seals to be affixed and attested by their duly authorized representatives this

_____ day of _____ 20_____

Principal

ATTEST:

By _____ (SEAL)

Secretary

 (SEAL)

Surety

ATTEST:

By _____

Secretary

Address of Surety's Home Office

By _____

Resident Agent of Surety

Signatures: Contractor's Bond must be signed with the full name of Contractor. If Contractor is a partnership Contractor's Bond must be signed in the partnership name by a partner. If Contractor is a corporation Contractor's Bond must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the Secretary of the corporation. A typewritten copy of all such names and signatures shall be appended.

Power of Attorney: Contractor's Bond must be accompanied by a power of attorney authorizing execution on behalf of the Surety and, in jurisdictions so requiring should be countersigned by a duly authorized resident agent of the Surety.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0107. The time required to complete this information collection is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing burden to: USDA-RUS, Attn.: Director, PDRA, 1400 Independence Ave., S.W., STOP, 1522, Washington, DC 20250-1522; and to the Office of Information and Regulatory Affairs, Paperwork Reduction Project (1910-1800), Office of Management and Budget DC 20503.

U.S. Department of Agriculture Rural Utilities Service

CERTIFICATE OF CONTRACTOR

_____ certifies that he/she is the

_____ of _____
 TITLE NAME OF CONTRACTOR

Contractor, in a Construction Contract No. _____ KEC Capital Project 513, 20240715

dated _____ 20 24

entered into between Contractor and Kootenai Electric Cooperative, Inc., Owner, and that authorized to and does make this certification on behalf of said Contractor in order to induce Owner to make payment to Contractor, in accordance with the provisions of said Construction Contract.

Undersigned further says that all persons who have furnished labor in connection with said construction have been paid in full, that the names of manufacturers, material suppliers, and subcontractors that furnished material or services or both in connection with such construction and the kind or kinds of material or services or both so furnished are:

<i>NAME</i>	<i>KIND OF MATERIAL AND SERVICE</i>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

and that the releases of liens executed by all such manufacturer material suppliers and subcontractors have been furnished Owner.

_____ By _____
Date *President*

This Certificate must be signed with the full name of Contractor. If Contractor is a partnership, this Certificate must be signed in the partnership name by a partner. If Contractor is a corporation, this Certificate must be signed in the corporate name by a duly authorized officer.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0107. The time required to complete this information collection is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing burden to: USDA-RUS, Attn.: Director, PDRA, 1400 Independence Ave., S.W., STOP, 1522, Washington, DC 20250-1522; and to the Office of Information and Regulatory Affairs, Paperwork Reduction Project (1910-1800), Office of Management and Budget DC 20503.

U.S. Department of Agriculture
Rural Utilities Service

WAIVER AND RELEASE OF LIEN SUB-CONTRACTOR TO CONTRACTOR

WHEREAS the undersigned:

_____ NAME OF MANUFACTURER, MATERIAL SUPPLIER OR SUBCONTRACTOR

Has furnished to

_____ NAME OF CONTRACTOR

the following:

_____ KIND OF MATERIAL AND SERVICES FURNISHED

use in the construction of a project belonging to Kootenai Electric Cooperative, Inc. NAME OF BORROWER

and designated as _____.

NOW, THEREFORE, the undersigned, _____ NAME OF MANUFACTURER, MATERIAL SUPPLIER OR SUBCONTRACTOR

for and in consideration of \$ _____ and other good and valuable consideration, the receipt whereof is hereby acknowledged, do(es) hereby waive and release any and all liens, or right to or claim of lien, on the above described project and premises, under any law, common or statutory, on account of labor or materials, or both, heretofore or hereafter furnished by the undersigned to or for the account of said Kootenai Electric Cooperative, Inc. NAME OF CONTRACTOR for said project.

Given under my (our) hand(s) and seal(s) this _____ day of _____, 20_____.

_____ Name of Manufacturer, Material Supplier, or Subcontractor

By _____ President

This Waiver and Release of Lien must be signed with the full name of the Manufacturer, Material Supplier, or Subcontractor. If the Manufacturer, Material Supplier, or Subcontractor is a partnership, this Waiver and Release of Lien must be signed in the partnership name by a partner. If the Manufacturer, Material Supplier, or Subcontractor is a corporation, this Waiver and Release of Lien must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the Secretary of the Corporation.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0107. The time required to complete this information collection is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing burden to: USDA-RUS, Attn.: Director, PDRA, 1400 Independence Ave., S.W., STOP, 1522, Washington, DC 20250-1522; and to the Office of Information and Regulatory Affairs, Paperwork Reduction Project (1910-1800), Office of Management and Budget DC 20503.

U.S. Department of Agriculture
Rural Utilities Service

WAIVER AND RELEASE OF LIEN CONTRACTOR TO KEC

WHEREAS the undersigned, _____
NAME OF MANUFACTURER, MATERIAL SUPPLIER OR SUBCONTRACTOR

has furnished to _____ Kootenai Electric Cooperative, Inc. _____ the following:
_____ for
KIND OF MATERIAL AND SERVICES FURNISHED

use in the construction of a project belonging to Kootenai Electric Cooperative, Inc.

and designated as _____ KEC Capital Project 513, 20240715 _____

NOW, THEREFORE, the undersigned, _____
NAME OF MANUFACTURER, MATERIAL SUPPLIER OR SUBCONTRACTOR

for and in consideration of \$ _____ and any other good and valuable consideration, the receipt whereof is hereby acknowledged, do(es) hereby waive and release any and all liens or right to or claim of lien on the above described project and premises, under any law, common or statutory, on account of labor or materials, or both, heretofore or hereafter furnished by the undersigned to or for the account of said Kootenai Electric Cooperative, Inc. for said project.

Given under my (our) hand(s) and seal(s) this _____ day of _____ 20 _____

Name of Manufacturer, Material Supplier or Subcontractor

By _____
President

This Waiver and Release of Lien must be signed with the full name of the Manufacturer, Material Supplier, or Subcontractor. If the Manufacturer, Material Supplier, or Subcontractor is a partnership, this Waiver and Release of Lien must be signed in the partnership name by a partner. If the Manufacturer, Material Supplier, or Subcontractor is a corporation, this Waiver and Release of Lien must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the Secretary of the Corporation.

CERTIFICATION REGARDING LOBBYING

**CERTIFICATION FOR CONTRACTS, GRANTS, AND
COOPERATIVE AGREEMENTS**

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated-funds have been paid or will be paid, by or on behalf of the undersigned, to any person with the intent of influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal-appropriated funds have been paid or will be paid to any person with the intent of influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, Disclosure Form to Report Lobbying, in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including sub-contracts, sub- grants, and contracts under grants, loans and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, Contractor understands and agrees that the provisions of 31 U.S.C. Chap.38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Name and Title of Contractor's Authorized Official

Name of Authorized Official

Date



CERTIFICATION REGARDING DEBARMENT
Debarment, Suspension, Ineligibility
and Voluntary Exclusion Lower Tier
Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 13 CFR Part 145. The regulations were published as Part VII of the May 26, 1988 *Federal Register* (pages 19160-19211). Copies of the regulations may be obtained by contacting the person to which this proposal is submitted.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON NEXT PAGE)

The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals are presently debarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Business Name _____

By _____
Name and Title of Authorized Representative

Signature of Authorized Representative

Date

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations (13CFR Part 145).
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not proposed for debarment under 48 CFR Part 9, Subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the ineligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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EXHIBIT A - CONTRACTOR'S PROPOSAL AND BID SHEETS

PROJECT DETAILS

1. Description of Project: *The Project will consist of approximately:*

Overhead Distribution Line Construction

_____ miles of _____ kV Single Phase Lines

_____ miles of _____ kV Two Phase Lines

_____ miles of _____ kV Three Phase Lines

_____ miles of secondary lines

_____ miles of services for _____ consumers.

Underground Distribution Line Construction

_____ miles of _____ kV Single Phase Lines

_____ miles of _____ kV Two Phase Lines

_____ miles of _____ kV Three Phase Lines

_____ miles of secondary lines

_____ miles of services for _____ consumers.

Distribution Line Changes, Conversion, and Removal

_____ miles of _____

_____ miles of _____

_____ miles of _____

Transmission Line Construction

_____ miles _____ kV; _____ miles _____ kV

_____ miles _____ kV underbuild

Substations and Other Major Facilities

<u>25/33.33/41.67</u>	<u>kVA</u>	<u>115kV/24.9kV</u>	<u>Voltage</u>	<u>Athol Substation</u>	<u>Name</u>
_____	<u>kVA</u>	_____	<u>Voltage</u>	_____	<u>Name</u>
_____	<u>kVA</u>	_____	<u>Voltage</u>	_____	<u>Name</u>

The project is located in Kootenai

Counties, in the State(s) of Idaho at 31611 US-95 Athol all as more fully described in the Plans, Specifications, Construction Drawings, and Contractor's Proposal therefore hereinafter referred to.

- 2. Work on Energized Lines.** Unless stated below, all construction work including attachments to existing poles and line changes is to be performed with the line deenergized. Approximately _____ miles of the line changes are to be made with the lines energized and such lines are in the following locations or areas:

_____ and are more fully described in the Plans, Specifications, and Contractor's Proposal. For work in these locations the Bidder must provide personnel qualified to work on energized lines. All such work shall be performed to meet at least the safety rules and regulations prescribed by the Owner for its own employees including the use of rubber gloves, hot sticks and associated protective equipment, a copy of which rules and regulations may be examined at the office of the Owner. The owner will perform any required power line or substation equipment switching.

3. Materials and Equipment.

Ground rods shall be _____ (Engineer to insert galvanized steel, copper, or stainless steel).

For transmission lines, the Bidder further agrees to furnish and use guy wire, overhead ground wire, and pole ground wire with ASTM Class _____ (Engineer to insert A, B, or C) zinc coating. Guy wire shall be _____ size, _____ grade.

The Bidder further agrees to furnish and use wood poles, wood crossarms, and other timber products, of which the physical characteristics, method of treatment, type of preservative, instructions on inspection and general procedure shall be in accordance with RUS standards and requirements.

Crossarms shall be _____ (Engineer to insert Douglas Fir or Southern Yellow Pine), treated with _____ (Engineer to insert type of preservative.)

SUBSTATION CONSTRUCTION ASSEMBLY UNITS

Description of Construction Assembly Units. Each Construction Assembly Unit consists of a complete installation of the designated portion of a substation as specified on the drawings, together with connections to associated equipment. Each Construction Assembly Unit represents all labor and material including necessary accessories completely installed and tested in satisfactory operation. Full identification of each Construction Assembly Unit and all necessary specifications of the installation is shown on the drawings.

Items of material in each Construction Assembly Unit shall be of the designated size, rating, type, voltage, or other specification in accordance with the drawings. The bill of material drawing for each substation shows the identification of the Construction Assembly Units under which the material is to be installed and shows which items of material may be partly or entirely found on the lists of Owner-furnished materials.

All items of equipment, unless otherwise specified, are mounted on a structure which shall be a Construction Assembly Unit of Group A.

Each Construction Assembly Unit is designated by the letter of the Group to which it belongs and an identifying number. The same item of equipment carries the same Construction Assembly Unit designation in all the substations. Items of equipment designated by the same Construction Assembly Unit in one substation are of only one kind as to voltage, type and other specifications. The tabulation of Construction Assembly Units for each substation is separate and contains all units necessary for construction of that substation.

- Group A. Structures.** A Construction Assembly Unit consists of a structure, or structures, with bus supports including insulators and fittings, buses, conductors and overhead ground wires to adjacent structures within the substation, grounding material to connect equipment with the ground bus, and associated material including mounting brackets, supports for equipment, clamps and connectors, all as specified in the drawings.
- Group B. Three-Pole Group Operated Air Break Switches.** A Construction Assembly Unit consists of one 3-pole group operated air break switch with all accessories and operating mechanisms as specified in the drawings.
- Group C. Lightning Arresters.** A Construction Assembly Unit consists of one single arrester.
- Group D. Single Pole Disconnecting Switches.** A Construction Assembly Unit consists of one single pole disconnecting or by-pass switch as specified in the drawings. If a fuse disconnect switch is specified, the fuse is included with the switch.
- Group E. Circuit Breakers.** A Construction Assembly Unit consists of one complete three-phase power circuit breaker complete with supporting frame and control cabinet, unless shown otherwise in the drawings, mounted as specified in the drawings.
- Group F. Reclosers.** A Construction Assembly Unit consists of a complete single-phase or three phase oil circuit recloser as specified in the drawings.
- Group G. Meters, Relays and Instrument Transformers.** A Construction Assembly Unit consists of one meter, relay potential transformer or current transformer.
- Group H. Transformers.** A Construction Assembly Unit consists of one power transformer or one station service transformer either single-phase or three-phase as specified in the drawings.
- Group I. Voltage Regulators.** A Construction Assembly Unit consists of one single-phase or three-phase voltage regulator as specified in the drawings.

SUBSTATION CONSTRUCTION ASSEMBLY UNITS *(Continued)*

- Group J. Communications and Supervisory Control Equipment.** A Construction Assembly Unit consists of carrier current equipment, microwave, or other types of communications and supervisory control equipment as specified in the drawings.
- Group K. Conduit and Cable.** A Construction Assembly Unit consists of the wire, cable, conduit and accessories necessary to complete the installation of equipment in accordance with the specifications and drawings, where such installation has not been included in other Groups.
- Group L. Foundations.** A Construction Assembly Unit consists of concrete footings and foundations except for the fence, as specified in the drawings.
- Group M. Site Preparation.** A Construction Assembly Unit consists of clearing, grading, drainage work, and surfacing, as specified in the drawings.
- Group N. Fence.** A Construction Assembly Unit consists of the complete installation of the fence, gates, etc., as specified in the drawings.
- Group O. Station Grounding.** A Construction Assembly Unit consists of the complete ground bus including ground rods, grounding mats or platforms, except as otherwise provided in other Groups, with connections to structures, equipment, and fence as specified in the drawings.
- Group P. Building.** A Construction Assembly Unit consists of a control building or cabinet, on a foundation of Group L and the facilities and equipment installed therein as specified in the drawings, except as otherwise provided in other Groups.
- Other Groups.** The Engineer shall specify such additional Groups as may be necessary for the completion of the Project. Description of these Groups shall be provided by an addition to this Part of the Specifications for Construction.

LIST OF SALVAGE ITEMS

NO.	CONSTRUCTION UNIT	UNITS
Group X	Salvage	
X1	Eaton Cooper Reclosers and F5 & F6 controls	3

LIST OF OWNER-FURNISHED MATERIALS

UNIT NO. NO.	NAME AND DESCRIPTION OF CONSTRUCTION UNIT	NO. OF UNITS	UNIT PRICE	EXTENDED PRICE
			Materials	Materials
Group A	Structures – BUS			
A2	383: 18-530 AL WELD COUPLER 1 1/2"IPS RUN AND TAP ^[1]	12	\$49.55	\$594.60
A3	384: 18-623-WR AL WELD TEE TAP 1-3"IPS TO A 4 HOLE PAD ^[1]	12	\$22.95	\$275.40
A4	385: 18-113-CFE AL WELD TERM 1 1/2"IPS TO A 2 HOLE PAD CENTER FORM (EXT FIT) ^[1]	24	\$56.30	\$1,351.20
A5	386: 18-114-CFE AL WELD TERM 1 1/2"IPS TO A 4 HOLE PAD CENTER FORM (EXT FIT) ^[1]	24	\$62.75	\$1,506.00
A6	ATH-M06: 13C, 103A, 3C, AND 401B ^[1]	12	\$129.00	\$1,548.00
Group D	Single Pole Disconnecting Switches			
D1	23kV, 1200 Amp Hook Operated Switches ^[1]	24	\$922.73	\$22,145.52
D2	25kV, 600 Regulator Hook Operated Bypass Switches ^[1]	12	\$3,797.00	\$45,564.00
Group E	Power Circuit Breakers			
E1	27.6 kV, 1200 Amp Vacuum Breakers ^[1]	3	\$29,822.00	\$89,466.00
Group K	Conduit and Cable			
K2	Other Wire and Cable - 304 - Jumpers, BARE COPPER CABLE, 37 STRANDING, SOFT DRAWN, 500 KCM ^[1]	18	\$166.67	\$3,000.06
K3-2	2-Conductor - Multi Strand - DC Cable - 884 ^[1]	1-Lot	\$1,174.84	\$1,174.84
K3-3	3-Conductor - Multi Strand - AC Cable - 884 ^[1]	1-Lot	\$1,608.00	\$1,608.00
K3-4	4-Conductor - Multi Strand - CT Cable - 884 ^[1]	1-Lot	\$2,004.03	\$2,004.03
K3-12	12-Conductor - Multi Strand - Breaker Control - 884 ^[1]	1-Lot	\$5,978.49	\$5,978.49
Group Other	E1 Material Items			
316	CU COMP TERM 500MCM TO A 4X4 PAD ^[1]	18	\$163.90	\$2,950.20
381	11-234 BR TERM (2) 4/0-1000 TO A 4 HOLE PAD ^[1]	48	\$313.20	\$15,033.60
382	110-103-CS-2 BR PAR CLAMP CABLE SPACER(2) 250-500 MCM (2" SPACING) ^[1]	48	\$80.30	\$3,854.40

SCHEDULE 1

ATHOL SUBSTATION CONSTRUCTION BID UNITS

UNIT NO.	NAME AND DESCRIPTION OF CONSTRUCTION UNIT	NO. OF UNITS	UNIT PRICE			EXTENDED PRICE Labor & Materials
			Labor	Materials	Labor & Materials	
Group A	Structures					
A1	Bus 1 ½" – A2 to Breaker Source Side and Breaker Load Side to Regulator Source Side	1-Lot				
A2	383: 18-530 AL WELD COUPLER 1 1/2"IPS RUN AND TAP ^[1]	12		\$49.55		
A3	384: 18-623-WR AL WELD TEE TAP 1-3"IPS TO A 4 HOLE PAD ^[1]	12		\$22.95		
A4	385: 18-113-CFE AL WELD TERM 1 1/2"IPS TO A 2 HOLE PAD CENTER FORM (EXT FIT) ^[1]	24		\$56.30		
A5	386: 18-114-CFE AL WELD TERM 1 1/2"IPS TO A 4 HOLE PAD CENTER FORM (EXT FIT) ^[1]	24		\$62.75		
A6	ATH-M06: 13C, 103A, 3C, AND 401B ^[1]	12		\$129.00		
Total for Group A						

Group D	Single Pole Disconnecting Switches					
D1	23kV, 1200 Amp Hook Operated Switches ^[1]	24		\$922.37		
D2	25kV, 600 Regulator Hook Operated Bypass Switches ^[1]	12		\$3,797.00		
Total for Group D						

Group E	Power Circuit Breakers					
E1	27.6 kV, 1200 Amp Vacuum Breakers ^[1]	3		\$29,822.00		
Total for Group E						

Group K	Conduit and Cable					
K1	Conduit and Conduit Accessories -Within Substation	1-Lot				
K2	Other Wire and Cable - 304 - Jumpers, BARE COPPER CABLE, 37 STRANDING, SOFT DRAWN, 500 KCM ^[1]	18		\$166.67		
K3-2	2-Conductor - Multi Strand - DC Cable - 884 ^[1]	1-Lot		\$1,174.84		
K3-3	3-Conductor - Multi Strand - AC Cable - 884 ^[1]	1-Lot		\$1,608.00		
K3-4	4-Conductor - Multi Strand - CT Cable - 884 ^[1]	1-Lot		\$2,004.03		
K3-12	12-Conductor - Multi Strand - Breaker Control - 884 ^[1]	1-Lot		\$5,978.49		
K4	Conduit and Conduit Accessories -Outside Substation, Including Conduit Needed for Riser Pole	1-Lot				
Total for Group K						

Group L	Foundations					
L1	ATH-F06: FOUNDATION G	3				
Total for Group L						

Group M	Site Finishing					
M1	Subgrade Preparation	1-Lot				
M2	Finish Gravel	1-Lot				
Total for Group M						

Group O	Station Grounding					
O1	Station Grounding	1-Lot				
Total for Group O						

Group U	Equipment Operational Checks and Bond					
U1	Equipment operational checks and pre-energization deficiency corrections as described in Exhibit B of the specifications	1-Lot		\$0.00		
U2	Performance Bond	1-Lot		\$0.00		
U3	Breaker Testing - HIPOT, DLRO, Speed Shot, Pulse and Ratio CT	3		\$0.00		
					Total for Group U	

Group X	Demolition and Salvage					
X1	Remove Eaton Cooper Reclosers and F6 controls for salvage, and associated wiring for disposal. Cut unused conduit above grade and cap adjacent to L1.	1-Lot				
					Total for Group X	
Group Other	E1 Material Items					
316	CU COMP TERM 500MCM TO A 4X4 PAD ^[1]	18		\$163.90		
381	11-234 BR TERM (2) 4/0-1000 TO A 4 HOLE PAD ^[1]	48		\$313.20		
382	110-103-CS-2 BR PAR CLAMP CABLE SPACER(2) 250-500 MCM (2" SPACING) ^[1]	48		\$80.30		
	Conductor Wrap - Gray Eel for 500 KCM ^[1]	18		\$150.00		
	Wild Life Guards ^[1]	18		\$150.00		
					Total for Group Other	

Notes: [1] Owner furnished material
[2] Some Owner furnished materials present for bid item - refer to owner furnished material list and specification drawings for specifics.
Include the costs of Owner furnished material in the material portion of your bid unit as it will be subtracted out from your monthly invoices

DISTRIBUTION CONSTRUCTION ASSEMBLY UNITS – Part UR

Part UR--UNDERGROUND EXCAVATION CONSTRUCTION ASSEMBLY UNITS

UR 2-S (D&W) Trenching Construction Assembly Unit, Soil - Consists of one (1) lineal foot of trenching in soil, measured parallel to the surface of the ground, to a specified depth (D) and width (W), in inches, including the excavation, and back filling, compacting, and stormwater prevention (BMP's). This unit includes all material and labor required in the repair and/or replacement of streets, roads, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, under- ground power and telecommunications facilities, buried sewerage and drainage facilities, and any other property damaged by the trenching, except as specifically provided for in other units. This unit includes conduit bedding construction assembly units, when required by Owner. This unit does not include underground conduit facilities installed in the trench.

UR 2-H (D&W) Trenching Construction Assembly Unit, Hydrovac - Consists of one (1) lineal foot of hydrovac trenching in soil, measured parallel to the surface of the ground, to a specified depth (D) and width (W), in inches, including the excavation, and back filling, compacting, and stormwater prevention (BMP's). This unit includes all material and labor required in the repair and/or replacement of streets, roads, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, under- ground power and telecommunications facilities, buried sewerage and drainage facilities, and any other property damaged by the trenching, except as specifically provided for in other units. This unit includes conduit bedding construction assembly units, when required by Owner. This unit does not include underground conduit facilities installed in the trench.

UR-3 Bedding Construction Assembly Unit - Consists of one (1) lineal foot of a 2-inch bed of clean sand or native soil placed in the trench under the conduit to the width of the trench and a 4-inch layer of clean sand or native soil back fill over the conduit to the width of the trench. This unit shall be considered incidental to Trenching Construction Assembly Unit, Soil (UR 2-S), Trenching Construction Assembly Unit, Rock Saw (UR 2-R) and Trenching Construction Assembly Unit, Rock (UR 2-RS). NOTE: The exact location and number of units shall be determined by Owner after the trenches are open in those areas where rock or other conditions make special bedding necessary.

UNIT	NO. OF		UNIT PRICE		EXTENDED PRICE
NO.	UNITS (ft)*	Labor	Materials	Labor & Materials	Labor & Material
UR2-H	180				
TOTAL Part UR--Underground Excavation Construction Assembly Units					

Contractor to provide 2 inch Grey Poly Schedule 80 Conduit plus associated couplers for boring, hydrovac, or plowing units in bid. Include materials in this table.

All 2 and 3 inch Schedule 80 PVC conduit shall be provided by Contractor.

SCHEDULE 2

BID SUMMARY - ATHOL BREAKER UPGRADE

Group A	Structures - BUS	
Group D	Single Pole Disconnecting Switches	
Group E	Power Circuit Breakers	
Group K	Conduit and Cable	
Group L	Foundations	
Group M	Site Finishing	
Group O	Station Grounding	
Group U	Equipment Operational Checks and Bond	
Group X	Demolition and Salvage	
Group Other	Other	
Part UR	Underground Excavation	
TOTAL BID -		

EXHIBIT B – CONSTRUCTION SPECIFICATION

GENERAL CONDITIONS

1. SCOPE

The intent of this specification is to describe labor, materials, and equipment necessary to complete upgrades and modification construction of the Athol Substation relaying and feeder protection equipment and set forth the manner in which the work shall be performed. Work covered by this specification includes: Contractor is responsible for removal of the existing feeder reclosers and installing all items for upgrading feeder vacuum breakers, control cable wiring, miscellaneous materials including conduit installation, foundation construction, and wiring necessary to provide a complete and operable substation consistent with the design provided herein and in the provisions of the Contract. Contractor will be responsible for removal of existing breaker disconnect switches and regulator bypass switches, and installation of new breaker disconnect switches and regulator bypass switches. Contractor will also be responsible for supplying all materials and equipment not supplied by Owner and specifically listed on Owner Furnished Material List. Removed reclosers and electronic controls are to be returned to the KEC warehouse. Additional removed equipment is to be disposed of at Contractor's discretion. Owner's employees will be responsible for equipment installation and wiring that is solely contained within the Athol Substation control building.

Documents contained in this specification are intended to describe the work to be performed at the substation Contractor is responsible for providing the labor, equipment, tools, and material to construct the facilities covered by this specification and its drawings, including any material not specifically identified or called out in the plans or material lists, but necessary for the proper construction of the facilities being supplied.

Should any error, omission, or inconsistency in the construction drawings become apparent to Contractor, Contractor shall immediately notify Owner's Engineer. Owner's Engineer will resolve any drawing inconsistencies and will provide clarifications necessary to allow construction to move forward.

No claim for extra work or cost will be allowed unless the same was one pursuant to an authorized change order described herein. Contractor shall supply with their bid a time and material rates for change orders.

2. LOCAL CONDITIONS AND WORK COORDINATION

2.1 PRECONSTRUCTION CONFERENCE

A preconstruction conference will be arranged prior to construction at which time safety requirements, construction schedule, work coordination, and other site and construction issues will be discussed. This meeting shall be attended by Owner, the Engineer, Contractor and Contractor's Project Superintendent.

2.2 USE OF PREMISES

Contractor will be permitted to use, for construction purposes, any land available in the vicinity of the work that is the property of Owner; provided, however, that such work shall not interfere with any part of the work or the work of Owner.

If other private land is used by Contractor, Contractor shall make all necessary arrangements and shall pay all costs connected with the use of the land. Contractor's use of premises shall be subject to the approval of Owner.

2.3 SAFETY PRECAUTIONS FOR WORK ON AND NEAR ENERGIZED LINES

Existing 115 kV transmission lines crossing the substation property are energized. The 115kV transmission line is owned and operated by KEC and will remain energized to serve Northern Lights, Inc. which takes delivery through the KEC owned transmission line. The 24.9 kV main distribution bus shall remain energized during portions of the construction timeline to provide station service power. When OSHA regulations require energized parts to be deenergized or covered, Contractor shall submit a request to KEC to have the energized equipment deenergized or parts covered with an insulating blanket or other insulating coverings. Substation distribution bus outages will be permitted for equipment removal/installation for vacuum breaker construction completion and regulator bypass switch removal/installation.

Contractor shall obtain utility locates before excavating outside the substation fence. Contractor shall notify Owner and Owner will have its locating subcontractor mark the location of any underground power cables inside the substation fence prior to commencement of Contractor's work. Extreme care shall be exercised when excavating or working near energized underground power lines. Excavation work within three (3) feet of energized underground power lines shall be accomplished by hand digging.

2.4 GENERAL SAFETY PRECAUTIONS

Contractor shall provide safe working conditions for all phases of construction and shall conform to requirements as set forth by OSHA and appropriate state and local authorities. Hard hat protection, eye, foot and hand protection are recommended and required by OSHA for some activities. Any fines or requirements imposed by OSHA, Worker's Compensation or any other authorized safety agency will be solely the responsibility of Contractor.

Construction safety is exclusively the responsibility of Contractor.

Contractor shall develop and maintain for the duration of this contract a safety program that will effectively incorporate and implement all safety provisions required by OSHA. In addition, Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

2.5 WORK COORDINATION

Contractor shall coordinate their activities with Owner or Owner's Agent throughout the duration of the project. Coordination shall include work to be accomplished by others for telemetry work, and testing services. A representative of Owner shall be on site while Contractor is working at the substation.

Addresses for correspondences to Owner are shown below:

Correspondence:

Mr. Phillip Evander, P.E., System Engineer
Kootenai Electric Cooperative, Inc.
9014 W. Lancaster Rd.
Rathdrum, ID 83858
Phone: 1-208-292-3206
Email: pevander@kec.com

3. ELECTRIC POWER FOR CONSTRUCTION PURPOSES

-The Owner will make temporary construction power available for the Contractor's use during construction. Construction power will be available from the substation control building. If additional construction power is needed, Owner will provide overhead 120/240V triplex service wire drop to Contractor's temporary construction power pole as coordinated with Owner. Contractor will be responsible for installing and connecting their temporary construction power pole and for restoring the site back to an as-found condition after pole is removed.

4. FIELD OFFICE

Contractor shall provide their own field office, if desired, and place it in a location acceptable to Owner while still maintaining ingress/egress of drive paths. All such costs associated with this field office shall be assumed by Contractor. It shall be understood that Owner's facilities shall not be used by Contractor or Contractor's employees for office work, storage, lunch breaks, or for any other purpose other than actual installation and check-out of facilities installed.

5. SANITARY FACILITIES

Sanitary facilities are present on the premises. If they are insufficient for the quantity of workers on the site, Contractor shall provide such additional facilities as required by OSHA. The location of these facilities shall be acceptable to Owner. Contractor is responsible for the maintenance of all sanitary facilities on the site for the duration of the project. Cost of additional sanitary facilities and the maintenance of all sanitary facilities shall be assumed by Contractor as part of the bid.

6. STAKING AND SURVEY WORK

The site has established reference points showing the boundary of the area owned by Owner, the fence corners, and a benchmark with assumed elevation. Contractor shall be responsible for lying out and dimensioning all work there from. Contractor shall provide all stakes, equipment, and instruments required to perform such work. Contractor shall employ competent personnel to properly locate, establish and check all grades, and reference lines.

7. RECEIVING, TRANSPORTATION, UNLOADING, INSTALLATION AND STORAGE OF EQUIPMENT AND MATERIALS

Contractor shall assume the responsibility and cost of the following work associated with materials and equipment received from KEC headquarters when needed following prior approval for receipt during hours agreed upon with the Owner:

- 7.1 Provide all materials and equipment required for performing the specified work.
- 7.2 Arrange for and provide prompt unloading and local transportation.
- 7.3 Provide storage for materials and equipment. Adequate safeguard shall be made to prevent loss, theft, damage due to storm, moisture and fire, or damage due to construction equipment and machines. All necessary inside warehouse type storage shall be arranged for and provided by Contractor.
- 7.4 Move and install all equipment and materials including cleaning, touch-up painting, minor field repairs, and any other work required to properly complete and place equipment ready for operation. This applies to all equipment installed by Contractor.
- 7.5 All equipment shall be moved with care to prevent breakage, stresses, and other damage. Equipment shall be moved, installed and checked in accordance with the manufacturer's recommendations.
- 7.6 Owner will not receive or be responsible for any Contractor-furnished materials. Materials and equipment shall not be delivered to any of Owner's warehouses or outposts.

8. DRILLING, CUTTING, BENDING AND OTHER CRAFTWORK

Contractor shall provide all necessary equipment and competent craftsmen to properly accomplish, in a workmanlike manner, all necessary field work including bending, drilling, welding, cutting and connector compression which may be required to properly fit and install all materials and equipment. Repairs and alterations shall be completed subsequent to Owner's approval. Owner will reject and Contractor will be required to rework and replace at Contractor's own expense any material or installations showing poor workmanship. Esthetics and good craftsmanship are important to Owner.

The need for bending conduit or bus material, welding bus and bus fittings, drilling steel or concrete to provide a neat and clean installation even though it might not be specifically called out or detailed in the design drawings is not cause for requesting a change order. Such work is to be expected as a matter of course during substation construction.

9. SITE CLEAN-UP AND TRASH DISPOSAL

Contractor shall provide and assume responsibility for the following:

- 9.1 Maintain clean and neat work area and prevent debris from scattering in the wind.
- 9.2 Dispose of trash, excess fill and other debris.
- 9.3 Smooth the finish grade and fill all unnecessary ditches and ruts. Haul in and spread additional make up site finish gravel of the same type and consistency of that present at the site if necessary to fill low spots.
- 9.4 Clear away and properly dispose of all excess materials, temporary quarters and sanitary facilities.

9.5 Contractor shall assume responsibility for all environmental protection as defined hereinbefore.

10. GRADING, EXCAVATION, TRENCHING AND HAULING

Contractor shall provide and be responsible for all necessary heavy construction equipment to install conduit, and repair ground mat, haul materials, and perform all other necessary work required for a complete and neat installation.

11. "OR EQUAL" AND "OR EQUIVALENT" CLAUSE

Wherever a required material or article is specified or shown on the plans by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, providing the proposed material or article is of equal substance and function in Owner's Engineer's opinion. It shall not be purchased or installed without Owner's Engineer's written approval.

12. COST ACCOUNTING AND PARTIAL PAYMENTS

Contractor shall provide complete and accurate cost accounting data to Owner. This data shall include a breakdown by units with associated cost for materials, labor, equipment and taxes to enable Owner to assign proper costs to the various plant accounts. Contractor shall go through requests for partial payments monthly with Owner's Engineer who will review the request for accuracy and inventory units installed. Contractor shall submit payment to Owner's Engineer for review and approval. Such will be required when requesting partial payments and upon completion of the project. Partial payments and release of liens are outlined in Article III. All liens shall be released prior to payment of any retainage amounts.

Only one request for partial payment may be submitted per month as stated in Article III of the Contract. In the event of multiple requests for payment in a given month, requests subsequent to the first request received will be returned to Contractor unprocessed.

Contractor shall submit to Owner lists of materials, quantities, costs, progress schedules, payrolls and other records and data as Owner may request concerning work performed or to be performed under this contract.

13. CONSTRUCTION TIME, PROGRESS REPORTS AND SCHEDULING

Construction Time is defined in Article II. Contractor will develop a proposed timeline of construction for major equipment installation for reporting and coordinating with Owner's representatives. Progress reports shall be made by Contractor as requested by Owner and shall be required as part of the request for partial payment.

In order to facilitate the scheduling of Owner's on site construction Inspector, Contractor shall notify Owner of its intended on site work schedule and times in advance. Contractor's site Superintendent shall attend weekly project meetings with Owner's Engineer and Site Inspectors and keep them apprised as to work progress, material issues, and site problems.

14. CONTRACT MODIFICATIONS AND CHANGE ORDERS

Any modifications of the contract after its execution must be authorized by Owner. Authorization shall be in writing as described in herein.

Change orders shall be agreed to and issued in writing prior to performing any associated work covered by the change order. As a minimum, change orders shall include the scope of the proposed change; the cost associated with the change; and be signed by Owner's Engineer and Contractor. Failure to adhere to these terms will result in the change order request being rejected.

After the fact claims for additional work performed will not be paid nor will claims for extra work or materials needed to fix problems caused by Contractor due to their work practices or caused by material substitutions made by Contractor. Reworks required by Owner for noncompliance with the specifications, poor workmanship, rejected material, construction delays, or damage to facilities while Contractor is in charge of the site are not acceptable reasons to request a change order and claims for such will be rejected.

15. DRAWINGS

15.1 Specification Drawings

Contractor will be furnished with two sets of these specifications, complete with all specification drawings, which have been released for construction after award of the contract. Additional copies of the specification drawings will be furnished as required. These drawings and specifications are instruments of service and are to be used on this project only, and are to be returned to Owner upon completion of the work, as set forth herein. Contractor shall be responsible for denoting any and all changes or modifications made and approved by Owner upon the return of the specification drawings. These record drawings shall reflect complete "as installed" status.

15.2 Record Drawings

Contractor shall be responsible for making all "record" corrections to original construction drawings. "Record" data for revisions will be furnished to Owner in the form of marked construction drawings.

16. CHECK-OUT AND ACCEPTANCE OF SUBSTATION FACILITIES

After installation of equipment, Contractor shall perform HIPOT, DLRO, and Speed Shot testing of each circuit breaker as well as pulse and turns ratio tests of every current transformer of each breaker. Owner and its testing firm will inspect all mechanical and electrical attributes. Contractor shall provide all necessary tools, materials and labor required to accomplish adjustments and any other required work to place equipment in proper operating condition as deemed necessary by Owner.

Contractor shall certify completion of the contract and provide all necessary assistance and action required for completion of close-out documents. Final acceptance shall be certified and approved by Owner and its Engineer as specified herein.

16.1 Inspection and Inventory of Buried Units

Before any backfilling operations are begun, Contractor and Owner shall jointly inspect all trenches, conduit placement, grounding mat repair, and other construction that will not be accessible after backfilling, and an inventory of units shall be taken. If corrections are required, a second inspection shall be made after completion of the changes.

17. SITE SECURITY

Contractor is responsible for site security. During the course of this project, costs for replacing any lost or damaged material or equipment are completely at the expense of Contractor. Access gates must be locked to prevent unauthorized personnel from entering the substation when Owner or Contractor's personnel are not on site.

18. WORKING IN ENERGIZED SUBSTATION

Contractor shall provide trained and qualified substation electrical workers for directing all workers on the site. Daily tailboard meetings with crews shall emphasize any area of energized equipment within the Athol Substation. Contractor shall ensure all personnel, tools and equipment are kept outside of the minimum approach distances as specified in the current OSHA 1910.269 rules. KEC has developed a checklist that will be used to document the characteristics of the Athol Substation. See Appendix B.

TECHNICAL SPECIFICATIONS

1. SCOPE

This section shall be complimentary to previous sections and is intended to function as a detailed description of work to be performed and material to be supplied.

Where codes and standards of manufacturing are referenced in these specifications, such codes and standards shall be assumed to be of the most recent issue available. In addition, nationally accepted standards not specifically mentioned in these specifications, but governing the design and manufacture of materials and equipment specified herein, shall be assumed applicable.

1.1 CONSTRUCTION COORDINATION

Contractor shall be responsible to coordinate the construction of the substation facilities described herein. Contractor shall submit a detailed construction schedule. The schedule shall be as outlined previously.

This section shall have, but not be limited to, the following categories:

- Grounding mat repair
- Conduits and Accessories
- 27kV Breakers
- Breaker Foundation Construction
- Wire and Cable installation
- Switchyard rock restoration
- Voltage Regulator Bypass Switch Installation

2. GROUP E: POWER CIRCUIT BREAKERS - BID ITEM E1

Contractor shall install three (3) power circuit breakers listed below. All costs incident to the installation of the power circuit breakers shall be included under this bid Item including picking up at Owner's warehouse facility in Rathdrum, Idaho, and transporting, unloading, installing, assembling, wiring and adjusting the power circuit breakers. Installation drawings and the equipment manual are included in the Appendix A.

<u>Breakers B01252, B01352, and B01452</u>	
Quantity:	3
Manufacturer:	Siemens
Weight:	3,069 lbs.
Type:	Stored Energy
Interrupter Type:	Vacuum
Voltage Rating:	27.6 kV
Continuous Current Rating:	1,200 Amps
Short Circuit Current Rating:	25,000 Amps

Breakers are to be anchored to their foundation pads using ¾ inch diameter x 5 inch long expansion type anchor bolts. Contractor shall supply and install anchor bolts including drilling anchor bolts holes into concrete footing as shown in the Specification drawings. Breaker legs shall be adjusted to provide a minimum of 9'-6" clearance to bottom of bushing from top of foundation.

3. GROUP K: CONDUIT AND CABLE

3.1 CONDUIT AND CONDUIT ACCESSORIES - BID ITEM K1

This item shall include all costs associated with miscellaneous conduit and wiring devices as described in the following paragraphs and on the specification drawings.

Contractor shall supply and install all conduits, fittings and other hardware required for a complete installation as depicted on the specification drawings. Conduit and cable types and sizes for each run are depicted in the conduit and cable schedules and in the material list.

Costs associated with the following are not included under this bid item; such costs shall be covered under other sections as referenced if applicable:

3.2 INSTALLATION

Solvent shall be used in making all PVC joints to obtain a watertight seal. Water shall not be permitted to enter conduit during or after installation.

All rigid conduit joints shall be reamed, cleared of burrs and sharp edges and threads coated with Galvacon prior to joining or terminating.

Bushings, chase nipples, or conduit bells shall be installed on ends of conduit to protect insulation sheath of wire and cable.

All conduit bends shall be made so that conduit is not flattened or injured and the internal diameter of conduit is not effectively reduced. Field bends shall be made only with bending equipment intended for the purpose of bending conduit.

Conduit and cable runs shall be clearly identified, showing proper designations per "Conduit and Cable Schedule." Use Panduit stainless steel tag system for marking conduit runs. Pre-marked plastic or PVC cable tags shall be used at both ends to mark each cable.

Care shall be made to ensure that conduits are free from all gravel or loose debris.

Where the Conduit Schedule indicates a PVC sub-grade run with PVC or galvanized rigid steel conduit riser, the PVC conduit shall end below finished grade. Riser transitions below finish grade and is the only thing visible above finish grade. PVC female adaptors for attaching liquid tight flexible conduit or rigid conduit to shall be at the top of the finish grade level so that the flexible conduit connectors or rigid conduit connection is at or above finish grade level.

Contractor shall remove pull strings after they have pulled in electrical wires and cables.

3.3 WIRE AND CABLE FOR CONTROL AND POWER DISTRIBUTION

Wire and cable requirements are listed on the Wire and Cable Schedule, and are specified in the following paragraphs. Locations of conduits are shown on the Conduit and Cable plan, Conduit Details, and Rack Details. Bid items for wire and cable shall include terminals, markers, ties and other hardware required for complete installation.

Required quantities of wire will be issued by Owner in 1000' reels except where noted. Contractor is responsible for determining exactly how much wire is used. Unused wire must be returned to Owner after construction completion. Bid items and payment will be made on a "lot basis."

A. CABLE REQUIREMENTS

Contractor shall install the following types of wire, cable and accessories:

1. Power Cable (Bid Item K2)

Bare copper conductor is to be installed between the source and load side of vacuum breakers after installation and testing completion.

Animal guards, protective wrap, and terminal pads shall also be installed on all breaker bushings and jumper terminals to provide 30" minimum protection distance to top of breaker cabinet.

3. Other Wire, Cable (Bid Item K3)

a. Multi Conductor Control Cable

Multi-conductor control and power cable shall be 600 volt, Type TC with XHHW-2 insulated stranded copper conductors and CPE overall jacket. Color code shall be per ICEA Method 1 in ICEA S66524 Appendix K, Tables E-1 & E-2, partially reproduced below. Size and number of conductors shall be as required by the Wire and Cable Schedule. Prior to ordering cable, Contractor shall provide Engineer, for approval, a sample of cable by the same manufacturer and of same basic design as the cable proposed for installation on this project.

Cable is to be installed in conduit, cable trench and cable tray required for A.C. and D.C. distribution, control, current and potential circuits. Bid items shall include materials, installation and termination.

ICEA S66524, Table E-1 (Partial)		
Conductor Number	Base Color	Tracer Color
1	Black	--
2	White	--
3	Red	--

ICEA S66524, Table E-2 (Partial)		
Conductor Number	Base Color	Tracer Color
1	Black	--
2	Red	--
3	Blue	--
4	Orange	--
5	Yellow	--
6	Brown	--
7	Red	Black
8	Blue	Black
9	Orange	Black
10	Yellow	Black
11	Brown	Black
12	Black	Red

b. Other Devices

Contractor shall install wire and other Owner and Contractor furnished devices depicted in the Specification Drawings not otherwise covered by other bid units.

3.4 INSTALLATION REQUIREMENTS

A. General

Cables are to be installed in raceway, cable trench, and cable tray. Wire and cable pulling shall be accomplished in a workmanlike manner to ensure insulation and cable jackets are not damaged. Prior to pulling cables in conduit, a foam line carrier blower (mouse) or equivalent system shall be used to clean conduits. U.L. approved lubricant shall be used when pulling cables. Any damaged wire or cable shall be replaced at no cost to Owner. Neither insulation repair nor conductor splicing will be permitted to repair wire or cable with damaged insulation.

B. Cable Marking

Each power and control cable shall be clearly identified with a cable marker at each end; markers shall show proper designation per "Wire and Cable Schedule". Cable markers shall be 3/4" x 2" white nylon (Panduit MP-200C, or equal), and lettered with a permanent black nylon marking pen. Markers shall be secured to cable with nylon ties and locking clamps. Multiphase A.C. power cable larger than #10 AWG shall have phases labeled A, B, C and N, in the same manner as specified above.

C. Stripping and Terminating

Stripping cable jackets and insulation of control cable shall only be performed by journeyman electricians. Termination shall be made with insulated ring tongue compression terminals properly sized for wire and stud. Terminals shall be U.L. listed. Compression tool shall be ratchet-type to insure proper compression. When terminating cable, Contractor shall leave at least eight inches of wire length in addition to the minimum required to reach specified terminals. All spare control wires shall be terminated and grounded.

Conductors, bus bars, and points of contact are to be cleaned to remove oxides and dirt prior to terminating.

D. Cable Entrances

All cable entrances into Control Building, outdoor junction boxes, etc., shall be sealed after cable installation to provide water-tight, insect-proof seal. Contractor shall seal cable entrances by wrapping a steel wool around cable or wire and then sealing the top of the conduit with an expanding foam sealant. The purpose of the steel wool is to stop the foam sealant from penetrating below the top couple inches of the conduit and to deter rodents. Foam sealant shall be trimmed back to present a neat and clean installation.

E. Cable Shields

All shielded control cables shall have shields grounded at the control switchboard. Shield connector shall be Scotchlok 4460 or approved equal. A #12 AWG standard copper ground wire shall run from shield connector to ground bus. Equipment end of control cables shall have shield removed to the point where the jacket is stripped and taped with Scotch #33 to a thickness equal to the overall jacket thickness.

4. GROUP L: FOUNDATIONS BID ITEMS L

4.1 GENERAL

This work shall consist of all materials and labor to construct foundations listed under Group L. of "Station Construction Units", in these specifications. Bid items reference foundation detail drawings showing all accessory construction requirements. General arrangement of foundations is shown on the drawings.

Foundation materials and installation requirements are defined in the following paragraphs. Bid items for each foundation shall include all costs incidental to its construction including: excavation, backfill and grading, de-watering, form-work, concrete including finish and curing, and conduit and other materials shown cast into or attached to foundations. Supplying and installing pre-cast concrete vaults, Drywells, camera poles, and fiberglass equipment pads and sub-grade basements are also included in this section.

Quantity of concrete shown on foundation drawings is measured to the lines, grades and dimensions shown. No addition has been made for excess excavation and soil consolidation, nor deletion for concrete volume displaced by reinforcement. Quantities shown are computed to the nearest 0.1 cubic yard.

Relatively high water table conditions may exist at the time of construction. Should such conditions exist, the Contractor shall de-water excavations prior to placing concrete. Water shall be exhausted off site.

All foundations and footings shall be placed on firm undisturbed earth or select structural fill compacted to a minimum of 95% of the modified proctor according to ASTM D1557 to the depth indicated. If select structural fill is used, it shall be placed on firm compacted natural soils. Any loose material shall be removed and replaced with compacted structural fill.

Compaction tests are required and will be performed by an Owner approved testing laboratory. The Owner will contract for and pay the testing laboratory directly. The Contractor does not need to include compaction testing in its bid.

4.2 STRUCTURAL EXCAVATION AND BACKFILL

A. GENERAL

This work shall consist of the necessary excavating for the foundations, control building, equipment pads, camera poles and fiberglass sub-grade basements, pre-cast vaults, manholes, and conduit cable ways. Back-filling, excavation, materials and disposal of excess material shall be in accordance with these specifications.

B. GRAVEL

Where excavation is to be accomplished after finish gravel has been placed, Contractor shall remove and stockpile gravel prior to excavation.

C. EXCAVATION

Excavation for foundations and pads shall be to the lines, grades, and elevations shown on the drawings. They shall be of sufficient size to permit the placing of structures of full width and length shown.

Excavation under foundations that is deeper than the grades specified shall be filled with concrete or compacted select structural fill, at the Contractor's expense. The Contractor is responsible for adequate compaction under all foundations, slabs and footings as well as over all trenches.

Boulders, logs, and other objectionable material encountered in excavation shall be removed. The removal and disposal of objectionable material is part of this contract and its associated bid units, as such the Contractor shall allow for it in his/her bid.

After excavation and compaction is complete, the Contractor shall notify the Engineer, who shall approve the depth of excavation and character of the foundation material prior to pouring concrete. Compaction tests will be performed prior to the placement of concrete under all foundations, slabs, footings, or pre-cast concrete structures including the control building.

D. FILL MATERIAL

When fill is required to raise the sub-grade for either pads or slabs to the elevation indicated on the drawings, such fill shall be placed and compacted as specified. Only select structural fill also described as crushed (rounded rock is unacceptable) granular fill consisting of clean, well graded sand and gravel moisture conditioned to within 3 percent of optimum moisture content and meeting the following gradation shall be used for fill beneath pads and slabs:

Percentage by Weight

<u>Sieve Designation</u>	<u>Passing Sieve</u>
3/4 inch	100

1/2 inch	75-90
No. 4	30-75
No. 8	25-45
No. 16	15- 25
No. 200	0-15

The Contractor shall submit a report of the sieve analysis performed by a testing agency for approval by the Owner or Engineer.

Before placing fill, remove all loam, vegetation, and other unsuitable materials. In no case, shall fill be placed on a sub-grade that is muddy, frozen, or that contains frost.

Fill shall be placed evenly in 6" horizontal layers and tamped to 95 percent maximum density according to the modified proctor of ASTM D1557 at optimum moisture content, unless otherwise noted on the drawings.

E. BACKFILL

No back-fill shall be placed until the foundations have been approved by the Owner's engineer.

All material subject to rot or corrosion and all deleterious materials shall be removed from areas to be back-filled.

Backfill with approved material shall be placed around the foundations in horizontal layers, not over 6 inches in depth, to the level shown on the drawings. Each layer shall be moistened or dried as required to achieve 95 percent maximum density and thoroughly compacted with mechanical tampers.

In placing backfill, the material shall be placed simultaneously, insofar as possible, to approximately the same elevation on all sides of the foundation.

Special care shall be taken to prevent any wedging action against the foundation. All slopes bounding or within the areas to be filled shall be benched or serrated to prevent wedge action.

F. UNSUITABLE AND EXCESS MATERIAL

The Contractor shall be responsible for removal of all unsuitable and excess excavated material, unless noted otherwise on the Foundation Plan.

G. SITE FINISH

The site shall be graded to a smooth and neat appearance after completion of fence and foundation construction and before final acceptance by the Owner.

4.3 CONCRETE

A. GENERAL

This work shall consist of the necessary cast-in-place concrete for tower foundations, equipment pads and miscellaneous items shown on the foundation plan, and/or detailed on the other contract drawings.

B. MATERIALS

Cement - Portland Cement shall be Type II conforming to ASTM C150.

Aggregates - Concrete aggregates shall conform to ASTM C33. The maximum size of aggregate shall be 1-1/2 inch.

Water - Mixing water for concrete shall be fresh, clean and potable.

Admixtures – Air entrained concrete shall be 5% by volume, +/- 0.5%. Air-entraining admixtures shall conform to ASTM C260-74, Darex AEA, or neutralized Vensol resin (NVX). No other admixtures shall not be used unless approved by the Engineer.

Mix Design – The compressive strength of the concrete mix shall test a minimum of 4,000 psi in 7-days. All mix design shall be presented to the Engineer for review and approval.

Tie-Wire - Cold drawn steel wire shall conform to ASTM A-82.

Reinforcing Steel - 60,000 psi minimum yield strength conforming to ASTM A615 Grade 60.

Welded Wire Fabric - shall conform to ASTM A185.

Anchor Bolts - Shall conform to ASTM F1554 Grade 36 or Grade 55. Galvanized heavy hex nuts for anchor bolts shall conform to ASTM A563 Grade A. Quantity and size shall be shown on the drawings.

C. STORAGE OF MATERIALS

Cement and aggregates shall be stored so as to prevent deterioration or intrusion of foreign matter.

Aggregate stockpile shall be arranged to avoid excessive segregation.

No deteriorated, frozen, or damaged materials shall be used.

D. CONCRETE PROPORTIONS AND CONSISTENCY

Concrete shall have minimum 7-day strength of 4,000 psi. Slump shall range from 2 inches minimum to 4 inches maximum.

Water cement ratio shall not exceed 5.5 gallons per sack. Minimum cement content shall not be less than 6.5 sacks per yard.

Air content shall be 5 percent by volume.

Contractor shall furnish a mix design with supporting test results for Owner's approval.

E. FORMWORK

Design and construction of all form-work shall be the responsibility of the Contractor. Forms shall conform to shapes, lines, and dimensions of the members as called for on the specification drawings, and shall be sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape.

The maximum deflection or bow of facing materials reflected in concrete surfaces exposed to view shall be 1/240th of the straight surface length. Suitable moldings or chamfer strips shall be placed in the corners and edges where the finished members are exposed.

Form accessories to be partially or wholly embedded in the concrete, such as ties or hangers, shall be commercially manufactured type. The portion remaining within the concrete shall leave no metal within one inch of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed one inch in diameter. No wooden spreaders shall be left in the concrete.

Unless otherwise specified herein or on the drawings, the following accuracy shall be as listed:

· Individual structures must be with $\pm 1/4$ inch of specified location.

- Anchor bolts in a cluster must be within $\pm 1/16$ inch of given dimension. Clusters of anchor bolts in a given structure must be within $\pm 1/8$ inch, with respect to each other.
- Individual tower and structure foundations must have all footing tops within ± 0.1 " of each other and within 0.5" of grade.

Removal of forms shall be accomplished in a manner such that concrete will not be damaged. Forms shall not be removed less than 36 hours from time of placing concrete.

Whenever the form-work is removed during the curing period, the exposed concrete shall be cured also.

F. PLACEMENT OF REINFORCING STEEL

All reinforcing bars shall be supported and wired together to prevent displacement by construction loads or the placing of concrete. Welding of reinforcing bars shall not be acceptable. Concrete block is approved for ground level supports. Over form-work; concrete, metal, plaster, or other approved spacers, shall be furnished. Where the concrete surface will be exposed to the weather, all accessories in contact with the form-work shall be galvanized or of plastic construction.

At the time concrete is placed, all reinforcements shall be free from loose thick rust, mill scale, mud, ice, or other foreign material. No bars partially embedded in concrete shall be field bent.

Welded wire fabric designated as load carrying shall have lapped splices so made that the overlap is not less than the spacing of the cross wire, plus two (2) inches.

Vertical bars in columns and piers shall be offset at least one bar diameter at lapped splices.

G. PLACEMENT OF ANCHOR BOLTS

Anchor bolts shall be placed in accordance with the individual foundation drawings. At the time concrete is placed, all anchor bolts shall be free from loose thick rust, mill scale, mud, ice, or other foreign matter.

Before concrete is placed, the contractor shall align and plumb the anchor bolts. The Contractor shall use either a double nut template system or a rigid wire cage system to prevent any anchor bolt movement during the concrete placement. Where anchor bolts are being set in foundations

supporting structures with more than one vertical support column or leg, anchor bolt templates and formwork for the structure shall be intertied to prevent movement and or shifting during concrete placement and curing.

Anchor bolts must be cleaned and have their threads chased after being imbedded in foundations.

H. MIXING

Mix shall be kept as dry as possible to work. All materials, including water, shall be measured or weighed. Mixer shall be rotated at the speed recommended by the manufacturer. Mixing time shall be not less than one and one-half (1-1/2) minutes. No partial sacks of cement shall be used in mixes unless properly weighed or measured.

Concrete may be mixed at the site of the construction, at a central plant, or by a transit mixer.

1. ***Delivery by Transit Mixer*** - Where time in transit between the batcher and construction site exceeds 45 minutes, water and cement shall not be mixed with the aggregate prior to arrival at the construction site. Cement may be placed in transit mixer, in bulk form, at the batcher, provided it is placed in a mass between the fine and coarse aggregates and mixer is not rotated until final destination is reached. Sacked cement may be transported on top of the aggregates. When cement is transported in contact with the moist aggregate, the entire batch will be rejected unless mixed within 1-1/2 hours after contact. Where transport time exceeds 1-1/2 hours, the cement shall be transported separately from other ingredients.
2. ***Delivery of Central Plant Mix*** - Methods and equipment used for transporting concrete after all ingredients have been mixed shall be such that no segregation of aggregate or appreciable slump loss occurs. Slump, at the time of placement, shall be within the limits set in these specifications; and in no event shall the

lapsed time between mixing and final placement exceed 1-1/2 hours. Adding water at placement site will not be permitted.

3. **Delivery of Batched Materials** - When previously weighed batches are hauled to mixer, there shall be no loss of ingredients during loading, hauling, and unloading operations. Where cement, either bulk or sacked, is transported in contact with the aggregate, any batches not mixed within 1-1/2 hours will be rejected.

I. **PLACEMENT OF CONCRETE**

Formwork shall be complete and adequately braced and all ice, mud and water removed prior to placing concrete. The sub-grade shall be damp, but not wet, prior to the placing of concrete, so as to eliminate suction.

Concrete shall be deposited, as nearly as practicable in its final position, to avoid segregation due to re-handling or flowing. No concrete shall be dropped more than 6 feet without the use of suitable chutes.

All concrete shall be thoroughly compacted by vibrating or tamping and working around rebar and corners of forms.

Concrete shall be placed at a rate such that the concrete is always plastic and flows freely. Concrete that has partially hardened or been contaminated by foreign material shall not be used.

Once pouring is started, it shall be carried on as a continuous operation until the placing of the section is completed.

There will be no construction joints allowed, that are not shown on drawings, without approval of the Owner's engineer. All unlisted construction joints are to be doweled, as specified by the contracting officer or his authorized representative. The concrete surface of all construction joints shall be thoroughly cleaned and all loose material removed. Construction joints shall be treated with a joint adhesion compound approved by the Owner's Engineer after cleaning the surface and prior to pouring the second portion of the joint.

J. **COLD WEATHER CONCRETE**

Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. No frozen materials or materials containing snow or ice shall be used.

All reinforcement, forms, fillers, and ground with which the concrete is to come in contact shall be free from snow and ice. All concrete placed in forms shall have a temperature of 50°F or higher after placement. Adequate means shall be provided for maintaining this temperature for

three days. Additional time necessary to insure proper curing of the concrete shall be provided as directed by the Owner or his authorized representative. The housing, covering, or other protection used in curing shall remain intact at least 24 hours after artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing.

K. HOT WEATHER CONCRETE

In hot weather, suitable precautions shall be taken to avoid drying of the concrete prior to finishing operations. Use of windbreaks, sunshades, fog sprays, or other devices shall be used as directed by the Owner or his authorized representative.

Concrete placed in hot weather shall not have a placing temperature that will cause difficulty from loss of slump, flash sets, or cold joints. Concrete temperatures shall be less than 90°F.

L. FINISHING AND/OR PATCHING

All tie holes and porous spots visible on removal of forms shall be cleaned out and filled with concrete mortar of the same proportions as originally used in the structures.

All vertical surfaces that are exposed above finish grade shall receive a sand floated or steel finish as directed by the Owner. The surface shall be wetted and rubbed with a wood float in a uniform circular motion with fine sand being rubbed into the texture until the resulting surface is even and uniform in color and texture.

Horizontal surfaces that are exposed shall receive a steel finish. Floating and finishing shall begin when the water sheen has disappeared. Trueness of surface shall be checked with a ten-foot straight edge at not less than two different angles to insure that tolerance is met as specified herein.

M. CURING

Concrete shall be cured by one of the following methods:

- 1. Water Curing** - concrete cured with water shall be kept wet for five (5) days immediately following placement by covering with water-saturated material or by a system of perforated pipes, mechanical sprinklers, porous hose, or any other approved method that will keep all surfaces to be cured continuously wet.

2. **Membrane Curing** - membrane curing shall be by application of a white-pigment scaling compound which forms a water-retaining membrane on surface of concrete. Sealing compound shall be applied to concrete surfaces by spraying one coat to provide a continuous uniform white membrane over all areas. Coverage shall not exceed 150 square feet per gallon. Coverage shall be decreased on rough surfaces as necessary to obtain required continuous membrane. All surfaces shall be kept continually moist until sealing compound is applied. Sealing compound shall be applied as soon as surface film of moisture disappears but while the surface still has a damp appearance.
3. **Curing of protective cover** - curing shall be by use of continuous membrane of undamaged three mil polyethylene cover. Edges of polyethylene cover shall be secured to form as watertight seal as possible. Cover shall remain in place for a minimum of five days from time of concrete placement.

N. TESTING

Routine testing of materials of proposed mix designs and of resulting concrete for compliance with technical requirements shall be the duty of a testing agency and shall be performed without expense to the Contractor.

To facilitate the testing services, the Contractor shall furnish material samples, submit proposed mix design, furnish casual labor to handle and obtain samples, and advise the Owner's engineer in advance of operations requiring testing. All tests to verify the concrete mix, yield, and strength shall conform to standard tests of the ASTM.

At commencement of work and thereafter, concrete shall be sampled in accordance with Method of Sampling Fresh Concrete (ASTM C172, CSA, A23, 2.21). The Erection Contractor shall provide personnel with the knowledge and skill to sample concrete according to these specifications. It is in the Erection Contractors best interest to make and protect test cylinders so that accurate test results may be obtained.

The Contractor shall make slump tests, air tests, prepare and cure the concrete test cylinders. The Contractor shall arrange for pick-up, delivery, testing, and maintaining of records for the test cylinders. Copies of all records shall be furnished to Engineer.

Field test for air content of air-entrained concrete shall be made for a set of test cylinders and shall conform to requirements of ASTM C173-75.

Field test for slump shall be done by the Method of Test of Slump of Portland Cement Concrete (ASTM C143, CSA, A23, 2.20). The Contractor shall provide slump tests as provided herein and at any time requested by the Owner and/or Engineer.

A minimum of five cylinders shall be prepared from every 10 cubic yards delivered to the job site. If less than 10 cubic yards is placed in a day then cylinders shall be prepared for the lesser amount if it is 1 cubic yard or more. Location of concrete batches from which concrete test cylinders are made shall be recorded and kept on file at the job until the completion of the work. Sampling shall be done in accordance with ASTM C172-71. One cylinder shall be tested at 3 days, two at 7 days, and two at 28 days. The 7day test shall show strength of at least 4,000 psi. The Contractor shall be responsible for the cost of testing the concrete test cylinders

O. ACCEPTANCE

The concrete strengths, as indicated by compression test cylinders, shall have a coefficient of variation of not more than 1 in 10 when referred to a cumulative record for the job. Should these conditions not be met or if deficient construction is suspected by the Owner and/or Engineer, core tests may be required. Cost of cores and tests shall be paid for by the Erection Contractor when the concrete is deficient. If the concrete is not deficient these costs will be paid by the Owner.

If core tests results fall below the design strength specified, concrete represented by the weaker strength samples shall be removed and replaced. Changes shall be made in the mixture or water content for future batches as required by the Owner and/or Engineer. All of this shall be accomplished at no additional cost to the Owner.

Completed concrete work which fails to meet the requirements specified herein or noted on the drawings and which cannot be brought into compliance may be rejected.

Should concrete work be rejected, the Contractor shall be responsible for all labor and material required to replace rejected concrete work and associated materials, as directed by the Owner.

Any additional testing required for concrete not meeting the strength requirements shall be accomplished by an agency approved and hired by the Owner and paid for by the Contractor.

5. GROUP M: SITE PREPARATION AND FINISHING

5.1 GENERAL

Cost of bid items below shall be included under "Group M". No make up finish gravel quantities or estimates on necessary quantities for select structural fill are offered by Owner or Owner's Engineer. Contractor will need to allow for any and all material contingencies in their bid including shrinkage due to compaction, increases in quantities to account for deleterious materials removed, etc. No change orders will be allowed for Contractor bidding errors on excavation volume or necessary material volume needed to be supplied by Contractor.

A. GRADING

Site is existing; grade as needed to restore subgrade and site after removal work, trenching, excavations and backfilling operations.

B. EXCAVATION AND BACKFILL

Excavation of existing finished graded materials is required to complete installation of proposed equipment. Substation finish gravel is to be pulled back in such a manner that it is easily reused once installation is completed. Topsoil below finish gravel shall be removed to top of existing ground grid in such a manner that it does not contaminate existing adjacent finish gravel thereby compromising insulation integrity of substation gravel. Any compromised substation finish rock must be removed and replaced at Contractor's expense and substation rock returned to existing finish grade conditions.

Removed topsoil shall be placed on adjacent tarping or onto other non-permeable medium for reuse once subgrade installation of equipment is completed. Exposed grounding grid is to be cut to allow for minimal necessary repairs and bent out of trench sufficiently to allow for subgrade equipment installation. Once bedding sand and necessary subgrade equipment are installed, Contractor shall install removed topsoil in open trench to allow for ground grid repair and install remaining existing top soil and finish gravel to pre-construction conditions. Any excess finish rock needed to meet required 6" minimum rock depth at finish grade shall be the Contractor's expense.

C. UNSUITABLE AND EXCESS MATERIAL DISPOSAL

Contractor shall be responsible for disposal of all unsuitable and excess excavated material.

D. BEDDING SAND

Contractor shall furnish and install bedding sand for the conduit installations as described in the specification drawings.

E. COST ACCOUNTING

All costs associated with site preparation, including all sub-grade excavation, backfill, and compaction, shall be included in the bid item M1.

5.2 FINISH GRAVEL (BID ITEM M2)

Contractor shall restore gravel surfacing over the substation area to site conditions previous to construction. Switchyard Gravel shall be provided and installed on disturbed areas inside the substation fence and within 3 feet on the outside of the fence. Road surface gravel shall be installed as necessary to restore the existing driveway areas on the site. Finish gravel once placed shall have a smooth neat appearance to a depth of six inches throughout the required project area. Cost of gravel and all work required for placement shall be included under Group M2 of the bidder's proposal.

Finish gravel shall conform to the following requirements: (except the existing switchyard rock may be substituted to gravel the driveway areas on the KEC property)

A. SWITCHYARD GRAVEL

Material shall conform to requirements of Type I Gradation C, Surface-Course Materials, ASTM Designation, D1242-69. Such material consists of stone or gravel with natural crushed sand and fine mineral particles conforming to the following gradation:

<u>Sieve Size</u>	<u>Percentage by Weight</u>
1 inch (sq. mesh)	100
¾ inch (sq. mesh)	80 to 90
½ inch (sq. mesh)	10 to 20
3/8 inch (sq. mesh)	0 to 5
¼ inch (sq. mesh)	<2

B. ROAD SURFACE GRAVEL

Material shall consist of stone or gravel with natural crushed sand and fine mineral particles conforming to the following gradation:

<u>Sieve Size</u>	<u>Percentage by Weight</u>
1 inch (sq. mesh)	100
¾ inch (sq. mesh)	90 to 100
No. 4 (sq. mesh)	40 to 65
No. 8 (sq. mesh)	30 to 50
No. 30 (sq. mesh)	10 to 20
No. 200 (sq. mesh)	3 to 9

6. GROUP O: STATION GROUNDING – BID ITEM O1

6.1 GROUND MAT

Contractor shall restore and install the substation ground-mat and station grounding system as depicted on the specification drawings ATH-G01 and ATH-G02.

6.2 GROUNDING CONNECTIONS

All underground connections shall be Cadweld. Contractor shall provide appropriate Cadweld molds and all associated Cadweld shots.

6.3 GROUND GRID DEPTH

The Ground-mat shall be buried a minimum of 18" below sub-grade. All trenches shall be back-filled with fine earth and compacted.

6.4 EXPOSED LEADS

Existing expose leads shall be reused for substation breaker installation to ground breakers to ground grid. Leads with insufficient length will be cut below the finish gravel and connected to new ground leads of sufficient length by Cadweld connection.

6.5 STRUCTURE AND EQUIPMENT GROUNDING

Steel structure, switch operators and equipment shall be connected to the main ground grid as indicated on the drawings. Wherever possible and practicable, ground wire shall be a continuous conductor. Splices at intermediate tower clamps are undesirable and not approved. Connections to surge arresters shall consist of two paths to the main ground grid. For surge arresters, such connections shall consist of a continuous loop extending up one structure leg (or corner of equipment) across to each arrester and down the opposite side.

Contractor shall provide all required ground terminal connectors and ground terminal lugs as depicted in the specification drawings.

Tower clamps shall be provided and installed to ground base of all steel structures and at tap locations for equipment grounds. Support of conductor at other intermediary points on

structure shall be accomplished with tower clamps or galvanized ground wire clips. Tower clamps shall be as depicted on the specification drawings and on the material lists. On structural steel box sections, ground clamps shall be attached using stainless steel bolts, with nuts and lock washer, extending through the box section.

Points of attachment of ground conductor to steel structure and equipment shall not be spaced more than 4 feet apart to insure adequate connection and neat appearance.

Flexible copper braids and U-bolt clamps for grounding air break switch operating rods and handles are covered herein.

7 EQUIPMENT OPERATIONAL CHECKS – BID ITEM GROUP U1

Contractor shall perform the following equipment operational checks after other substation work is completed and prior to the Pre-Energization system checks and testing bid item U3. Costs associated with equipment operational checks and adjustments shall be figured into equipment installations for each respective bid unit. No additional charges for performing adjustments or operational checks will be allowed.

7.1 WIRING

Identify all cables into panels.

Perform continuity checks on all panel wiring AC and DC circuits.

7.2 AC AND DC SERVICE PANELS

Verify proper AC and DC circuits to yard equipment, control house equipment and relay panels.

8. PRE-ENERGIZATION TESTING AND FINAL SIGNOFF

Owner will thoroughly test and check all aspects of the equipment and system operation. Contractor will be required to correct any deficiencies found prior to final project sign-off. Costs associated with correcting any deficiencies found shall be at the expense of the bidder. Owner will apply voltages and push currents through various circuits and verify proper equipment operation including breaker, relay and alarm operation.

9. DEMOLITION – GROUP X

This group includes all costs associated for Contractor to dismantle, transport, dispose of all demolished items in an environmentally compliant manner with all federal, state, and local laws and regulations. Contractor is responsible for any disposal fees, spill fees, clean up fees and associated restoration costs with this removal work.

Exhibit C - MATERIAL LISTS

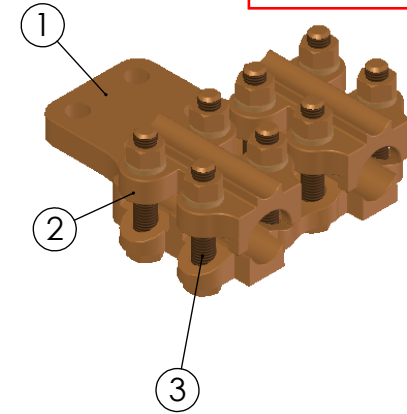
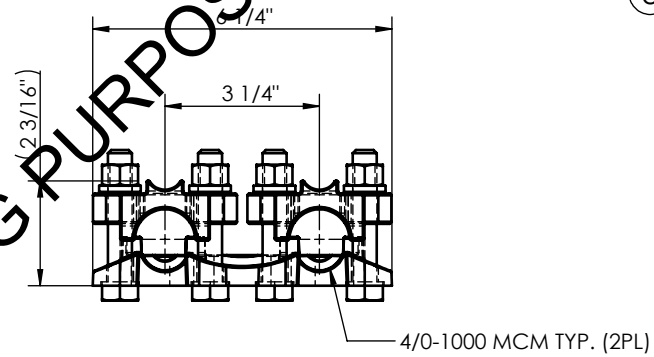
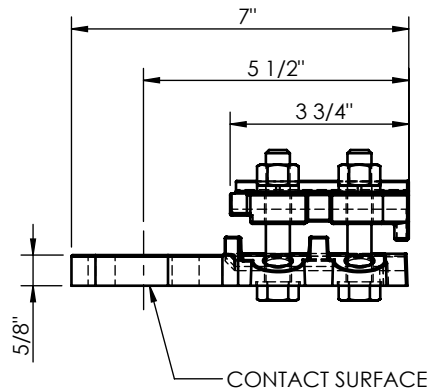
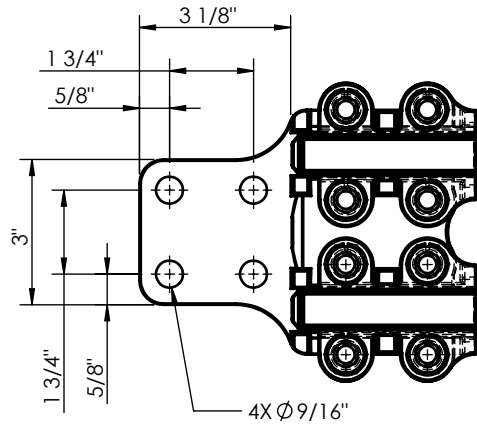
**Category 300, 500, 700, And Misc.
Material List**

**Athol Substation
Breaker Upgrade**

Item No.	This Contract	Quantity	Source	Description	Manufacturer & Catalog No.
300	Yes	1-Lot	Contractor	Bus and Connectors Material Items as Follows:	
301.1	Yes	1-Lot	Contractor	ALUMINUM SEAMLESS BUS PIPE, 6063-T6, ASTM B-241, SCHEDULE 40, 1 1/2" DIAMETER	
381	Yes	48	KEC	BR TERM (2) 4/0-1000 TO A 4 HOLE PAD	[TRAVIS PDU] 11-234
382	Yes	48	KEC	BR PAR CLAMP CABLE SPACER(2) 250-500 MCM (2" SPACING)	[TRAVIS PDU] 110-103-CS-2
383	Yes	12	KEC	AL WELD COUPLER 1 1/2"IPS RUN AND TAP	[TRAVIS PDU] 18-530
384	Yes	12	KEC	AL WELD TEE TAP 1-3"IPS TO A 4 HOLE PAD	[TRAVIS PDU] 18-623-WR
385	Yes	24	KEC	AL WELD TERM 1 1/2"IPS TO A 2 HOLE PAD CENTER FORM (EXT FIT)	[TRAVIS PDU] 18-113-CFE
386	Yes	24	KEC	AL WELD TERM 1 1/2"IPS TO A 4 HOLE PAD CENTER FORM (EXT FIT)	[TRAVIS PDU] 18-114-CFE
500	Yes	1-Lot	Contractor	Station Grounding Material Items as Follows:	
503	Yes	1-Lot	Contractor	Cadweld, 4/0 to 4/0 Horizontal Splice, Weld-Shot 90	Erico Mold No. SSC-2Q
504	Yes	1-Lot	Contractor	Cadweld, 4/0 to 4/0 Horizontal X Connections, Weld-Shot 250	Erico Mold No. XBM-2Q2Q
508	Yes	1-Lot	Contractor	Cadweld, Horizontal Tee, 2/0 Run to 4/0 Tap, Weld-Shot 115	Erico Mold No. TAC-2G2Q
509	Yes	1-Lot	Contractor	Cadweld, Horizontal Tee, 4/0 Run to 4/0 Tap, Weld-Shot 150	Erico Mold No. TAC-2Q2Q
510	Yes	1-Lot	Contractor	Cadweld, Horizontal Tee, 4/0 Run to 2/0 Tap, Weld-Shot 90	Erico Mold No. TAC-2Q2G
511	Yes	1-Lot	Contractor	Cadweld, Horizontal Tee, 2/0 Run to 2/0 Tap, Weld-Shot 90	Erico Mold No. TAC-2G2G
512	Yes	1-Lot	Contractor	Weld Metal	Erico Shot No. 250
513	Yes	1-Lot	Contractor	Weld Metal	Erico Shot No. 150
514	Yes	1-Lot	Contractor	Weld Metal	Erico Shot No. 115
515	Yes	1-Lot	Contractor	Weld Metal	Erico Shot No. 90
700	Yes	1-Lot	Contractor	Station Conduit Material	
705	Yes	1-Lot	Contractor	2" Metallic Liquid Tight Flex Conduit	Topaz Catalog No. 6106UL
706	Yes	1-Lot	Contractor	3" Metallic Liquid Tight Flex Conduit	Topaz Catalog No. 6108UL
712	Yes	1-Lot	Contractor	2" Sch. 80 PVC	CANTEX Part No. A53CA12
724A	Yes	1-Lot	Contractor	2" Sch. 80 PVC Sweep - Standard Radius	CANTEX Part No. 5123868
742	Yes	1-Lot	Contractor	2" Liquid Tight Connector, Straight, With Gaskets	MEYER HUBS Catalog No. SSTG 6
743	Yes	1-Lot	Contractor	3" Liquid Tight Connector, Straight, With Gaskets	MEYER HUBS Catalog No. SSTG 8
	Yes	3	Contractor	Conduit Plug, 1 1/2" Conduit	Grainger Cat. No. 22FJ28
	Yes	3	Contractor	Conduit Plug, 1" Conduit	Grainger Cat. No. 22FJ32
761	Yes	1-Lot	Contractor	2" PVC Female Adapter	CANTEX Part No. 6141628
762	Yes	1-Lot	Contractor	3" PVC Female Adapter	CANTEX Part No. 6141630
13C	Yes	12	KEC	ATH-M06	FAB
103A	Yes	12	KEC	ATH-M06	FAB
3C	Yes	12	KEC	ATH-M06	FAB
401B	Yes	12	KEC	ATH-M06	FAB

FOR BIDDING PURPOSES ONLY

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FOR BIDDING PURPOSES ONLY

NOTES:

1. INTERPRET DRAWING PER ASME Y14.5M-1994.
2. REMOVE ALL BURRS AND SHARP EDGES.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	B-1538	833 BRZ. TERM (2) 4/0-1000 TO A 4 HOLE PAD	1
2	A-601	BR 833 BOLTED CONNECTOR CAP 4/0-1000	2
3	.5X2.75 SBHW	1/2X2 3/4 SILICONE BRONZE HARDWARE	8

Part Number:			
11-234			
DESCRIPTION:			
BR TERM (2) 4/0-1000 TO A 4 HOLE PAD			
UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	JWB
TOLERANCES: ± 1/8"			
ANGULAR: ± 1 DEG		CHECKED	10/03/16
MATERIAL:	833 BR	1:4	WEIGHT: FINISH



PROPRIETARY AND CONFIDENTIAL

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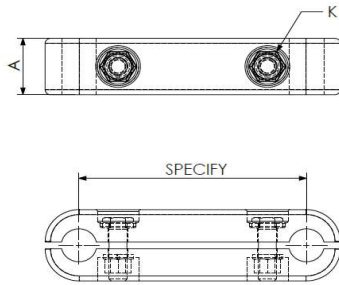
SIZE	SHEET 1 OF 1	REV
A		

BRONZE / ALUMINUM PARALLEL CABLE SPACERS

SECTION

110-1CS

382



BRONZE CABLE SPACERS

CATALOG NUMBER	CABLE MAIN		CABLE TAP		DIMENSIONS IN INCHES	
	AWG MIN	MCM MAX	AWG MIN	MCM MAX	A	K
110-101-CS*	4	250	4	250	1 1/4	3/8
110-103-CS*	250	500	250	500	1 7/8	1/2
110-105-CS*	500	1000	500	1000	2 1/8	1/2
110-107-CS*	1000	1500	1000	1500	2 1/8	5/8
110-110-CS*	1500	2000	1500	2000	2 3/8	5/8

Bronze Parallel Cable Spacers:

The type CS cable spacer connects a cable main parallel to a cable tap. It features a clamping member made of high strength, high conductivity copper alloy. The bolts, nuts, and lockwashers are silicon bronze to enhance clamping efficiency and resistance to corrosion.

Note: To obtain a cable spacer for (2) 300 MCM copper conductors spaced at 8" add suffix "-8"

Example: 110-103-CS-8.

*Please specify cable spacing (in.)

Aluminum Parallel Cable Spacers:

A high strength, high conductivity aluminum cable spacer, the type CSA includes clamping hardware made of high-tensile aluminum for dependability and durability in the field. To facilitate installation, all bolt heads are captivated. Width (A) will vary with length.

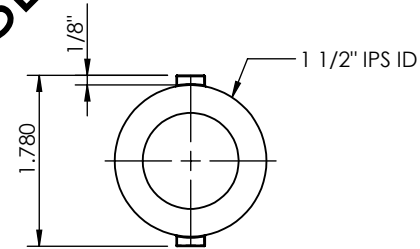
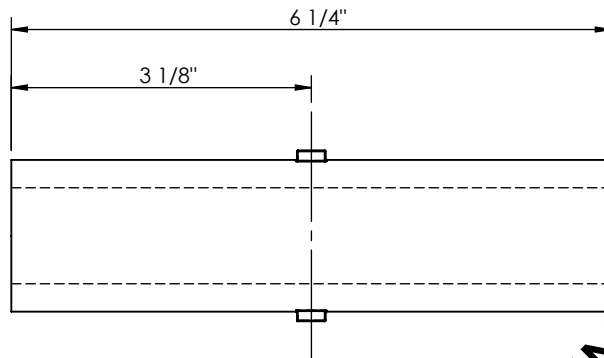
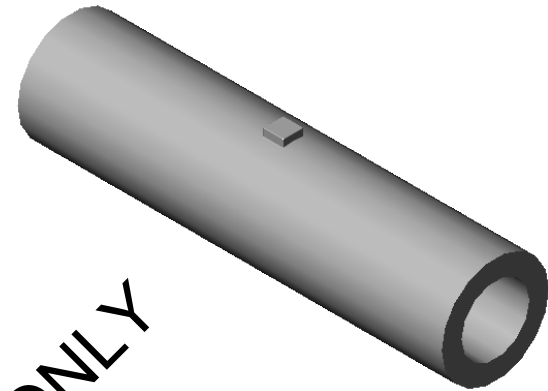
ALUMINUM CABLE SPACERS

CATALOG NUMBER	AAC AWG OR MCM	ACSR AWG OR MCM	DIMENSIONS IN INCHES	
	MIN-MAX	MIN-MAX	A	K
110-111-CS*	4-250(37)	4(6/1)-4/0(6/1)	1 3/4	1/2
110-113-CS*	250(7)-400(37)	4/0(6/1)-336.4(26/7)	1 3/4	1/2
110-115-CS*	350(19)-600(61)	336.4(18/1)-477(30/7)	1 3/4	1/2
110-117-CS*	600(61)-900(61)	556.5(18/1)-795(54/7)	1 3/4	1/2
110-119-CS*	900(61)-1272(91)	715.5-1113	2 1/8	5/8
110-121-CS*	1272(61)-1590(61)	1113-1272	2 1/8	5/8
110-123-CS*	1590(61)-2000(127)	1272-1780	2 1/8	5/8



*Please specify cable spacing (in.)

383



FOR BIDDING PURPOSES ONLY

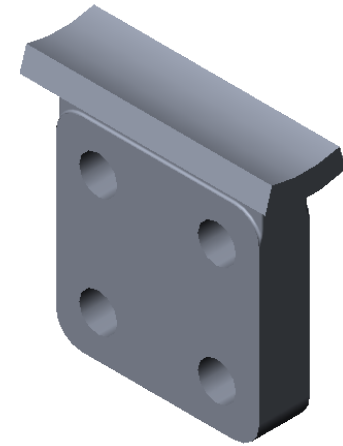
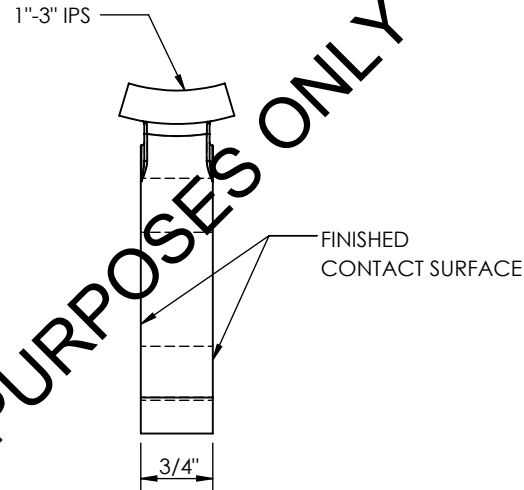
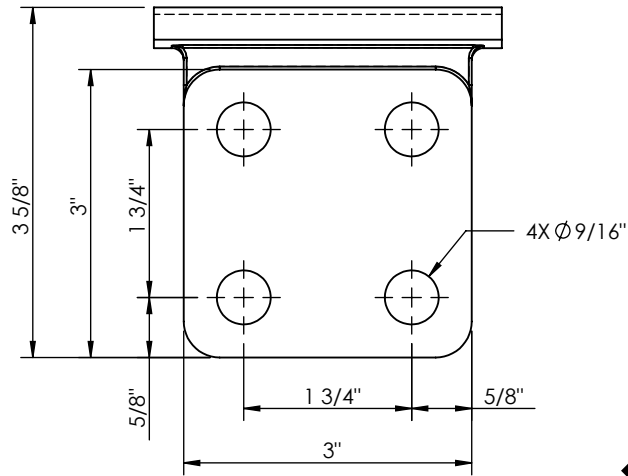
NOTES:

1. INTERPRET DRAWING PER ASME Y14.5M-1994.
2. REMOVE ALL BURRS AND SHARP EDGES.

Part Number:				18-530				<p style="font-weight: bold; margin: 0;">TRAVIS</p> <p style="font-weight: bold; margin: 0;">PATTERN & FOUNDRY, INC</p> <p style="font-size: 0.8em; margin: 0;">PROPRIETARY AND CONFIDENTIAL</p> <p style="font-size: 0.7em; margin: 0;">THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TRAVIS PATTERN & FOUNDRY. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF TRAVIS PATTERN & FOUNDRY IS PROHIBITED.</p>	
DESCRIPTION:				AL WELD COUPLER 1 1/2"IPS RUN AND TAP					
UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE					
DIMENSIONS ARE IN INCHES TOLERANCES: ± 1/8" ANGULAR: ± 1 DEG		CHECKED	JWB	2/27/2020					
MATERIAL: 356-T6		1:2	WEIGHT:	FINISH					
				SIZE	SHEET 1 OF 1		REV		
				A					

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	B-1266	AL WELD COUPLER 1 1/2"IPS RUN AND TAP (CORE 1" X 8")	1

384



FOR BIDDING PURPOSES ONLY

NOTES:

1. INTERPRET DRAWING PER ASME Y14.5M-1994.
2. REMOVE ALL BURRS AND SHARP EDGES.

Part Number:

18-623-WR

DESCRIPTION:

AL WELD TEE TAP 1-3"IPS TO A 4 HOLE PAD



PROPRIETARY AND CONFIDENTIAL

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UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	JTO	09/25/14
TOLERANCES: $\pm 1/8"$	CHECKED		
ANGULAR: ± 1 DEG			
MATERIAL: 356-T6	1:2	WEIGHT:	FINISH

SIZE A	SHEET 1 OF 1	REV
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	B-227	WELD TEE TAP 1-3"IPS TO A 4 HOLE PAD	1

5

4

3

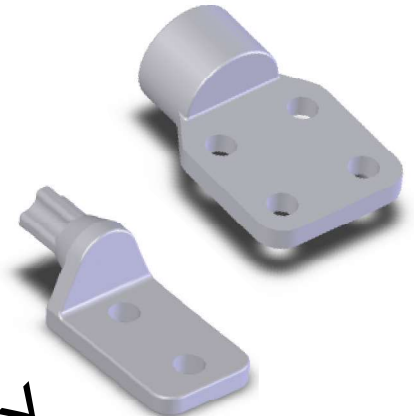
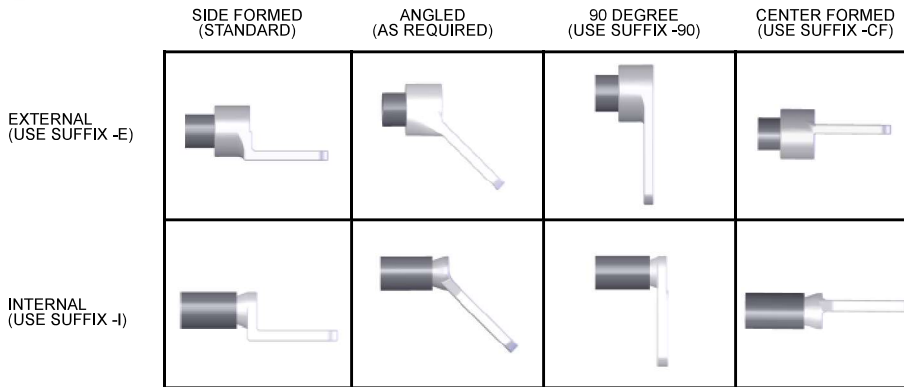
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1

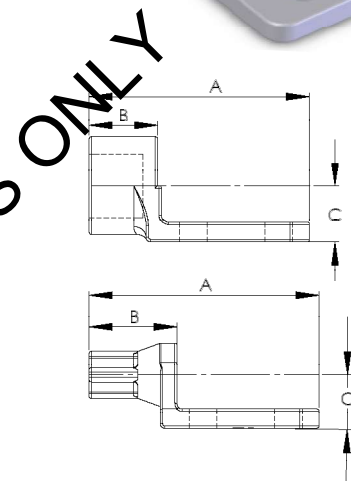
ALUMINUM WELDMENT CONNECTORS PIPE TO FLAT PAD

SECTION

18-1



CATALOG NUMBER	PIPE MAIN IPS	PAD STYLE	DIMENSIONS IN INCHES			PAD THICKNESS
			A	B	C	
18-101	1/2	B	4 5/8	1 1/4	15/16	3/8
18-102	1/2	C	4 5/8	1 1/4	15/16	3/8
18-103	1/2	D	5 5/8	1 1/4	15/16	3/8
18-104	3/4	B	4 3/4	1 1/4	1	3/8
18-105	3/4	C	4 1/8	1	1	3/8
18-106	3/4	D	4 1/2	1	1	3/8
18-107	1	B	5	1 3/4	1 1/8	3/8
18-108	1	C	5	1 3/8	1 1/8	3/8
18-109	1	D	6	1 3/8	1 1/8	3/8
18-110	1 1/4	B	5 1/8	1 1/2	1 1/4	3/8
18-111	1 1/4	C	4 1/2	1 3/8	1 1/4	3/8
18-112	1 1/4	D	5 1/2	1 3/8	1 1/4	3/8
18-113	1 1/2	B	5 1/4	1 7/8	1 1/2	1/2
18-114	1 1/2	C	5	2	1 1/2	1/2
18-115	1 1/2	D	5 7/8	1 7/8	1 1/2	1/2
18-116	2	B	5 1/2	2	1 3/4	1/2
18-117	2	C	5 1/8	1 7/8	1 3/4	1/2
18-118	2	D	6	2	1 3/4	1/2
18-119	2 1/2	B	6	2 3/8	2 3/8	1/2
18-120	2 1/2	C	5 3/4	2 3/8	2 3/8	1/2
18-121	2 1/2	D	6 7/8	2 3/8	2 3/8	1/2
18-122	3	B	6	2 3/4	2 3/8	5/8
18-123	3	C	6	2 3/4	2 3/8	5/8
18-124	3	D	7 1/8	2 5/8	2 3/8	5/8
18-125	3 1/2	B	6 1/8	2 5/8	2 5/8	3/4
18-126	3 1/2	C	6 1/8	2 5/8	2 5/8	3/4
18-127	3 1/2	D	7 1/8	2 5/8	2 5/8	3/4
18-128	4	B	6 5/8	3 1/8	2 7/8	3/4
18-129	4	C	6 5/8	3 1/8	2 7/8	3/4
18-130	4	D	7 5/8	3 1/8	2 7/8	3/4
18-131	4 1/2	B	6 5/8	3 1/8	2 7/8	3/4
18-132	4 1/2	C	6 5/8	3 1/8	2 7/8	3/4
18-133	4 1/2	D	7 5/8	3 1/8	2 7/8	3/4
18-134	5	B	6 5/8	3 1/8	3 3/8	1
18-135	5	C	6 5/8	3 1/8	3 3/8	1
18-136	5	D	7 5/8	3 1/8	3 3/8	1
18-137	6	B	7	3 3/4	4	1 1/8
18-138	6	C	7 3/4	4 1/8	4	1 1/8
18-139	6	D	8 3/4	4 1/8	4	1 1/8



Cast of a lightweight and corrosion-resistant aluminum alloy, the type WAT secures a pipe to a flat bar bus more permanently and economically than other terminal connectors. Side formed NEMA pads are standard.

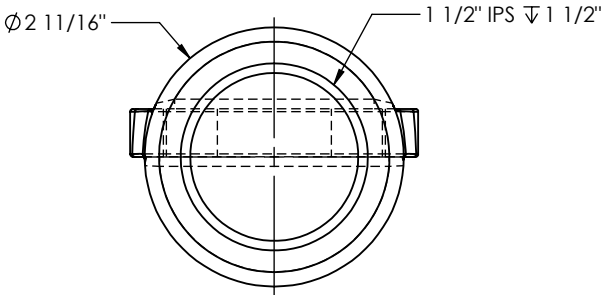
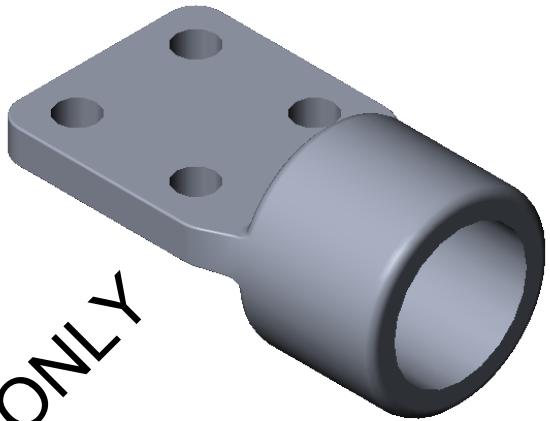
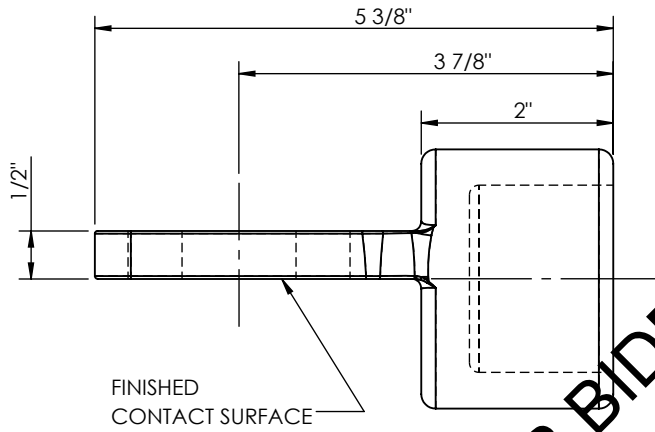
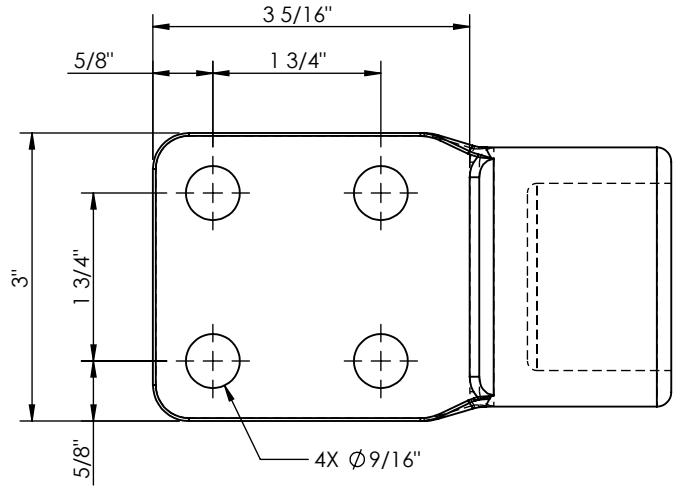
Any special tongue features will be readily provided if designated by the addition of a suffix to the catalog number.

Example: if a center-formed tongue were requested for catalog number 18-101E, that number should appear on the order as 18-101-CFE.

Similarly, a 45 degree tongue for the same catalog number should be written 18-101-E-45.

385

FOR EHPS (SCH80) INTERNAL PIPE FITTINGS USE SUFFIX (H). EX: 18-139H-I



FOR BIDDING PURPOSES ONLY

386

NOTES:

1. INTERPRET DRAWING PER ASME Y14.5M-1994.
2. REMOVE ALL BURRS AND SHARP EDGES.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	B-906	356-T6 AL WELD TERM 1 1/2"IPS TO A CENTER FORM 4 HOLE PAD (EXT FIT)	1

5

4

3

2

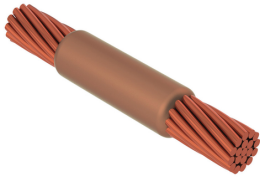
1

Part Number:				18-114-CFE			<p>TRAVIS PATTERN & FOUNDRY, INC</p> <p>PROPRIETARY AND CONFIDENTIAL</p> <p>THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TRAVIS PATTERN & FOUNDRY. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF TRAVIS PATTERN & FOUNDRY IS PROHIBITED.</p>	
DESCRIPTION:				AL WELD TERM 1 1/2"IPS TO A 4 HOLE PAD CENTER FORM (EXT FIT)				
UNLESS OTHERWISE SPECIFIED:		NAME		DATE				
DIMENSIONS ARE IN INCHES		DRAWN		JWB		10/21/2019		
TOLERANCES: ± 1/8"		CHECKED						
ANGULAR: ± 1 DEG		MATERIAL:		1:2		FINISH		
				WEIGHT: 1.11		REV		
			SIZE			SHEET 1 OF 1		
			A					

CABLE TO CABLE, SS, 4/0 CONCENTRIC TO 4/0 CONCENTRIC

CATALOG NUMBER

SSC2Q



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: SS

Conductor 1: 4/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.528"

Conductor 2: 4/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.528"

Split Crucible: No

Wear Plates: No

Mold Only: No

Welding Material: 90 or 90PLUSF20, Sold Separately

Handle Clamp: L160, Sold Separately

Price Key: C

FOR BIDDING PURPOSES ONLY

ADDITIONAL PRODUCT DETAILS

For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

WARNING

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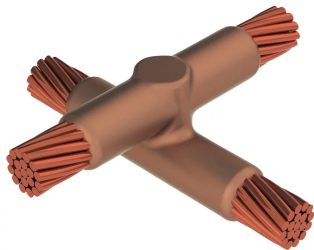
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CABLE TO CABLE, XB, 4/0 CONCENTRIC TO 4/0 CONCENTRIC

CATALOG NUMBER

XBM2Q2Q



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

CERTIFICATIONS



FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: XB

Conductor 1: 4/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.53"

Conductor 2: 4/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.53"

Split Crucible: No

Wear Plates: No

FOR BIDDING PURPOSES ONLY

Mold Only: No

Welding Material: 250 or 250PLUSF20, Sold Separately

Frame: Attached

Price Key: M

Ease of Use: Preferred

504

ADDITIONAL PRODUCT DETAILS

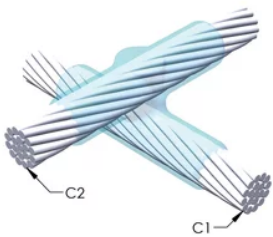
For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

DIAGRAMS



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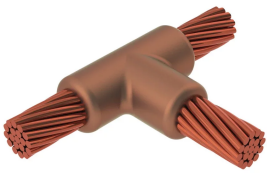


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CABLE TO CABLE, TA, 2/0 CONCENTRIC, 0.418" CONDUCTOR 1 OD, 4/0
CONCENTRIC, 0.528" CONDUCTOR 2 OD

CATALOG NUMBER

TAC2G2Q



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

CERTIFICATIONS



FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: TA

Conductor 1: 2/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.42"

Conductor 2: 4/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.53"

Split Crucible: No

FOR BIDDING PURPOSES ONLY

Wear Plates: No

Mold Only: No

Welding Material: 115 or 115PLUSF20, Sold Separately

Handle Clamp: L160, Sold Separately

Price Key: C

Ease of Use: Preferred

508

ADDITIONAL PRODUCT DETAILS

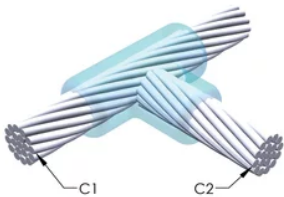
For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

DIAGRAMS



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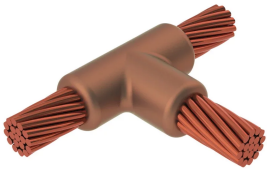
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CATALOG NUMBER

TAC2Q2Q



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

CERTIFICATIONS



FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: TA

Conductor 1: 4/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.53"

Conductor 2: 4/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.53"

Split Crucible: No

Wear Plates: No

FOR BIDDING PURPOSES ONLY

Mold Only: No

Welding Material: 150 or 150PLUSF20, Sold Separately

Handle Clamp: L160, Sold Separately

Price Key: C

Ease of Use: Preferred

509

ADDITIONAL PRODUCT DETAILS

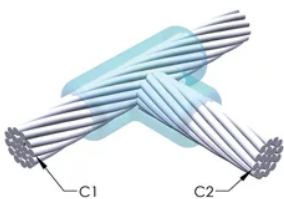
For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

DIAGRAMS



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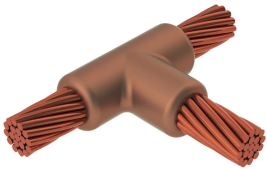
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CATALOG NUMBER

TAC2Q2G



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

CERTIFICATIONS



FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: TA

Conductor 1: 4/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.53"

Conductor 2: 2/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.42"

Split Crucible: No

Wear Plates: No

FOR BIDDING PURPOSES ONLY

Mold Only: No
 Welding Material: 90 or 90PLUSF20, Sold Separately
 Handle Clamp: L160, Sold Separately
 Price Key: C
 Ease of Use: Preferred

510

ADDITIONAL PRODUCT DETAILS

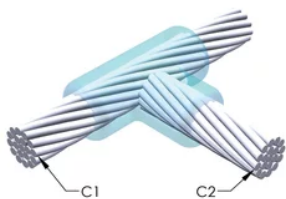
For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

DIAGRAMS



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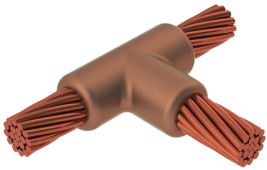


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CABLE TO CABLE, TA, 2/0 CONCENTRIC TO 2/0 CONCENTRIC

CATALOG NUMBER

TAC2G2G



nVent ERICO Cadweld graphite molds are designed and engineered for thousands of connection styles and conductor combinations.

CERTIFICATIONS



FEATURES

Forms a permanent, low resistance connection

Provides a molecular bond

nVent ERICO Cadweld Exothermic Connections are rated with the same current capacity as the conductor

Portable installation equipment with no external source of power required

Installers can be easily trained to make nVent ERICO Cadweld Exothermic Connections

Connections can be visually inspected

PRODUCT ATTRIBUTES

Mold Family: TA

Conductor 1: 2/0 Concentric

Conductor 1 Outer Diameter, Nominal: 0.42"

Conductor 2: 2/0 Concentric

Conductor 2 Outer Diameter, Nominal: 0.42"

Split Crucible: No

Wear Plates: No

FOR BIDDING PURPOSES ONLY

Mold Only: No
 Welding Material: 90 or 90PLUSF20, Sold Separately
 Handle Clamp: L160, Sold Separately
 Price Key: C
 Ease of Use: Preferred

511

ADDITIONAL PRODUCT DETAILS

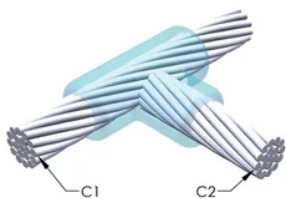
For applications such as computer room, tunnel or other low-ventilation areas, specify a smokeless nVent ERICO Cadweld Exolon mold. Add an XL prefix to the standard mold part number when ordering (for example, a TAC2Q2Q becomes XLTAC2Q2Q). Similarly, nVent ERICO Cadweld Exolon welding material is also designated by the XL prefix (for example, 150 becomes XL150).

A gap between conductors may be required. See mold tag for more information.

XX-X-XX-XX-L-M-W		
XX	Mold Family	
X	Price Key	
XX	Conductor Code 1	
XX	Conductor Code 2	
L*	Split Crucible	Crucible section is split on molds designed with horizontal opening for easier cleaning
M*	Mold Only	
W*	Wear Plates	Reduce mechanical abrasion of molds at cable entry points

* Empty if none

DIAGRAMS



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CADWELD WELDING MATERIAL, F20, 250

CATALOG NUMBER

250



CERTIFICATIONS



FEATURES

Mixture consists mainly of copper oxide and aluminum

Primarily used in grounding and bonding applications

Welding material is in the top of the tube and starting material is in the bottom of the tube

Packaged by size in plastic tubes with clear caps

Tubes packaged in plastic boxes along with metal disks

Each welded connection uses a single disk

Non-explosive

Not subject to spontaneous ignition

See specific nVent ERICO Cadweld connection details to determine welding material requirements

WARNING

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FOR BIDDING PURPOSES ONLY

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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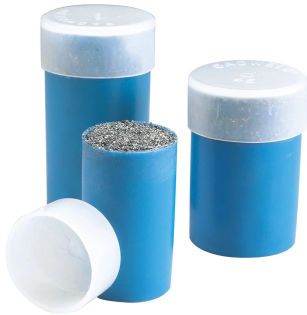
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CATALOG NUMBER

150



CERTIFICATIONS



FEATURES

Mixture consists mainly of copper oxide and aluminum

Primarily used in grounding and bonding applications

Welding material is in the top of the tube and starting material is in the bottom of the tube

Packaged by size in plastic tubes with clear caps

Tubes packaged in plastic boxes along with metal disks

Each welded connection uses a single disk

Non-explosive

Not subject to spontaneous ignition

See specific nVent ERICO Cadweld connection details to determine welding material requirements

PRODUCT ATTRIBUTES

Complies With: EN IEC@ 62561-1 permanent connection

FOR BIDDING PURPOSES ONLY

WARNING

513

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TRACER

CADWELD WELDING MATERIAL, F20, 115

CATALOG NUMBER

115



CERTIFICATIONS



FEATURES

Mixture consists mainly of copper oxide and aluminum

Primarily used in grounding and bonding applications

Welding material is in the top of the tube and starting material is in the bottom of the tube

Packaged by size in plastic tubes with clear caps

Tubes packaged in plastic boxes along with metal disks

Each welded connection uses a single disk

Non-explosive

Not subject to spontaneous ignition

See specific nVent ERICO Cadweld connection details to determine welding material requirements

PRODUCT ATTRIBUTES

Complies With: EN IEC® 62561-1 permanent connection

FOR BIDDING PURPOSES ONLY

WARNING

514

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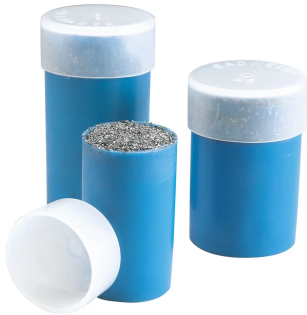
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TRACER

CATALOG NUMBER

90



CERTIFICATIONS



FEATURES

Mixture consists mainly of copper oxide and aluminum

Primarily used in grounding and bonding applications

Welding material is in the top of the tube and starting material is in the bottom of the tube

Packaged by size in plastic tubes with clear caps

Tubes packaged in plastic boxes along with metal disks

Each welded connection uses a single disk

Non-explosive

Not subject to spontaneous ignition

See specific nVent ERICO Cadweld connection details to determine welding material requirements

PRODUCT ATTRIBUTES

Complies With: EN IEC@ 62561-1 permanent connection

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WARNING

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nVent.com CADDY ERICO HOFFMAN RAYCHEM SCHROFF
TRACER

Job Name/Title: _____
 Contractor: _____

705 & 706

Metallic - Coil



Features

- Crush and corrosion resistant steel core for lasting mechanical protection
- Durable PVC jacket is oil, heat and sunlight resistant (UV)
- Smooth interior for easy wire pull through
- 3/8" thru 1-1/4" with continuous bonding strip

Applications

- Suitable for damp or wet locations in commercial and industrial applications
- Suitable as a grounding conductor when used for circuits rated up to 200A for 3/8" & 1/2" trade sizes and 60A for 3/4" through 1-1/4" trade sizes in lengths six feet or less per NEC Article 250.118(6). Larger sizes require separate grounding conductor.
- Listed for Direct Burial and in Poured Concrete
- Class I Div. 2: Article 501.10 (B)(2) & 501.30 (B)
- Class II Div. 1: Article 502.10 (A)(2) & 502.30 (B) Div. 2: 502.20 (B)(2)
- Class III Div. 1: Article 503.10 (A)(3) & 503.30 (B) Div. 2: 503.10 (B)

Standard Material

- PVC jacket
- Galvanized Steel Core

FOR BIDDING PURPOSES ONLY

Catalog Number	UPC	Size	Feet Coil	Ship Case	Weight/Case	Inside Diameter		Outside Diameter		Outside Diameter PVC Jacket	
						Min.	Max.	Min.	Max.	Min.	Max.
6100UL	03812	3/8"	100'	100'	25	.484	.504	.594	.614	.690	.710
6101UL	03813	1/2"	100'	100'	29	.622	.642	.732	.765	.820	.840
6102UL	03814	3/4"	100'	100'	41	.82	.84	.930	.96	1.03	1.05
6103UL	03815	1"	100'	100'	55	1.04	1.066	1.201	1.226	1.29	1.315
6104UL	03816	1-1/4"	50'	50'	33	1.38	1.41	1.54	1.57	1.63	1.66
6105UL	03817	1-1/2"	50'	50'	54	1.575	1.60	1.735	1.77	1.865	1.90
6106UL	03818	2"	25'	25'	32	2.02	2.045	2.18	2.215	2.34	2.375
6107UL	03819	2-1/2"	25'	25'	46	2.48	2.505	2.64	2.675	2.84	2.875
6108UL	03820	3"	25'	25'	56	3.07	3.10	3.295	3.335	3.46	3.50
6109UL	03821	3-1/2"	25'	25'	69	3.50	3.54	3.72	3.789	3.96	4
6110UL	03822	4"	25'	25'	80	4	4.22	4.22	4.28	4.46	4.50

705

706

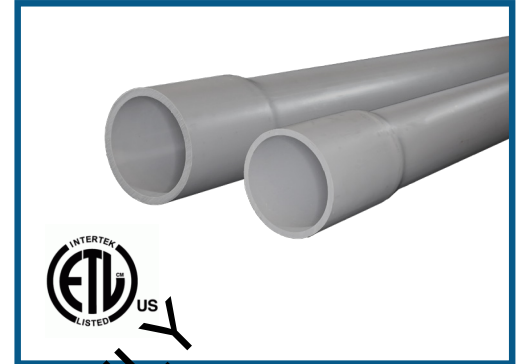
Nonmetallic PVC Schedule 40 & 80 Conduit

712

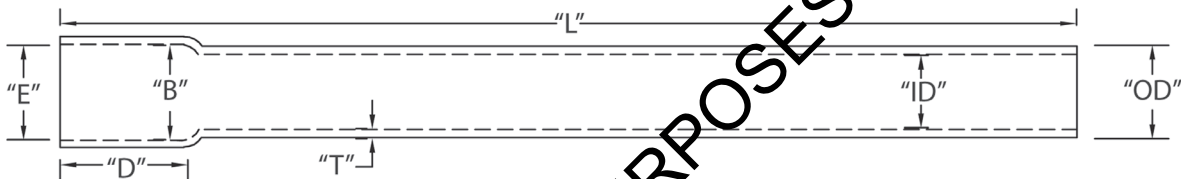
Nonmetallic PVC Schedule 40 Conduit

CANTEX Schedule 40 PVC Conduit is designed for underground or aboveground applications, and it is backed by over 60 years of manufacturing excellence.

- Nonmetallic PVC material which is corrosion, rust and sunlight resistant
- ETL listed
- Conforms to UL651 and NEMA TC-2
- Rated for use with 90-degree C conductors
- Made in USA
- Sunlight Resistant
- 10' Lengths
- 20' Lengths available (See note below)



Nonmetallic PVC Schedule 40 Conduit Belled End - 10' Lengths



Part No.	Size	Feet per Pack	T Min	OD	ID Min	E	B	D Nom	L Min
A52AE12	1/2	6,000	.109	.840	.578	.852	.836	1.500	120
A52AG12	3/4	4,400	.113	1.050	.780	1.064	1.046	1.750	120
A52BA12	1	3,600	.133	1.315	1.004	1.330	1.310	2.000	120
A52BC12	1-1/4	3,300	.140	1.660	1.335	1.677	1.655	2.250	120
A52BE12	1-1/2	2,250	.145	1.900	1.564	1.918	1.894	2.500	120
A52CA12	2	1,350	.154	2.375	2.021	2.393	2.369	3.000	120
A52CE12	2-1/2	930	.203	2.875	2.414	2.890	2.868	3.250	120
A52DA12	3	880	.216	3.500	3.008	3.515	3.492	3.750	120
A52DE12	3-1/2	630	.226	4.000	3.486	4.015	3.992	4.000	120
A52EA12	4	570	.237	4.500	3.961	4.515	4.491	4.500	120
A52FA12	5	380	.258	5.563	4.975	5.593	5.553	5.500	120
A52GA12	6	260	.280	6.625	5.986	6.658	6.614	6.125	120
A52JA12*	8	180	.322	8.625	7.853	8.670	8.610	6.375	120

* Not ETL Listed

Dimensions are nominal

PVC Schedule 40 Conduit Belled End-20' Lengths

CANTEX Schedule 40 Conduit is available in 20' lengths with the exception of the 1/2 inch trade size. The measurements for each trade size listed above are the same with the exception of the length (L) which is 240 inches. The following is a list of the product numbers for each 20" conduit trade size: A52AG42 is the 3/4" trade size; A52BA42 is the 1" trade size; A52BC42 is the 1 1/4 " trade size; A52BE42 is the 1 1/2' trade size; A52CA42 is the 2" trade size; A52CE42 is the 2 1/2" trade size; A52DA42 is the 3" trade size; A52DE42 is the 3 1/2" trade size; A52EA42 is the 4" trade size; A52FA42 is the 5" trade size; and A52GA42 is the 6" trade size.

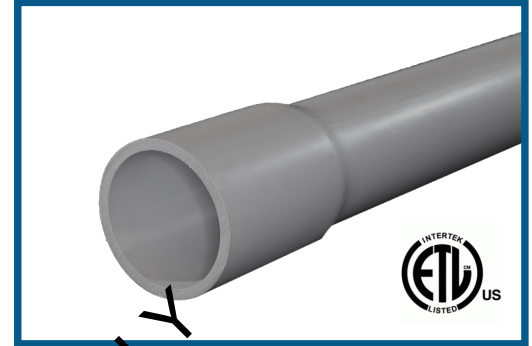
Nonmetallic PVC Schedule 40 & 80 Conduit

712

Nonmetallic PVC Schedule 80 Conduit

CANTEX Schedule 80 PVC Conduit is designed for underground or aboveground applications that are at risk of physical damage.

- Nonmetallic PVC material which is corrosion, rust & sunlight resistant
- ETL listed
- Conforms to UL651 and NEMA TC-2
- Rated for use with 90-degree C conductors
- Made in USA
- Sunlight Resistant
- 10' Lengths
- 20' Lengths available (See note below)



Nonmetallic PVC Schedule 80 Conduit Belled End - 10' Lengths



Part No.	Size	Feet per Pack	T Min	OD	ID Min	E	B	D Nom	L Min
A53AE12	1/2	6,000	.147	.840	.502	.852	.836	1.500	120
A53AG12	3/4	4,400	.154	1.050	.698	1.064	1.046	1.750	120
A53BA12	1	3,600	.179	1.315	.910	1.330	1.310	2.000	120
A53BC12	1-1/4	3,200	.191	1.660	1.227	1.677	1.655	2.250	120
A53BE12	1-1/2	2,900	.200	1.900	1.446	1.918	1.894	2.500	120
712 A53CA12	2	1,400	.218	2.375	1.881	2.393	2.369	3.000	120
A53CE12	2-1/2	930	.276	2.875	2.250	2.890	2.868	3.250	120
A53DA12	3	880	.300	3.500	2.820	3.515	3.492	3.750	120
A53DE12	3-1/2*	630	.318	4.000	3.486	4.015	3.992	4.000	120
A53EA12	4	570	.337	4.500	3.737	4.515	4.491	4.500	120
A53FA12	5	380	.375	5.563	4.713	5.593	5.553	5.500	120
A53GA12	6	260	.432	6.625	5.646	6.658	6.614	6.125	120

Dimensions are nominal

PVC Schedule 80 Conduit Belled End-20' Lengths

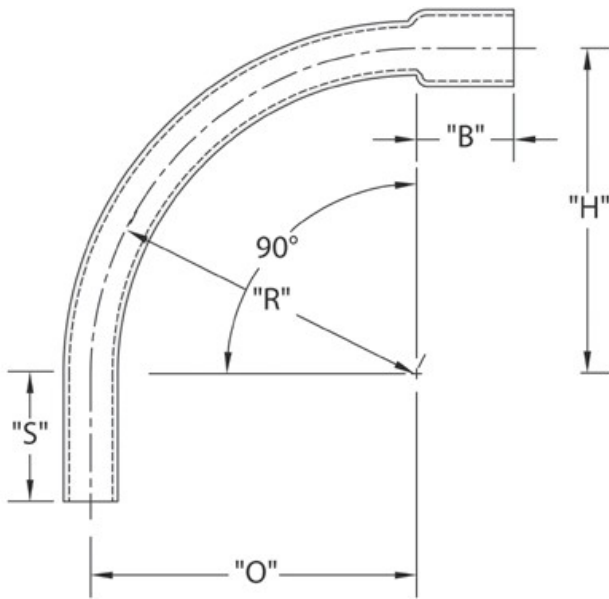
CANTEX Schedule 80 Conduit is available in 20' lengths with the exception of the 1/2 and 3/4 inch trade sizes. The measurements for each trade size listed above are the same with the exception of the length (L) which is 240 inches. The following is a list of the product numbers for each 20" conduit trade size: A53BA42 is the 1" trade size; A53BC42 is the 1 1/4 " trade size; A53BE42 is the 1 1/2' trade size; A53CA42 is the 2" trade size; A53CE42 is the 2 1/2" trade size; A53DA42 is the 3" trade size; and A53EA42 is the 4" trade size.

Rigid Nonmetallic EB & DB Elbows - Special Radius

Additional sizes are available as non-stock items. Call for specifications and quotes.

724A

DB-60 90° Elbow for Type EB & DB Duct Special Radius Bell End



DB-60 Special Radius Bell End 90 Degree Elbows are used to change the direction of a conduit run by 90 degrees.

- DB-60 Nonmetallic Utility Duct is designed for underground communication and electrical wire and cable
- For use in direct burial or encasement burial applications
- Meets NEMA TC6 & 8 standards and ASTM F-512
- Bell end for easy installation
- Made from high modulus PVC material
- Made in USA

DB-60 90° Elbow 36" Radius Bell End

Part Number	Trade Size	"R"	"O"	"H"	"S" MIN	"B" MIN	"L"
5123868	2	36.000	36.000	36.000	2.000	2.000	56.500
5123872	3	36.000	36.000	36.000	3.125	2.500	56.500
5123876	4	36.000	36.000	36.000	3.375	3.250	56.500
5123880	5	36.000	36.000	36.000	3.625	4.250	56.500
5123884	6	36.000	36.000	36.000	3.750	5.000	56.500

Dimensions are nominal

DB-60 90° Elbow 18" Radius Bell End

Part Number	Trade Size	"R"	"O"	"H"	"S" MIN	"B" MIN	"L"
5123866	2	18.000	18.000	18.000	2.000	2.000	28.250
5123870	3	18.000	18.000	18.000	3.125	2.500	28.250
5123874	4	18.000	18.000	18.000	3.375	3.250	28.250

Dimensions are nominal

DB-60 90° Elbow 48" Radius Bell End

Part Number	Trade Size	"R"	"O"	"H"	"S" MIN	"B" MIN	"L"
5123865	2	48.000	48.000	48.000	2.000	2.000	75.375
5123869	3	48.000	48.000	48.000	3.125	2.500	75.375
5123877	4	48.000	48.000	48.000	3.375	3.250	75.375
5123881	5	48.000	48.000	48.000	3.625	4.250	75.375
5123894	6	48.000	48.000	48.000	3.750	5.000	75.375

Dimensions are nominal

DB-60 90° Elbow 24" Radius Bell End

Part Number	Trade Size	"R"	"O"	"H"	"S" MIN	"B" MIN	"L"
5123867	2	24.000	24.000	24.000	2.000	2.000	37.688
5123871	3	24.000	24.000	24.000	3.125	2.500	37.688
5123875	4	24.000	24.000	24.000	3.375	3.250	37.688
5123879	5	24.000	24.000	24.000	3.625	4.250	37.688

Dimensions are nominal

DB-60 90° Elbow 60" Radius Bell End

Part Number	Trade Size	"R"	"O"	"H"	"S" MIN	"B" MIN	"L"
5123806	2	60.000	60.000	60.000	2.000	2.000	94.250
5123810	3	60.000	60.000	60.000	3.125	2.500	94.250
5123878	4	60.000	60.000	60.000	3.375	3.250	94.250
5123899	5	60.000	60.000	60.000	3.625	4.250	94.250
5123895	6	60.000	60.000	60.000	3.750	5.000	94.250

Dimensions are nominal

If you don't see the size you need, additional sizes of special radius elbows are available as non-stocked items. Call for specifications and quotes.

742 & 743

Applications:




- Myers™ hubs are used in the termination of electrical circuits through wall of the enclosure
- Designed for use indoors or outdoors with rigid conduit and IMC
- Ideal for pharmaceutical, chemical and food processing, pulp/paper, nuclear, solar and commercial construction applications
- Resistant to a variety of chemicals, including acetic, citric and salt water
- Special design of o-ring gasket provides excellent environmental ratings and chemical resistance
- Hub is provided with a stainless steel ground nut



Features:

- Wide range of styles, trade sizes and materials to meet customer requirements and preferences
- Multiple certifications provide users peace of mind
- Easy installation and smooth pulling service for labor savings
- Tapered female threads for rigid/IMC conduit, NPSM male threads

Certifications and compliances:

- NEC/CEC:
 - Class I, Division 2
 - Class II, Divisions 1 & 2
 - Class III, Divisions 1 & 2
 - Class I, Zone 1, AEx e II
 - Class I, Zone 1, Ex e II
- cULus Listed
 - UL Standard 514B
 - CSA Standard C22.2 No. 18
- NEMA Type 2, 3, 3R, 4, 4X, 12 (std. hub and ground hub)
- IEC:
 - STGK:
 - ATEX Certified ITS12ATEX47591X Ex  II 2G Ex e IIC Gb to EN 60079-0:2009, EN 60079-7:2007, and EN 60079-14 Standards Ta -15°C to 120°C
 - IECEX Certified IECEX ETL 12.0009X Ex  II 2G Ex eb IIC Gb to IEC 60079-0:2007-10, Edition 5, IEC 60079-7:2007, Edition 4 and IEC 60079-14 Standards Ta -15°C to 120°C
 - IP66
 - SSTGK M2:
 - ATEX Certified DEMKO 18 ATEX 2002X,  II 2G Ex eb IIC Gb to EN IEC 60079-0:2018 and EN IEC 60079-7:2015 +A1:2018 standards Ta -55°C to 180°C
 - IECEX Certified IECEX UL 18.0007X, Ex eb IIC Gb to IEC 60079-0:2017 and IEC 60079-7:2017 standards Ta -55°C to 180°C
 - IP66

Standard materials:

- Nut: Zinc (Zamek-2, Zamek-3), aluminum (Al 360), stainless (316)
- Body: Zinc (Zamek-2, Zamek-3), aluminum (Al 360), stainless (316)
- Insuliner: Lexan, PEEK GF15 (SSTGK M2 only)
- O-Ring: Viton; silicone (SSTGK M2 only)
- Ground Screw: steel/stainless steel

Standard finishes:

- Aluminum – natural
- Zinc – natural
- Stainless – natural

Options:

- | Description | Suffix |
|--|--------|
| • Nickel-chrome plate finish (available on zinc hubs only) | CP |

FOR BIDDING PURPOSES ONLY

Conduit hubs

742 & 743

Myers hubs design features

1 Grounding screw
• For added safety

2 Vibration-proof
• Strong, oversize nut with radial serrations helps assure flush installation and positive grounding

4 Precision machine cut threads
• Positive fit and simple installation

2 Posi-lok insulated throat
• Cannot come out, standard in sizes from 1/2" through 4"

5 No welding
• Unique serrations on both nut and hub bite into metal assuring a positive electrical ground. (UL approved for use with service entrance conduit)

6 Captive o-ring gasket
• Impervious to corrosive moisture and petroleum products. Gasket helps assure positive water and dust-tight installations

Conduit hubs

FOR BIDDING PURPOSES ONLY

Available in trade sizes 3/8" through 6"

Available in trade sizes 1/2" through 6"

Available in trade sizes 1/2" through 4"

Stainless steel now rated for -55°C to 180°C

Hub Basic Scru-Tite™

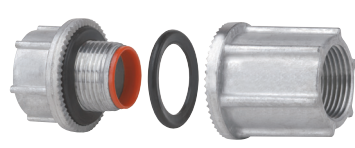
Hubs are ideal for general use with rigid conduit. Provides positive seal and electrical ground.

Ground hub

Combines all of the features of the Hub Basic Scru-Tite plus the additional feature of the grounding screw on the locknut.

ATEX rated hub

Hub is listed for use in hazardous (classified) locations to IECEx-ATEX certifications. Ideal for global requirements and OEM's shipping material worldwide.



Through-bulkhead fitting

Hubs are the perfect method for installing hubs on cast boxes or through thicker walls.



Metric to NPT adapter

Used to convert a threaded metric entry to a NPT entry.



Drain plugs

Designed to install in the bottom of an enclosure to drain any accumulated condensation. Available in aluminum or stainless steel construction.



Cap-off

Designed to install in enclosure to provide environmental cap for unused entries or knockouts.

742 & 743

HUB BASIC SCRU-TITE – NEMA 2, 3, 3R, 4, 4X, 12

Zinc

UL File No. E-27258



Cat. #	Size	Unit qty.	Wt. lbs. per 100
ST 03	3/8"	25	11
ST 1	1/2"	25	19
ST 2	3/4"	25	27
ST 3	1"	25	40
ST 4	1 1/4"	10	51
ST 5	1 1/2"	10	68
ST 6	2"	10	92
ST 7	2 1/2"	5	210
ST 8	3"	2	245
ST 9	3 1/2"	2	278
ST 10	4"	2	318
ST 11	5"	1	478
ST 12	6"	1	685

⓪ Optional nickel-chrome plate finish. Add suffix -CP.
 Ⓟ Not supplied with insulator.

HUB BASIC SCRU-TITE – NEMA 2, 3, 3R, 4, 4X, 12

Aluminum

UL File No. E-27258



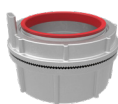
Cat. #	Size	Unit qty.	Wt. lbs. per 100
STA 1	1/2"	25	8
STA 2	3/4"	25	11
STA 3	1"	25	17
STA 4	1 1/4"	10	26
STA 5	1 1/2"	10	30
STA 6	2"	10	38
STA 7	2 1/2"	5	80
STA 8	3"	2	100
STA 9	3 1/2"	2	138
STA 10	4"	2	150
STA 11	5"	1	300
STA 12	6"	1	300

Ⓟ Not supplied with insulator.

GROUND HUB – NEMA 2, 3, 3R, 4, 4X, 12

316 Stainless steel

UL File No. E-59509



Cat. #	Size	Unit qty.	Wt. lbs. per 100
SSTG 1	1/2"	10	29
SSTG 2	3/4"	10	41
SSTG 3	1"	10	57
SSTG 4	1 1/4"	5	73
SSTG 5	1 1/2"	5	99
SSTG 6	2"	5	134
SST 7	2 1/2"	2	183
SST 8	3"	2	278
SST 9	3 1/2"	2	328
SST 10	4"	2	395

Ⓜ Not UL Listed as means of grounding and bonding. Does not include tapped ground tab or ground screw.

GROUND HUB – NEMA 2, 3, 3R, 4, 4X, 12

Zinc

UL File No. E-59509



Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. Copper Grd. Wire Size	
				CSA	UL
STG 1	1/2"	25	20	#8	#8
STG 2	3/4"	25	28	#8	#8
STG 3	1"	25	42	#8	#8
STG 4	1 1/4"	10	55	#8	#8
STG 5	1 1/2"	10	70	#6	#8
STG 6	2"	10	95	#4	#8
STG 7	2 1/2"	5	190	#2	#6
STG 8	3"	2	243	1/0	#6
STG 9	3 1/2"	2	300	2/0	#6
STG 10	4"	2	323	2/0	#4
STG 11	5"	1	625	2/0	#2
STG 12	6"	1	750	3/0	#1

Ⓟ Not supplied with insulator.
 Ⓜ Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

GROUND HUB – NEMA 2, 3, 3R, 4, 4X, 12

Aluminum

UL File No. E-59509



Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. Copper Grd. Wire Size	
				CSA	UL
STAG 1	1/2"	25	13	#8	#8
STAG 2	3/4"	25	14	#8	#8
STAG 3	1"	25	18	#8	#8
STAG 4	1 1/4"	10	25	#8	#8
STAG 5	1 1/2"	10	33	#6	#8
STAG 6	2"	10	41	#4	#8
STAG 7	2 1/2"	5	90	#2	#6
STAG 8	3"	2	103	1/0	#6
STAG 9	3 1/2"	2	138	2/0	#6
STAG 10	4"	2	140	2/0	#4
STAG 11	5"	1	325	3/0	#2
STAG 12	6"	1	350	3/0	#1

Ⓟ Not supplied with insulator.
 Ⓜ Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

Conduit hubs

FOR BIDDING PURPOSES ONLY

742
743

742 & 743

ATEX HAZARDOUS LOCATION HUB WITH INCREASED SAFETY GROUND TERMINAL

Zinc – NEMA 2, 3, 3R, 4, 4X; IP66

II 2 G Ex e IIC Gb Ta (-15°C to 120°C)

IECEX – Ex e IIC Gb Ta (-15°C to 120°C)
Class I, Zone 1, AEx e II
Class I, Zone 1, Ex e II

UL File No. E-59509



Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. Copper Grd. Wire Size	
				CSA®	UL®
STGK 1	1/2"	10	20	#8	#8
STGK 2	3/4"	10	31	#8	#8
STGK 3	1"	10	44	#8	#8
STGK 4	1 1/4"	5	60	#8	#8
STGK 5	1 1/2"	5	73	#6	#8
STGK 6	2"	5	99	#4	#8
STGK 7	2 1/2"	2	145	#2	#6
STGK 8	3"	2	243	1/0	#6
STGK 9	3 1/2"	2	304	2/0	#6
STGK 10	4"	2	327	2/0	#4

Ⓢ Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

ATEX HAZARDOUS LOCATION HUB WITH INCREASED SAFETY GROUND TERMINAL

316 Stainless steel – NEMA 2, 3, 3R, 4, 4X; IP66

II 2 G Ex eb IIC Gb Ta (-55°C to 180°C)

IECEX – Ex eb IIC Gb Ta (-55°C to 180°C)
Class I, Zone 1, AEx e II
Class I, Zone 1, Ex e II

UL File No. E-187273



Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. Copper Grd. Wire Size	
				CSA®	UL®
SSTGK 1 M2	1/2"	10	33	#8	#8
SSTGK 2 M2	3/4"	10	44	#8	#8
SSTGK 3 M2	1"	10	60	#8	#8
SSTGK 4 M2	1 1/4"	5	76	#8	#8
SSTGK 5 M2	1 1/2"	5	103	#6	#8
SSTGK 6 M2	2"	5	137	#4	#8
SSTGK 7 M2Ⓜ	2 1/2"	2	185	#2	#6
SSTGK 8 M2Ⓜ	3"	2	281	1/0	#6
SSTGK 9 M2Ⓜ	3 1/2"	2	331	2/0	#6
SSTGK 10 M2Ⓜ	4"	2	399	2/0	#4

Ⓢ Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

Ⓜ Not UL Listed as means of grounding and bonding.

THROUGH-BULKHEAD FITTING – ZINC

UL File No. E-27258



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STTB 1	1/2"	5	30
STTB 2	3/4"	5	50
STTB 3	1"	5	70
STTB 4	1 1/4"	5	85
STTB 5	1 1/2"	5	110
STTB 6	2"	5	152
STTB 7	2 1/2"	4	280
STTB 8	3"	2	408
STTB 9	3 1/2"	2	468
STTB 10	4"	2	533

THROUGH-BULKHEAD FITTING – ALUMINUM

UL File No. E-27258



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STTBA 1	1/2"	5	11
STTBA 2	3/4"	5	21
STTBA 3	1"	5	31
STTBA 4	1 1/4"	5	40
STTBA 5	1 1/2"	5	50
STTBA 6	2"	5	65
STTBA 7	2 1/2"	4	106
STTBA 8	3"	2	175

THROUGH-BULKHEAD FITTING – ZINC WITHOUT NIPPLES

Packaged as two pieces unassembled
UL File No. E-27258



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STTTB 1	1/2"	5	35
STTTB 2	3/4"	5	58
STTTB 3	1"	5	85
STTTB 4	1 1/4"	5	105
STTTB 5	1 1/2"	5	135
STTTB 6	2"	5	169

THROUGH-BULKHEAD FITTING – ALUMINUM WITHOUT NIPPLES

Packaged as two pieces unassembled
UL File No. E-27258



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STTTBA 1	1/2"	5	16
STTTBA 2	3/4"	5	25
STTTBA 3	1"	5	35
STTTBA 4	1 1/4"	5	40
STTTBA 5	1 1/2"	5	50
STTTBA 6	2"	5	75

Conduit hubs

FOR BIDDING PURPOSES ONLY

METRIC TO NPT ADAPTER – ZINC



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STM 1	M20 - 1/2"	25	13
STM 2	M25 - 3/4"	25	19
STM 3	M32 - 1"	25	32
STM 4	M40 - 1 1/4"	10	40
STM 5	M50 - 1 1/2"	10	57
STM 6	M63 - 2"	10	70

Note: The Myers metric to NPT hub adapter is used to convert a threaded metric entry to an NPT entry. The female thread is NPT and the male thread is metric.

GROUND NUT – ZINC

UL File No. E-59509



Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. copper grd. wire size	
				CSA [ⓐ]	UL [ⓑ]
STGN 1	1/2"	25	6	#8	#8
STGN 2	3/4"	25	10	#8	#8
STGN 3	1"	25	13	#8	#8
STGN 4	1 1/4"	10	15	#8	#8
STGN 5	1 1/2"	10	23	#6	#8
STGN 6	2"	10	28	#4	#8

[ⓐ]Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

GROUND NUT – ALUMINUM

UL File No. E-59509

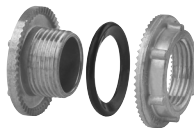


Cat. #	Size	Unit qty.	Wt. lbs. per 100	Max. copper grd. wire size	
				CSA [ⓐ]	UL [ⓑ]
STAGN 1	1/2"	25	3	#8	#8
STAGN 2	3/4"	25	4	#8	#8
STAGN 3	1"	25	6	#8	#8
STAGN 4	1 1/4"	10	8	#8	#8
STAGN 5	1 1/2"	10	11	#6	#8
STAGN 6	2"	10	14	#4	#8

[ⓐ]Use of wire terminal is required by CSA and recommended by UL for wire gauges over 10 AWG.

CAP-OFF – ZINC

UL File No. E-23223



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STC 1 [ⓐ]	1/2"	25	13
STC 2 [ⓐ]	3/4"	25	19
STC 3 [ⓐ]	1"	25	28
STC 4 [ⓐ] [ⓑ]	1 1/4"	10	40
STC 5 [ⓐ] [ⓑ]	1 1/2"	10	50
STC 6 [ⓐ] [ⓑ]	2"	10	67

[ⓐ]Optional nickel-chrome plate finish. Add suffix "P".
[ⓑ]Not UL Listed.

CAP-OFF – ALUMINUM

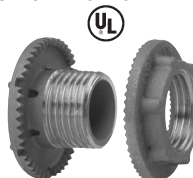
UL File No. E-23223



Cat. #	Size	Unit qty.	Wt. lbs. per 100
STAC 1	1/2"	25	5
STAC 2	3/4"	25	8
STAC 3	1"	25	12

NON-HAZARDOUS DRAIN PLUG – 316 STAINLESS STEEL

UL File No. E-23223



SSTS 1

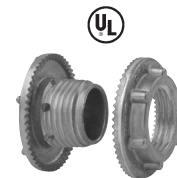


SSTS 1CD

Cat. #	Size	Unit qty.	Wt. lbs. per 100
SSTS 1	1/2"	25	17
SSTS 1CD	1/2"	10	12

NON-HAZARDOUS DRAIN PLUG – ALUMINUM

UL File No. E-23223



STAC 1ST



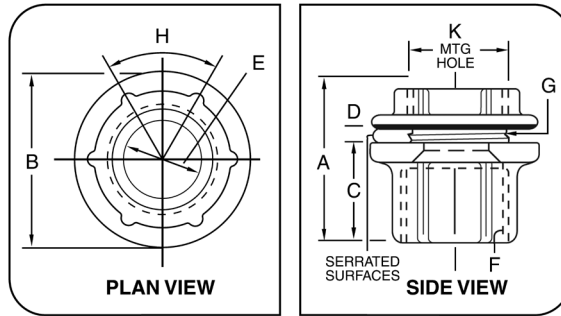
STAC 1CD

Cat. #	Size	Unit qty.	Wt. lbs. per 100
STAC 1ST	1/2"	25	6
STAC 1CD	1/2"	25	2

Note: SSTS 1 and STAC 1ST are for knockouts and are supplied with a locknut and straight threads. SSTS 1CD and STAC 1CD are for threaded openings and are supplied without locknut and NPT threads. Not gasketed to allow for water drainage.

742 & 743

Hub dimensions (in inches):



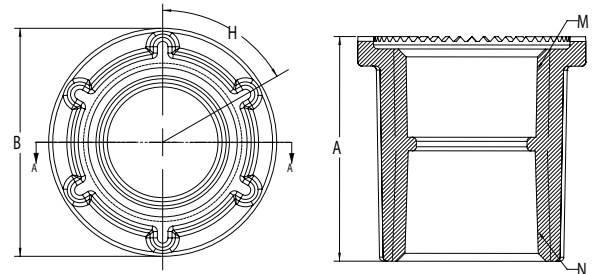
"D" dimension indicates maximum panel thickness which hub will accommodate.

Pipe size	A	B	C	D	E		F	G	H	K (mounting hole)	
					Min.	Max.				Min.	Max.
3/8	1 ³ / ₃₂	1 ¹ / ₈	2 ¹ / ₃₂	1 ¹ / ₈	0.468	0.493	3/8 NPT	3/8 NPSM	60°	43/64	11/16
1/2	1 ¹¹ / ₃₂	1 ⁷ / ₁₆	1 ¹³ / ₁₆	3/16	0.591	0.622	1/2 NPT	1/2 NPSM	60°	55/64	7/8
3/4	1 ¹⁵ / ₃₂	1 ²³ / ₃₂	2 ⁹ / ₃₂	3/16	0.783	0.824	3/4 NPT	3/4 NPSM	60°	1 ¹ / ₁₆	1 ¹ / ₈
1	1 ²¹ / ₃₂	2	1 ¹ / ₃₂	1/4	0.997	1.049	1 NPT	1 NPSM	60°	1 ²¹ / ₆₄	1 ³ / ₈
1 1/4	1 ¹¹ / ₁₆	2 ³ / ₈	1 ¹ / ₃₂	1/4	1.311	1.380	1 1/4 NPT	1 1/4 NPSM	60°	1 ⁴³ / ₆₄	1 ³ / ₄
1 1/2	1 ¹¹ / ₁₆	2 ³ / ₄	1 ¹ / ₃₂	1/4	1.529	1.610	1 1/2 NPT	1 1/2 NPSM	60°	1 ⁵⁹ / ₆₄	2
2	1 ³ / ₄	3 ¹ / ₄	1 ³ / ₃₂	1/4	1.964	2.067	2 NPT	2 NPSM	60°	2 ²⁵ / ₆₄	2 1/2
2 1/2	2 ¹ / ₃₂	3 ³ / ₄	1 ⁹ / ₃₂	1/4	2.346	2.469	2 1/2 NPT	2 1/2 NPSM	60°	2 ⁵⁷ / ₆₄	3
3	2 ⁵ / ₁₆	4 ³ / ₈	1 ³ / ₈	1/4	2.915	3.068	3 NPT	3 NPSM	45°	3 ³³ / ₆₄	3 ⁵ / ₈
3 1/2	2 ³ / ₈	5	1 ⁷ / ₁₆	1/4	3.371	3.548	3 1/2 NPT	3 1/2 NPSM	45°	4 ¹ / ₆₄	4 ¹ / ₈
4	2 ⁷ / ₁₆	5 ¹ / ₂	1 ¹ / ₂	1/4	3.825	4.025	4 NPT	4 NPSM	45°	4 ³³ / ₆₄	4 ⁵ / ₈
5	2 ¹⁵ / ₁₆	6 ¹ / ₈	2	1/4	4.795	5.015	5 NPT	5 NPSM	45°	5 ³⁷ / ₆₄	5 ¹ / ₁₆
6	3	7 ¹¹ / ₁₆	2	5/16	5.762	6.065	6 NPT	6 NPSM	45°	6 ⁴¹ / ₆₄	6 ³ / ₄

Conduit hubs

Bulkhead dimensions (in inches):

Cat. #	Size	A	B	H	M	N
STTB 1						
STTB A 1	1/2	1.465	1.429	60°	1/2 - 11 NPSM	1/2 - 14 NPT
STTTB 1						
STTTBA 1						
STTB 2						
STTB A 2	3/4	1.652	1.677	60°	3/4 - 14 NPSM	3/4 - 14 NPT
STTTB 2						
STTTBA 2						
STTB 3						
STTB A 3	1	1.801	1.998	60°	1 - 11 1/2 NPSM	1 - 11 1/2 NPT
STTTB 3						
STTTBA 3						
STTB 4						
STTB A 4	1 1/4	1.711	2.373	60°	1 1/4 - 11 1/2 NPSM	1 1/4 - 11 1/2 NPT
STTTB 4						
STTTBA 4						
STTB 5						
STTB A 5	1 1/2	1.717	2.741	60°	1 1/2 - 11 1/2 NPSM	1 1/2 - 11 1/2 NPT
STTTB 5						
STTTBA 5						
STTB 6						
STTB A 6	2	1.755	3.230	60°	2 - 11 1/2 NPSM	2 - 11 1/2 NPT
STTTB 6						
STTTBA 6						
STTB 7						
STTB A 7	2 1/2	2.500	3.747	45°	2 1/2 - 8 NPSM	2 1/2 - 8 NPT
STTB 8						
STTB A 8	3	2.500	4.392	45°	3 - 8 NPSM	3 - 8 NPT
STTB 9						
STTB A 9	3 1/2	2.290	4.975	45°	3 1/2 - 8 NPSM	3 1/2 - 8 NPT
STTB 10						
STTB A 10	4	2.439	5.516	45°	4 - 8 NPSM	4 - 8 NPT



FOR BIDDING PURPOSES ONLY

742 & 743

Spacing chart:
Conduit or pipe size

Cond. size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
3/8	1 5/32	1 1/4												
1/2	1 5/16	1 13/32	1 9/16											
3/4	1 7/16	1 17/32	1 11/16	1 13/16										
1	1 9/32	1 11/16	1 27/32	1 31/32	2 1/8									
1 1/4	1 25/32	1 7/8	2 1/32	2 5/32	2 5/16	2 1/2								
1 1/2	1 31/32	2 1/16	2 1/32	2 11/32	2 1/2	2 11/16	2 7/8							
2	2 1/32	2 5/16	2 15/32	2 19/32	2 3/4	2 15/16	3 1/8	3 3/8						
2 1/2	2 15/32	2 9/16	2 23/32	2 27/32	3	3 1/16	3 3/8	3 5/8	3 7/8					
3	2 25/32	2 7/8	3 1/32	3 5/32	3 5/16	3 1/2	3 11/16	3 15/16	4 3/16	4 1/2				
3 1/2	3 3/32	3 3/16	3 11/32	3 15/32	3 5/8	3 13/16	4	4 1/4	4 1/2	4 13/16	5 1/8			
4	3 11/32	3 7/16	3 19/32	3 23/32	3 7/8	4 1/16	4 1/4	4 1/2	4 3/4	5 1/16	5 1/8	5 3/4		
5	4 1/32	4 3/8	4 3/32	4 13/32	4 9/16	4 3/4	4 15/16	5 3/16	5 1/16	5 3/4	5 11/16	6 3/16	7 1/8	
6	4 19/32	4 1/2	4 21/32	4 25/32	4 15/16	5 1/8	5 5/16	5 9/16	5 13/16	6 1/8	6 1/16	6 11/16	7 3/8	7 3/4

Minimum space from center of pipe or conduit to nearest obstruction.

1. Dimensions in top row (boxed squares) are centers for conduits of same size.
 Example: How close may 3" conduits be spaced? Answer 4 1/2".
2. Dimensions in gray shaded squares are for centers of conduits NOT of the same size.
 Example: What is the minimum spacing for 2" and 3/4" conduit?
 Read down column marked 3/4" to figure opposite 2" and find dimension is 2 9/32".

Note: Minimum spacing dimensions as shown will give approximately 1/8" clearance between locking nuts.

Conduit hubs

Minimum space from center of pipe or conduit to nearest obstruction

	19/32	11/16	21/32	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 5/16	2 5/8	2 7/8	3 9/16	3 15/16
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FOR BIDDING PURPOSES ONLY



**SCHEDULE 40 & SCHEDULE 80
PVC FITTINGS & ACCESSORIES**

CANTEX offers an all-inclusive line of Schedule 40 & Schedule 80 PVC electrical fittings and accessories. With several decades of experience manufacturing PVC fittings and accessories, you can trust CANTEX to provide quality products.

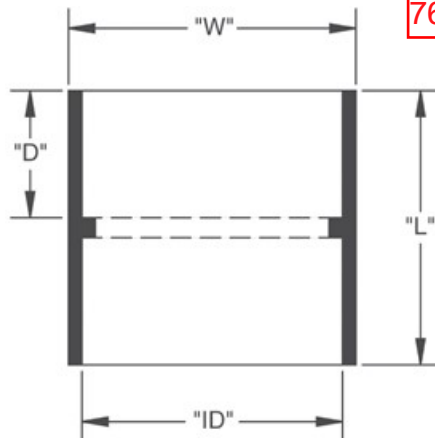
All of our PVC fittings are easy-to-install and offer non-conductivity, high impact, tensile strength, industry certifications, and resistance to a wide range of chemicals, acids and salt. Our schedule 40 & 80 fittings and accessories connect seamlessly with other standard schedule 40 & 80 products making it easy to convert entire electrical infrastructures to PVC.

Standard UL Schedule 40 Center Stop Coupling



Schedule 40 Standard Center Stop Couplings are used to join lengths of conduit pipe together with two solvent weld socket ends.

- For use with Schedule 40 and Schedule 80 conduit
- Center stop to help determine proper depth of connection
- For use aboveground and underground and non-conductive & sunlight resistant
- Meets NEMA TC-3 Standards
- UL and CSA listed
- Made in USA



Part Number	Trade Size	Carton Qty.	"W"	"L"	"ID"	"D"
6141623	1/2	200	1.063	1.500	.875	.625
6141624	3/4	125	1.313	1.563	1.063	.625
6141625	1	70	1.625	2.000	1.313	1.000
6141626	1-1/4	40	2.000	2.125	1.688	1.000
6141627	1-1/2	30	2.250	2.375	1.938	1.063
6141628	2	40	2.688	2.600	2.375	1.192
6141629	2-1/2	20	3.250	3.500	2.875	1.750
6141630	3	40	4.000	3.875	3.500	1.188
6141631	3-1/2	30	4.1250	4.000	4.000	1.938
6141632	4	20	5.000	4.188	4.500	2.000
6141633	5	10	6.125	5.375	5.625	2.500
6141634	6	8	7.250	6.375	6.625	3.000
* 6141635D	8	1	9.313	13.000	8.625	5.000

* Not UL Listed

Dimensions are nominal



Cap: 1 1/2 in Fitting Pipe Size, Schedule 40, Female Socket, 330 psi, White

Item 22FJ28 Mfr. Model 447015

Compare

Product Details

Catalog Page [2810](#)

Basic Fitting Shape **Cap**

Specific Fitting Shape **Cap**

Nominal Pipe Size **1-1/2 in**

Schedule **Schedule 40**

Temp. Range **0° to 140° F**

Color **White**

Standards **NSF 14; NSF 61**

Brand **GRAINGER APPROVED**

Pipe Fitting Material **PVC**

Application **Potable Water**

Fitting Connection Type **Female Socket**

For Pipe Schedule **40**

Includes Pre-Applied Thread Sealant **No**

Includes Seal **No**

Low Lead Certified Standard **NSF 61; NSF 14**

Outside Diameter **2-3/16 in**

Overall Length **2 in**

Displayed Brand **GRAINGER APPROVED**

Manufacturer Part Number **447015**

750

Web Price

\$1.39 / each

Qty

Add to Cart

Ship

Pickup

Expected to arrive **Fri. Aug 11.**

Ship to **83835** | [Change](#)

Shipping Weight **0.1 lbs**

[Ship Availability Terms](#)

[Add to List](#)

Compliance & Restrictions

This product has been certified by a third party to be compliant with the "Safe Drinking Water Act" requirements for low lead in potable (human consumption - drinking and cooking) and non-potable water applications (non-human consumption).

Green Product - This item has been designated by the manufacturer as an environmentally preferable product (EPP) because this item is NSF(R) Certified (Sustainability or Environmental Standard).

FOR BIDDING PURPOSES ONLY

[Chat with an Agent](#)

Maximum Operating Pressure 330 psi

UNSPSC 40142310

Country of Origin USA (subject to change)

Product Description

Socket x socket Schedule 40 fittings, also called slip or hub fittings, include socket ends on all fitting connection ends. The socket ends fit over the end of a PVC pipe and require glue or adhesive to secure the connection. Schedule 40 fittings have thinner walls than Schedule 80.

750

FOR BIDDING PURPOSES ONLY



**Cap: 1 in Fitting Pipe Size,
Schedule 40, Female
Socket, 450 psi, White**

Item 22FJ32 Mfr. Model 447010BC

Compare

Product Details [Catalog Page 2810](#)

Basic Fitting Shape **Cap**

Specific Fitting Shape **Cap**

Nominal Pipe Size **1 in**

Schedule **Schedule 40**

Temp. Range **0° to 140° F**

Color **White**

Standards **NSF 14; NSF 61**

Brand **GRAINGER APPROVED**

Pipe Fitting Material **PVC**

Application **Potable Water**

Fitting Connection Type **Female Socket**

For Pipe Schedule **40**

Includes Pre-Applied Thread Sealant **No**

Includes Seal **No**

Low Lead Certified Standard **NSF 61; NSF 14**

Outside Diameter **1-9/16 in**

Overall Length **1-11/16 in**

Displayed Brand **GRAINGER APPROVED**

Manufacturer Part Number **447010BC**

Maximum Operating Pressure **450 psi**

751

Web Price

\$0.91 / each

Qty
1

Add to Cart

Ship

Pickup

Expected to arrive **Fri. Aug 11.**

Ship to **83835** | [Change](#)

Shipping Weight **0.05 lbs**

[Ship Availability Terms](#)

[Add to List](#)

Compliance & Restrictions

This product has been certified by a third party to be compliant with the "Safe Drinking Water Act" requirements for low lead in potable (human consumption - drinking and cooking) and non-potable water applications (non-human consumption).

Green Product - This item has been designated by the manufacturer as an environmentally preferable product (EPP) because this item is NSF(R) Certified (Sustainability or Environmental Standard).

FOR BIDDING PURPOSES ONLY

[Chat with an Agent](#)

UNSPSC 40142310

Country of Origin **USA** (subject to change)

Product Description

Socket x socket Schedule 40 fittings, also called slip or hub fittings, include socket ends on all fitting connection ends. The socket ends fit over the end of a PVC pipe and require glue or adhesive to secure the connection. Schedule 40 fittings have thinner walls than Schedule 80.

751

FOR BIDDING PURPOSES ONLY

Exhibit D - CABLE, WIRE AND CONDUIT LISTS

ATHOL SUBSTATION
CONDUIT LIST

CONDUIT SCHEDULE - BREAKER UPGRADE					
RUN #	SIZE & TYPE	SUBGRADE RISER	STRUCTURE RISER	FROM	TO
27	3" PVC SCH 40		3" RIGID	STA. SERV. TRANSF. #2	SERVICE DISCONNECT
28	3" PVC SCH 40		3" RIGID	SERVICE DISCONNECT	VAULT #3
29	2" PVC SCH 40		2" RIGID	VAULT #3	FIBER OPTIC J-BOX
30	1" PVC SCH 40		1" RIGID	VAULT #3	FIBER OPTIC J-BOX
31	3" PVC SCH 40			TWACS TRANSF. H.V. COMP.	STA. SERV. TRANSF. #2
32	4" PVC SCH 80			VAULT #2	VAULT #3
33	4" PVC SCH 80			VAULT #2	VAULT #3
34	4" PVC SCH 80			VAULT #2	VAULT #3
35	4" PVC SCH 80			VAULT #2	VAULT #3
36	4" PVC SCH 80			VAULT #2	VAULT #3
37	4" PVC SCH 80			VAULT #2	VAULT #3
38	3" PVC SCH 80			VAULT #3	BRK #801252
39	3" PVC SCH 80			VAULT #3	BRK #801352
40	3" PVC SCH 80			VAULT #3	BRK #801452
41	3" PVC SCH 80			VAULT #3	BRK #801552
42	2" PVC SCH 80			VAULT #3	BRK #801252
43	2" PVC SCH 80			VAULT #3	BRK #801352
44	2" PVC SCH 80			VAULT #3	BRK #801452
45	2" PVC SCH 80			VAULT #3	BRK #801552
46	2" PVC SCH 80			VAULT #3	BRK #801252
47	2" PVC SCH 80			VAULT #3	BRK #801352
48	2" PVC SCH 80			VAULT #3	BRK #801452
49	2" PVC SCH 80			VAULT #3	BRK #801552
50	1-1/2" PVC SCH 80			VAULT #2	LIGHTING CONTROL #1 J-BOX
51	3" PVC SCH 40			VAULT #2	6' EAST OF BLDG, CAP
52	3" PVC SCH 40			VAULT #2	6' EAST OF BLDG, CAP
53	1-1/2" PVC SCH 80			VAULT #2	STATION LIGHT #5 J-BOX
54	1-1/2" PVC SCH 80			STATION LIGHT #5 J-BOX	STATION LIGHT #6 J-BOX
55	1-1/2" PVC SCH 80			STATION LIGHT #6 J-BOX	STATION LIGHT #7 J-BOX
56	1-1/2" GRS			STATION LIGHT #5 J-BOX	STATION LIGHT #5
57	1-1/2" GRS			STATION LIGHT #6 J-BOX	STATION LIGHT #6
58	1-1/2" GRS			STATION LIGHT #7 J-BOX	STATION LIGHT #7
59	1-1/2" PVC SCH 80			VAULT #2	CAMERA PULLBOX #1
60	1-1/2" PVC SCH 80			CAMERA PULLBOX #1	CAMERA PULLBOX #2
61	1-1/2" PVC SCH 80			CAMERA PULLBOX #2	CAMERA PULLBOX #3
62	1-1/2" PVC SCH 80			CAMERA PULLBOX #1	CAMERA POLE #1
63	1-1/2" PVC SCH 80			CAMERA PULLBOX #2	CAMERA POLE #2
64	1-1/2" PVC SCH 80			CAMERA PULLBOX #3	CAMERA POLE #3
65	1-1/2" PVC SCH 80			VAULT #3	CAMERA POLE #4
66	2" PVC SCH 80			CAMERA PULLBOX #4	CAMERA POLE #4
67	2" SCH. 80 PVC	2" SCH. 80 PVC	NA	SOUTH RISER POLE	ATS/MTS WIRE TROUGH
68	3" SCH. 80 PVC	NA	NA	ATS/MTS WIRE TROUGH	VAULT #2
69	1" SCH. 80 PVC	NA	NA	MAINT. TRAILER AC PLUG 2	VAULT #1
70	3" SCH. 80 PVC	NA	NA	ATS/MTS WIRE TROUGH	VAULT #2
71	2" SCH. 80 PVC	2" SCH. 80 PVC	NA	SOUTH RISER POLE	VAULT #2
72	3" SCH. 80 PVC	NA	NA	ATS/MTS WIRE TROUGH	VAULT #2
73	3" SCH. 80 PVC	NA	NA	VAULT #1	VAULT #2
74	3" SCH. 80 PVC	NA	NA	VAULT #1	VAULT #2
172	1" SCH. 40 PVC	NA	NA	GENERATOR PLUG	CABLE WIREWAY
173	3" SCH. 40 PVC	NA	NA	SEC. SERVICE DISCONNECT SWITCH	CABLE WIREWAY
174	3" SCH. 40 PVC	NA	NA	SEC. SERVICE DISCONNECT SWITCH	CABLE WIREWAY
175	1" SCH. 40 PVC	NA	NA	BATT. TRAILER AC PLUG	CABLE WIREWAY
176	1" SCH. 40 PVC	NA	NA	MAINT. TRAILER AC PLUG 1	CABLE WIREWAY
177	2" SCH. 40 PVC	NA	NA	CONTROL HOUSE BATT. BACKUP PLUG	CABLE WIREWAY
178	3" SCH. 40 PVC	NA	NA	STATION SERVICE DISCONNECT SWITCH	CABLE WIREWAY

FOR BIDDING PURPOSES ONLY

ATHOL SUBSTATION CONDUIT LIST

179	3" SCH. 40 PVC	NA	NA	STATION SERVICE DISCONNECT SWITCH	CABLE WIREWAY
180	3" EMT	NA	NA	AC MTS	CABLE WIREWAY
181	3" EMT	NA	NA	AC ATS	CABLE WIREWAY
182	1" EMT	NA	NA	HYDROGEN DETECTOR	CABLE TRAY
183	2" EMT	NA	NA	SUBSTATION BATT. BANK	DC MTS
184	3" EMT	NA	NA	DC MTS	CABLE WIREWAY
189	3" EMT	NA	NA	AC MTS	AC ATS
190	3" EMT	NA	NA	AC MTS	CABLE WIREWAY
191	3" EMT	NA	NA	DC MTS	CABLE WIREWAY

- CONTRACTOR SUPPLIED
- CONTRACTOR TO MODIFY EXISTING CONDUIT
- KEC TO REUSE EXISTING CONDUIT IF POSSIBLE

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**ATHOL SUBSTATION
WIRE LIST**

CABLE NO.	CABLETYPE	COND.NAME		FROM			TO		FUNCTION
			COLOR	DEVICE	TERM.	TERM.	DEVICE		
C100	1-2 Conductor #10 CU	P	RD	48 VDC POWER PANEL	Brk 9	TB-1	801352 Breaker	48V DC to Breaker	
		G	BK		Bkr 11	TB-2			
C101	1-3 Conductor #10 CU	L1	BK	120/240 VAC POWER PANEL	Brk 10	TB-35	801352 Breaker	120V AC to Breaker	
		N	WH		Neutral	TB-36			
		L2	RD		Capped	Capped			
C102	1-4 Conductor #10 CU	A Ø	RD	RACK 3 TB	TB-1	TB2X-X2	801352 Breaker	Breaker Source Side CTs to Rack 3	
		B Ø	OR		TB-2	TB4X-X2			
		C Ø	BL		TB-3	TB6X-X2			
		COM	BK		TB-4	TB2X-X4			
C103	1-12 Conductor #10 Cu	Trip 1+	BK	Rack 3 TG	TG-1	TB-93	801352 Breaker	Breaker Controls and Logic	
		Trip 1-	RD		TG-2	TB-94			
		Trip 2+	BL		TG-3	TB-123			
		Trip 2-	OR		TG-4	TB-124			
		Close +	YL		TG-5	TB-87			
		Close -	BR		TG-6	TB-88			
		801352 Opened	RD/BK		TG-7	TB-58			
		801352 Closed	BL/BK		TG-8	TB-16			
		801352 Status	OR/BK		TG-9	TB-98			
		Spring Discharge +	YL/BK		TG-10	TB-3			
		Spring Discharge -	BR/BK		TG-11	TB-23			
		Loss of DC -	BL/RD		TG-12	TB-106			
		C106	1-2 Conductor #10 CU		P	RD			48 VDC POWER PANEL
G	BK			Bkr 12	TB-2				
C107	1-3 Conductor #10 CU	L1	BK	120/240 VAC POWER PANEL	Brk 11	TB-35	801452 Breaker	120V AC to Breaker	
		N	WH		Neutral	TB-36			
		L2	RD		Capped	Capped			
C108	1-4 Conductor #10 CU	A Ø	RD	Rack 3 TC	TC-1	TB2X-X2	801452 Breaker	Breaker Source Side CTs to Rack 3	
		B Ø	OR		TC-2	TB4X-X2			
		C Ø	BL		TC-3	TB6X-X2			
		COM	BK		TC-4	TB2X-X4			
C109	1-12 Conductor #10 Cu	Trip 1+	BK	Rack 3 TH	TH-1	TB-93	801452 Breaker	Breaker Controls and Logic	
		Trip 1-	RD		TH-2	TB-94			
		Trip 2+	BL		TH-3	TB-123			
		Trip 2-	OR		TH-4	TB-124			
		Close +	YL		TH-5	TB-87			
		Close -	BR		TH-6	TB-88			
		801452 Opened	RD/BK		TH-7	TB-58			
		801452 Closed	BL/BK		TH-8	TB-16			
		801452 Status	OR/BK		TH-9	TB-98			
		Spring Discharge +	YL/BK		TH-10	TB-3			
		Spring Discharge -	BR/BK		TH-11	TB-23			
		Loss of DC -	BL/RD		TH-12	TB-106			
		C112	1-2 Conductor #10 CU		P	RD			48 VDC POWER PANEL
G	BK			Bkr 16	TB-2				
C113	1-3 Conductor #10 CU	L1	BK	120/240 VAC POWER PANEL	Brk 12	TB-35	801552 Breaker	120V AC to Breaker	
		N	WH		Neutral	TB-36			
		L2	RD		Capped	Capped			
C114	1-4 Conductor #10 CU	A Ø	RD	Rack 3 TD	TD-1	TB2X-X2	801552 Breaker	Breaker Source Side CTs to Rack 3	
		B Ø	OR		TD-2	TB4X-X2			
		C Ø	BL		TD-3	TB6X-X2			
		COM	BK		TD-4	TB2X-X4			
C115	1-12 Conductor #10 Cu	Trip 1+	BK	Rack 3 TI	TI-1	TB-93	801552 Breaker	Breaker Controls and Logic	
		Trip 1-	RD		TI-2	TB-94			
		Trip 2+	BL		TI-3	TB-123			
		Trip 2-	OR		TI-4	TB-124			
		Close +	YL		TI-5	TB-87			
		Close -	BR		TI-6	TB-88			
		801552 Opened	RD/BK		TI-7	TB-58			
		801552 Closed	BL/BK		TI-8	TB-16			
		801552 Status	OR/BK		TI-9	TB-98			
		Spring Discharge +	YL/BK		TI-10	TB-3			
		Spring Discharge -	BR/BK		TI-11	TB-23			
		Loss of DC -	BL/RD		TI-12	TB-106			

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Exhibit E - DRAWINGS

APPENDIX A – SIEMENS SDV7 BREAKER MANUAL

APPENDIX B – HAZARD INFORMATION

APPENDIX B. HAZARD INFORMATION

Contractor acknowledges that work performed on Kootenai Electric Cooperative, Inc.’s (KEC or Owner) electrical distribution system may involve hazards. This document details characteristics of KEC’s installation that are related to the safety of the work to be performed and are listed in OSHA regulation 1910.269(a)(4)(i) through (a)(4)(v).

Minimum Clearance Distances of energized lines or equipment from conductive equipment or materials for non-qualified electric workers performing work near energized lines or equipment.

**Safe working distances when working near energized lines or equipment
(for non-qualified electrical workers)**

Line or Substation Voltages (kV)	Minimum clearance distances non-qualified electric workers. (from OSHA crane standard tables)
15 kV (AC) 25 kV (AC)	10 feet (up to 50kV)
115 kV (AC)	15 feet (50 – 200 kV)

Induced Voltage/Accidental Energization Potential: Prior to commencing Work, Contractor and KEC will meet to review current infrastructure as well as adjacent energized circuits parallel to the line under construction (i.e., double circuit distribution lines/overbuild/underbuild) and any other energized lines crossing the line under construction.

Maximum Per-Unit Transient Over Voltages: No later than April 1, 2015, for voltages over 72.5 kilovolts, the employer shall, through an engineering analysis or assume a maximum anticipated per-unit transient voltage, phase-to-ground, in accordance with Table R-9.

Table R-9 – Assumed Maximum Per-Unit Transient Overvoltage

Voltage range (kV)	Type of current (ac or dc)	Assumed maximum per-unit transient overvoltage
72.6 to 420.0	ac	3.5
420.1 to 550.0	ac	3.0
550.1 to 800.0	ac	2.5
250 to 750	dc	1.8

Minimum Approach Distances of energized lines or equipment from conductive equipment or materials for qualified electrical workers.

- KEC uses WAC 296-45-325 table 2 for AC live work minimum approach distance.

AC Live Work Minimum Approach Distance

Voltage	Phase-to-Ground Exposure	Phase-to-Phase Exposure
15.1- 36 kV	2.7 feet	3.0 feet
72.6 – 121 kV	3.9 feet	4.8 feet

Condition of Protective Grounds and Equipment Grounding Conductors - Minimum Requirements:

- Protective ground sizing for line or substation:
 - 1/0 protective grounds for underground distribution
 - 2/0 protective grounds for distribution
 - 2/0 protective grounds for transmission
 - 2/0 protective grounds for all substations

Protective Clothing Requirements - Minimum Requirements:

- Arc flash incident energy rating: 8 calorie/cm² rated clothing

Contractor and KEC will also review relevant conditions that could affect work safety, including:

- Condition of protective grounds (if applicable).
- Are equipment grounds intact?
- Rejected poles or poles believed unsafe to climb (if known).
- Potential landowner concerns (if known).

KEC discloses the following common hazards that may be present on its system. Contractor acknowledges these are common hazards and list is not all-inclusive:

- Two-piece insulators
- Chance cutouts
- Woodpecker holes
- Poles damaged by ants
- Bad wood pole markings
- 6 Position mod cabinets with potential bad bus work
- Locations with copper weld wire
- Locations with #6 Copper
- 25 KV non Posi load break caps
- 10 kV & 18 kV Lightning arrestors

Contractor Requirements: Contractor shall advise KEC of any unique or unanticipated hazardous conditions found during the Work that KEC did not disclose and/or any other information regarding work safety. Reports shall be made in writing to KEC's contract representative within 2 working days following discovery

CONTRACTOR CERTIFICATION

Contractor certifies all of Contractor's employees, sub-contractors and others under its management or supervision have been appropriately trained prior to reporting to work and that Contractor is in compliance with regulatory and utility safety and health requirements. Contractor certifies it has received and understood this hazard information.

Contractor Name

Signature

Printed Name

Title

Date

This information is provided in accordance with OSHA's information sharing provision under the 1926 Subpart V and 1910.269 regulations for electric generation, transmission & distribution regulations.