FOREST SERVICE SUPPLEMENTAL SPECIFICATIONS

For

ASHLEY LAKE NORTH CAMPGROUND RENOVATION

OPTION ITEM 3

U.S.D.A Forest Service, Region 1
Flathead National Forest, Tally Lake Ranger District
Flathead County, Montana

SPECIFICATION INDEX
FOR
Ashley Lake North Campground Well House and Water System

GENERAL REQUIREMENTS

01010 - Summary of Work	2 pages
01103 – Measurement and Payment	1 pages
01300 - Submittals	1 pages
01601 - Mobilization	1 pages

SITE WORK

02071 – Removal of Structures and Obstructions	1 pages
02110 - Clearing and Grubbing	1 pages
02220 - Excavation and Backfill for Buildings	2 pages
02223 - Excavation and Backfill for Utilities	3 pages
02304 - Aggregate Base Course	2 pages
02510 - Water Lines and Appurtenances	8 pages

BUILDING CONSTRUCTION

13000 – Precast Concrete Utility Building	2 pages

MECHANICAL

15400 - Building Plumbing	3 pages
15146 - Submersible Pump	3 pages

ELECTRICAL

16110 – Building Electrical	3 pages

END OF SPECIFICATION INDEX

SUMMARY OF WORK - 01010

PART 1 - GENERAL

1.1 - Location

The project site "Ashley Lake North Campground" is a recreation site on the Tally Lake Ranger District of the Flathead National Forest. It is located approximately 20 miles west of Kalispell, Montana.

1.2 - Site Work and Utilities

General:

All work shall be completed in accordance with project specifications and drawings. The work includes all labor, material, and equipment necessary to perform the work specified.

Site work:

The project consists of developing a new wellhead, installation of a new contractor furnished, contractor installed precast concrete utility building (well house). Installation of well pump, plumbing and electrical controls. Installation of a water supply system.

1.3 - Timing of Work

It is intended the site shall be closed to the public during construction. No restrictions are placed on weekend work. Work shall be accomplished during the contract period of performance.

1.4 - Government-Furnished Facilities

1. The site is available to the Contractor for staging and storage during construction. Any damage resulting from the Contractor's use of the site will be repaired or replaced at the direction of the Contracting Officer.

2. Sanitary facilities for construction workers are available at the site.

3. All temporary services and use areas shall be completely removed and the areas restored upon completion of use.

4. Electricity is available at the site.

5. Potable water is not available at the site.

1.5 - Material Sources

All materials shall be obtained from a commercial source unless noted otherwise.

1.6 - Clean up and Disposal

Disposal of excess equipment waste material will be off National Forest Land and in compliance with local laws regarding disposal of construction waste. Natural organic debirs will be wasted on site.

1.7 - Subsurface Soils and Investigations

No auger borings, tests, or investigations have been made of the subsurface site conditions.

1.8 - Precautionary Measures

Protection of Work:

The Contractor shall take precautions to protect all work during the construction period and shall provide and maintain adequate protection during severe weather conditions to prevent damage to the work and the materials.

Safety:

The Contractor is responsible for safeguarding employees, public, existing facilities, and forest resources from his operations. The Contractor shall erect signs and fencing barricades as necessary to make unguarded operations safe. Signs and barricades shall be maintained at night and on weekends. Precautions such as lowering tractor blades and safely storing materials shall be practiced to prevent injury to others in the area.

Security:

No security shall be provided by the Government. The Contractor shall take all precautions deemed necessary to secure the worksite, improvements and equipment.

END OF SPECIFICATION 01010

MEASUREMENT AND PAYMENT - 01103

PART 1 - GENERAL

1.1 – Requirements:

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 – Payment:

One of the following methods of measurement for determining final payment is designated on the schedule of items for each pay item.

(a) Contract Quantities (CQ). These quantities denote the final number of units to be paid for under the terms of the contract. They are based upon the original design data available prior to solicitation of the project. Original design data include the design assumptions, calculations, drawings, and the presentation in the contract. Changes in the number of units of the originally contemplated work will not be made unless authorized under one or more of the following conditions:

(1) As a result of changes authorized by the Contracting Officer in the originally planned work. Minor changes or adjustments will not be considered changes in quantities.

(2) As a result of the Contracting Officer determining that errors exist in the original design to determine designed quantities, that cause a pay item to change by 15 percent.

(3) As a result of the Contractor submitting to the Contracting Officer a written request showing evidence of errors in the original design data used to determine design quantities that cause a pay item total to change by 15 percent or more. The evidence must be verifiable and consist of calculations, drawings, or other data that show how the designed quantity is believed to be in error.

Final payment will be made for the contract quantities at the unit price shown in the schedule of items, subject to the Variation in Quantities Provision.

(b) Actual Quantities (AQ). These quantities are determined from measurements of completed work.

(c) Lump Sum Quantities (LSQ). These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job. They will not be measured.

1.3 - Units of Measurement:

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

END OF SPECIFICATION 01103

SUBMITTALS - 01300

PART 1 - GENERAL

1.1 - Requirements

It will be 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 which involves the item. Contractor shall allow ten (10) days for processing of submittals by the Government.

Submittals may also be referred to as shop drawings.

1.2 - Manufacturer's Literature and Shop Drawings

Submit copies to the Contracting Officer for approval on the items required herein.

Submittal specifications are to be submitted in the following format:

A. The specifications and salient qualities of the item specified in the contract.

B. The specifications and salient qualities of the submittal item.

C. A listing of the differences and a comparison between the two, including but not limited to the structural qualities, operational qualities, any modifications necessary to accomplish installation of unit, and guarantee and warranty.

D. A cost comparison between the specified and submitted item(s) with the cost reduction benefit to the government or adequate justification for a cost increase to the government.

E. Shop drawings of submitted item(s) including wiring or layout diagrams.

If there are any modifications necessary to facilitate installation, a set of drawings showing installation of specified item and a set showing how the submittal item will be installed.

Submittals will be waived if Contractor furnishes exact item used for design when manufacturer's model, size, etc. are shown in the contract.

Submittals are required per the following sections:

1. 02304 – Aggregate Base Course; Certificate-of-Compliance of Aggregate Base
2. 02510 – Water Lines and Appurtenances
3. 15146 – Submersible Pumps
4. 15400 – Building Plumbing; Provide Product Data
5. 16110 - Building Electrical; Provide Product Data and an Electrical Plan

END OF SPECIFICATION 01300

MOBILIZATION - 01601

PART 1 - GENERAL

1.1 - Description

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 - NONE

PART 3 - EXECUTION- NONE

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

The 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.

(a) 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.

(b) 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.

(c) Upon completion of all work, any unpaid amount for mobilization will be paid.

4.2 - Payment

Payment will be made under:

PAY ITEM	DESCRIPTION	PAY UNIT
01601	Mobilization (Including Bonding Cost)	Lump Sum

END OF SPECIFICATION 01601

REMOVAL OF STRUCTURES AND OBSTRUCTIONS - 02071

PART 1 - GENERAL

1.1 - Description

This section specifies work requiring the removal and disposal of structures and obstructions within the project limits are shown on the drawings.

Existing equipment which is to become an integral part of the planned improvements shall be removed and reinstalled as shown on the drawings or specifications.

1.2 - Material Classification

Material to be excavated is unclassified.

1.3 - Related Work Specified Elsewhere

02220 - Excavation and Backfill for Buildings

PART 2 - PRODUCTS

None.

PART 3 - EXECUTION

3.1 - Disposal

All excess equipment materials removed and designated for disposal as shown on the drawings or specifications shall be removed from National Forest Lands and disposed of in accordance with local regulations regarding disposal of construction waste.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

Measurement will be the number of units completed and accepted, including removal, backfill, and disposal.

4.2 - Payment

This work is incidental to other items in this contract and direct separate payment will not be made.

END OF SPECIFICATION 02071

CLEARING AND GRUBBING - 02110

PART 1 - GENERAL

1.1 - Description

This section specifies clearing, grubbing, removing, and disposing of vegetation and debris. Work includes the protection from injury or defacement of trees designated to remain, and treatment or removal of damaged trees. This section covers work associated with roads and facilities construction such as buildings, utilities, etc.

PART 2 – PRODUCTS - None

PART 3 - EXECUTION

3.1 - Clearing

Clear all trees, shrubs, brush and other objects within the work area except the following:

(1) Live, sound, and firmly rooted trees which are designated to remain.
(2) Live brush and herbaceous plants which are designated to remain.
(3) Other objects designated to remain.

3.2 - Grubbing

Grub stumps and roots within the work area.

3.3 - Debris Disposal

Natural organic debris may be disposed of on National Forest Lands. Contractor shall dispose of excess equipment in accordance with local regulations regarding disposal of construction waste.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

This work will not be measured for separate payment.

4.2 - Payment

This work is incidental to other items in this contract and direct separate payment will not be made.

END OF SPECIFICATION 02110

EXCAVATION AND BACKFILL FOR BUILDINGS - 02220

PART 1 - GENERAL

1.1 - Description

This section covers excavation; furnishing, hauling, and placing backfill material; disposal of excess or unsuitable material; and grading for buildings.

1.2 - Related Sections

13100 – Precast Concrete Utility Building

1.3 - Material Classification

Material to be excavated is unclassified.

PART 2 - PRODUCTS

2.1 - Backfill Materials

Backfill materials shall contain no frozen or organic material.

Backfill materials shall consist of excavated material containing no rock larger than 3 inches.

PART 3 - EXECUTION

3.1 - Excavation

Excavate sub-soil in accordance with lines and levels required for construction of the building pad. During excavation, topsoil will be piled separately from underlying material. All material shall be piled in an orderly manner a sufficient distance from the banks of the excavation to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be utilized on the site. Whenever depth of excavation exceeds 5 feet, the surface shall be sloped back at 1-1/2 to 1 or the excavation shall be shored.

Conform to the dimensions and elevations indicated on the drawings. Prevent surface water from entering the excavation.

3.2 - Backfilling for Buildings

Prior to backfilling clean trash and debris from excavation. Prepare material to a water content that will permit proper compaction by either aerating the material if it is too wet, or spraying the material with water if it is too dry. Thoroughly mix each lift before compaction to assure uniform distribution of water content. Place backfill in lifts 12 inches or less and compact with mechanical tamper. Compact each layer with a minimum of 3 passes over the entire lift surface.

3.3 - Excess Material

Excess excavated material shall be used where needed by other parts of the contract.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

The work specified herein will not be measured for payment.

4.2 - Payment

This work is incidental to other items in this contract and direct separate item payment will not be made.

END OF SPECIFICATION 02220

EXCAVATION AND BACKFILL FOR UTILITIES - 02223

PART 1 - GENERAL

1.1 - Scope

This section covers excavation; furnishing, hauling, and placing backfill material; disposal of excess or unsuitable material; and grading for utilities.

1.2 - Related Work Specified Elsewhere

15400 – Building Plumbing
02510 – Waterlines and Appurtenances

1.3 - Class of Material

Material to be excavated for installation of utilities is unclassified.

1.4 - Approvals Required

Excavation Notify Contracting Officer when excavation is completed. Do not place pipe, bedding, or backfill until the excavation is approved by the Contracting Officer.

Backfill Do not place backfill until installation of pipe has been approved by the Contracting Officer.

PART 2 - PRODUCTS

2.1 - Backfill Materials

Backfill shall contain no frozen or organic material.

(a) Select Excavated Material Excavated material containing no rocks larger than 6 inches in largest dimension.

(b) Bedding/Shading Material Fine sand or soil with a maximum P.I. of 10, 100% passing the 3/8" sieve, without sharp chips or points.

PART 3 - EXECUTION

3.1 - Excavation

Excavation shall not begin until after clearing and grubbing work has been completed. Operations shall comply with the requirements and restrictions of OSHA.

All trenches shall be excavated in reasonably close conformity with the lines and grades shown on the drawings. Any shifting or change from the alignment and grade shown on the drawings must receive prior approval by the Contracting Officer in writing.

Lay utilities in continuous open trench. Short tunnel sections or boring may be used in special locations with the approval to the Contracting Officer.

Trim roots flush with trench wall.

3.2 – Over-excavation

Restore to grade any over-excavation by backfilling with bedding material.

3.3 - Wet Excavation

If water is encountered during trench excavation, provide adequate pumping equipment and piping to keep trench free from water and dispose of the water without damage to adjacent property. Separate payment will not be made for pumping of water from trenches or for excavation of material rendered unsuitable as a result of water encountered.

3.4 - Backsloping, Sheeting and Shoring

Backsloping of trench walls will be allowed only upon prior written approval of the Contracting Officer.

Remove all shoring and sheeting when construction is completed. Withdraw shoring in such a manner as to prevent trench wall from caving in while backfilling.

3.5 - Excavated Material

Pile excavated material at the side of the trench where it will provide the best protection for the work. Leave adequate space between the toe of the spoil pile and edge of trench, to prevent material from falling into the trench.

3.6 - Backfill

Before compacting backfill other than rock or sand, prepare material to a water content that will permit proper compaction by either aerating the material if it is too wet, or spraying the material with water if it is too dry. Thoroughly mix each lift before compaction to assure uniform distribution of water content. Do not compact material above pipe until there are 6 inches of cover over the pipe. There shall be no machine compaction within 6" of an electric cable or conduit. Compact each lift to the required density.

(a) Bedding and Shading Place in lifts 6 inches or less and compact with a minimum of 3 passes over the entire lift surface.

(b) Select Excavated Material and Conduit Backfill Distribute large rocks so they are individually surrounded by fine materials. Place 12-inch lifts or less and compact each layer with a minimum of 3 passes over the entire lift surface.

(c) Surface Restoration Mound final compacted lift above grade, except in roadways and drainfield trenches, where the final surface shall be even with the surrounding roadway.

(d) Final Finish After the utility installation and backfill have been completed, finish all disturbed areas, except trench area required to be mounded, to a smooth , uniform grade and texture, well blended to the original contours, showing minimum evidence of construction activity.

3.7 - Disposal of Excess Excavation and Unsuitable Material

Any excess excavation shall be used where needed by other parts of the contract or wasted at locations as designated by the Contracting Officer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

The work herein will not be measured for separate payment.

4.2 - Payment

The work is incidental to other items in this contract and direct separate payment will not be made.

END OF SPECIFICATION 02223

AGGREGATE BASE COURSE - 02304

PART 1 - GENERAL

1.1 - Description

This work shall consist of furnishing, hauling, and placing aggregate base on an approved subgrade, including under concrete, sidewalks, and pavement in the locations shown on the drawings.

1.2 - Related Work Specified Elsewhere

02220 - Excavation and Backfill for Buildings
13000 – Precast Concrete Utility Building

1.3 - Submittals

The Contractor shall submit to the Contracting Officer written certification that the aggregate meets the required specifications.

Written certification shall contain information as to the size, type, and gradation of the aggregate.

PART 2 - PRODUCTS

2.1 - Aggregate

Aggregate shall be commercially supplied, crushed stone, slag, or gravel with at least 50% by weight retained on the No. 4 sieve having at least one mechanically fractured face.

Gradation:	Sieve Size	Percent Passing
	1 inch	100
	3/4 inch	70 - 98
	No. 4	36 - 60
	No. 8	25 - 47
	No. 30	12 - 31
	No. 200	3 - 8

Quality Requirements:

Percent Wear, T96: max. loss 9% (100 rev.)
40% (500 rev.)
Plasticity Index, T90: 6 maximum

PART 3 - EXECUTION

3.1 - Preparation of Subgrade

The subgrade surface shall be prepared in accordance with Specification 02220 – Excavation and Backfill for Buildings and shall be approved in writing by the Contracting Officer prior to placement of aggregate.

3.2 - Mixing and Placing

Aggregate shall be moistened or dried to a uniform moisture content suitable for compaction. When satisfactorily mixed, 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.

3.3 - Compaction

Aggregate base shall be compacted in maximum 6-inch layers until the nominal thickness of the aggregate base shown on the drawings is reached.

Compact with mechanical tamper. Compact each layer with a minimum of 3 passes over the entire lift surface.

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

3.4 - Water Application

Equipment used for dust control and watering operations of the aggregate shall provide uniform and controlled application of water without ponding or washing.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

The work specified herein will not be measured for payment.

4.2 - Payment

This work is incidental to other items in this contract and direct separate item payment will not be made.

END OF SPECIFICATION 02304

WATER LINES AND APPURTENANCES - 02510

PART 1 - GENERAL

1.1 - Scope

A. This section covers the buried potable water lines and appurtenances to be installed under this contract.

1.2 - Submittals

A. Submit to the Contracting Officer (CO) for approval three (3) copies of manufacturer's literature on the following:

1. HDPE Pipe
2. Couplings and Fittings

1.3 - Quality Assurance

A. Piping materials shall bear label, stamp, or other markings of specificed testing agency.

B. Comply with NSF 14 for plastic potable-service piping. Including marking “NSF-pw” on piping.

C. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.4 - Delivery, Storage, and Handling

A. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris and moisture.

B. Protect flanges, fittings, and specialties from moisture and dirt.

C. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

PART 2 - PRODUCTS

2.1 – High Density Polyethylene (HDPE) Pipe and Fittings

A. Pipe

1. HDPE plastic pipe shall be PE-3408 as defined in ASTM D1248, with a minimum cell classification of 345464C in accordance with ASTM D3350. The pipe shall be SDR11, 200 psig minimum pressure rating and comply dimensionally with ASTM D3035.

2. Pipe shall be manufactured in accordance with AWWA C901 for sizes ½" through 3".

3. HDPE pipe larger than 2" diameter shall be provided in 40-foot lengths rather than rolls. HDPE pipe 2" and smaller shall be provided in rolls.

4. The joining method shall be butt-fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. Butt-fusion equipment used in the joining procedures shall be capable of meeting recommended conditions of the pipe manufacturer, like temperature requirements, alignment, and fusion pressures. Ribbed steel inserts with stainless steel clamps are not approved for HDPE pipe.

B. Fittings

1. HDPE fittings shall be made from material meeting the same requirements as the pipe.

2. Molded fittings shall be manufactured in accordance with either ASTM D2683 for socket fused or ASTM D3261 for butt fused and shall be so marked.

3. All HDPE fittings shall have the same or higher-pressure rating and compositions.

2.2 - Galvanized Steel Pipe (GSP) and Fittings

A. Pipe
1. Galvanized steel pipe and fittings shall be galvanized Schedule 40, ASTM A53.
2. Threaded ends shall meet requirements of ASME B1.20.1.

B. Fittings
1. ASTM A53, Schedule 40.
2. For threaded ends use Teflon thread sealing tape.

2.3 - Joints Between Dissimilar Materials

A. For metallic to Polyethelene connections, use prefabricated fittings with metallic coupling fittings. Pack joint or other Polyethelene pipe manufacturer approved fittings.

2.4 - Tracer Wire

A. Nonconductive water pipe shall have an 12 awg copper wire with blue insulation placed in the trench adjacent to the water line. Provide wire ends accessible for connection at ends of the pipe.

2.5 – Pipe Bedding Materials

A. Type 1 Pipe Bedding

1. Type 1 Pipe Bedding includes the material placed from 4 inches (10 cm) below the bottom of the pipe to 6 inches (15 cm) over the pipe.

2. Provide Type 1 Bedding consisting of crushed stone or gravel, which is free of cementitious substances or thin, flat particles in an amount that would cause the material to cake, pack, or otherwise form and unyielding support for the pipe.

3. Provide imported granular material with a gradation as follows and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

Percent by Weight Passing	
Sieve Size	% Passing
1" (25 mm)	100
3/4” (19.0 mm)	90 - 100
3/8” (9.5 mm)	20 - 55
No. 4 (4.75 mm)	5 - 10
No. 8 (2.36 mm)	0 - 5

4. Crush material so that the percentage of fractured particles in the finished product is as constant and uniform as practical. Crush to produce material where at least 50 percent of the material retained on the No. 4 sieve has at least one fractured face.

5. To prevent migration of material from around the pipe, do not use sand, sandy gravel, or material composed mainly of sand for bedding material in the pipe zone where groundwater is or will be present or where existing material con-tains voids which would allow migration. Where trench excavation encounters wet or unstable material, Type 1 Pipe Bedding must be well graded, free-drain-ing, and non-plastic.

6. Refer to the Special Provisions and details in the Drawings for other require-ments.

B. Type 2 Pipe Bedding

1. Type 2 Pipe Bedding is used as directed by the CO to replace unsuitable material encountered in the trench bottom.

2. Place Type 2 Pipe Bedding from the bottom of the Type 1 Bedding material to the depth required to adequately support the pipe.

3. Type 2 Bedding consists of granular material meeting the following gradation and having a maximum plasticity index of 6 and a maximum liquid limit of 25 percent.

Percent by Weight Passing	
Sieve Size	Type B-Modified
3" (75 mm)	100
No. 4 (4.75 mm)	0 - 25
No. 8 (2.36 mm)	0 - 10

PART 3 – EXECUTION

3.1 – Pipe Alignment and Grade

A. Construct the water system to the lines and grades shown or established in the field.

B. Stake locations of water lines as shown on the drawings. The Contracting Officer (CO) shall approve the water line location prior to the start of excavation.

C. Water system shall be constructed to drain by gravity to system drains for winter shutdown. Waterlines shall be constructed to drain at a minimum grade of 1.0% unless indicated on the drawings. Waterlines not meeting this requirement shall be removed by the Contactor and replaced at no cost to the Government.

D. Bends resulting in tension on joints will not be allowed.

E. Pipe sizes as shown on the drawings. Valves and unions shall be line size.

3.2 - General

A. All pipe, fittings, and appurtenances shall be handled and laid in strict conformance to the manufacturer's recommendations.

B. The interior of all pipe, fittings, and other accessories shall be kept as free as possible from dirt and foreign matter at all times. Each piece of line as it is laid shall be cleaned of all debris. When the pipeline has become dirty on the inside during shipment or storage, it shall be swabbed out by drawing a damp swab through the line before lying. Care shall be exercised to keep all joining surfaces clean. Any pipe with contaminated or damaged joining surfaces, which cannot be satisfactorily cleaned or repaired, shall be

discarded. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or the weather is unsuitable for such work. At all times when work is not in progress, all open ends of the pipe and fittings shall be securely closed to the satisfaction of the CO so that no trench water, rodents, earth, or other substance will enter the pipe or fittings.

C. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe at the Contractor's expense.

D. A minimum of one-foot horizontal separation shall be maintained between electric and water lines in the same trench. The water line shall be a minimum of 1-foot below the electric conductors.

E. Bury piping with depth of cover over top of pipe a minimum of 24 inches for the water supply line.

3.3 – Cutting and Handling of Pipe

A. Cutting of pipe for closure pieces or for other reasons shall be done in a neat manner by methods, which will not damage the pipe. The pipe and fittings shall be handled in such a manner as to insure delivery and final placement in good, undamaged condition. Particular care shall be exercised not to injure the pipe surfaces or coatings. Damaged pipe shall not be used in the work.

3.4 – Laying Pipe

A. No pipe shall be placed in the trench until the CO has approved the trench and bedding.
B. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel.

C. Backfill the pipe within 24 hours after installing the pipe in the trench, leaving the joints and one foot of pipe on each side of each joint exposed until testing is complete.

D. When work is not in progress, securely close open ends of pipe and fittings.

3.5 – HDPE Pipe Installation

A. Install HDPE pipe according to ASTM D 2774 and ASTM F 645.

3.6 – Joint Construction

A. Joints shall be made using jointing materials and applied with the proper accessories, in accordance with the manufacturer's instructions. The joints shall be adjusted and the

work performed in a manner so as to obtain the degree of water tightness required. If pipe and fittings are assembled with lubricant, it must be nontoxic. Where connections are made between new work and existing lines, the connections shall be made by using special fittings to suit the actual conditions.

B. Dissimilar Materials Piping Joints

1. Couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the coupling will cause the pipe to yield before the coupling disjoints.

2. Use adapters compatible with both piping materials, OD, and system working pressure.

3.7 – Tracer Wire

A. Tape tracer wire to water line at a maximum interval of 10 feet.

B. Clamp tracer wire to outlet drains, hydrants, and ball valves with ground clamps sized for pipe at appurtenance.

3.8 - Final Pipe Cleaning and Flushing

A. Before testing, clean new water distribution piping systems by high pressure water jet or mechanical means.

B. During the flushing operation, operate all valves, hydrants, hose bibs and other outlets.

C. Flush system with clean potable water until dirty water does not appear at points of outlet.

3.9 - Pressure Testing Waterlines

A. The Contractor shall furnish the pump, pipe, gauge, measuring device, connections, and all other necessary apparatus, and shall furnish the necessary personnel to conduct the tests. All equipment, gauges, and attachments shall be subject to approval by the CO.

B. The CO shall be present during the testing period.

C. Test all newly constructed portions of the water system, including water mains, service lines, fittings, valves, and hydrants. New waterlines shall be tested at the test pressure specified here unless the CO specifies another pressure. Pneumatic testing will not be allowed.

D. Use only potable water.

E. Test Procedure

1. Slowly fill each valve or plugged test section of pipe with water. The line shall be

filled by means of a pump connected to the pipe. Operate all hydrants and taps to bleed entrapped air from the test section. Operate the pump continuously during bleeding operations. The pump shall take suction from a small auxiliary tank for measuring the water pumped into the test section.

2. Raise the internal pressure of the system by pumping in water. Increase pressure in 25-psig increments and inspect each joint between increments. Raise internal pressure to a test pressure of 1.5 times the working pressure or 75 psig at the point of testing based on the elevation of the lowest point of the line or section under test, or other test pressure as approved by the CO.
3. The system should be allowed to stabilize for three (3) hours at the test pressure before conducting the hydrostatic test. Additional liquid may be added during this time to return to test pressure.
4. After obtaining the approved test pressure record the water level in the auxiliary tank.
5. Immediately following the initial expansion phase, reduce the test pressure by 10 psi, and stop adding test liquid. If the test pressure remains steady for one (1) hour, no leakage is indicated.

F. Leakage shall be verified by the Contractor and the CO.

G. No leakage is allowed, the Contractor shall, at his own expense, locate and replace any defective pipe, fittings, valves, joints, and hydrants as required, until all leakage has stopped. All visible leaks are to be repaired regardless of the amount of leakage. Flush the system, and repeat the pressure test until leak is repaired.

H. No paints, asphalts, tars, enamels, or other types of pipe compounds shall be used to eliminate leaks.

I. Backfill for waterlines shall be completed after the CO approves testing.

J. The Contractor shall furnish a written report to the CO describing the results of each test. The report must identify the specific portions of the pipeline tested, the pressure, the duration of the tests, and the amount of leakage.

3.10 - Disinfection of Water Lines

A. Disinfection by chlorination shall be performed after flushing and pressure testing are completed and approved by the CO.

B. Dosage: Provide chlorine solution with approximately 10 mg/l of total chlorine for disinfecting the water system unless otherwise directed by the CO.

C. Procedure: The entire system including the well shall be filled with the disinfecting solution. Chlorine solution shall be placed in the system, at a location approved by the CO. All taps, hydrants, and other outlets shall be opened and left open until chlorine is noticeable by odor or testing in the water coming from each. Immediately close taps, hydrants, and other outlets. An effort shall be made to limit the amount of chlorinated

water discharged from the taps, hydrants and other outlets. Heavily chlorinated water shall not be drained into streams, rivers, or lakes; rather open first those drains and hydrants that permit the longest travel time for the solution to reach surface waters.

D. Test Period:

1. Chlorinated water shall remain in the system a minimum of 24 hours, after which the system shall be examined by the CO for residual chlorine. Chlorine residual at the end of the 24-hour period shall be a minimum of 2 mg/1.

2. If the minimum residual is not found present, the system shall be drained and the disinfection testing shall be repeated. When disinfection is complete and approved by the CO, the system shall be flushed with potable water and the water leaving the lines shall have a free residual chlorine concentration no higher than 1 mg/l.

E. Bacteriological Examination: After the system has been disinfected as specified, the CO shall test the water for bacteriological contamination from representative points in the system. The coliform organisms shall be tested for presence/absence in accordance with State drinking water regulations. If coliform bacteria are present, testing shall be repeated in accordance with State drinking water regulations. If the report of this examination is unsatisfactory, the system shall be flushed and the disinfection procedure repeated until the results of bacteriological examinations are satisfactory.

F. The satisfactory quality of water delivered by the waterline should continue for a period of at least two full days, as demonstrated by laboratory examination of samples taken from taps along the system.

G. Bacteriological testing of the water system will be the responsibility of the Forest Service.

H. Where bacteriological water test indicates the presence of total coloform bacterial the Contractor shall repeat the water system disinfection at no cost to the Government.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

The work specified herein will not be measured for payment.

4.2 - Payment

This work is incidental to other items in this contract and payment will be made under other items of the contract.

PRECAST CONCRETE UTILITY BUILDING - 13100

PART 1 - GENERAL

1.1 - Description

This section specifies the installation of a contractor-furnished precast concrete utility building and amenities.

1.2 - Related Work Specified Elsewhere

02220 - Excavation and Backfill for Buildings
02223 - Excavation and Backfill for Utilities
02304 - Aggregate Base Course
15400 – Building Plumbing
16110 – Building Electrical

PART 2 - PRODUCTS

2.1 - Precast Concrete Utility Building

The building shall be contractor-furnished and delivered to the construction site.

2.2 - Aggregate Base

Aggregate used for leveling and backfilling shall be in conformance with Section 02304 - Aggregate Base Course.

2.3 - Building Plumbing

Building plumbing items shall be as shown on the drawings and as listed in CSI Specifications 15400 – Building Plumbing

2.3 - Building Electrical

Building electrical items shall be as shown on the drawings and as listed in CSI Specification 16110 – Building Electrical.

PART 3 - EXECUTION

3.1 - Installation

The building shall be installed at the elevations and locations as shown on the drawings. The Contractor is responsible for the coordination of delivery and all site work necessary for the complete installation. Site work includes building layout, excavation, leveling course, backfill, all required compaction including watering.

3.2 - Coordination

The Contractor shall coordinate delivery of the building with the manufacturer. Coordination shall begin upon contract award and continue to installation date. The Contracting Officer shall be on site during delivery and installation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Method of Measurement

Measurement will be for a complete precast concrete utility building installed including building supply, excavation, aggregate base, backfill, compaction, final grading, and installation all plumbing elements and appurtenances including pipe, meter, valves, captive air tanks, all electrical equipment including lights, equipment panels, wall heater, switches, outlets, conduit and conductors extended to the building.

4.2 - Basis of Payment

Payment will be made at the contract unit as listed in the "Schedule of Items" for quantities measured and accepted as follows:

Payment will be made under:

PAY ITEM	DESCRIPTION	PAY UNIT
13340	Precast Concrete Utility Building.	Lump Sum

END OF SPECIFICATION 13100

SUBMERSIBLE PUMPS - 15146

PART 1 - GENERAL

1.1 – Scope

This section covers the installation of a submersible pump and drop pipe in an existing water well.

PART 2 - PRODUCTS

2.1 - SUBMERSIBLE PUMP CABLE

A. Type TW or RW, UL listed or labeled, comply with the National Electrical Code, NFPA 70, latest edition.

B. Twisted-type cable, three stranded soft copper conductors, size as required by NEC for the submersible pump installed.

2.2 - WATERTIGHT CONNECTOR

A. Cable terminal or splicing kit for connection between submersible pump motor leads and submersible pump cable: Plastic type or mold-type with wire connector and chemical filler or rubber bushings to form watertight connection.

B. Approved heat-shrink watertight connections are acceptable. TAPED SPLICE WILL NOT BE ACCEPTABLE AS A WATERTIGHT CONNECTION.

2.3 - DROP PIPE

A. Galvanized steel pipe. Steel pipe (welded and seamless); Federal Specification WW-P-406C, weight A (standard), class 2 (zinc-coated).

B. Galvanized steel pipe fittings, malleable iron, wrought iron steel (threaded), 150 pound. Federal Specification WW-P-521F, type 11 (zinc-coated).

2.4 - PITLESS UNIT

A. No pitless unit for this application.

2.5 - SUBMERSIBLE PUMP

A. 4-inch, 230 volts AC, single phase, 60 cycle, three-wire construction, With appropriate control box.

B. Non-corrosive Construction
   1.Pump case, pump shaft, and motor - Stainless steel.
   2.Discharge head - Stainless steel.
   3.Impellers - Stainless steel.
   4.Bowls - Stainless steel.
   5. Screen and cable guard - Stainless steel.

C. Built-in, spring-loaded poppet-type check valve on pump discharge. Stainless steel construction.

D. Pump motor shall be 3/4 horse power, capable of pumping a minimum of 11.5 gallons per minute against a Total Dynamic Head (TDH) of 200 feet of water at a minimum effeciency of 45 percent.

E. Lightning Protection: If built-in lightning protection is not provided, install expulsion type lightning protection to protect the submersible pump from electrical surges. Square D, J9200-10 or approved equal.

F. "Grundfos" model 10S07-12 or approved equal.

PART 3 - EXECUTION

3.1 - FLUSHING AND DISINFECTION OF WELLS

A. Wash the exterior surface of the drop pipe and submersible pump with a 100 mg/l chlorine solution as they are lowered into the well.

   Note: 1/6 cup of 5 1/4 percent household bleach per 5 gallons of water is approximately a 100 mg/l chlorine solution.

B. After the pump has been installed, operate the pump until the discharge is clear and clean.

C. After flushing, pour 1/2 cup of 5 1/4 percent household bleach diluted in 5 gallons of potable water into the well for each 20 feet of water standing in the well. Disperse bleach evenly throughout the well by pouring bleach solution into the well through a hose or pipe that is moved up and down in the well.

D. Operate the submersible pump until the distinct odor of chlorine is detected in the water discharged from the well.

E. After 24 hours or more have elapsed, flush the well until the free chlorine residual is measured to be less than 1.0 mg/l. The CO will measure the chlorine residual with a color comparator-type DPD chlorine test kit.

3.2 – PITLESS UNIT

A. no pitless unit for this application.

3.3 – ELECTRICAL CONNECTIONS

A. Fasten electrical conductors to the drop pipe every 5 feet to help prevent damage to the conductors during pump installation.

B. Grounding: Install separate ground wire to submersible pump in accordance with NEC 250-43.

3.4 - TESTING

A. Upon completion of installation of the submersible pump it shall be tested for proper operation.

PART 4 - Measurement and Payment

4.1 - Measurement

Submersible Pumps will not be measured for payment.

4.2 - Payment

This work is incidental to other items in this contract and direct payment for Submersible Pumps will not be made.

END OF SPECIFCIATION 15146

BUILDING PLUMBING - 15400

PART 1 - GENERAL

1.1 - Scope

This work consists of furnishing and installing all building plumbing and fixtures complete with all appurtenances and incidentals as needed for a complete and operational installation.

Items to be installed in new building include ball valves, captive air tanks, water meter, pressure switch and pressure relief valve. All items shall be new contractor supplied and installed.

1.2 - Related Work Specified Elsewhere

02223 - Excavation and Backfill for Utilities

1.3 - Codes and Standards

(a) Work performed under this section shall meet the requirements of the following:

1. Uniform Plumbing Code (UPC), Latest Edition.
2. Uniform Building Code (UBC), Latest Edition.
3. American National Standards Institute (ANSI)
4. Occupational Safety and Health Standards, OSHA, Part 1910.

1.4 - Submittals

(a) Product data: The Contractor shall submit the following:

1. Materials list of items proposed to be provided under this section.
2. Manufacturer's specifications, catalog cuts, and other data to prove compliance with the specified requirements and including fixtures, valves, and special items.
3. Shop Drawings showing rough-in dimensions and data required to indicate method of installing and attaching equipment, except where such details are fully shown on the drawings.

PART 2 - Products

2.1 - General

Fixtures, valves, plumbing items, and related work shall be as shown on the drawings or as specified herein and in the related sections with their references, or as approved by submittal. All pipe, valves and water system appurtenances shall be NSF 61 approved.

2.2 - Plumbing Fixtures

1. Sample Tap

Chrome finish, ½" MIP threaded inlet, plain outlet. Matco-Norca model FY-691LF or approved equal.

2. Ball Valves

Full port forged brass body, blow out proof stem, RPTFE seats, 600 PSI. Apollo model 77 FLF or approved equal.

3. Check Valves

Cast brass or unleaded alloy body and threaded ends, minimum 200 PSI. Flomatic series 4033E or approved equal.

2.3 - Plumbing and Piping Materials

All piping shall be Galvanized Steel, size as shown on the drawings. Pipe shall comply with ASTM A 120, Schedule 40, threaded and coupled. Threaded fittings shall comply with ANSI B16.3.

2.4 – Pressure Tank and Controls

A. Pressure Tank: Sealed diaphragm type, Well-X-Trol Model WX-255 or approved equal. Pre-charged with air for 50-70 psi pump on-off cycle.
B. Pressure Switch: Model 9013FSG, Square D or approved equal. Standard setting of 50-70 psi.
C. Pressure Relief Valve: Merrill PRVNL757, 100 psi rated.
D. Pressure Gauge: Winters Instruments, Model PFQ804LF, 2-1/2-inch diameter, 0-100 psi, stainless steel, 1/4-inch NPT, liquid filled.
E. Pressure Reducing Valve: Zurn Model 600XL, 1-1/2". Valve shall be set to reduce pressure to 50 psi.

2.4 – Water Meter

A. Magnetic drive vertical turbine meter, permanent hermetically sealed register, size one inch, with all-bronze meter case. Meets latest version of AWWA Standard C-701, Cold Water Meters. Provide all-bronze straight meter couplings on both sides (1 inch MIP x meter swivel nut). Hersey Model MVR 50 or equal.

PART 3 - Execution

3.1 - Installation

A. Install equipment and valves at the locations shown on drawings.

3.2 – Pressure Tank Installation

A. Install pressure tank where shown on the drawings, in accordance with manufacturer's recommendations, in vertical position.

B. Install threaded unions and line-size ball valves at the tank connection.

C. Adjust tank air pressure as recommended by manufacturer for the intended operation.

3.3 – Operational Sequence

A. Pump operation shall be controlled by the pressure switch. Set the pressure switch to operate between 50-70 psi.

3.4 – Operational Test

A. After installation of the pressure tank, related plumbing and electrical equipment is completed, Contractor shall perform an operational test of all systems.

B. Verify watertight installation of all work completed under this contract.

C. Verify proper operation of the pump controls. Complete adjustments as required.

PART 4 - Measurement and Payment

4.1 - Measurement

Building Plumbing will not be measured for payment.

4.2 - Payment

Payment will be made at the contract unit as listed in the "Schedule of Items" for quantities measured and accepted as follows:

Payment will be made under:

PAY ITEM	DESCRIPTION	PAY UNIT
02615-1	Well House Piping	Lump Sum

END OF SPECIFICATION 15400

BUILDING ELECTRICAL - 16110

PART 1 - GENERAL

1.1 - Description

This section specifies the furnishing and installation of all building electrical systems including conduit, disconnects, panel boards, conductors, wall mounted heater, outlets and switches, light fixtures and testing.

Items to be installed in new building include electric service panel, pump relay, pump control and pressure switch. All items shall be new contractor supplied and installed.

1.2 - Related Work

13000- Precast Concrete Utility Building

1.3 - Submittals

Submit copies of a list of materials and equipment proposed for use in the project. Rough-in materials such as conduit, fittings, outlet and junction boxes, wire and cable rated 600 volts or less and connectors need not be included in the material list. Give name of manufacturer and where applicable, type and catalog number.

Submit sufficient descriptive literature to demonstrate like quality and function of products submitted as "equal" to products listed in the drawings or specifications. Substitutions, which require alterations to the structural or aesthetic design of adjacent project elements, will not be acceptable.

The Contractor shall submit an Electrical Plan to the Contracting Officer for approval prior to installation of any electrical circuits which includes wire sizes, types, and color codes. The plan shall also show locations of all electrical equipment, accessories, and conductors as circuits. The Contractor shall establish a complete grounding system at all service entrance and control equipment locations, in accordance with applicable codes.

1.4 - Quality Assurance

Codes and Standards:

Products shall be Underwriters Laboratory approved and shall be a standard catalogued product of a manufacturer regularly engaged in the manufacture of the product.

All work shall be done in accordance with the National Electrical Code and the National Electrical Safety Code except where local regulations are more stringent.

All work shall be done by electricians licensed by the State of Montana.

Operating Test:

After electrical installations are completed, the Contractor shall conduct an operating test in the presence of the Contracting Officer. The Contractor shall demonstrate that all equipment operates properly and in accordance with these specifications and drawings and the manufacturer's specifications where applicable. The Contractor shall furnish all instruments and personnel necessary for the testing.

Labels:

All breakers, controls, and switches must be labeled. All labels must be clearly visible, readable and tell what particular equipment they serve. Labels must be of a material, which will not deteriorate when exposed to moisture or direct sun.

PART 2 - PRODUCTS

2.1 - Insulated Wire

600 V, Type: RHW or THW for indoor and outdoor use with conduit. Copper conductors 90 deg. C. minimum. Sized as required by the National Electric Code.

2.2 - Conduit

Electrical metallic tubing (EMT) shall be installed inside of the building. EMT shall be wall or ceiling mounted.

2.3 - Conduit Fittings

Conduit fittings shall be corrosion and leak-resistant standard fittings designed for use with the conduit furnished.

2.4 – Wall Mounted Heater

Wall mounted heater shall be 120 V, 500 watt, 1708 BTU/HR. Heater shall be controlled by integral thermostat with a temperature range of 40° to 70° F. Qmark model WHT500 or approved equal.

2.5 – Light Fixtures

Light fixtures shall be UL approved, industrial type lighting, 8.5" wraparound clear acrylic diffuser, LED shop light, 4-foot long, 60W, 7200 LM, integrated LED, prismatic lens, hardwired, linkable, flush mount ceiling light fixture.

PART 3 - EXECUTION

3.1 – Wiring

All wiring shall be in EMT or Flexible Metal conduit.

3.2 – Conduit

Conduit shall be secured to walls and/or ceilings in accordance with the National Electric Code.

3.3 – Grounding

A complete grounding system shall be installed with ground rods to ground all non-current carrying conductive components and grounded circuits conductors of the wiring system in accordance with the National Electrical Code (NFPA No. 70). A grounded circuit conductor (neutral wire) may not be used for equipment grounding purposes.

3.4 – Tests

All circuits shall be tested. Test between phase and neutral, and neutral and ground. Test all equipment installed for proper operation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 - Measurement

There will be no separate measurement for this section.

4.2 - Payment

Payment will be made at the contract unit as listed in the "Schedule of Items" for quantities measured and accepted as follows:

Payment will be made under:

PAY ITEM	DESCRIPTION	PAY UNIT
16000-1	Well House Electrical	.Lump Sum

END OF SPECIFICATION 16100