Tres Piedras Waterline Replacement

SPECIFICATIONS

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References

New Mexico Administrative Code (NMAC)
https://www.srca.nm.gov/nmac-home/nmac-titles/

Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG)
https://www.fs.usda.gov/sites/default/files/FSORAG-2013-Update.1.pdf

Architectural Barriers Accessibility Act Standards (ABAAS)

https://www.access-board.gov/files/aba/ABAstandards.pdf

Overview of the asbestos "National Emission Standards for Hazardous Air Pollutants" (NESHAP)
https://www.epa.gov/asbestos/overview-asbestos-national-emission-standards-hazardous-air-pollutants-neshap

SECTION 01100
SUMMARY OF WORK

PART 1 - GENERAL

1.1 Project Information

A. Project Title: Tres Piedras Waterline Replacement

B. Location:

From the Carson National Forest Supervisors Office: Drive West on Cruz Alta Rd. to State Road 68. Proceed North along HWY 68 (merges with US HWY 64). Remain on HWY 64 and proceed to Tres Piedras NM. Continue West along HWY 64, Tres Piedras Ranger District Office will be on the right-hand side of the road.

Approximate GPS Location: 36.65115, -105.97363

Well Site: From the Tres Piedras Ranger District Office: Drive West on HWY 64 towards Tierra Amarilla Proceed West for approximately 1.4 miles Forest Service Road 64H will be located to the left. Continue along Forest Service Road 64H for .15 mile at the intersection turn left, follow this Forest Service Administration Road. The Tres Piedras Well site will be located on the left-hand side.

Approximate GPS Location: 36.6466970, -105.9929817

1.2 Summary

A. Work for this project requires the Contractor to be responsible for supplying all labor, materials, equipment, freight and delivery, and all necessary valid licenses and permits required to complete the following:

1. Tres Piedras Waterline Replacement (non-sequential order of work objectives, bid options are specified in the SOW)
   a. Remove and dispose of both fire & yard hydrants as shown on the drawings.
   b. Trench & install 4' deep, (+/-) 10,009 ft. of 2" HDPE water line from the existing well to a new pump house and throughout the existing district compound to supply multiple facilities. Included in this work will be the installation of multiple shutoff valves, air release valves, fire & yard hydrants, HDPE pipe fittings to include TEE's and 4-way crosses, PVC caps etc. Reference drawings and Schedule of Items for further details.
   c. Construct a 170 sq. ft. concrete block utility building.
   d. Provide & Install water system accessories in the utility building, including a 2,500 gallon water storage tank, water level controls, a wireless pump control

system, pressure tank, electrical panel box and wiring, plumbing, pressure boosting pump, chlorinator assembly, valves, drains, and other accessories.

e. Install 200 Amp panel and underground electric service from the transformer to the new utility building house.

1.3 General Site Conditions and Weather

A. The elevation of the associated sites ranges between 8,000 and 8,500 feet. In the summer, average high temperatures are in the 70's and 80's. As is typical in the northern New Mexico mountains, frequent afternoon thunderstorms can be expected during the monsoon season from June thru September.

1.4 Meals and Lodging

A. The nearest town with restaurants or lodging is Taos NM, (+/-) 32 miles away from the project site. A small local restaurant is available in Tres Piedras, scheduling is unknown.

1.5 Camping

A. With approval by the Tres Piedras Ranger District, National Forest Service lands may be used by the Contractor to have one fully contained recreation vehicle which may remain at these sites for security & convenience.

1.6 Work Restrictions

A. Contractor's Use of Premises: During construction, Contractor will have full use of project site.

1. Perform construction only during normal working hours (8 AM to 5 PM) Monday thru Friday, other than any/all Federally Observed holidays), unless otherwise agreed upon and formally documented by the Contracting Officer (further denoted as CO).
2. Limits: Limit site disturbance, including earthwork and clearing of vegetation. A 10-foot clearing limit to either side of the new waterline shall be permitted if deemed critically necessary for health and safety purposes or adherence to contract drawings and/or specifications. Similarly, a 20-foot clearing limit shall be permitted beyond utility building perimeter if deemed critically necessary for health and safety purposes or adherence to contract drawings and/or specifications. Clearing beyond the limits provided shall be agreed upon and formally documented by the District Ranger, Contracting Officer Representative (further denoted as COR) and CO.
3. Driveways, Walkways, and Entrances: All access routes including US Forest service System Roads, sidewalks, and trails must remain passable. Administrative roads shall also remain clear unless otherwise agreed upon and formally documented by the District Ranger, COR and CO.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01103
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 Requirements:

A. Measurement and payment for contract work will be made only for and under those pay items included in the SCHEDULE OF ITEMS. All other work and materials will be considered incidental to and included in the payment of the pay items in the SCHEDULE OF ITEMS.

1.2 Measurement Terms and Definitions:

A. Unless otherwise specified, the following terms are defined as follows:

B. Each. One entire unit. The quantity is the actual number of units completed and accepted.

C. Linear foot (LF). As applicable, measure the work along its length from end-to-end; parallel to the base or foundation; along the top; along the front face; or along the invert. Do not measure overlaps.

D. Lump sum (LS). Do not measure directly. The bid amount is complete payment for all work described in the contract and necessary to complete the work for that item. The quantity is designated as *"1."* Estimated quantities of lump sum work shown in the contract are approximate.

E. Actual Quantity Clause. Actual quantities (AQ) are defined as the quantity of a certain material that was physically installed. This quantity will be measured by the CO during or upon completion of the project. The Federal Government will only pay for the amount of material installed at the awarded rate noted in the contractors bid. If the contractor can show that this measurement is greater than what is stated in the contract, notify the COR to determine a resolution with the Contracting Officer.

1.3 Units of Measurement

A. Payment will be by units defined and determined according to U.S. Standard measure.

END OF SECTION 01103

SECTION 01110
SUBMITTALS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. It is the Contractor's responsibility to submit all items with such promptness as to cause no delay in the work. Approvals must be obtained before starting work involving the item. Contractor shall allow 10 days for processing of submittals by the Government. If a submittal is rejected, a resubmittal is required, and the time for review is restarted.

B. Submit all design submittals in electronic PDF format to the COR.

C. Though contract work cannot begin prior to the issuance of the Notice to Proceed, contractor can begin ordering materials that have been approved through the submittal process.

1.2 MANUFACTURER'S LITERATURE AND SHOP DRAWINGS

A. Submit 1 copy to the COR for approval on the items required herein.

B. The following format shall be used:

1. The specifications and salient qualities of the submittal item.
2. Shop drawings

1.3 SUBMITTALS ARE REQUIRED FOR THE FOLLOWING:

A. Waterline and associated water distribution components such as valves, hydrants etc.

B. Demolition and construction schedules

C. Landfill ticket(s) from building demolition

D. NESHAP Permit for asbestos removal work.

E. Concrete mix in conformance with SECTION 03301.

F. Material data sheets including but not limited to: soil proctors, compaction curves, compaction test results etc.

G. Provide quality control measures of overall construction with submissions of photos/videos demonstrating the project is complying with all specifications and regulations. Submit to the COR and CO as requested.

H. Certificates executed by the manufacturer, supplier, or vendor, stipulating that all commercial items, such as metal roofing, wood finish, concrete mix design, meet applicable requirements shown on the drawings or stated in the specifications.

I. As-Built Drawings to show any changes during construction.

J. O&M Manuals for equipment in pump house.

K. Notarized Affidavit for Certification of Disinfection of Water Facilities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01110

SECTION 01601
MOBILIZATION

PART 1 - GENERAL

1.1 Description

A. This work shall consist of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site, and for all other work and operations that must be performed or that cause costs to be incurred prior to beginning work on the various items on the project site.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement

A. Contractor can request payment for performance and payment bonds. The amount of the premium, including coinsurance and reinsurance agreements, will be paid upon reciept of evidence of full payment to the surety. When separate payment for bonding cost is made, the bonding cost will be subtracted from the total contract amount for this pay item and the balance paid in accordance with the progress payment schedule outlined below.

1. When 5 percent or more of the original contract amount is earned from other pay items, 50 percent of the amount for mobilization, or 5 percent of the original contract amount, whichever is less, will be paid.

2. When 10 percent or more of the original contract amount is earned from other pay items, 100 percent of the amount for mobilization, or 10 percent of the original contract amount, whichever is less, will be paid.

3. Upon completion of all work on the project, any unpaid amount for mobilization will be paid.

4. Mobilization is considered to be incedental to the entirety of the project. Additional payments will not be made for each location.

B. Any bonding costs in excess of the total contract amount of this pay item will be paid under one or more other pay items under this contract as determined by the Contracting Officer. In no circumstance will the total amount of this contract be increased as a result of bonding costs exceeding the total contract amount of this pay item. The total of all payments shall not exceed the original contract amount for this item.

C. Payment: Payment will be made at the contract unit price as designated in the Schedule of Items.

Description	Pay Unit
01601(01)	LS

END OF SECTION 01601

SECTION 01710
CLEANING

PART 1 - GENERAL

1.1 Description

A. Throughout the construction period, maintain the construction site and facilities in an orderly and clean manner as described in this Section.

PART 2 - PRODUCTS

2.1 Cleaning Materials and Equipment

A. Provide required personnel, equipment and materials as needed to maintain the specified standard.

2.2 Compatibility

A. Use only the cleaning materials and equipment, which are compatible with the surface being cleaned, as recommended by the manufacturer of the cleaning material.

PART 3 - EXECUTION

3.1 Progress Cleaning

A. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
B. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this work.
C. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

3.2 Site

A. Daily, and more often, if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
B. Always maintain the site in a neat and orderly condition.
C. Clean mud and debris from roadways or highways adjacent to the project site daily.

3.3 Equipment

A. Cleaning of Off-Road Equipment used by the Contractor for contract work shall be conducted outside the boundary of any National Forest Service land prior to moving each piece of equipment onto the project. The Contractor shall notify the Forest Service prior

to moving each piece of equipment onto the project. Upon request from the Forest Service, an arrangement will be made for Forest Service to inspect each piece of equipment prior to it being placed into service. The Contractor shall use cleaning methods necessary to ensure equipment is free of all attached mud, dirt, and plant parts. If noxious weeds are present at a project site, cleaning may also be required before moving between locations within the same project. These measures will assist to prevent the introduction/spread of the seeds of noxious weeds onto National Forest land. The Contractor shall certify in writing, compliance with the above requirements. "Off-road Equipment" includes all machinery other than log truck, chip vans, pickup trucks or vehicles used to transport personnel daily.

3.4 Structure

A. At least weekly, inspect the structures and pick up all scrap, debris and waste material and remove them to the place designated for their storage.

B. “Clean” for the purpose of this paragraph shall be interpreted as meaning free from material capable of being removed by reasonable effort with a handheld broom.

3.4 Final Cleaning

A. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.

B. Final cleaning of the project site shall be approved by the Forest Service prior to final acceptance of the work.

END OF SECTION 01710

SECTION 02419
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 Section Requirements

A. The demolition work includes the following:
   a. Abandon in place the associated water lines as shown in the drawings.
   b. Remove existing fire/yard hydrants as noted in the drawings.
   c. Remove existing air valves.

PART 2 - PRODUCTS

2.1 Performance Requirements

A. Comply with OSHA regulations regarding trenches.

PART 3 - EXECUTION

3.1 Demolition

A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities shown on the drawings. Verify with COR location of capped utilities.
   1. Arrange to shut off indicated utilities with utility companies. (NOT APPLICABLE)
   2. Yard hydrants may be cut flush a minimum of 6” below existing grade, capped and abandoned in place.
   3. Fire hydrants shall be completely removed, and supply line shall be capped and abandoned in place at the depth of the existing waterline. This depth is assumed to be 4’-00”.
   4. Existing air valves are Tee’d off main supply line as shown in the drawings. They are enclosed in CMP culverts and shall be completely removed, new air valves may be installed in same location, but all existing components shall be removed. Existing CMP’s shall be considered salvageable and may be repurposed in this project with approval by COR. If not used then they shall be returned to the Forest Service and stored in an approved location per COR.

B. Payment: Payment will be made at the contract unit price as designated in the Schedule of Items for the pay item 02149(01).

Pay Item	Pay Unit	Description
02419(01)	Ea.	Demolition of Yard Hydrants
02419(02)	Ea.	Demolition of Fire Hydrants
02419(03)	Ea.	Demolition of Air Valves

END OF SECTION 02419

SECTION 02450
EXCAVATION, BACKFILL AND COMPACTION FOR UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies all trenching required to install utility lines in this contract.

PART 2 – PRODUCTS

2.1 BACKFILL

A. General backfill shall be excavated material containing no unsuitable material or rocks greater than 6" in size.

B. Designated Backfill shall be either native material with all rocks over 2" removed.

C. Bedding Material shall be1/4 inch minus crusher fines or sand; 100% passing the #4 sieve.

2.2 IDENTIFICATION TAPE

A. Electrical lines –plastic, 2" wide min., nondetectable

B. Water lines –2" wide, foil backed, detectable

C. Sewer Lines - 2" wide, foil backed, detectable (NOT APPLICABLE)

C. Each tape will bear an appropriate message warning of the utility being protected and colors as follows:

1. UG Electric.....Red
2. Water lines...……Blue
3. Sewer.....…Green

PART 3 – EXECUTION

3.1 GENERAL

A. UNDER NO CIRCUMSTANCES shall trenches be cut across existing roads until location is approved by COR.

B. Where multiple contract utilities are shown adjacent to one another on the drawings, they shall be installed in the same trench as shown on the typical sections. (NOT APPLICABLE)

C. Utility alignment may deviate slightly from the plans where advantageous to minimize clearing. Deflection of pipes or conduits shall not exceed the manufacturer's recommendations. Deviation in excess of 3 feet either way from centerline shall be approved by COR prior to trenching.

3.2 TRENCHING

A. Trenches shall be excavated through any or all materials, including rock. All excavation is considered unclassified.

B. If the bottom of any excavation is taken out beyond the limits shown on the plans without consultation and approval by COR, it shall be refilled at the contractor's expense with an acceptable material compacted to the density of adjacent undisturbed material. Soil proctors for adjacent material and associated compaction tests will be at the contractors expense.

C. The contractor shall take all precautions to assure that water does not accumulate in trenches while utility lines are being installed.

D. Contractor shall not remove the existing waterline along areas of new installation unless otherwise stated in the drawings. The approximate location of the existing waterlines is shown on the Drawings. See site plans. The Contractor is responsible for the disposal of the old waterline materials if applicable.

3.3 BACKFILLING

A. Any pipe damaged by backfill operations shall be replaced with new pipe, at Contractor's expense. All trenches shall be mounded 3-4" above natural grade to complete the backfilling operation.

B. Identification tape shall be buried approximately 12" below finished grade, directly above and run continuously above all utilities. Where two or more different utilities are run in the same trench, all types of warning tape shall be installed.

C. Trenches which are left open over night shall be covered with plywood and fenced with orange construction fencing.

D. Backfilling shall not be performed on any section of trench without prior approval by the COR.

3.4 BASE COURSE GRADING REQUIREMENTS

A. Base course gradation requirements shall conform to section 02520.

3.5 BASE COURSE COMPACTION

A. See section 3.6 for maximum compaction levels. (1) compaction test must be completed for associated backfill on the waterline (representative of compaction of buried electric lines as well). Additionally base course used for road patching will require the same level of compaction and a minimum of (1) compaction test & base course used for the utility building will require (1) compaction test. Compaction effort required to achieve the specified percentage will be noted by COR and shall be carried out for the duration of the project. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be of any type, provided they are capable of compacting each lift of material as specified.

C. The surface of each layer shall be bladed during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, the density of each layer will be determined in accordance with AASHTO T

191, T 205 or T 238; T 217, T 239 or T 255; and T 224. Corrections for coarse particles will be made in accordance with AASHTO T 99, Note 7.

NOTE: For the portion of the water utility that is to be concrete encased per the drawings, contractor shall collect (1) soil proctor for the subgrade/native material and (1) compaction test representative of the entire section of encasement. Subgrade/native soil for this particular section shall be compacted to a minimum of 95 percent of the maximum dry density per the native soil proctor. All other subgrade compaction required throughout the project shall adhere to the compaction effort required to achieve compaction in this particular section of the utility trench.

3.6 COMPACTION METHODS

A. Base course aggregate shall be moistened or dried to a uniform moisture content suitable for compaction. Placement shall be in maximum six inch (6") lifts. Rollers shall be operated over the full width of the layer and shall be compacted to a density of at least 95 percent of the maximum dry density, as determined by AASHTO T 99, Method C or D.

B. The crusher fines surface course shall be laid over compacted reprocessed aggregate and compacted using a vibration plate compactor or other suitable compaction method as approved by the COR. Water shall be used to maintain optimum moisture during compaction.

3.7 PAVEMENT SURFACE COURSE REPAIR: (**NOT APPICABLE)**

A. Provide 3-inch minimum depth cold mix asphalt for repair of utility trenches.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to 02500(01) line item for water utilities and 16400(01) line item for electrical lines in the contract bid schedule.

B. The (4) compaction tests are incidental to other line items per the bid schedule. (3) tests shall be incidental to 02500 (01) and (1) test incidental to 10168(01). The (1) subgrade/native material proctor shall be incidental to 02500 (01).

END OF SECTION 02450

SECTION 02500
WATER UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Buried pipe, fittings, hydrants, valves, appurtenances, and associated accessories for water distribution and transmission lines

B. Operation & Maintenance Plan

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. NSF International:

1. Standard 60 – Drinking Water Treatment Chemicals – Health Effects
2. Standard 61 – Drinking Water System Components – Health Effects
3. 372 – Technical Requirements – Lead Free Products

C. Plastics Pipe Institute (PPI):

1. TR-4 – HDB / HDS / SDB / PDB / MRS Ratings for Thermoplastic Piping Materials or Pipe
2. TR-33 – Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe
3. Handbook of Polyethylene Pipe
4. Material Handling Guide

D. International Plumbing Code (IPC)

E. International Code Council (ICC)

F. Operation & Maintenance Plan Template from New Mexico Environment Department, Drinking Water Bureau.

1.3 SUBMITTALS

A. Submit under provisions of Division 1 Specifications

B. Shop Drawings: Provide piping layout and assembly drawings with fitting dimensions. Provide sufficient information to verify compliance with specifications.

C. Product Data: Provide manufacturer's catalog information with dimensions, material, and assembled weight. Indicate pressure ratings for pipe, fittings, valves.

1. Pipe materials
2. Special, fitting, and coupling details.
3. Joint restraint system

4. Isolation Valves
5. Air valves
6. Valve enclosures
7. Laying and installation schedule
8. Specifications and data sheets
9. Yard Hydrants
10. Fire Hydrants
11. Backflow prevention devices

D. Closeout Submittals
    1. Valve keys – 2
    2. Nut and control wheels from Air Valve Spigot, Each installation

1.4 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of piping mains, valves, connections, and any mapped or unmapped utilities

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

A. Manufacturers shall be experienced in the design and manufacturing of materials specified herein for a minimum period of 5 years unless otherwise specified by COR.

B. All pipe of similar material type, regardless of diameter, shall be supplied by a single manufacturer.

C. Perform Work in accordance with AWWA C651 – Disinfecting Water Mains & AWWA C652 – Disinfection of Water Storage Facilities.

D. Submit notarized Affidavit for Certification of Disinfection of Water Facilities.

E. Contractor shall conduct visual inspection before installation. Subject to COR inspection.

F. Provide manufacturer's name and pressure rating marked on piping and valves

G. Provide piping complete with all fittings, jointing materials, supports, joint restraint system, and necessary appurtenances for watertight, fully operational water lines

1.6 REGULATORY REQUIREMENTS

A. Conform to all Federal and local codes and ordinances.

B. Conform to AWWA C651 & C652, as appropriate for performing the work of this Section.

C. In case of apparent conflict, notify the Contracting Officer.

D. In absence of State and local regulations, International Plumbing Code applies

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1 specifications.

B. Storage
   1. Store pipe, fittings and gaskets in clean locations protected from environmental conditions such as: direct sunlight, mud, etc.
   2. Do not use pipe and fittings stored in direct sunlight for periods in excess of 18 months.
   3. Do not remove valve end protectors unless necessary for inspection; then reinstall for storage.
   4. Protect valves from weather by storing indoors or support valves off ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling
   1. Handle so as to ensure installation in sound undamaged condition
   2. Use equipment, tools, and methods for unloading, reloading, hauling and laying that do not damage pipe or cause an impact. Damaged pipe will be cause for rejection.
   3. Use hooks or straps with broad, well-padded contact surfaces for lifting sections of pipe.

D. Preparation for Transport: Prepare valves, for shipping as follows: Ensure that valves are dry and internally protected against rust and corrosion. Protect valves against damage to threaded ends, flange faces, and weld ends. Set valves in best position for handling. Set valves closed to prevent rattling.

E. Deliver and store valves and accessories in shipping containers with labeling in place in accordance with AWWA C500

F. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

G. Seal valve ends to prevent entry of foreign materials into valve body.

H. During loading, transporting and unloading, exercise care to prevent damage to material.
   1. Use nylon slings only.
   2. Do not drop pipe or fittings.
   3. Do not roll or skid against pipe already on ground.
   4. Repair any damage done to coating or lining.
   5. Handle per manufacturer's recommendations.
   6. Store rubber gaskets in cool dark location.
   7. Store all material on wood pallets or timbers.

I. Adequately tag or otherwise mark all piping, fittings, and valves as to size per AWWA C509, C900, and C905

1.8 JOB CONDITIONS

A. Underground Obstructions

1. Underground Obstructions known to Contracting Officer are shown on Drawings.
   a. Locations shown may prove inaccurate and other obstructions not known to Contracting Officer may be encountered. This will be considered an unforeseen condition and shall treated as such. Consultation between the Contractor, COR and CO will be required.
   b. Contractor shall field locate and verify all obstructions shown on the Drawings. Obstructions not shown on the drawings shall be incorporated in the As-builts.
2. Expose and verify size, location and elevation of underground utilities and other obstructions where conflicts might exist sufficiently in advance to permit changes in the event of a conflict.
   a. Notify Contracting Officer and Government in case of a conflict.
   b. In case of a conflict, the proposed work may be changed by Contracting Officer
3. Maintain, protect, and support by shoring, bracing or other means existing utilities and appurtenances.

PART 2 PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Minimum Working Pressure: 160 psi

2.2 SYSTEM COMPONENTS

A. Gaskets, solvents, cement products, and other materials or components that come into contact with drinking water or water treatment chemicals shall conform to NSF/ANSI 61.

2.3 HDPE DR11 PIPE

A. Manufacturers
   1. Baker Utility
   2. Or approved equal

B. The following piping shall be HDPE DR11 pipe as indicated on Drawings and as specified herein:
   1. Water transmission mains: 2" diameter.
   2. Diameters: Cast iron pipe equivalent outside diameters (NOT APPLICABLE)

C. Material
   1. The pipe shall be manufactured from a PE 4710 resin compound listed with the Plastic Pipe Institute (PPI) as TR-4.
   2. The resin material shall be in accordance with ASTM D3350 with a minimum cell classification of 445574C/E.
   3. This resin material shall have a Long Term Hydrostatic Strength of 1600 PSI when tested in accordance to ASTM D2837.
   4. Pipe dimensions shall be in accordance with ASTM D3035 as a minimum..
   5. The final compounded material shall contain a minimum of 2% carbon black.
   6. The pipe shall contain no recycled material except that generated by the pipe manufacturer in their own plant from resin compound of the same specification and

raw material supplier. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

7. Pipe shall have a manufacturing standard of ASTM F714 and be manufactured by an ISO 9001 certified manufacturer.
8. All pipes and fittings shall be suitable for use as pressure conduits, listed as NSF 14, and per AWWA C906 Pressure Class (PC) 100 have a nominal burst value of three and one-half times the Working Pressure Rating (WPR) of the pipe and/or fitting.
9. The pipe shall be DR11 unless noted otherwise on the Drawings.

D. Fittings
1. All fittings shall be PE 4710 HDPE, minimum Cell Classification of 445574C/E as determined by ASTM D3350 and approved for use by AWWA.
2. All fittings shall be of the same base resin as the pipe.
3. All fittings shall have a working pressure rating equal to the pipe unless otherwise specified in the plans.
4. All fittings shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.
5. Butt Fusion Fittings
   a. Molded butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification.
6. Compression Type Mechanical Coupling
   a. Suitable for joining HDPE to HDPE, HDPE to PVC, or HDPE to DIP
   b. Factory coat coupling internally and externally with a fusion bonded epoxy.
   c. Reinforce HDPE pipe with a split ring type stiffener in pipe bore.
      i) Size stiffeners for size of HDPE pipe being joined.
      ii) Supply feature that prevents stiffener from sliding completely into pipe
      iii) Size stiffeners for length of mechanical coupling and not to extend outside of body of mechanical coupling.
      iv) Mark stiffener with pipe diameter.
      v) Factory coat stiffeners internally and externally with fusion bonded epoxy
   d. Use seal and restraint type coupling. Requirements for type of couplings are specified herein or shown on Drawings.
      i) Approved Manufacturers:
      ii) JCM, Industries
      iii) Sur-Grip
      iv) Romac
      v) Or accepted substitution

E. Transition Couplings: One piece assembly
1. One end being HDPE pipe with butt fusion joining technique.
2. Other end being either steel or brass pipe threaded suitable for connecting ductile iron, threaded fittings, or threaded valves.
   a. Approved Manufacturers:
      i) Central Plastics Company
      ii) Industrial Pipe Fittings, Inc.
      iii) Or accepted substitution

F. Pipe fittings and flanged connections, to be joined by thermal butt-fusion, shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier.

G. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

H. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

I. Flange Gaskets
   1. Flange gaskets shall be full-faced and shall be in accordance with ASTM D1330
   2. Flange gasket drilling pattern shall conform to ANSI B16.1/B16.5
   3. Flange gaskets shall be 1/16" thick for flanges up to 14" diameter. 1/8" thick gaskets shall be provided for flanges over 14" diameter.
   4. Gasket material shall be EPDM.

2.4 BACKFLOW PREVENTION DEVICES/CHECK VALVE

A. All check valves shall be lead free brass, spring type, high capacity, 400 psi minimum rated for potable water unless otherwise denoted in the plans. Contractor shall submit proposed valve in the form of a contract submittal for COR approval prior to purchase and installation.

B. For the condition where a double check valve is required, contractor shall furnish and install per the following: ZURN Double Check Backflow Preventer: 350, 2 ½ in Pipe Size, Flange x Flange, Mrf. Model 212-350 (or approved equal). The double check valve shall be installed in a valve box per section 2.11.B of the 02500 Water Utilities specification. It shall be installed such that it can be removed for ongoing maintenance and/or inspection by the US Forest Service.

C. Install check valves at locations noted in the drawings. Check valves shall be installed with threaded unions on either side for future operation and maintenance. Consult with COR for field verification.

2.5 AIR VALVE

A. For this project, air valves shall be constructed using a 3/4" hose bib with locking nut and control wheel. Hose bib will be directly connected to a 2" SCH.80 PVC riser at designated locations. Upon approval and acceptance of installation, locking nut and wheel shall be provided to COR. Fittings/reducers are incidental to 02500(03). The contractor shall submit proposed air valve components in the form of a contract submittal for COR approval prior to purchase and installation.

2.6 FIRE HYDRANTS

A. Fire hydrants shall be: Kupferle Eclipse #2 Post Flushing Hydrant w/ 2" FIP inlet or approved equal.
    1. NOTE: this hydrant has a standard burial depth of 3'-00". Contractor shall furnish pipe and fittings to ensure connection to the new waterline at bury depth of 4'-00". Contractor shall ensure a gravel drain pit is installed for proper operation of the self-draining fire hydrant.

2.7 YARD HYDRANTS (NOT IN CONTRACT)

A. Yard Hydrants shall be Woodford MFG with a 4'-00" bury depth: Mfr. Model Y34-4, or approved equal.

2.8 ISOLATION VALVES

A. Isolation Valves shall be:
    1. MILWAUKEE VALVE Gate Valve: 2in, Brass, Non-Rising, FNPTxFNPT, 200 psi CWP, Wheel, Solid Wedge: Mfr. Model UP667 2"
    2. Or approved equal

2.9 PIPE ACCESSORIES

A. Identification Marker Tape: Provide metallic core tape, blue with black letters "CAUTION – WATER LINE BELOW" continuously printed plastic tape with metallic core, intended for direct-burial service; not less than 6-inch wide x 4 mils thick. Provide identification markers of one of the following:
    1. Allen Systems, Inc.
    2. Emed Co., Inc.
    3. Seton Name Plate Corp.
    4. Or approved equal

B. Tracer Wire
    1. Provide tracer wire for all HDPE pipe.
    2. All tracer wire shall be 12 AWG solid copper wire coated with 45 mil Type HMW – PE blue insulation compliant with ASTM D1351 specifically designed for direct burial in corrosive soil or water.
    3. Place tracer wire approx. 3" above pipe.
    4. UL listed.

C. Tracer Wire Test Stations
    1. 4-inch with locking lid
    2. Manufacturers:
        a. CP Test Services
        b. Glenn Series "Glenn-4"
        c. Or accepted substitution

2.10 CONCRETE ENCASEMENT

A. For the section of the new waterline that requires concrete encasement per the drawings, the contractor shall be permitted to use high strength Quikrete. Concrete shall provide a minimum coverage of 3” in all directions around the utility. Contractor shall adhere to the compaction requirements specified in section 02450 for concrete encased sections of waterline.

2.11 BEDDING

A. Bedding: As shown in drawings and in Specification 02450.

2.12 ACCESSORIES – MISCELLANEOUS

A. Extension stems
   1. For valve installations with operating nuts over 5 five below grade, extend stem to 4.5 feet of final grade. Provide spacers to center stem in valve box.

B. Valve boxes
   1. Air valves: enclosures shall be 4’-00” diameter CMP’s cut to appropriate heights per drawings. Note Valve enclosures will extend up above ground. Contractor shall harvest native material (dirt) to insulate air valve riser above ground and furnish and install foam spigot covers for frost protection.
   2. Isolation Valves: enclosures for all buried isolation valves shall be:
      a. Manufacturer: Bass & Hays Foundry, Inc.
         Model No./Part: BH 536F 48” Depth x 36” Diameter
         Associated Locking Lid: 5LID1
      b. Or approved equal
   3. All valve box enclosures shall be installed on compacted native subgrade (firm and stable surface per visual inspection) and furthermore supported by pieces of CMU blocking at 4 separate locations (minimum) along the enclosure’s perimeter as shown in the drawings. Consult with COR upon installation.

      NOTE: Contractor shall furnish and install fiberglass insulation with an R11 value inside any/all isolation valve, air valve, and check valve enclosures.

C. Concrete for Thrust/Wall Blocks, Valve box collars & Hydrant splash pads: conform to requirements of section 03301 Cast in Place Concrete. Concrete collars and associated reinforcement shall be incidental to 02500(02.2) and 02500(05) for valve enclosures and fire hydrant splash pads respectively. All concrete pads shall be cast on a 3” layer of compacted base course per sections 02450 & 02520.

PART 3 EXECUTION

3.1 EXAMINATION

A. Carefully examine pipe and fittings for cracks, damage to linings, and other defects prior to installation.

B. Start installation only when conditions are satisfactory.

3.2 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. Excavation and backfill operations shall be performed in such a manner to prevent cave-ins of excavations or the undermining, damage or disturbing of existing utilities and structures or of new work.

B. Backfill shall be placed and compacted so as to prevent future settlement or damage to existing utilities and structures and new work.

C. Any excavations improperly backfilled or where settlement occurs shall be reopened to the depth required then refilled with approved materials and compacted, and the surface restored to the required grade and condition, at no additional costs to the Government.

3.3 SITE PREPARATION

A. Clear all site areas within the limits of work of grasses, roots, brush, and other objectionable material and debris.

3.4 BEDDING

A. Place bedding material in accordance with drawings. Level fill materials in one continuous layer not exceeding 6 inches compacted depth, compact to 95 percent. Protect from lateral displacement by placing embedment evenly on both sides of pipe.

3.5 PIPE INSTALLATION

A. Route pipe as indicated on the Drawings.

B. The inside of all pipe, valves, and fittings shall be smooth, clean, and free from blisters, loose mill scale, sand, and dirt when connected.

C. Install as specified or in accordance with the manufacturer's recommendations.

D. Maintain minimum 4.0 feet depth of ground cover and maintain minimum grade for drainage.

E. Protect from lateral displacement by placing embedment evenly on both sides of pipe.

F. Do not lay pipe in water. Do not lay pipe under unsuitable weather or trench conditions.

G. Form and place concrete for thrust blocks at each elbow or tee.

H. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

I. Protect pipe from floatation or movement until completely backfilled and put into service.

J. Where the main distribution waterline crosses a road or is subject to vehicle loads such as a parking lot, the main line shall be sleeved in 4” Sch. 80 PVC. Resurface roadway with a 6” compacted layer of base course per the requirements of Section 02450 subsections 3.4 & 3.5.

3.6 JOINTS

A. Connect piping in accordance with manufacturer's specification & recommendations.

3.7 THRUST BLOCKS

A. Installation:

1. Thrust blocks shall be constructed at bends and fittings that require support due to unbalanced line thrust. Care shall be taken to ensure that outlets, cover bolts, nuts, clamps, and other fittings are accessible. A bond breaker shall be placed between the pipe and the thrust block to aid in future removal. If a large thrust block is to be placed, it shall be separated into sections by a suitable material. Bearing surface areas are minimum areas to bear against the undisturbed trench wall.

2. Before placing concrete, equipment used in the mixing and transport shall be cleaned. Debris, water, or ice shall be removed from the area to be occupied by concrete. Concrete shall not be placed on frozen subgrade. Concrete shall be placed only in the presence of Contracting Officer unless inspection is waived prior to the placement.

3.8 ABANDONMENT

A. Cap ends of piping as shown in drawings. Consult with COR prior to final capping.

B. Where mains are to be abandoned and removed to a fitting or valve, cut, and plug main at fitting or valve.

3.9 FIRE HYDRANT INSTALLATION

A. Install hydrants according to manufacturer’s recommendations.

B. Install concrete pads for hydrants as shown on the drawings unless otherwise informed by COR. Consult with COR for confirmation.

3.10 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions set forth by the referenced standards.

B. Test each line at the Contractor's expense in the presence and to the satisfaction of Government or Contracting Officer at a maximum of 1,000-foot intervals.

C. Valve Testing

1. Conduct pressure and leakage tests on all newly installed valves
2. Furnish all necessary equipment and material and make all connections to the pipe, as required. The Contracting Officer shall monitor the tests.

D. Hydrostatic Pressure Tests
   1. Provide all necessary pumping equipment, piping connections, pressure gauges with maximum of 5 psi increments, and other required equipment, facilities, and materials.
   2. All water used for pressure testing must be potable and delivered in acceptable containers.
   3. Immediately locate and replace all pipe fittings, valves, pipe joints, and other materials found to be defective with new and acceptable material.
   4. If tests indicate work does not meet specified requirements, remove work, replace, and retest at no cost to Government.
   5. Procedure
      a. Disconnect all fixture devices and other accessories which may be damaged by the specified test pressure.
      b. Plug or cap ends as required.
      c. Bleed system to eliminate all air from system.
      d. No pressure testing shall be permitted until all concrete thrust blocks have adequate curing time to reach design strength, 7-day minimum.
      e. Notify Contracting Officer 48 hours prior to testing.
      f. Test for 2 hours with no more than 5 psi pressure loss
      g. Leakage is the quantity of water added to a test section to maintain test pressure ±5 psi:

$$L = \frac{S \times D \times (P)^{0.5}}{133{,}200}$$

Where:
L = allowable leakage in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during test, psig

   6. Hydrostatic Test Conditions: At lowest point in the line or section under test pressure or operating pressure, whichever is greater:
      a. Test Pressure: 150 psi
      b. Operating Pressure: 100 psi
      c. Test Medium: Water
   7. While the test pressure is maintained, an examination shall be made of the pipeline and any leaks located and repaired. Pipe or fittings found to be faulty shall be removed and replaced. Leakage is not allowed through the bonnet of the line valve. A valve leaking through the bonnet may be repaired in place or removed and replaced.
   8. After visible leaks are stopped, repeat procedure beginning at 3.10.D.5 of this section.

3.11 FINAL ACCEPTANCE

A. Drain all test water from the new pipe system prior to placing in service.

B. Provide final reports to Contracting Officer for:
   1. Bac-T results
   2. Residual chlorine tests
   3. Hydrostatic tests for each section or pipe

C. Prepare Operation & Maintenance Plans for all 3 water systems using the template provided. COR will review and add comments and notes and return for final preparation.

3.12 BASIS OF PAYMENT

A. Payment will be at the contract unit price for each item as designated below and in the schedule of items.

DESCRIPTION		PAY UNIT
02500(01)	Trenching & Water Lines, HDPE 2”	LF
02500(02)	Isolation Valves	Each
02500(02.2)	Valve Enclosures	Each
02500(03)	Air Valves	Each
02500(04)	Check Valve	Each
02500(05)	Fire Hydrants	Each
02500(06)	Water System Disinfection	Each
02500(07)	2” Sch. 80 PVC	LF
02500(08)	As-Built Plans	Each

END OF SECTION 02500

SECTION 02505
DISINFECTION OF WATER SYSTEMS

PART 1 GENERAL

3.13 SECTION INCLUDES

A. Disinfection of potable water piping, potable water storage facilities, treatment unit equipment and piping, pumping equipment, and piping; testing and reporting results.

3.14 REFERENCES

A. American Water Works Association (AWWA):
   1. B300 – Standard for Hypochlorites
   2. B301 – Standard for Liquid Chlorine
   3. C651 – Disinfecting Water Mains
   4. C652 – Disinfection of Water Storage Facilities

3.15 SUBMITTALS

A. Test Reports: Indicate results comparative to specified requirements.

B. Certification of Disinfection of Water Facilities

3.16 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01110

B. Disinfection report; record:
   1. Type and form of disinfectant used.
   2. Date and time of disinfection injection start and time of completion.
   3. Test locations
   4. Initial and 24-hour disinfectant residuals (quantity in treated water) in parts per million (ppm) or milligrams per liter (mg/L) for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfection residual after flushing in ppm for each outlet tested.

C. Bacteriological (Bac-T) report; record:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection
   3. Name of person collecting samples
   4. Test locations
   5. Initial and 24 hour disinfectant residuals in pm for each outlet tested
   6. Coliform bacteria test results for each outlet tested.
   7. Bacteriologist's signature and authority.

3.17 QUALITY ASSURANCE

A. Perform work in accordance with AWWA C651, C652, C653, and the New Mexico Environmental Department (NMED).

3.18 REGULATORY REQUIREMENTS

A. Conform to AWWA C651 & C652 as appropriate, and NMED regulations for performing the work of this Section.

PART 4 PRODUCTS

4.1 DISINFECTION CHEMICALS

A. Calcium and sodium hypochlorite shall conform to AWWA B300, AWWA B301, and NSF / ANSI 60.

B. Store hypochlorite in a cool, dark place away from flammable materials.

PART 5 EXECUTION

5.1 CLEANING

A. Verify that piping has been cleaned and inspected.

B. Verify that piping has been successfully pressure tested and flushed.

C. Perform scheduling and disinfection activity with start-up, testing, adjusting, demonstration procedures, including coordination with related systems.

5.2 DISINFECTION

A. This disinfection procedure applies to the distribution system leaving the pump house.

B. Provide and attach required equipment to perform the work of this Section.

C. Tablet, continuous, or slug disinfection may be followed in accordance with AWWA C651.

D. The preferred method is continuous disinfection, summarized as follows:
   1. Inject treatment disinfectant, free chlorine in liquid form into piping system to obtain 50 to 80 ppm residual.
   2. Bleed water from outlets to ensure distribution and test for disinfectant residual.
   3. During the process of chlorinating the pipelines, valves and other appurtenances shall be operated from closed to full open to closed while the pipeline is filled with heavily chlorinated water.
   4. Maintain disinfectant in system for 24 hours.
   5. If final disinfectant residual tests less than 25 ppm, repeat treatment.

E. Replace permanent system devices removed for disinfection.

5.3 BACTERIOLOGICAL TESTING

A. After disinfection and final flushing such that typical system chlorine residuals are present, if the system operates with a residual, bacteriological testing for total coliform analysis shall be performed in accordance with ANSI/AWWA C651. The pipe shall be filled with fresh potable water and left for a period of 24 hours before any sample is collected. An initial set of samples shall be taken and then second set up samples shall be taken after a minimum of 16 hours. Each set of samples shall include a sample taken every 1,200 feet of new potable water main, plus one sample at the end of the line and at least one from each branch greater than one pipe length. Also, the contract shall provide an Affidavit that the water system was disinfected per the AWWA Standard.

B. Re-disinfetion: If the initial disinfection treatment fails to produce satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained.

5.4 FINAL FLUSHING

A. Flush, circulate and clean until residual equal to that of the incoming potable water or 1.0 mg/L is achieved.

B. Maintain a flushing velocity of 2.5 feet per second in piping.

C. Collect chlorinated water for proper disposal and/or dechlorinate to less than 0.1 ppm free chlorine prior to discharge in accordance with State, County, and local regulations.

5.5 FIELD QUALITY CONTROL

A. After final flush, and before main or equipment is placed in service, collect water samples from representative points along the main and field test for chlorine residual.

B. Chlorine residual shall be within 50 percent of the chlorine residual prevailing in the source.

C. If initial disinfection fails to provide satisfactory samples, repeat disinfection until satisfactory samples have been obtained.

5.6 TESTING AND ACCEPTANCE

A. The contractor will perform Bac-T sampling and testing after pipes have been disinfected and flushed.

B. If any portion of the piping fails Bacteriological testing, the Contractor is responsible for repeating disinfection procedures until passing Bac-T test is obtained.

C. Contractor shall provide and pay for services of a certified laboratory to complete Bac-T testing.

D. Submit test results to Contracting Officer.

E. Submit Certification of Disinfection of Water Facilities.

5.7 BASIS OF PAYMENT

A. Payment for this work is included and incidental to Section 02500 Water Utilities.

END OF SECTION 02505

SECTION 02512
CONCRETE SLABS & PADS

PART 1 - GENERAL

1.1 Description

A. This section shall consist of the construction of concrete slabs including all site work, excavation, compaction, backfill, water, aggregate, forming, reinforcing, joints and cleanup as it pertains to the utility building. Concrete pads for water system components ie. hydrants, valve collars shall conform to Section 03301.

PART 2 - PRODUCTS

2.1 Concrete: All concrete shall conform to Specification 03301.

2.2 Aggregate: Aggregate shall conform to Specification 02520.

PART 3 - EXECUTION

3.1 Construction

A. Construct slabs in conformance with these specifications and as SHOWN ON THE DRAWINGS. Surface finish for sidewalk and slabs shall be Class 5, broomed unless otherwise noted on the drawings. Construction joints shall be troweled not sawn and shall be located at 1.25 times the width of the slab. For example, a 4' wide sidewalk will have joints every 5' along the length of the sidewalk.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement

A. Measurement will be the number of units completed and accepted, including all related construction and materials.

4.2 Payment

A. This payment is included in various line items per the bid schedule.

END OF SECTION 02512

SECTION 02520
AGGREGATE (COMMERCIAL SOURCE)

PART 1 – GENERAL

1.1 Description

A. This work shall consist of furnishing, hauling, and placing of base course.
B. All base course for this project shall conform to requirements of this section or an approved NMDOT Base Course equivalent.

PART 2 – PRODUCTS

2.1 Sub-base or base aggregate: Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

1) Gradation	Table 02520-1
(2) Liquid limit, AASHTO T 89	25 max.
(3) Plastic limit, AASHTO T 90	Nonplastic
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	50% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

2.2 Surface course aggregate **Surface course aggregate.** Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 02520-1
(2) Liquid limit, AASHTO T 89	35 max.
(3) Plastic Index, AASHTO T 90	Table 02520-1
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	75% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Do not furnish material that contains asbestos fibers.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

2.3 **Screened aggregate –** Furnish hard, durable particles or fragments of stone, slag, or gravel conforming the following:

(1) Gradation	Table 02520-1
(2) Plastic Index, AASHTO T 90	Less than 9
(3) Los Angeles abrasion, AASHTO T 96	55% max.
(4) Free from organic matter and lumps or balls of clay.	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

Table 02520-1
Limits for
Surface Course Gradation and Plasticity Index

Sieve Size	**Percent by Mass Passing Designated Sieve (AASHTO T 27 & T 11)**	
1 inch	100	
3/4 inch	97 – 100	
3/8 inch	68 – 85	
No. 4	45 – 64	
No. 16	25 – 42	
No. 40	16 – 29	
No. 200	8-12	12-18
Plasticity index (PI)*	5-9	2-5

If desired, off-site clay soil may be used to meet indicated limits or 2% bentonite*
maybe added by weight when there at least 8% No 200 and low or no PI

PART 3 - EXECUTION

1.1 Obtain approval before placing aggregate.

1.2 The aggregate shall be spread in a uniform layer, with no segregation of size, and to a loose depth that shall have the required thickness when compacted.

1.3 Hauling and compaction equipment shall be operated over the entire surface in a dispersed manner to minimize rutting or uneven compaction.

1.4 Compaction - Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be of any type, provided they are capable of compacting each lift of material as specified.

1.5 The surface of each layer shall be bladed during the compaction operations to remove irregularities and produce a smooth, even surface.

1.6 Compaction Methods – Reference section 02450-3.5. The contractor shall submit a proctor provided by the vendor for adherence to compaction requirements.

1.7 The crusher fines surface course shall be laid over compacted base course or compacted subgrade AS SHOWN ON THE DRAWINGS and compacted using a vibration plate compactor or other suitable compaction method as approved by the COR. Water shall be used to maintain optimum moisture during compaction. (only applicable to the use of cruser fines). Consult with COR for utility line bedding.

1.8 Stockpiling - If the Contractor elects to stockpile aggregates on site prior to placement, stockpile locations shall be approved in advance by the COR.

1.9 All materials shall be transported and handled to preserve their quality and fitness for the work. Aggregates shall be stockpiled, loaded, and transported in a manner that will preserve specified gradation and avoid contamination. Stockpiles of aggregate having different gradations shall not be intermingled.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement - The work specified herein will not be measured for payment.

4.2 Basis of Payment –Aggregate for the utility backfilling will be incidental to 02500(01) & 16400(01); aggregate for the utility building will be incidental to 10168(01) as shown in the Schedule of Items.

END OF SECTION 02520

SECTION 03301
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 Description

A. This section specifies concrete to be used for cast-in-place concrete construction as it pertains to the new utility building.

1.2 Submittals

A. Mix Design A mix design showing the proposed weights of aggregate, water, cement and other components per cubic yard of concrete shall be furnished to the COR a minimum of 72 hours prior to the placement of concrete. No concrete shall be placed without prior approval of this mix design.

B. Admixtures Complete information on proposed admixtures, as specified herein, shall be submitted for the COR's approval a minimum of 72 hours prior to the placement of concrete.

C. Deliver Tickets Provide Engineer with a delivery ticket in accordance with ASTM C-94 for each load of concrete.

PART 2 – PRODUCTS

2.1 Cement

A. Type I or Type II portland cement unless otherwise specified - ASTM C-150. Only one brand of cement shall be used.

2.2 Aggregate

A. Aggregate shall meet the requirements of ASTM C 33, "Specifications for Concrete Aggregate". Coarse aggregate shall be Size Number 67 as specified therein.

2.3 Admixtures for Concrete

A. Air Entrainment Air-entraining admixtures shall meet the requirements of ASTM C-260.

B. Water Reducers Water-reducing, set-retarding, and set-accelerating admixtures shall meet the requirements of ASTM C 494.

C. Submittals Furnish the following information to the COR for approval:

1. Brand name of the admixture.
2. Amount of admixture to be used per cubic yard of concrete.
3. Reason for requesting the use of the admixture.

2.4 Curing Materials

A. Curing materials shall meet the following requirements:

1. Burlap cloth made from jute or kenaf	AASHTO M 182
2. Sheet materials for curing concrete	ASTM C 171
3. Membrane-forming curing compounds	ASTM C-309, Type 1 or 1-D

2.5 Water

A. Water used in mixing, curing, or other applications shall be of potable quality.

2.6 Proportioning Concrete

A. Minimum compressive strength of concrete shall be 3000 psi. Proportion concrete in accordance with ACI 318-77, Chapter 4, Article 4.3 and within the limits below:

Minimum Cement Content	5.5 sacks/cubic yard
Maximum Water Content	6 gallons/sack
Entrained Air	3 to 6 per cent
Slump	1 to 4 inches

2.7 Proportioning Concrete for Cold Weather

A. For concrete placed under "Cold Weather Concreting and Curing" conditions, the Contractor may elect to alter the required proportions in one of the following ways:
B. Type III Cement Type III cement may be substituted in equal quantities for Type I or II cement.
C. Additional Cement An additional sack per cubic yard of Type I or Type II cement may be added.

2.8 Temperature Limits for Cold Weather Concrete

A. Provide concrete having a minimum temperature of 50 degrees F and a maximum temperature of 90 degrees F at the time of placing. The temperature of the mixing water shall not exceed 140 degrees F. If aggregates are heated, heat uniformly with steam or water coil. Aggregate temperature shall not exceed 95 degrees F. Aggregate water mix

temperature shall not exceed 80 degrees F. Do not use materials containing frost or icy lumps.

2.9 Temperature Limits for Hot Weather Concrete

Provide concrete having a maximum temperature of 90 degrees F at time of placing. If the ambient temperature is above 90 degrees F, the forms, reinforcing steel, steel beam flanges, and other surfaces which will come in contact with the mix shall be cooled to below 90 degrees F by means of a water spray or other approved methods. Water reducing admixtures shall be used so the maximum amount of water or slump is not exceeded. The mixing of the concrete and the time between mixing and placing shall be kept to a minimum. Chipped or crushed ice may be substituted for a portion of the mixing water on a pound-for-pound basis. If ice is used, all ice shall be entirely melted at the completion of the mixing period. If concrete temperature exceeds 75 degrees F, concrete shall be in accordance with ACI 305.

2.10 Mixing

A. Plant Batched and Transit Mixed

1. Batch at a central plant and mix en route to the project in transit mix trucks in compliance with ASTM C-94. (ASTM C 94 Sections 3 and 17 shall not apply).
2. Place concrete within a maximum of 1-1/2 hours after introduction of cement into the batch. In hot weather or due to other contributing factors, a time less than 1-1/2 hours may be required by the COR.
3. Time interval between placement of batches shall not exceed 30 minutes.

B. Hand Mixed Hand mixing will not be allowed.

2.11 Mix Adjustments

A. Water: Water may be added once for purposes of acquiring minimum slump, provided the specified water-cement ratio is not exceeded. For all project mixed concrete, water shall not be added later than 15 minutes from start of mixing. For transit-mixed or agitated concrete, such water may be added upon arrival at the job site. Adding water beyond these conditions constitutes retempering which will not be allowed. When water is added, an additional 20 revolutions at mixing speed is required.

B. Admixtures Air-entraining admixtures shall not be added after the start of mixing.

PART 3 - EXECUTION

3.1 Construction

A. Excavation shall be made to the required dimensions to permit the installation and bracing of the forms. The foundation shall be compacted to a firm even surface. All soft, yielding material shall be removed and replaced with acceptable material.

B. Forms shall meet the requirements of Section 03100 - Concrete Formwork. Machine slip forming may be used.

C. Mixing and Placing: The concrete shall be struck off to the cross section that matches existing, after which it shall be finished to a smooth and even surface.

D. Reinforcement: Reference construction drawings for various forms of reinforcement.

E. Placement: Concrete shall be discharged into the forms within 1-1/2 hours after the introduction of the cement to the aggregate. Retempering concrete shall not be permitted. The cement shall be added to the mixer at the jobsite whenever this condition cannot be met.

F. Temperature: Concrete shall not be mixed or placed when the daily minimum atmospheric temperature is, or is expected to be, less than 40 degrees F unless adequate provisions are made to protect the concrete. No concrete shall be placed when the concrete temperature reaches 90 degrees F.

G. Consolidation: Concrete shall be placed to avoid segregation. High-frequency internal vibrators shall be used for consolidating concrete in the forms. Vibrators shall be operated to produce concrete free of voids, but shall not be held so long in one place as to result in segregation or formation of laitance on the surface.

H. Finishing: Prepare surface as in a Class 4, Trowel Finish. Lightly broom to a roughened finish of uniform pattern and texture. Tool exposed edges with slightly rounded edging tool. Tool joints with a groover.

I. Concrete Placement: Notify the COR a minimum of 24 hours prior to placement.

1. Place concrete in the forms as near final position as practical in a manner which will prevent segregation or loss of materials.

2. Immediately after placing, thoroughly compact concrete with mechanical vibrators. Provide minimum of two vibrators. Provide minimum of two power sources unless commercial power is available at site. Hand tamping, when permitted, will be approved in writing by the COR.

3. Place each concrete section in a continuous operation, such as slab, footing, columns.

4. Do not drop concrete freely more than 4 feet.

5. Do not place concrete in water or allow water to rise over freshly placed concrete until a set is sufficient to prevent damage.

J. Backfilling: After the concrete has set sufficiently, it shall be backfilled to the required elevation with selected material placed in horizontal layers, not over 6 inches (loose measure) in depth, to the level of the original ground surface. Backfill shall be readily compactible material free of frozen lumps, chunks of highly plastic clay, or other objectionable material. Rocks larger than 3 inches in diameter shall not be used within 1 foot of the structure.

K. Protection from Rainfall: Protect flat work during rainy periods with adequate waterproof covering. Support covering so that finishing may be performed and initial set obtained without damage. Dragging of tarpaulins or other covering across unset concrete will not be permitted.

L. Curing: Commence curing and protection of concrete immediately after completion of the finishing. Cure Type I and Type II cement for 7 days continuously. The work shall be moistened and kept moist during this time, or curing shall be accomplished by the use of membrane-forming curing compound.

M. Cold Weather Concreting and Curing: When the descending air temperature at the project falls below 40 degrees F the Contractor shall cease placing concrete unless the procedures described below are followed. Normal concreting operations may resume when the ascending temperature at the site exceeds 40 degrees F.

1. Provide cover and heating equipment sufficient to maintain the temperature of the concrete at not less than 50 degrees F for a period of period of 3 days for Type I and Type II cement. Maintain the temperature at not less than 50 degrees F for a period of 2 days for Type III cement or when one additional sack of Type I or Type II cement is added.

2. Provide additional protection to prevent the concrete temperature from dropping more than 40 degrees F in the 24 hour period following the required protection period.

3. Keep concrete and forms wet. Remove and replace any concrete damaged by frost or freezing when directed by the COR.

N. Hot Weather Concreting and Curing: If curing temperatures as placed are expected to exceed 75 degrees F, placing and curing shall be in accordance with ACI 305.

O. Tests All tests will be the responsibility of the Contractor and certified test results shall be submitted to the COR. Samples will be selected on a random sample basis in accordance with ASTM C-172. If the measured slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same load. In the event of a second failure, the concrete will be considered to have failed the requirements of the specification and the load will be rejected.

1. The following concrete tests will be taken:

2. Slump Testing will be in accordance with ASTM C-143.

3. Air Content Testing will be in accordance with ASTM C-231.

4. Compressive Tests Compressive test cylinders will be molded, cured, prepared and tested in accordance with ASTM C-31 and C-39. A minimum of three cylinders will be taken for each required test.

5. The first cylinder from each set shall be tested at 7 days, the second at 28 days, and the third shall be tested immediately if the second cylinder in the set fails at less than the specified compressive strength. Test results of cylinders tested at 28 days will form the basis for acceptance or rejection of concrete strength. Each 28 day compressive test result shall be the average of the compressive test of two cylinders from the same set. A minimum of two cylinders from each batch will be evaluated in accordance with ACI 318-77, Article 4.8.2.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement

A. Cast In Place Concrete will be measure in Cubic Yards of Concrete.

4.2 Payment: This work is incidental to various line items in the bid schedule that have concrete work associated. Contractor shall submit all concrete invoices to COR per associated line item for quanitity tracking.

END OF SECTION 03301

SECTION 04200
CONCRETE MASONRY UNIT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work includes furnishing and installing split-faced and smooth concrete unit masonry for the construction of pump house building as shown on drawings and as specified herein.

B. Work includes, but is not limited to, installation of concrete foundation, installation of masonry block units and installation of mortar and grout.

1.2 REFERENCE STANDARDS

A. ASTM A 82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement (Sep-2002)

B. ASTM C90-06b – Standard Specification for Load-bearing Concrete Masonry Units (Dec-2006)

C. ASTM C140-07a– Standard Test methods of Sampling and Testing Concrete Masonry (Dec-2007)

D. ASTM C780-07a - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry (Nov-2007)

E. Obtain concrete units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer.

F. Obtain mortar ingredients of uniform quality, including color, for exposed masonry, from one manufacturer for each cemetitious component and from one source and producer for each aggregate.

1.3 DELIVERY, STORAGE, & HANDLING

A. Deliver and store materials to prevent damage and exposure to the weather. Remove damaged material from the site.

B. Store aggregates where grading and required characteristics can be maintained. Store masonry accessories, including metal items, to prevent deterioration by corrosion and accumulation of dirt.

C. Deliver packaged mortar materials in unopened containers bearing the manufacturer's identification of contents.

1.4 PROJECT CONDITIONS

A. Do not install masonry in temperatures below forty (40) degrees Fahrenheit. Replace all work damaged by frost or freezing. If work stops due to rain, snow or low temperatures, cover new work with a waterproof membrane. Do not allow masonry construction to be flooded from construction processes or weather.

1.5 SUBMITTALS

A. Submit samples and manufacturer's product data for each type of masonry unit, accessory, mortar and other manufactured products, including certifications and current test reports for each unit type. Test reports are dated within six (6) months for compressive strength and within twelve (12) months for linear shrinkage. COR approval is obtained prior to ordering materials.

PART 2 – PRODUCTS

2.1 CONCRETE UNITS

A. Split face and smooth units, are as manufactured by Utility Block Company, 505.344.2368, or approved equal, and conform to ASTM C90, Grade N-1, requirements, and are manufactured using scoria aggregate. Units are of the nominal thickness and facial configuration as shown on the drawings, and include all special shapes and sizes required to complete the work indicated. All exposed surfaces above ground have a split-face surface, scored and non-scored, as shown on the drawings.

B. Hollow Loadbearing Block meets the following specifications:

1. ASTM C 90
2. Medium Weight Classification
3. Minimum Comprehensive Strength = 1500 psi, Average Gross Area
4. Linear shrinkage does not exceed .030%
5. Moisture content does not exceed 25% of total absorption
6. Aggregate is volcanic scoria and meets all requirements of ASTM C-331
7. Nominal unit sizes are 8" x 8" x 16" and 8" x 8" x 8", while caps (if applicable) are 4"x 4"x 8"
8. Unless indicated otherwise, all exterior exposed masonry faces are split face or split/smooth as shown on drawings
9. When placed in the structure, Masonry units are cured for not less than 28 days

2.2 MORTAR AND GROUT MATERIALS

A. Portland Cement

1. ASTM C 150, Type I, except Type III may be used for cold weather construction. 2. Provide color as required to match block color.

B. Masonry Cement

1. ASTM C 91, Mortar for all exterior, above-grade block walls is Type M Mortar and contains the manufacturer's recommended amount of liquid polymeric integral water-repellant mortar admixture for water repellancy and to assure proper bond strength.
2. Follow manufacturer's instructions pertaining to critical temperatures for mixing mortar with integral water repellant admixture.

C. Hydrated Lime

1. ASTM C 207, Type S. Because of water repellancy requirement, no tempering, tempering admixtures or lime substitutes will be alllowed unless authorized by water repellancy manufacturer.

D. Aggregates for Mortar

1. ASTM C 144, except for joints less than 1/4", use aggregate graded with 100% passing the No. 16 sieve.

E. Aggregate for Grout: ASTM C 404.

F. Water: Clean and potable.

2.3 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

A. Comply with requirement indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.

1. Mill Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 123, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.
2. Application: Use where indicated on drawings or as required to insure strength.
3. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:
4. Width: Fabricate joint reinforcement in units with widths of approximately 2' less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
5. Wire Size for Rods: 0.1483" diameter.
6. Wire Size for Cross Rods: 0.1483" diameter.
7. For single-wythe masonry, provide Ladur design with cross rods at 15" O.C. for free standing walls.
8. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvinized to comply with ASTM C 153, Class C, in sizes and configurations indicated.
9. Shields and plaques and signs are anchored with tamper resistant bolts.
10. Miscellaneous Masonry Accessories
11. Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
12. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

13. Premolded Control Joint Strips: Styrene-butadiene rubber compound complying with ASTM D 2000, by Dur-O-Wal, Inc., or equal, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.4 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including air entraining agents, accelerators, retarders, anti-freeze compounds or other admixtures, unless otherwise indicated.

1. Do not use Calcium Chloride in mortar or grout.

B. Mixing: Combine and thoroughly mix cement, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

1. Use Type N Mortar for exterior, above-grade loadbearing and non-loadbearing walls; for interior loadbearing walls, and for other applications where another type is not indicated. Use Type S Mortar for foundations.

2. Grout for Unit Masonry: Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated. NOTE all CMU cells shall be grouted.

PART 3 – EXECUTION

3.1 EXECUTION

A. Do not wet concrete masonry units.

B. Cut masonry units using motor-driven saws to provide clean, sharp unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.

C. Use dry cutting saws to cut integral color split-face concrete masonry units.

. Use wet cutting saws to cut standard concrete masonry units.

E. Do not apply concentrated loads for at least three (3) days after building masonry walls or columns.

F. Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with such masonry.

G. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

H. Protect ledges and projections from droppings of mortar.

3.2 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls and rises, do not exceed 1/4" in 10', or 3/8" in a story height not to exceed 20'. For external corners,

expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20'. For vertical alignment of head joints do not exceed 1/2" max plus or minus 1/4" in 10'.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

3.3 LAYING MASONRY WALLS

A. Lines and grades are as shown on drawings, or designated on the ground by COR.

B. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners. Obtain COR's approval of layout before proceeding with construction, especially for the scored pattern shown.

C. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

D. Pattern Bond - Lay exposed masonry in the bond pattern as SHOWN ON THE DRAWINGS. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less the 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.

E. Stopping and Resuming Work - Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry (stopping overnight). Fill in solidly with masonry around built-in items.

F. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

H. Fill cores in hollow concrete masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

1. All reinforcing with minimum twelve (12) inch overlap is in place before grouting begins. Walls have reinforcement 32" o.c. as a minimum, unless shown otherwise, all corners and wall intersections are grouted and any other cells are as shown on drawings.
2. All grout is vibrated or puddled in place.
3. Mortar droppings are kept out of grout spaces.
4. Vertical cells to be filled have vertical alignment to maintain a continuous unobstructed cell area not less than 2 inches by 3 inches. Cells containing reinforcement are filled solid with grout and pours are stopped 1-1/2 inches below the top of a course to form a key at pour joints.
5. All anchors and bolts inserted in the wall and bond beams are solid grouted. The tops of unfilled cell columns under a horizontal masonry beam are covered with metal lath or special units are used to confine the grout fill to the bond beam section.
6. All reinforcing steel is inspected in place before grouting.
7. Structure is grouted in heights of less than a four (4) foot drop.

3.4 MORTAR MIXING

A. Mix in the proportions of 1 part portland cement, 0 to 1/4 part lime putty, and 2 to 3 parts sand. Mix with a mechanical mixer capable of mixing thorougly and consistently. Use mortar within 2-1/2 hours after initial mixing.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

B. Lay walls with 3/8" joints except for minor variations required to maintain bond alignment.

C. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.

D. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift into place.

3.6 HORIZONTAL JOINT REINFORCEMENT

A. Place side rods over face shell mortar beds with 5/8 inch mortar cover on exterior side. Lap reinforcement a minimum of six (6) inches. Embed side rods fully in mortar. Install factory fabricated sections at corners and wall intersections. Break reinforcement at control joint or an expansion joint, unless otherwise indicated on drawings .

B. Install horizontal reinforcemetn twenty four (24) inches on center.

3.7 HOLLOW CONCRETE MASONRY WALLS

A. Reinforce with continuous horizontal joint reinforcement.

B. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

C. In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with above.

3.8 ANCHORING MASONRY WORK

A. Provide anchor devices as SHOWN ON THE DRAWINGS.

B. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

C. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.

D. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

E. Space anchors as indicated, but not more than 24" O.C. vertically and 36" O.C. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

A. Provide vertical and horizontal expansion, control and isolation joints in masonry where shown or agreed upon by COR. Build in related items as the masonry work progresses.

B. Build flanges of metal expansion strips into masonry. Lap each joint 4' in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.

C. Build flanges of factory fabricated expansion joint units into masonry.

D. Build in non-metallic joint fillers where indicated.

E. Build in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting non-metalllic compressible joint filler of width required to permit installation of sealant and backer rod.

F. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.10 REPAIR, POINTING, AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged or if units do not match adjoining units. Provide new units to match adjoining units and install in fresh mortar, or grout, pointed to eliminate evidence of replacement.

B. At the completion of the work, fill and finish all holes in joints of masonry surfaces, except weep holes. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

C. Clean masonry surfaces with a stiff fiber brush. Immediately after cleaning thoroughly, rinse surfaces with water. Do not sandblast, water blast, or acid clean.

3.11 PROTECTION

A. Provide protection and maintain conditions in a manner acceptable to manufacturer.

3.12 MEASUREMENT AND PAYMENT

A. Payment for concrete masonry units will be incidental and shall be paid Utility Building, Item 10168(01).

END OF SECTION 04200

SECTION 05500
METAL FABRICATION

PART1 – GENERAL

1.1 DESCRIPTION

A. This section specifies requirements for metal fabrication of the pump house building and other miscellaneous metals. Work includes providing fasteners, structural steel sections, and miscellaneous metal items.

1.2 QUALITY ASSURANCE

B. Welding shall conform to AWS requirements.

PART 2 – PRODUCTS

2.1 FASTENERS

A. Bolts - Federal Specification FF-B-575.

B. Expansion Shields - Federal Specification FF-S-325.

C. Flat Washers - Federal Specification FF-W-92.

D. Lag Bolts - Federal Specification FF-B-561.

E. Nuts - Federal Specification FF-N-836.

F. Tapping Screws - Federal Specification FF-S-107.

G. Steel Plate, Bars and Structural Shapes - ASTM A 36.

H. Steel Bars - rolled steel, 1" x 1/4".

I. Framing Anchors - "Teco," "Simpson," or an approved equal. Comply with ICBO Research Recommendation No. 1211.

J. Bolts for the Trash Receptacle shall be as recommended by the manufacturer.

K. Steel Boll

2.2 BOLLARDS

A. 5’ long, 4” diameter, steel bollard filled with concrete. Painted forest green.

PART 3 – EXECUTION

3.1 FABRICATION

A. Fabrication for pump house building **as shown on the drawings** and according to Manufacturer’s specifications and recommendations. Structural steel members are erected and installed in accordance with standard construction practices regarding methods and quality of work.

B. Minimum weld, 1/8" fillet or butt welds unless noted otherwise. Grind exposed welds smooth. Clean all welds.

C. Shop prime all structural steel except for minor items specifically exempted by the COR. Top with two (2) coats of enamel paint as specified in 09901 Paint. Color is approved by COR.

D. Touch up all nuts, bolts, welds, and abrased surfaces with primer and top coat after completion of installation.

PART 4 – MEASUREMENT & PAYMENT

All work covered by this section is incidental New Utility Building 10168(01) except concrete bollards which shall be included in item 02500(05).

END OF SECTION 05500

SECTION 06100
ROUGH CARPENTRY

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies rough carpentry, including all framing, wood nailers and blocking, sheathing, wood furring, underlayment, posts, wood and pressure treatment.

1.2 DELIVERY & STORAGE

A. Keep materials dry and protected from weather and contact with damp or wet surfaces. Stack wood and plywood to provide air circulation within and around stacks and under temporary coverings.

1.3 CLOSEOUT SUBMITTAL

A. Furnish one gallon of each type of stain and sealer used.

1.4 QUALITY ASSURANCE

A. Furnish materials complying with the following:

1. Softwood Lumber

a. Graded in accordance with the latest edition of "Grading and Dressing Rules No. 16," WCLIB, or "Grading Rules for Western Lumber," WWPA. Lumber grades specified below are taken from "Grading and Dressing Rules No. 16." Equal grades from "Grading Rules for Western Lumber" are acceptable. Furnish lumber bearing a recognized grading bureau mark or a "Certificate of Grade" may be substituted. Where a grade for Douglas Fir species is indicated, other species, if approved by the COR, may be supplied on an equal stress grade basis.

b. Nominal size is indicated except where specifically detailed and dimensioned.

2. Pressure Treatment.

a. For wood that comes into contact with food stuffs, the wood preservative treatment shall be an industrial fungicidal wood preservative and water-repellant treatment which is odorless, non-crystalline oil-based product which is low in toxicity to humans. The preservative treatment shall be approved by the EPA for treatment of wood that comes into contact with food stuffs while providing chemical resistance to insects, decay, mold, mildew and bacterial growths. The material will accept oil based stains. The following product shall be used: Copper-8-quinolinolate.

b. For wood that comes into contact with ground or concrete (UC4A - Wood and wood based materials used in contact with the ground, fresh water, or other situations favorable to deterioration), the following products shall be used in accordance with the AWPA Use Category System (see Western Wood Preservers

Institute at http://www.WWPInstitute.org). All metal in contact with pressure treated wood shall be double galvanized or stainless steel.

i. 0.40 for Alkaline Copper Quat (ACQ)

ii. 0.40 for Ammoniacal Copper Zinc Arsenate (ACZA)

iii. 0.21 for Copper Azole (CA-B)

c. CCA, Chromated Copper Arsenate, products will NOT be used in this project.

3. Plywood.

a. Graded in accordance with PS-1.

b. Furnish panels identifiable by a grade trademark of a recognized grading association.

c. Index numbers listed (24/0, etc.) may be larger but not smaller than shown.

PART 2 – PRODUCTS

2.1 LUMBER

A. Furnish S4S lumber, unless otherwise shown on drawings. Furnish lumber with a moisture content of 19% or less for material three inches and less in nominal thickness, unless otherwise specified.

2.2 PUMP HOUSE BUILDING WOOD FACING

A. Facing receives a UV protectant stain and preservative.

B. Wood surfaces are primed with BioShield Penetrating Oil Sealer #5 or approved equal.

C. Wood surfaces are stained with Bioshield oil stain finish #3-010 (pine) or approved equal.

D. Stain and preservative materials are manufactured from naturally derived materials including cirtrus peel oils and solvents, essential oils, seed oils tree resins, inert ineral fillers, tree and bee waxes, lead-free dryers and earth pigments and manufactured by Eco Design Co., available at Bioshield, Santa Fe, NM, 87505, 800-621-2591 or approved equal.

2.3 PRESSURE TREATMENT

A. Install pressure treated wood in contact with concrete or soil.

B. All treated pieces to comply with appliable requirements of A.W.P.A. standards and bear the quality mark of an approved inspection agency certified to inspect preservative-treated wood, and be rated for ground contact, except the preservative for the table planks.

C. Treat all cuts and holes in pressure treated members with copper haphthenate when using water-borne treatment.

2.4 HARDWARE

A. Install hot dipped galvanized hardware, nails, bolts, etc. at locations exposed to the weather unless otherwise shown on drawings.

2.5 EXTERIOR SHEATHING

A. Concealed surfaces are ¾ inch C-C exterior plywoor, 30/12.

B. Exposed surfaces and soffits are 1" x 6" Tongue and Groove (T&G), "B" finish, KD, SRC. Must provide a waterproof vapor barrier.

C. Wall Sheathing is ½ inch CDX, plywood 24/0.

D. Underlayment is ½ inch underlayment C-C plugged exterior plywood.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

B. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

D. Countersink nail heads on exposed carpentry work and fill holes.

3.2 GENERAL FRAMING

A. Provide members of size and spacing as shown on drawings. Anchor and nail members in accordance with the latest edition of the International Building Code (IBC).

B. Do not splice structural members between supports.

C. Frame roof as shown in the drawings. Nail to top plate with four 10d nails. Install framing anchors where shown on drawings.

3.3 STUD FRAMING

A. Provide continuous length studs. Set sills level, with full bearing, and anchored to the foundation. Provide flat washers on all anchor bolts in accordance with IBC.

B. End nail trimmer studs to header with 16d nails.

3.4 RAFTER AND CEILING JOIST FRAMING

A. Set rafters with crown edge up. Cut bird-mouths to provide full bearing. Nail or anchor rafters to top plate and ceiling joists.

B. At ridge, where adjacent rafters abut, align rafters and fasten to ridge member with ridge hangers.

C. At valleys and hips place rafter 2" deeper than rafters or as shown on drawings. Bevel ends of jack rafters for full bearing on hip rafters.

D. Approved hangers are used on all connections as follows:

1. Rafters to ridge board
2. Ridge board to ridge board
3. Rafters to top plate

E. Nail studs to top plate with four 8d toenails or two 16d end nails.

F. Install full length cripples at all openings.

G. Nail cripples to studs with 16d nails at 24" O.C.

H. Toenail cripple to header with two 8d nails.

I. End nail studs to header with three 16d nails.

3.5 TIMBER FRAMING

A. Provide beams and girders of size and spacing shown. Install crown edge up and minimum 4" of bearing surface. Use continuous members as shown in the drawings.

B. Provide wood posts as shown and metal anchors to adjacent support. Run continuous between supports, cut ends for full bearing.

3.6 EXTERIOR SHEATHING

A. Apply plywood roof sheathing with the face grain at right angles to supports. Stagger end joints. Nail with galvinized 8d nails 6" O.C. at edges and 12" O.C. at intermediate supports.

B. Apply roof decking and panelling at right angles to rafters and studs. Stagger end joints. Nail with 8d nails at all supports.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to the New Utility Building 10168(01) line item. No separate payment will be made for this work.

END OF SECTION 06100

SECTION 07412
PREFORMED METAL ROOFING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies preformed metal roofing and accessories.

1.2 SUBMITTALS

A. Submit catalog cuts or brochures, fully describing all materials and color samples.

PART 2 – PRODUCTS

2.1 MATERIALS

A. **Match profile, protective coating, and color of existing district office, samples approved by COR**,

Local Suppliers: Highway 64 Metal Roofing, or approved equal.

B. Acceptable roofing systems shall conform to the following:

1. System shall be engineered to withstand 50 psf wind uplift.
2. Roofing panels, ridge cap and valley flashing are 24 gauge, baked enamel steel, 'Galvalume', ASTM 792-86. Panels and accessories shall be prefabricated with seams rolled in the manufacturer's plant, UL-90 listed.
3. Ridge cap is the two piece interlocking type, formed to match roofing.
4. All exposed adjacent flashing is of the same material and finish as the panel system.
5. Valley flashing is 36 inches wide minimum.
6. Felt is ASTM D 226 Type I, 15 pounds/square.
7. Nails are 1 ¾ inch aluminum, screw shank with neoprene washer for aluminum flashing.
8. Screws are self tapping hex-head type.
9. Ribs shall be spaced on 12 inch centers.
10 Fasteners shall be as recommended by the manufacturer, be of sufficient length to secure roof and have same paint coating.
11. Finish to be satin finish "Galvalume", by the Kynar 500 Fluorcarbon application.
12. Color to be selected by COR from color chart supplied by Contractor.
13. All exposed adjacent flashing shall be of the same material and finish as the panel system.

2.2 DELIVERY

A. Material is delivered only after suitable facilities for its storage and protection are available on the site.

2.3 STORAGE

A. Store materials out of the weather in a clean, dry place. One end of each container is elevated to allow any moisture to run off. Panels and flashing with strippable film are not stored in areas exposed to sunlight. Care is taken to prevent contact with any substance which could cause a discoloration in the finish during storage. Materials are stored to provide ventilation and prevent bending, abrasion, or twisting.

2.4 HANDLING

A. Bundles are to remain banded during unloading process. Bundles are not lifted by the banding material.

B. Individual sheets are handled carefully to prevent panel buckling and damage to the panel coating. When removing a sheet from a bundle it will be rolled (not dragged) off the bundle to prevent scratchiing of the next sheet. Sheets are not picked up by the ends, but are lifted along their longitudinal edge and carried in a vertical position. Sheets over ten (10) feet require two or more people to transport. Soft gloves are worn to prevent "fingerprinting" of the sheets.

C. Do not allow foot traffic on completed roof. If required, provide cushioned walk boards.

D. Protect installed products from damage caused by foreign objects and adjacent construction until completion of project.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install roofing, trim and ridges according to manufacturer's recommencations over 15 lb. felt. Scatter nail or staple felt.

B. Apply a 1/4" bead of exterior caulking as recommended by manufacturer at all end laps and at ridge cap laps.

3.2 Touch Ups

A. Only minor scratches and abrasions is allowed to be touched up. Any other damaged material is replaced.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to the New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 07412

SECTION 07460
Utility Building: Exterior Finish

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Direct application of Portland cement plaster to CMU brick.
2. Typical 2-coat proprietary plaster system
3. Finish coat color.

1.3 SUBMITTALS

A. Contractor shall submit final color selection in the form of a contract submittal to COR for approval prior to applying finish color coat.

1.4 QUALITY ASSURANCE

A. Worker Qualifications: Engage an experienced stucco company that can confirm best practice techniques for commercial grade finish product given the direct application of plaster to CMU brick.

B. Ensure each layer is free of cracking, properly floated and has the specified finish texture per the drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's unopened packages or bundles with labels intact.

B. Store materials in a dry, well-ventilated, weathertight place. Comply with manufacturer's written instructions for storage, handling, and protection.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written

instructions and if the substrate is not excessively wet beyond minimal requirements for plastering.

1.7 WARRANTY

A. Special Project Warranty: Submit a written warranty, executed by either the contractor/ or subcontractor (whomever performs the plastering/stuccoing) agreeing to repair or replace any failures and/or excessive cracking in the finish layer or workmanship within the specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering. Fading is defined as loss of color, after cleaning with product recommended by manufacturer.

1. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers/product vendors shall be the contractors choice, subject to approval by COR for any specialized products proposed by contractor. NOTE: contractor shall use the same vendor for associated materials for quality assurance and consistency purposes.

2.2 ACCESSORIES

A. Plaster Stops: Use typical plaster stops only as regulated by applicable building codes related to plaster/stucco.

2.3 Colors

A. Finish color shall match that of the existing building in and around the compound. Anticipated color is buckskin/tan. Final color selection shall be approved by COR prior to purchase and/or application

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for substrates, installation tolerances, and other conditions affecting the application of plaster/stucco. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing as applicable.

3.3 INSTALLATION

A. General: Comply with recommendations of the experienced stucco company as specified in item 1.4.A of this section.

PART 4 – MEASUREMENT AND PAYMENT

The work associated with the section will be measured as a Lump Sum item and be paid through line item 07460(01).

END OF SECTION 07460

SECTION 07600
FLASHING AND SHEET METAL

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies work related to flashing and sheet metal, exposed metal trim and fascia units, laminated and composition flashing, integral masonry flashings as specified in Specification 04200 - Concrete Masonry Unit, roofing accessories installed integral with roofing panels are specified in roofing system sections as roofing work, and roof accessory units of premanufactured, set-on type as specified, in Section 07412, Preformed Metal Roofing, as Shown on the Drawings.

NOTE: Flashing and sheet metal components can be ordered as a package with preformed metal roofing packages provided by the local supplier *Highway 64 Metal Roofing* noted in Section 07412.2.1

If not ordered as a package deal from that vendor, all flashing and sheet metal shall conform to the requirements of this section.

1.2 SUBMITTALS

A. Submit product data for Flashing, Sheet Metal and Accessories which includes Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

B. Shop drawings show layout, profiles, methods of joining and anchorage details, including major counterflashings, trim/fascia units, scuppers and expansion joint systems.

C. Flashing and sheet metal shall be purchased from the same vendor as the preformed metal roofing supplier, or a vetted partener to ensure compatibaility on installation, color, texture, finish etc.

PART 2 – PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM MATERIALS

A. Zinc-Coated Steel - Commercial quality with .20 percent copper, ASTM A 526 except ASTM A 527 for lock-forming, G90 hot-dip galvanized, mill phospatized where indicated for painting; 0.0359-inch thick (20 gage) except as otherwise indicated.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners are the same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

B. Bituminous Coating - SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

C. Elastomeric Sealant - Generic type recommened by manufacturer of metal or fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07900 – Sealants.

D. Adhesives - Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.

E. Metal Accessories - Provide sheet metal clips, vents, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.

F. Elastic Flashing Filler - Closed-cell polyethytlene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

G. Roofing Cement - ASTM D 2822, asphaltic.

2.3 FABRICATED UNITS

A. General Metal Fabrication – Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams - Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

C. Expansion Provisions - Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges not less than 1 inch deep, filled with mastic sealant which is concealed within joints.

D. Sealant Joints - Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

E. Separations - Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 – EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor

units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams that will be permanently watertight and weatherproof.

B. Underlayment - Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Contractor provides procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Final Inspection.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 07600

SECTION 07900
SEALANTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. The work of this section consists of furnishing and installing sealants to provide a barrier against air, water, moisture, or dirt, and where needed for appearance.

1.2 SUBMITTALS

A. As specified in Section 01301- Manufacturer's technical data and application instructions; and samples of sealant colors.

1.3 QUALITY ASSURANCE

A. Contractor shall have copies of referenced ASTM standards available on the job site.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and store in a protected area at temperatures recommended by manufacturer.

1.5 PROJECT/SITE CONDITIONS

A. Install sealants only in favorable weather conditions as defined in ASTM C962.

B. To help balance extension and compression of sealants in exterior working joints, install sealants at substrate temperatures as near as possible to sixty (60) degrees Fahrenheit.

PART 2 – PRODUCTS

2.1 MANUFACTURERS (OR APPROVED EQUAL):

A. Backer Rod Manufacturing and Supply Company, Denver, Colorado.

B. General Electric Company, Waterford, New York.

C. Pecora Corporation, Harleysville, Pennsylvania.

D. Sika Chemical Corporation, Lyndhurst, New Jersey.

E. Sonneborn-Contech, Minneapolis, Minnesota.

F. Tremco, Cleveland, Ohio.

G. Williams Products, Inc., Troy, Michigan.

2.2 EXTERIOR SEALANTS

A. Vertical Surfaces - Silicone or urethane; ASTM C920, Type S, Grade NS, Class 25, Use M, A, or O as applicable.

B. Horizontal Surfaces in Traffic Areas – Urethane; ASTM C920, Type S or M, Grade P, Class 25, Use T; Grade NS, Use T, in areas with slopes exceeding one (1) percent.

2.3 INTERIOR SEALANTS

A. Vertical Surfaces, Movement Anticipated - Silicone or urethane; ASTM C920, Type S,

Grade NS, Class 25, Use M, A, or O as applicable.

B. Horizontal Surfaces in Traffic Areas - Urethane. ASTM C920, Type S or M, Grade P, Class 25, Use T. Grade NS, Use T, in areas with slopes exceeding 1 percent.

C. Horizontal Surfaces in Nontraffic Areas - ASTM C920, Type S, Grade P, Class 25, Use NT. Grade NS, Use NT, in areas with slopes exceeding one (1) percent.

D. Vertical and Horizontal Surfaces in Humid Areas - ASTM C920, Type S, Grade NS, Class 12-1/2, Use O.

E. Vertical and Horizontal Surfaces, Dry Areas Only, No Movement Anticipated - Single component water-based latex, paintable, ASTM C834.

2.4 JOINT FILLERS

A. ASTM C962, Type A, rod stock closed cell polyethylene foam, closed cell neoprene foam, or open cell urethane foam recommended by sealant manufacturer for compatibility with sealant and primer.

2.5 BOND BREAKER TAPE

A. Colored polyethylene pressure sensitive tape, minimum thickness 0.012 inch.

2.6 PRIMER

A. Use primer if sealant manufacturer recommends it for anticipated substrates and environmental conditions.

PART 3 – EXECUTION

3.1 SEALANTS

A. Follow sealant manufacturer's instructions for installation of sealants, joint fillers, bond breakers, and primers.

B. Tool joints concave.

C. Install latex sealants in accordance with ASTM C790.

D. Install elastomeric sealants in accordance with ASTM C962.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 07900

SECTION 08110
STANDARD STEEL DOORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Provide and install exterior standard steel doors, frames and hardware. Sizes, locations and gauge are as shown on the drawings.

1.2 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

1.3 SUBMITTALS

A. Submit manufacturer's technical product data substantiating that products comply with requirements.

1.4 STORAGE & HANDLING

A. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide a minimum of 1/4" spaces between stacked doors to promote air circulation.

PART 2 – PRODUCTS

2.1 DOOR & FRAME

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.

D. Supports and Anchors: Fabricated using not less than 18-gauge galvanized sheet steel.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except use “hot-dip galvanized” items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

F. Primer: Rust-inhibitive primer, either air-drying or baking, suitable as a base for specified finish paints, as indicated under Specification 09901 - Painting.

G. Finish: Two coats of exterior alkyd enamel paint, as indicated under Specification 09901 - Painting.

H. Standard Steel Doors: Comply with ANSI/SDI-100, Grade III, 16 gauge extra heavy duty, Model 3, seamless hollow hot-dipped galvanized steel door with 14 gauge lock rail,

12 gauge hinge rail, 20 gauge vertical ribs at 6" o.c. and lock reinforcing. Some doors have door levers and some do not have door levers.

I. Standard Steel Frames: Steel frame construction conforms to Steel Door Institute Standard ANSI A250 standards for exterior applications. Fastenings are concealed, unless otherwise indicated. Fabricate frames of minimum 16-gauge cold rolled steel with mitered and welded corners.

2.2 HARDWARE

A. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

B. Hinges: Stanley heavy duty style for hollow metal doors.

C. Finish Hardware Preparation

1. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with Accessories & Hardware Schedule and templates provided by hardware supplier.

2. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

D. Reinforcement: Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

E. Door Silencers: Provide three silencers per jamb.

F. Anchors: 18 gauge steel, 3 per jamb.

G. Lockset and Deadbolt: Type and style of locksets and deadbolts are as shown on drawings and specified in section 08710 - Finish Hardware. All deadbolts shall be keyed alike.

H. Door Closures and Door Sweeps: Type of door closure and door sweep are specified in Section 08710 - Finish Hardware.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Installation: Install standard steel doors, frames and accessories as shown on drawings and per manufacturer's recommendations.

3.2 PLACING FRAMES

A. Comply with provisions of ANSI/SDI A250.11 - "Recommended Erection Instructions For Steel Frames" unless otherwise indicated.

B. Place frames prior to construction of enclosing walls and ceilings.

C. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set.

D. Install frames with heads level and maintain jamb plumb and square.

E. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

3.3 DOOR INSTALLATION

A. Fit metal doors accurately in frames in accordance with NFPA Std. No. 80

B. Doors shall be fitted to 3/32" clearance in frames and 1/2" over floors.

3.4 ADJUST AND CLEAN

A. Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air drying primer and repaint with the enamel specified under Section 09901 - Painting.

3.5 FINAL ADJUSTMENTS

A. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

B. Doors shall open, close and lock easily, without sticking.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 08110

SECTION 08360
GARAGE DOORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies overhead section garage doors.

1.2 WARRANTY

A. Provide 10-year rust-through warranty.

1.3 SUBMITTALS

A. Submit technical data and a service manual on the proposed garage door to the COR for approval prior to installation.

PART 2 – PRODUCTS

1.1 GARAGE DOOR

A. Furnish a torsion spring counter balance type door including the following features:

1. Springs. - oil tempered, low stress, torsion spring on continuous steel shaft.
2. Track - 2 inch bracket mount, 0.063 inch thick, zinc plated, 15 inch radius.
3. Lock and latch - 5 pin tumbler, single bar, and stile locking mechanism
4. Rollers - steel tired ball bearing rollers.
5. Cable - 1/8 inch diameter rustproof aircraft cable with lubricated hemp core, operating inside of vertical track
6. Door Sections - nominal 1-3/4 inch thick, polystyrene core insulation, 1/8 inch industrial exterior hardboard facings, factory prime painted.
7. Weatherstrip - black rubber or an approved equal.
8. Furnish a thermal break between external and internal steel skins for best energy efficiency.
9. Furnish durable, steel skins pressure bonded to energy-efficient polystyrene cores.
10. Furnish maintenance-free, prepainted finishes inside and out, triple coat, baked-on polyester top coat over phosphate coating.
11. Furnish galvanized, white-painted end stiles for attractive, finished look and DASMA 102 compliant.
12. Garage door shall be Holmes Gold Series, Model 240 (http://www.holmesgaragedoor.com/commercial.htm), or approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Fabricate to the size shown, with size as indicated on the Drawings.

B. Provide glued wood dowels and steel pins at all joints between stiles and rails.

C. Install door square and plumb and adjust to operate without binding.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 08360

SECTION 08710
FINISH HARDWARE

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section covers the furnishing and installing of finish hardware for doors, as required for a complete installation as shown on the hardware schedule and as specified herein.

1.2 SUBMITTALS

A. Submit manufacturer's literature for the finish hardware specified on the drawings.

B. Type, style and finish are shown on the drawings and any discrepancies will be brought to the attention of the COR before purchasing the hardware.

1.3 PRODUCT HANDLING

A. Hardware shall be delivered and stored in packages that permit handling without damage to the contents.

PART 2 – PRODUCTS

2.1 HARDWARE

A. Hardware shall be new, well manufactured commercial heavy-duty quality or better, free of defects, and suitable for use in the installation indicated.

B. Items found defective or deficient are removed and replaced.

C. Door Sweep and Threshold

1. Install compatible sweep and threshold to effectively eliminate rodent access.

2. Use the brown “Triple Seal Door Sweep” and ½-inch high extruded aluminum threshold with slotted holes; from AM Conservation Group, Inc. (2301 Charleston Regional Parkway, Charleston, SC 29492 USA, Tel 843.971.1414, 843.971.1467, Fax 843.971.1472, 843.849.8242, Order Line: 800.777.5655) or approved equal.

3. Products shall be fire labeled, tested to: UL 10B, and meet the requirements of: ASTM E-152, NFPA-252 and UBC-432.

D. Door Silencers: Three rubber door silencers per door jamb.

E. Locksets:

1. Locksets shall be of manufacturer's design, or approved equal, and shall comply with the following:

a.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Every hinged door shall have fitted hardware and installed as per manufacturer's recommendations. All hardware shall be installed straight.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to New Utility Building 10168(01). No separate payment will be made for this work.

END OF SECTION 08710

SECTION 09901
PAINTING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies painting and finishing.

B. The term paint, as used herein, includes alkyd resins, acrylics, epoxies, enamels, paints, stain, varnishes, lacquers and other applied materials whether used as prime, intermediate or finish coat.

C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts or labels.

1.2 LEAD-BASED PAINT PROHIBITION

A. No lead-based paint containing more than .06 percent lead by weight (calculated as lead metal) in the total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied, or both, is used in the construction of structures under this contract.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver material to the site in the original containers with labels intact and seals unbroken.

C. A portable unit for such storage is used and positioned where approved by the COR.

D. Remove cloths and waste material, which may constitute a fire hazard, from the project daily.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Use materials meeting the following referenced Federal Specifications (F.S.):

1. Filler, wood paste, F.S. TT-P-336;
2. Latex paint, F.S. TT-P-29;
3. Interior semigloss enamel, F.S. TT-E-508;
4. Paint, interior, F.S. TT-P-47.

2.2 STEEL DOORS

A. Color shall be brown and shall be approved by the COR upon submittal of the paint manufacturer's color chart.

2.3 FERROUS METAL - EXTERIOR

A. Semi-Gloss:

1. 1st coat: Rust-Oleum Rust-Inhibitive Primer, or approved equal.

2. 2nd coat: Semi-gloss alkyd enamel, FS TT-E-529C, Class A
3. 3rd coat: Semi-gloss alkyd enamel, FS TT-E-529C, Class A
4. First coat is not required on items delivered shop primed.

B. Flat:

1. 1st coat: Rust-Oleum Rust-Inhibitive Primer, or approved equal.
2. 2nd coat: Lusterless alkyd enamel, FS TT-E-527C
3. 3rd coat: Lusterless alkyd enamel, FS TT-E-527C
4. First coat is not required on items delivered shop primed.

2.4 ZINC COATED METAL – EXTERIOR

A. Semi-Gloss:

1. 1st coat: Zinc dust-zinc oxide primer, FS TT-P 641G, Type I
2. 2nd coat: Semi-gloss alkyd enamel, FS TT-E-529C, Class A
3. 3rd coat: Semi-gloss alkyd enamel, FS TT-E-529C, Class A

2.5 FERROUS METAL - INTERIOR

A. Semi-Gloss: Doors and frames, etc.

1. 1st coat: Oil alkyd primer, FS TT-P-636D
2. 2nd coat: Enamel undercoat, FS TT-E-543A
3. 3rd coat: Semi-gloss alkyd enamel, FS TT-E-509B
4. First coat not required on items that are shop primed.

2.6 ZINC COATED METAL - INTERIOR

A. Semi-Gloss:

1. 1st coat: Zinc dust-zinc oxide primer, FS TT-P-641G, Type I
2. 2nd coat: Enamel undercoat, FS TT-E-543A
3. 3rd coat: Semi-gloss alkyd enamel, FS TT-E-509B

2.7 GRAFFITI PROTECTION FOR SPLIT FACE & FLUTED CONCRETE UNITS

A. Use "*SUPER-KRETE Top Sealer*" (http://www.super-krete.com), or approved equal, for CMU walls and vertical concrete surfaces.

B. Protective coating is non-toxic and will not alter color, texture or any other physical characteristic of the surfaces.

2.8 CONCRETE SEALANT

A. Apply "SealMaxx Concrete Sealant" using manufacturer's recommendations (http://www.sealmaxxstl.com/concrete_sealant.html) or approved equal, to all exposed concrete surfaces.

PART 3 – EXECUTION

3.1 PREPARATION

A. With rough surfaces (e.g. split-faced CMU block) clean surfaces with high pressure spray prior to product application.

B. With rough wood, clean surfaces and cut out all pitch pockets, before produt application.

C. With other surfaces, sand and clean before finishing.

D. Maintain 60 degrees minimum temperature on all surfaces receiving paint.

E. Surrounding constructed and natural features are to be protected before painting or staining commences.

3.2 MIXING

A. All paints shall be the standard product of a paint manufacturer, delivered to the job in standard containers.

B. If paints are mixed from basic materials, mix on the job, as recommended by the manufacturer.

3.3 PAINTING OR STAINING

A. Painting or staining will not be performed during windy or rainy weather.

B. Priot to installation, products designated for stain or paint, will have one face coat applied before fabrication and one final coat after fabrication and installation.

C. Putty recessed nails after priming.

D. Application will meet current industry standards and manufacturer's recommendations.

E. Paint is compatible with the plastic and wood fiber materials specified.

F. Sticker marks from stacking will not be exposed.

G. Agitate stain during application to produce a uniform color throughout the project.

H. The minimum temperature of surfaces during all applications is sixty (60) degrees Fairinheit.

3.4 PAINTING METAL WORK (if not manufactured with specified color)

A. Paint all exposed metal.

B. Apply one prime coat (rustoleum) and two coats of exterior enamel, as previously specified.

C. Prime galvanized surfaces as needed.

3.5 CLEAN-UP

A. Paint spots, oil and stains of any material are removed from concrete surfaces and other surfaces not receiving paint finishes.

PART 4 – MEASUREMENT & PAYMENT

4.1 PAYMENT

A. The work covered by this section is incidental to 10168(01). No separate payment will be made for this work.

END OF SECTION 09901

SECTION 10168
NEW UTILITY BUILDING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies the construction of a CMU pump house building and related accessories including the construction of the footings, slab with floor drain, door, garage door, and metal roof, AS SHOWN ON DRAWINGS.

PART 2 – PRODUCTS

2.1 MISCELLANEOUS

A. All materials required under this section for the building construction are specified elsewhere or as SHOWN ON DRAWINGS, and shall meet the requirements set forth in the Architectural Barriers Act (ABA).

B. Floor drain shall be brass and two inches (2”) diameter with PVC pipe drainage where shown on the drawings and designated by the COR.

PART 3 – EXECUTION

3.1 BUILDING CONSTRUCTION

A. Construction of the pump house building shall be as specified elsewhere and as SHOWN ON DRAWINGS.

B. Construction shall meet all applicable Federal, State, and Local building codes.

C. Construction shall include the sealing of all holes the size of a dime or larger to prevent the entry of rodents.

D. The concrete floor in the plumbing chase area shall be sloped towards the floor drain and all floors shall be sealed as specified under Section 09901.

3.2 INSTALLATION

A. Installation of materials, interior wall, and accessories required in this section shall be as per manufacturer's recommendations, specifications above, and as SHOWN ON THE DRAWINGS.

B. The metal roof removable panel shall be placed over the well casing for future well maintenance.

C. All hardware, exterior doors and accessories installed shall meet the requirements set forth in ABA, guidelines for accessibility to persons with disabilities.

D. The interior wall shall have finished 3/8” plywood panels or as approved and shall be constructed up to the roof elevation and be painted white, as specified under Section 09901.

PART 4 – MEASUREMENT & PAYMENT

4.1 METHOD OF MEASUREMENT

A. Measurement will be of lump sum for the construction of a well house, CMU two room building including all required excavation, foundation, slab with floor drain, backfill, concrete, split face block, paneling, metal roofing with removable panel, vent, steel doors, hardware, paint and all other necessary materials for the completed sealed well house.

B. Measurement for the underground electrical service, meter base, panelboard, lights, switches, and outlets shall be paid in this section.

C. The pump house water piping and equipment installation is also included in this section.

4.2 PAYMENT

A. Payment will be at the contract unit price for each item as designated below and accepted. Payment will be made under:

DESCRIPTION	PAY UNIT
10168(01) New Utility Building	L.S.
10168(02) New Utility Building Electrical System	L.S.

END OF SECTION 10168

SECTION 15544
UTILITY BUILDING EQUIPMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. This section specifies installation of a new storage tank, all distribution piping, valves, float switch, meter, booster pump, chemical metering pump, hydropneumatic tank, contact tank, pressure switch, pump controls, solution tank, corporation stop and nozzle assemblies, sampling spigots, air release valves, pressure gauges, and for the plumbing specified in the utility building. Also to be included is a heating system. The system described in the drawings, specifications, utility plan and the connection of new distribution lines provides a complete and operable water system, meeting all regulations of the New Mexico Environment Department (NMED).

1.2 REFERENCES

A. All work to comply with the latest edition of The International Plumbing Code (IPC).

1.3 SUBMITTALS

A. Pipe, all valves, hydropneumatic and contact/storage tanks and booster pump equipment manufacturer's literature, installation and maintenance instructions and manufacturer's warranty paperwork is submitted to COR. Upon completion of the contract work, as-built drawings of the building piping is submitted to the COR. Contractor prepares a scaled piping plan including location of proposed equipment, piping and all appurtenances and connections to well house forcemain.

PART 2 PRODUCTS

2.1 PIPING

A. Use 2” Sch. 80 PVC in the treatment building with required supports and hangers. All piping runs perpendicular or at right angles to the floor and walls, in straight lines whenever possible.

B. Fittings are class or pressure rated as the same or greater than the pipe. The dry fit of all fittings are snug. Building up the joint to overcome a loose fit is not permitted. All fittings shall be glued fittings.

C. Unions shall Sch. 80 PVC be rated up to 235 (psi) @ 73 Degrees F unless otherwise agreed upon with COR.

D. All equipment and piping have adequate means to completely drain them using hose bibs or other valves and ports as approved by the COR.

E. All of the piping in the treatment building is adequately supported. Install isolation valves on all pressure guages. Install splash resistant covers on each of the plug receptacle faces where water piping exists.

2.2 VALVES

A. Isolation, equipment and drain valves are quarter-turn ball valves, sized to match piping, as submitted and approved by COR.

2.3 CHECK VALVE

A. A check valve in accordance with Section 02500-2.3.A shall be installed on line from the well head. The Contractor shall submit manufacturers literature and specifications for approval before installation. The unit shall prevent backflow into the well and be sized to match the source piping Shown on the Drawings.

2.4 FLOAT SWITCH

A. Contact tank float switch shall be a double piggyback variable level float switch. Float switch is manufactured by Zoeller Pump Co., 3649 Cane Run Road, Louisville, KY 40211-1961, or approved equal.

2.5 METER

A. A **5/8x3/4 in. Neptune T-10 (or approved equal)**, water meter with brass body shall be installed on line as Shown on the Drawings or approved by the COR. Fittings are incidental to the utility building.

2.6 BOOSTER PUMP

A. Pump shall be a centrifugal, 2 Hp unit, delivering 24 gpm at 72 psi, and designed for continuous duty and operates from a pressure signal from the hydropneumatic tank(s). Pump pumps to the hydropneumatic tank when pressure drops to 40 psi at the tank and turns off when pressure rises to 60 psi at the tank. Pump has a drain plug that drains all water from the pump. Pump is manufactured by Grundfos Pumps Corporation, 17100 W. 118th Terrace, Olathe, KS 66061, or approved equal. Pump shall have a circuited time clock that indicates the number of hours the pump has run. Pump shall have a nameplate with data indicating voltage, amps, flowrates, pressures, insulation class and other pertinent data for future replacement of the pump.

2.7 CHEMICAL METERING PUMP & SOLUTION TANK FOR TREATMENT BUILDING

A. Chemical metering pump shall be 45MHP2, Stenner Peristaltic Pump; 0.2-0.3 gpd – 100(psi)- Adjustable – single head - #1Tube complete with a STS15NC – 15 Gallon Stenner Chemical Tank (or approved equal).

2.8 HYDROPNEUMATIC TANK

A. Corrosion proof, polypropylene inner shell with fiberglass filament wound epoxy resin exterior and polyurethane aircell. 1-1/4 inch MPT brass system connection and PVC bottom drain. 24 inch nominal diameter, 119 gallon tank volume, maximum operating pressure of 125 psi. Well Mate Model WM-35B by Structural Fibers Division of Essef Corporation, Chardon, OH 44024, Ph. 440-286-4116 or approved equal.

2.9 WATER STORAGE TANK

A. The water tank shall have a 2500-gallon capacity, NSF Approved, and White Translucent to read the water level from the outside. (Dimension shall be such that the tank fits inside the new utility building) Two options are from Norwesco (https://www.norwesco.com/products/above-ground-tanks/vertical-storage) or Den Hartog Industries (https://www.denhartogindustries.com/vertical-tanks/) Submit product info to COR for approval before ordering. Regarding the Norwesco option, as of 10/4/2023, the manufacturing plant in Lancaster, Ohio was one of only 2 of their locations producing the NSF model.

B. The tank shall have a 2" overflow outlet on the side of the tank, towards the top, dropping down to no closer than 24" above the floor. This shall also have a 24-mesh stainless steel screen. This will double as the vent.

2.10 WIRELESS TELEMETRY

A. Ritron QuickTalk RQT. 2-watt industrial-grade radio transmitter to be located at the new pump house.

B. Ritron TeleSwitch. Switch to be located at the well house to turn the submersible well pump on and off.

2.11 CORPORATION STOP AND NOZZLE ASSEMBLIES

A. Corporation Stop and nozzle assembly shall be by Liquid Metronics Model No. 10998, 3/4-inch NPT bronze corporation stop with CPVC nozzle assembly or approved equal.

2.12 SAMPLING SPIGOT TAPS

A. Two brass assembly spigots shall be installed inside the treatment building. One will be a raw well water sample tap before it is treated. And one will be after leaving the tank, after the water is treated. The spigot for raw water shall be labeled as "Raw Tap."

2.13 AIR RELEASE VALVE:

A. ½-inch NPT, as distributed by McMaster-Carr Supply Co., New Brunswick, NJ, or approved equal.

2.14 PRESSURE GAUGES:

A. Bottom mount 1/4" NPT, enamel coated steel case, copper alloy bourdon type, range in psi as shown on the drawings.

B. 3-1/2" dial, +/- 1 percent at mid-range, graduations at least one tenth of figure intervals.

C. Series H Quality Gauge and gauge cock by Marsh-Marshalltown Instruments, Newell, WV 26050, Ph. 304/387-1200 or approved equal.

2.15 HEATING SYSTEM:

A. Heating system shall be adequately sized to maintain user desired temperatures during the winter. Building square footage = 170 square feet.

B. Temperature shall be adjustable.

PART 3 EXECUTION

3.1 LAYOUT

A. The layout of the piping and equipment is submitted by the Contractor to the COR for approval prior to installation.

B. The submittal shall include a drawing of the building floor plan with the submitted equipment placed accurately and dimensions noted.

C. The COR will approve the layout of all piping and equipment before installation and the placement provides adequate maintenance areas for equipment and required clearances for the electrical panelboards and equipment.

D. Horizontal deflections in the lines are made with the appropriate fittings. Avoid excessive bending of the pipes. All reducers, couplings, etc. are installed in accordance with UPC. The piping that is parallel to the floor is placed at a minimum height of two (2) feet above the floor, or as approved.

E. All work complies with UPC requirements and AWWA guidelines and meets all regulations of the NMED Drinking Water Bureau. Install galvanized unions on each side of the valves, on pressure gauges and at all equipment connections.

3.2 PUMP INSTALLATION

A. Mount the pump using four concrete expansion anchors to ensure stability. In accordance with NEC Codes, if pump is plugged into a wall receptacle, wall receptacle is protected from water splashing should a leak in the building develop.

3.3 PUMP PIPING

A. A minimum length of straight piping, equivalent to 5 pipe size diameters, is used between the pump suction inlet and any plumbing fittings (elbows, valves, etc.). Piping has pipe unions on both suction and supply lines for ease of pump removal from the system. A check valve is installed on the suction side of the pump. A liquid-filled pressure gauge, with a range of 0-150 psi, is installed on the supply line with an isolation valve from the main. Full port ball valves are installed on both the suction and supply sides of the pump. A relief valve is installed on the supply side of the pump to operate at 150 psi after the testing is accepted.

3.4 PRESSURE TESTING

A. All piping used in the final system is subjected to a pressure test. The test uses water (not air) as the testing medium. Use AWWA C600 guidelines as approved by the COR. No amount of leakage is acceptable. Leaks in the new piping and connections are repaired by the Contractor at no additional cost to the Government.

3.5 DISINFECTION & BACTERIOLOGICAL TESTING

A. See Specification 02505 – Disinfection of Water Systems

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Measurement will be for the water system piping and elements furnished and installed as specified above and as shown on the drawings. The treatment building piping and equipment described herein includes piping, fittings, all valves, booster pump, contact tank and all installation, testing and disinfection, for a complete and operational drinking water system, as accepted.

4.2 BASIS OF PAYMENT

A. Payment for this work is included in Pay Item 10168(01) New Utility Building.

END OF SECTION 15544

SECTION 16010
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. All electrical work shall be performed by a licensed & certified electrician, with current certification for work in the State of New Mexico.

B. Equipment and materials are furnished and installed to provide required electrical service to one (1) utility building.

C. Final rough-in locations are verified, and approved by COR, using field measurements and the requirements of the actual equipment to be connected.

D. Electrical equipment and materials installation are coordinated with other building components. Chases, slots and openings in building components are arranged to allow for electrical installations.

E. Connection of electrical systems are coordinated with underground utilities and services. Requirements of the governing regulations of the Kit Carson Electric Cooperative. (KCEC) are met during construction and installation. The US Forest Service shall coordinate the new service connection with Kit Carson, additionally USFS will pay Kit Carson for their services.

F. Materials and installation are in full accordance with the latest requirements of the National Electrical Code. Nothing in these drawings and specifications is to be construed to permit work not conforming to these codes.

G. Products are delivered to project identified with accurate names, model numbers, types, grades, compliance labels and similar information necessary for identification. Products are adequately packaged and protected to prevent damage during shipment, storage and handling.

H. Permanent operational data nameplates are provided for each electrical item indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances and other essential data.

I. All warranty information, parts lists, operating manuals and names of suppliers of all equipment in this contract, are provided. All light fixtures, lamps and lenses are cleaned and operational prior to final project acceptance.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

PART 4 MEASUREMENT AND PAYMENT

The work covered by this section shall be paid out through line item 10168(02) Utility Buidling Electrical.

END OF SPECIFICATION 16010

SECTION 16050
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 DESCRIPTION

A. All work performed in this contract shall comply with the latest edition of the National Electrical Code, see Item 01090 - Reference Standards. Nothing written in these specifications is to be construed as providing relief from any requirements of the National Electrical Code.

1.2 SUBMITTALS

A. Contractor shall submit an electrical diagram, conductor sizes, grounding conductor size, method of grounding, size and location of the main distribution panel for the new utility building. Panel shall be located in the treatment building. For bidding purposes, the MDP shall be a 200 amp panel, unless otherwise advised by a certified electrician and/or Professional Electrical Engineer. MDP sizing shall be documented and presented to the COR as a contract submittal for approval by COR. All electrical design work shall be performed by a certified electrician and/or electrical engineer with current registration as a Professional Engineer in the State of New Mexico with appropriate education and experience in the work being performed. Submit certification upon request by the COR. All electrical work shall be performed by a licensed electrician.

B. Materials furnished for inclusion in the work shall be designed, built, and tested in accordance with applicable NEMA standards, shall be approved and labeled by the Underwriters' Laboratories, Inc. and shall be new.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES

A. Except as otherwise indicated on drawings, fused or non-fused disconnects are the general duty type, horsepower rated, motor circuit switches. Contacts are completely visible with the cover open and are quick-make, quick-break type. The switch has provisions for padlocking the operating handle in the “off” position and the front cover in the closed position. The switch enclosures are NEMA 3R. All switches are rated for use at 240 volts and be of the rating required for the application involved. Fused switches utilize Class R fuse holders and fuses unless otherwise indicated.

2.2 WIRE AND CABLES

A. Wire and cable comply in all respects with current UL standards where applicable. Unless otherwise specified, all conductors are annealed copper and stranded except #10 and 12 branch circuit cables may be solid. Grounding conductors are required for all

circuits. Conduit is not allowed for use as the equipment ground. Minimum size wire used for power circuits is #12 AWG copper:

1. In conduit underground and wet locations, insulation is type TW, THW or THWN.
2. In conduit above ground in dry locations, insulation is type THWN or THHN.
3. Wiring underground and not in conduit is type UF or USE.

2.3 CONDUIT

A. Rigid Metallic Conduit is galvanized coated ferrous pipe manufactured and marked for use as electrical conduit. This classification includes Intermediate Metal Conduit (IMC). Plastic-coated rigid steel and IMC conduit are also acceptable.

B. Rigid Non-Metallic conduit is schedule 40 PVC manufactured to NEMA TC-2 and WC 1094 specifications.

C. Electrical Metallic Tubing (EMT) is galvanized coated ferrous tubing manufactured and marked for use as electrical conduit.

D. Flexible Metal Conduit is UL labeled zinc coated steel. Conduit used in damp or corrosive atmospheres is liquid-tight and conforms to UL 360.

E. Fittings are the same material as the conduit being connected. Fittings for use with metal conduit are either the threaded or the compression type. Set screw fittings are not used. PVC conduit is joined using either threaded or socket type adapters, connected by the solvent welding process.

2.4 PANELBOARDS

A. Typed directories are furnished and mounted behind a transparent protective coating. Where more than one (1) panel is required, all panels are from the same manufacturer and are keyed alike.

B. All panels are provided with an isolated neutral bus for connection of circuit neutral conductors and separate ground bus bonded to the steel cabinet for connection of grounding conductors.

C. Minimum interrupting capacity of all circuit breakers are 10,000 amperes, unless otherwise indicated.

2.5 JUNCTION BOXES

A. Exposed and surface mounted boxes used with metallic conduit and mounted outdoors are cast metal with weather –proof covers. PVC "F" series boxes may be used outdoors or in wet locations with PVC conduit. Receptacle and switch boxes are complete with weatherproof spring loaded hinges. Where use is exposed to the rain, covers are constructed in such a manner as to protect both the receptacle and the cord and plug assembly in accordance with NEC 410-57 and be UL listed "Raintite while in Use".

B. Exposed and surface mounted metal boxes indoors are the “handy” type with rounded edges and corners.

2.6 WIRING DEVICES

A. Toggle type AC switches are specification grade rated 15 or 20 amp, 120 volt AC. Switches are rated to the load being controlled.

B. Receptacles are specification grade duplex 3-wire ground type rated for 15 or 20 amps @125 volts AC or DC, Hubble or Leviton 5262-I or equal. All receptacles are grounded.

C. Ground fault circuit interrupter receptacles (GFCI) are UL listed and rated for 15 or 20 amps as required. All receptacles located in the toilet rooms, plumbing alleys, chases, within 6’ of faucets, outside or in damp or wet locations are GFCI type.

D. Device plates for interior concealed boxes are Leviton 86000 series or equal. Device plates for receptacles located on a porch, in a plumbing alley or chase, or in a damp or wet location, have spring loaded gasketed corrosion resistant covers with dye-cast zinc finish, Leviton 4990 or equal. If located outside exposed to the rain, covers are UL-listed “Raintite while in Use” as described above.

2.7 SPLICING AND TERMINATION COMPONENTS

A. “Wire nuts”, “wing nuts” and similar devices are used for splicing conductors No. 10 AWG and smaller within junction, switch, and receptacle boxes. Insulated pressure-type connectors are used for splicing larger conductors.

B. Provide solderless terminal lugs for stranded conductors.

C. Provide splicer reducers (such as Ilsco type SPA of the appropriate size) for connecting flexible leads to be attached to overcurrent device terminals to large feeder conductors (such as conductors sized large to prevent voltage drop, and the full-sized conductor do fit the terminal). Do not use split bolt connectors, two bolt connectors or similar devices unless approved by the Engineer.

D. Splices in direct bury conductors and cable are compression type, Ilsco AS, CT, CTL or equal. The proper hydraulic crimp tools and dies are used to install compression sleeves. The splices are insulated with heavy wall heat shrink tubing or flexible splice kits, Plymouth “Plyflex” or equal. Thin wall heat shrink is not acceptable.

2.8 GROUND RODS

A. Ground rods are copper coated steel rods 5/8” x 10’ long conforming to UL Specification No. 467. Connection of grounding electrode conductors to ground rods are with cast bronze, one piece ground rod clamps listed for burial in earth or concrete, Ilsco BGRC-58 or equal. Cast brass ground clamps are used for bonding to water pipe as indicated.

PART 3 EXECUTION

3.1 CONDUIT AND BOXES:

A. All conduit penetrating concrete slabs or installed above ground to switches and boxes is rigid metallic conduit or schedule 80 PVC unless otherwise indicated or required by Kit Carson Electric Cooperative. All conduit passing through concrete is sleeved with two (2) layers of 15# felt or by other approved methods.

B. Do not use EMT for feeder circuits, above ground, encased in concrete, in areas subject to severe physical damage, in hazardous or outdoor work areas, or in sizes larger than two (2) inches.

C. Except as indicated otherwise, exposed conduit above switches or two (2) feet above the floor are either EMT or PVC.

D. Make changes in direction using field made bends or fittings as appropriate, but do not install crushed or deformed conduits.

E. Fasten metal conduits to boxes with two locknuts where required by the NEC, where insulated bushings are used or where bushings cannot be brought into firm contact with the box. Locknuts are the type with sharp edges for digging into the wall of the box. Install bushings on the ends, and of the insulating type where conductors emerge.

F. If no size is specified, conduit shall be sized in accordance with NEC with a minimum size of three quarters inch (¾").

G. Provide insulating bushings wherever insulated cables exit conduit to become direct bury.

3.2 WIRING

A. All conduit runs either perpendicular or horizontal to the building and is supported as required in the NEC with a maximum support spacing of five (5) feet.

B. All 120 and 240 volt circuits are equipped with a separate neutral (as required) and a ground wire. No common neutrals are allowed.

3.3 GROUNDING

A. All equipment is grounded in strict accordance with requirements of the National Electrical Code. Ground rods are installed outside drip lines or drainages.

3.4 SPLICES AND TERMINATIONS

A. Direct bury conductors may be spliced with compression sleeves covered with heavy wall heat shrink tubing directly in the trench. Splices in underground cable in conduit must be approved by Mora-San Miguel Electric CO-OP and must be a "PC" style

junction box installed with the cover at grade. Box is identified with the proper logo (Electric) and is watertight in accordance with NEMA 4. Use Quazite composolite "PC" style gasketed box of the appropriate size, stackable as required to achieve the proper volume and depth. Use standard cover unless the installation is in a driveway, parking area, campground spur or similar off-road application, where a heavy duty cover is used.

B. Run an insulated green equipment grounding conductor (bare if a part of a non-metallic cable assembly) for all feeder and branch circuits. Do not use conduit as the sole grounding path. Make appropriate connections to driven ground rods outside building drip lines and other grounding electrodes as indicated above and on the drawings.

C. Test all wiring to assure that no short circuits or accidental grounds exist. Test each device subject to manual operation. Test the grounding system to assure continuity and that the resistance to ground is not excessive.

PART 4 MEASUREMENT AND PAYMENT

The work covered by this section shall be paid out through line item 10168(02) Utility Buidling Electrical.

END OF SECTION 16050

SECTION 16400
UNDERGROUND ELECTRICAL SERVICE

PART 1 GENERAL

1.1 DESCRIPTION

A. Installation of the underground electrical distribution system conforms to the *applicable* requirements of **Kit Carson Electric Cooperative**. (KCEC).

1.2 SUBMITTALS

A. Contractor submits a design for underground electrical system that includes detailed electrical schematic drawings indicating meter, conduit and wire sizes, and manufacturer's literature for installation, operation and maintenance for all equipment to the COR for approval prior to installation. All electrical installations are in compliance with all applicable codes. All electrical work shall be performed by a licensed electrician.

1.3 PROJECT COORDINATION

A. The existing electrical service located in the district compound for this contract is owned and operated by the Carson National Forest and KCEC.

B. Work is coordinated by the Contractor for the installation of the cable and service by the power supplier and shall conform to the specifications in this contract.

C. The Contractor shall install all cable and make all connections from the buried power line/pole, cable or conductor installation within the Contractor installed conduit, meter and other miscellaneous items.

D. Schedule any power outages with the COR.

1.4 SYSTEM DESCRIPTION

A. The primary electrical distribution system consists of overhead electric lines that currently dead-end behind the District Office.

PART 2 PRODUCTS

2.1 DESCRIPTION

A. The conductors, power connections, meters and all related splicing necessary to complete the underground power systems will be supplied and installed by the Contractor. All material required for the complete installation are provided by the Contractor. This includes:

1. Secondary Underground Electric Lines: 4/0 Copper wire at the quantity shown in the bid schedule, unless otherwise specified by KCEC and approved by COR.
2. Meter Base & Secondary Electric Pole: Contractor shall furnish and install a meter base & secondary mounting pole compatible with KCEC equipment. Coordination with KCEC will be the responsibility of the US Forest Service. Contractor shall notify the US Forest Service when this item in complete for KCEC coordination purposes.
3. Main Distribution Panel: Adequately sized for anticipated loads in new utility building
4. Conduit –2" schedule 80 PVC on all buried electric lines
5. Warning Tape for UG installations - as specified under Specification 02221 - Excavation, Backfill, And Compaction For Utilities.

PART 3 EXECUTION

3.1 DESCRIPTION

A. Excavate and prepare all trenches to receive the primary and secondary conductors or conduit. All labor in the trench is performed by the Contractor. This includes trenching, bedding the trench, installing the conduit with pull string, furnishing the bedding material, select backfill placement, compacting backfill, finish grading of the completed installation, seeding the disturbed areas and all other work required to complete the installation.

B. Meter base and termination box installation, wiring and any temporary service pedestals are the responsibility of the Contractor. The Contractor is responsible for the power used during construction activities and staging areas.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT FOR COMPLETED, WORKING SYSTEM WILL BE MADE UNDER THE FOLLOWING:

A.

Pay Item	Description	Pay Unit
16400(01)	Trenching, Underground Electric Lines, & Panels	LF (AQ)
16400(02)	Electric Meter Base & Secondary Electric Pole	Lump Sum

END OF SPECIFICATION 16400

SECTION 16450
GROUNDING

PART 1 GENERAL

1.1 DESCRIPTION

A. This section specifies grounding systems for electric service and equipment.

PART 2 PRODUCTS

2.1 GROUNDING SYSTEM

A. Materials, equipment and devices related to the grounding system are specified under other sections of these specifications.

PART 3 EXECUTION

3.1 GENERAL

A. Install two separate grounding systems:
   1. A service grounding system
   2. An equipment grounding system.

B. The service equipment, conduit systems, supports, cabinets, equipment and neutral conductor are grounded in accordance with the minimum code requirements and as further indicated on the drawings or specified. Connect the two grounding systems together only at the main service equipment and at the secondary terminals of transformers creating separately derived distribution systems such as dry-type transformers.

3.2 SERVICE GROUNDING SYSTEM

A. General: The service grounding system is provided for the AC service neutral ground. Current return conductors, such as neutrals of the service entrance, feeder circuits and branch circuits, are not used for equipment grounding. Neutral bars are not bonded to the enclosures of panelboards, etc., which are not part of the main service equipment. Except for separately derived systems, the neutral conductors are grounded only in the main service equipment.

B. Common Ground Point: Establish one common ground point in the main service equipment by interconnecting the insulated neutral bus (or bar), the uninsulated equipment ground bus (or bar), and service grounding electrode conductor.

C. Neutral Disconnecting Means: Install a neutral disconnecting means in the main service equipment for disconnecting and isolating the neutral bus from the common ground. The disconnecting means may be disconnecting links in the interconnection between the insulated neutral and uninsulated equipment ground.

D. Neutral Bars: Provide an insulated neutral bar, separate from the uninsulated equipment ground bar, in all panelboards, transformers, starters, disconnect switches, cabinets, etc., which have neutral connections.

3.3 EQUIPMENT GROUNDING SYSTEM

A. General: Provide a complete equipment grounding system in accordance with the minimum code requirements and as further indicated on the drawings or specified. The equipment ground (green conductor) consists of metallic conditions to ground of non-current carrying metal parts of the wiring system or apparatus connected to the system.

B. Common Ground Point: Establish one common ground point as specified elsewhere in this section of the specifications for interconnection of the equipment grounding system and the service grounding electrode conductor.

C. Service Equipment Enclosure: Bond the enclosure of the main service equipment to the uninsulated equipment ground bus (or bar) with a conductor or bar sized for 25% of the largest service overcurrent device.

D. Ground Bar: Provide an uninsulated equipment ground bar, separate from any insulated neutral bar, in all switchboards, panelboards, transformers, motor control centers, starters, disconnect switches, cabinets, etc. for grounding the enclosure and for connecting other equipment ground conductors. The ground bar is an integrally mounted and braced bus bar in switchboards or a separately mounted bar adequately braced or bolted at the enclosure of other types of equipment. The ground bar is adequately braced or bolted to the enclosure after thoroughly cleaning both surfaces to assure good contact. Provide solderless pressure connectors for all conductor terminations. Number and size of pressure connectors on equipment grounding bars are as required for the termination of equipment grounding conductors. In addition to the active circuits, provide pressure connectors for all three-phase spares and spaces.

E. Conduits: Where metallic conduits shall terminate without mechanical connection to a metallic housing of electrical equipment by means of lock nut and bushings. Provide ground bushing connected with a bare copper conductor to the ground bar in the electrical equipment. Metallic conduits containing ground wiring are bonded to the ground wire at both conduit entrance and exit. Install grounding conductor in each non metallic conduit or duct except those used for telephone, sound, or low-voltage signals and in all flexible conduit that does not have a built-in ground conductor. Bond the conductor at both ends to the equipment grounding system.

F. Feeders and Branch Circuits: Provide a separate green insulated equipment grounding conductor for each single or three-phase feeder and each branch circuit with a three-phase protective device. Provide a separate green insulated equipment grounding conductor for

single phase branch circuits where indicated on the drawings. Install the required grounding conductor in the common conduit or raceway with the related phase and/or neutral conductors and connect to the box or cabinet grounding terminal. Where there are parallel feeders installed in more than one raceway, each raceway shall have a green insulated equipment ground conductor.

G. Devices: Install a minimum No. 12 green insulated equipment bonding conductor from a grounding terminal in the respective outlet or junction box to the green ground terminal of all receptacles and through flexible conduit to all light fixture housings.

H. Motors: Install a separate green insulated equipment bonding conductor from the equipment ground bar in the motor control center of separate starter through the conduit and flexible conduit to the ground terminal in the connection box mounted on the motor. Install the grounding conductor in the common conduit or raceway with the related motor circuit conductors.

3.4 SEPARATELY DERIVED SYSTEMS

A. Transformers creating separately derived distribution systems, such as dry-type transformers, utilize the equipment ground bars in the transformer enclosure for both secondary equipment ground and secondary neutral ground with separate grounding conductor extended to an approved ground electrode.

3.5 GROUNDING ELECTRODES

A. Service ground electrodes are utilized. One is the main cold water metallic water piping system and the other is a made electrode consisting of not less that twenty feet of bare copper conductor encased along the bottom of a concrete foundation footing which is in direct contact with the earth (NEC 250-83a). Make the connections to the cold water pipe inside the building at the point of entrance. The grounding electrode for separately derived systems is approved for this application.

3.6 GROUNDING CONDUCTORS

A. The grounding conductors for both service ground electrodes are insulated or bare copper, sized in accordance with NEC 250-94(a), including the conductor for the made electrode. The conductors are continuous without joint or splice and are installed in conduit with the conduit bonded to the conductor at each end. Install the conductor to permit the shortest and most direct path and terminate in the main service equipment on the common ground point. Equipment grounding conductors are green insulated conductors equivalent to the insulation on the associated phase conductor, but not less than Type TW. The equipment grounding conductor or straps are sized in accordance with NEC. Where one feeder serves a series of panelboards or transformers, the equipment grounding conductor is continuous without splices. Grounding conductors are not installed through metal-sheathed holes. All connections are available for inspection and maintenance.

3.7 GROUND CONNECTIONS

A. Clean surfaces thoroughly before applying ground lugs or clamps. If surface is coated the coating must be removed down to the bare metal. After the coating has been removed, apply a non-corrosive approved compound to cleaned surface and install lugs or clamps. Where galvanizing is removed from metal, it shall be painted or touched up with "Galvanox", or equal.

3.8 TESTS

A. Test the completed grounding system at the service ground bar and submit a written report to the COR for approval.

PART 4 MEASUREMENT AND PAYMENT

The work covered by this section is incidental to other items. No separate payment will be made for this work.

END OF SPECIFICATION 16450

SECTION 16500
LIGHTING EQUIPMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included in this section includes furnishing and installing interior and exterior lighting at the treatment building.

1.2 CONFORMANCE

A. Conform with applicable provisions of Specification 16010, Basic Electrical Requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish all lighting fixtures complete with lamps, sockets, wiring, fitters, hangers, plaster rings, canopies, etc. as required.

2.2 INTERIOR AND EXTERIOR LAMPS FOR TREATMENT BUILDING

A. Interior lamps are two 4’ fluorescent or LED light fixtures (each with 100-watt incandescent equivalent lighting), or approved equal.

B. Exterior fixture is a Lithonia Wall Pack: WPX1 LED P1 40K MVOLT DDBXD or an approved equal.

PART 3 EXECUTION

3.1 SUPPORTS

A. Support ceiling fixtures by anchorage to the ceiling only where the ceiling is concrete or masonry units. For ceilings of other construction, anchor ceiling fixtures to metal supports provided for that purpose of suitable strength and stability, adequately attached to and supported by joists, trusses, or other structural members, unless other methods of support are specifically approved by the COR. Where lay-in construction is used, fixtures are the lay-in type.

3.2 CLEAN-UP

A. At final inspection all fixtures and lighting equipment are in operating order, in perfect condition as to finish, clean and free from defects, dust, plaster or paint spots, completely

lamped and with the required glassware, reflectors, side panels, louvers or other components necessary to complete the fixtures.

3.3 TOP PLATES

A. All surface mounted fixtures are furnished with top plated whenever applicable.

3.4 SAFETY GUARDS

A. All open reflector type fixtures are equipped with lamp safety guards to prevent lamp fallout.

PART 4 MEASUREMENT AND PAYMENT

The work covered by this section is incidental to other items. No separate payment will be made for this work.

END OF SPECIFICATION 16500