SPECIFICATIONS

GAOA - FORT HOWES WATER STORAGE TANK REPLACEMENT

Bureau of Land Management
Eastern Montana Dakotas District
Office

SPECIFICATIONS GROUP

General Requirements Subgroup

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	SUMMARY	3
01 3000	ADMINISTRATIVE REQUIREMENTS	7
01 3300	SUBMITTAL PROCEDURES	12
01 4000	QUALITY REQUIREMENTS	16
01 5000	TEMPORARY FACILITIES AND CONTROLS	17
01 6000	PRODUCT REQUIREMENTS	22
01 7000	EXECUTION AND CLOSEOUT REQUIREMENTS	26
01 7113	MOBILIZATION	30
01 7419	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL	33
01 7800	CLOSEOUT SUBMITTALS	35

DIVISION 31 - EARTHWORK

31 4000	TRENCHING AND BACKFILLING	38

DIVISION 33 - UTILITIES

33 1200	WATER UTILITIES	47

END OF TABLE OF CONTENTS

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Project Information

B. Work covered by Contract Documents

C. Access to site

D. Contractor Use of Premises

E. Public use of site

F. Occupancy requirements

G. Work Restrictions

H. Specification Formats and conventions

I. Work Sequence

1.2 PROJECT INFORMATION

A. Project Name: Fort Howes Water Storage Tank Replacement

B. Project Location: Fort Howes Fire Station, 18 Fort Howes Road, Ashland Montana. Project location is accessed from State Highway 484, located approximately 22 miles south-southeast of Ashland, Montana.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work consists of the following:

1. Demo and replacement of an existing 19,000 gallon buried concrete storage tank on an existing potable water system:

a Demolition of existing storage tank and ancillary overflow, fill line, outlet and drain lines and existing valves.

b Furnish and install new 20,000 gallon storage tank and ancillary piping and valves

c Disinfect and commission existing potable water system.

B. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

A. Access to the Work: The work site is accessed by state and local highway. The work area under

construction should be closed to the public during construction hours. Contractor shall be responsible to ensure no unauthorized personnel access the work area during construction. The work site is on public lands. After each day's work, contractor shall ensure all hazards are clearly marked and protected from access by the public. Coordinate appropriate Traffic Control on state and local roads as needed for completion of the work. All traffic control construction signs, barriers, and devices shall be according to the most current Manual on Uniform Traffic Control Devices (MUTCD) stand- ards including signage on state highways if applicable. This work shall not be measured for payment and should be included in the contract price for other items.

B. Environmental Considerations: The aesthetic values of the site and surrounding area are of prime importance. The Contractor shall take all care necessary to preserve all plant life and other natural features. No surface damage outside the staked area shall occur. Any surface damage outside the staked area shall be corrected by the Contractor at his expense. Any damage to existing State, County or local roads, used to transport materials to the project, shall be corrected by the Contractor at his expense.

1. Project Stipulations:

a The contractor is required to obtain and adhere to all necessary permits throughout the project.

b The contractor will indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this project proposal.

c Disturbance of improvements such as fences, roads, watering facilities, etc., encountered during the construction will be kept to an absolute minimum. The contractor is required to immediately restore any damaged improvements to at least their former state.

d Project work will only be authorized by the BLM during dry or frozen conditions.

e Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered during the project on public or federal land will immediately be brought to the attention of the Contracting Officer. The contractor will suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the appropriate specialist to determine appropriate actions to prevent the loss of significant cultural or scientific values.

f All construction equipment and vehicles must be washed prior to being brought on site to help prevent the spread of noxious weeds. Cleaning shall consist of the removal of all dirt, grease, debris, and materials that may harbor noxious weeds and their seeds. Cleaning shall occur off public lands.

g The contractor will take all necessary measures to protect the health and safety of all persons involved in the project and will immediately alleviate any health or safety hazards.

h The project will be completed during adequate weather conditions as to not disturb additional resources.

1.10 CONTRACTOR USE OF SITE AND PREMISES

B. Construction Operations: Limited to areas noted on Drawings.

C. Provide access to and from site as required by law and by Contract Officer:

2. Do not obstruct roadways or other public ways without permit.

1.11 PUBLIC USE OF SITE

A. Contractor shall at all times conduct his operations to ensure the least inconvenience to the public. Road closures will be permitted, when required, upon specific approval of Contracting Officer for a maximum of 1 day per road crossing.

1.12 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 6:00 a.m. to 7:00 p.m., Monday through Friday, except when otherwise indicated.

2. Weekend Hours: Weekend work can be conducted with CO approval.

B. Construction timeframe shall be coordinated with the CO. Construction shall occur between September 1, 2026 and April 30, 2027.

C. Work on Saturdays, Sundays, Federal holidays or at night may not be performed without prior consent from the Contracting Officer. Submit requests 48 hours in advance of the work to the Contracting Officer for approval.

D. No signs or advertisements (except those specified) shall be displayed on the construction site or within the premises unless approved by the Contracting Officer.

E. Existing Utilities

1. Existing Utilities: Notify Contracting Officer and utility companies of proposed locations and times for excavation.
2. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.
3. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.

F. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Contracting Officer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Contracting Officer’s written permission.

1.13 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.

1. Division 01 – General Requirements: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

C. Terminology: All references to “Owner” shall be replaced with the term “Government” or “Contracting Officer” (when referring to the person acting for the Government). All references to “Architect” shall be replaced with the term “Contracting Officer”.

1.14 WORK SEQUENCE

A. Coordinate construction schedule and operations with COR.

PART 2 - PRODUCTS – Not Used.

PART 3 - EXECUTION – Not Used.

END OF SECTION 01 1000

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electronic document submittals.

B. Preconstruction meeting.

C. Progress meetings.

D. Requests for Information (RFIs)

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

a.1 ELECTRONIC DOCUMENT SUBMITTAL

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via email.

B. Besides submittals for review, information, and closeout, this procedure applies to Requests for Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

C. It is Contractor's responsibility to submit documents in allowable format.

D. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

a.2 PRECONSTRUCTION MEETING

A. Attendance Required:

1. COR.
2. Contractor.

B. Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Record minutes and distribute copies within 2 days after meeting to participants, with 2 copies to COR, Owner, participants, and those affected by decisions made.

a.3 PROGRESS MEETINGS

A. Attendance Required:

1. Contractor.
2. COR.
3. Contractor's superintendent.
4. Major subcontractors.

B. Agenda:

1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Maintenance of quality and work standards.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to work.
12. Record minutes and distribute copies within 2 days after meeting to participants, with digital copies to COR, Owner, participants, and those affected by decisions made.

a.4 REQUESTS FOR INFORMATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Contracting Officer
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Requested date for response.
12. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop
13. Drawings, and other information necessary to fully describe items needing interpretation.
14. Include dimensions, thicknesses, structural grid references, and details of affected
15. materials, assemblies, and attachments on attached sketches.

C. Contracting Officer’s Action: Contracting Officer will review each RFI, determine action required, and return it. Allow seven calendar days for Contracting Officer's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for approval of Contractor’s means and methods.
   d. Requests for coordination information already indicated in the Contract Documents.
   e. Requests for adjustments in the Contract Time or the Contract Sum.
   f. Requests for interpretation of Contracting Officer's actions on submittals.
   g. Incomplete RFIs or RFIs with numerous errors.

2. Contracting Officer's action may include a request for additional information, in which case Contracting Officer's time for response will start again.

D. On receipt of Contracting Officer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Contracting Officer within seven days if Contractor disagrees with response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Contracting Officer.
4. RFI number including RFIs that were dropped and not submitted.RFI description.
5. Date the RFI was submitted.
6. Date Contracting Officer's response was received.
7. Identification of related bilateral or unilateral modifications, extensions, and changes in scope, appropriate.

3.1 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

1. Product data.
2. Shop drawings.
3. Construction schedule.
4. Submit to COR for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
5. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.2 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.
8. Submit for COR's knowledge as contract administrator or for Owner.

3.3 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

1. Submit Final Correction Punch List for Substantial Completion.
2. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   a. Project record documents.
   b. Operation and maintenance data.
   c. Warranties.

d. Bonds.
e. Other types as indicated.

3. Submit for Owner's benefit during and after project completion.

3.4 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by COR.

C. After review, produce duplicates.

D. Retained samples will not be returned to Contractor unless specifically so stated.

3.5 SUBMITTAL PROCEDURES

A. General Requirements:

B. Shop Drawing Procedures:

END OF SECTION 01 3000

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SCOPE

A. Submittals covered by these requirements include manufacturers' information, test procedures, test results, samples, requests for substitutions, and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, rock sources, coir fabric sources, and fabricated items. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, and schedules and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents.

1.2 CONTRACTOR'S RESPONSIBILITIES

A. A.The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the COR in each case where his submittal may affect the work of another contractor. The Contractor shall coordinate submittals among his subcontractors and suppliers including those submittals complying with unit responsibility requirements specified in applicable technical sections

B. The Contractor shall coordinate submittals with the work so that work will not be delayed. The Contractor shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete. This requires that submittals for review and comment shall be returned to the Contractor stamped "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

C. The Contractor shall certify on each submittal document that he has reviewed the submittal, verified field conditions, and complied with the contract documents.

D. The Contractor may authorize in writing a material or equipment supplier to deal directly with the COR with regard to a submittal. These dealings shall be limited to contract interpretations to clarify and expedite the work.

1.3 STANDARD COMPLIANCE

A. When materials or equipment must conform to the standards of organizations such as, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL) documents showing, or proving, conformance shall be submitted.

B. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual Sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable tests, and is approved by the COR. The certificate shall state that the item has been tested in accordance with the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product, and the referenced standard and shall state that the manufacturer certifies that the product conforms to all requirements of the project Specification and of the referenced standards listed.

1.4 REVIEW OF CONTRACTOR'S INFORMATION

A. When review and checking for acceptance is required of any drawing, or information regarding materials and equipment, the Contractor shall prepare or secure, and submit for review, two (2) copies. The COR, after taking appropriate action, will return (1) marked copies to the Contractor. Within 7 calendar days after receipt of said submittal copies, the COR will return the marked copies indicating one of the following four (4) actions:

B. If review and checking indicate no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately on incorporating the material and equipment covered by the submittal into the work.

C. If review and checking indicate limited corrections are required, copies will be returned marked "MAKE CORRECTIONS NOTED". Work may begin immediately on incorporating into the work the material and equipment covered by the corrected submittal.

D. If review and checking indicate insufficient, or incorrect data, has been submitted, copies will be returned marked, "AMEND AND RESUBMIT". No work may begin on incorporating the material and equipment covered by this submittal into the work until the submittal is revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

E. If review and checking indicate the material and equipment submittal is unacceptable, copies will be returned marked "REJECTED-RESUBMIT". No work may begin on incorporating the material and equipment into the work until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

F. Approval by the COR shall not relieve Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this Contract.

1.5 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the COR, or by any officer or employee thereof, and the Contractor shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "NO EXCEPTIONS TAKEN or MAKE CORRECTIONS NOTED" shall mean that the COR has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed

PART 2 - PRODUCTS

2.1 MANUFACTURER'S DATA

A. Submittals for each manufactured item shall be comprised of manufacturer's descriptive literature, drawings, diagrams, performance and characteristic curves, and catalog cuts. Manufacturer's name, trade name, model or catalog number, nameplate data, size, layout dimensions, capacity, project specification references, and any other additional information necessary to establish contract compliance shall be clearly indicated.

PART 3 - EXECUTION

3.1 SUBMITTAL PROCEDURE

A. At least 7 calendar days prior to the Contractors need for approval, contractor shall forward to the COR all submittals required by the individual Sections of the Specifications.

B. All submittals shall be identified by submittal number and specification section number on the letter of transmittal. Submittals shall be numbered consecutively, and resubmittals shall have a letter suffix. For example:

1. First submittal: 05001
2. First submittal: 05001A
3. Second resubmittal: 05001B, etc.

3.2 CONTRACTOR SUBMITTALS

A. Items to be submitted are specified in individual Sections of these Specifications. Submittals for each Section shall be bound together in one book. Book shall have numbered tab dividers for each item. Submittals that are related to, or affect, each other shall be forwarded simultaneously as a package to facilitate coordinated review. Uncoordinated submittals will be rejected. Do not combine unrelated materials in the same submittal. Submittals shall be arranged in same order as

they appear in the Specification Section. Items shall be clearly marked with the same identification number as indicated on the drawings. The Contractor shall include submittal time appropriate within each item of work on the Construction Schedule. The COR will receive submittals at the preconstruction meeting.

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL – Not Used.

PART 2 - PRODUCTS – Not Used.

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from COR before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION 01 4000

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary sanitary facilities.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Security requirements.

D. Vehicular access and parking

E. Waste removal facilities and services.

F. Project identification sign.

G. Removal of utilities, facilities and controls

1.2 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.3 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide protection for plants designated to remain (preservation area). Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage

1.4 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.5 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of emergency facilities and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and COR.

C. Provide means of removing mud from vehicle wheels before entering public roads.

D. Parking in staging area only. Provide temporary parking areas to accommodate construction personnel. Provide access to well pads above site.

1.6 WASTE REMOVAL

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.7 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

1.9 SITE MAINTENANCE

A. The Contractor shall keep the work site, staging areas, and Contractor's facilities clean and free from rubbish and debris. The Contractor staging area is noted on the drawings. Materials and equipment shall be removed from the site when they are no longer necessary. Equipment removed as part of demolition shall not be stored on site. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance.

B. Waste material of any kind will not be permitted to remain on the site of the work or on adjacent roads. Immediately upon such materials becoming unfit for use in the work, they shall be

collected, carried off the site, and properly disposed of by the Contractor.

C. The Contractor may provide temporary restroom and cleanup facilities for Contractor's employees and shall keep these areas clear of all refuse, rubbish, and debris that may accumulate from any source and shall keep them in a neat condition to the satisfaction of the COR.

D. In the event that waste material, refuse, debris, and/or rubbish are not so removed from the work by the Contractor, the COR reserves the right to have the waste material, refuse, debris, and/or rubbish removed and the expense of the removal and disposal charged to the Contractor.

E. Utilize all safety precautions to protect humans, wildlife, fisheries, livestock, and water quality where needed.

F. Monitor daily turbidity upstream and downstream of work (if there is any flow).

G. Use existing roads to the extent possible.

H. Pressure wash all equipment to remove dirt, grease, oil, fuel, vegetation and weed seeds before entering the restoration area.

I. Use hydraulic fluids that meet or exceed U.S. Environmental Protection Agency standards.

J. Complete vehicle and equipment staging, cleaning, maintenance, refueling, and fuel storage in a designated temporary construction staging and material storage area, more than 100 feet from the edge of major ephemeral drainages.

K. Minimize emissions and control fugitive dust.

L. Ensure the security of the project site to prevent damage or loss to equipment, materials, and supplies.

M. Take all measures necessary to minimize damage to existing vegetation.

N. Where in-channel structures are keyed into the streambank or streambeds, use the excavated material as back-fill around the structure and grade to match upstream and downstream bank elevations and desired streambed elevations.

O. Adhere to wildlife seasonal restrictions including timing limitations within two miles of sage-grouse leks during breeding and nesting periods.

P. Adhere to cultural and paleontological stipulations.

Q. Remove only those shrubs that are absolutely necessary for the execution of the work.

R. Remove all temporary equipment and facilities upon completion of work.

1.10 AIR POLLUTION CONTROL

A. The Contractor shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the air pollution regulations for the area. The Contractor shall maintain construction vehicles and equipment in good repair. Exhaust emissions that are determined to be excessive by

the COR shall be repaired or replaced. If determined to be necessary by the Project Inspector, Contractor shall provide a water truck to manage project area dust.

1.11 NOISE CONTROL

A. The Contractor shall comply with all local controls and noise level rules, regulations, and ordinances which apply to any work performed pursuant to the Contract. If the requirements of this Section are more restrictive than those of the local regulations, the requirements of this Section shall govern.

B. Each internal combustion engine, used for any purpose related to this Contract, shall be enclosed and be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler and enclosure.

1.12 STORMWATER AND EROSION CONTROL

A. A Stormwater and Erosion Control Plan for construction activities shall be prepared and carried out by the Contractor to prevent pollution related to construction operations.

B. Erosion control measures shall be in place prior to commencing construction. During construction, all erosion controls shall be inspected by the contractor daily to ensure they are working adequately.

1. If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.

2. Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control.

C. Contractor shall provide measures to prevent stockpile erosion during rain events or when the stockpile site is not moved or reshaped for more than 48 hours, by surrounding piles with compost berms, covering piles with impervious materials or other equally effective methods.

D. Contractor shall provide measures to prevent construction vehicles from tracking sediment offsite or onto roadways.

1.13 SUBMITTALS

A Stormwater and Erosion Control Plan for construction activities shall be prepared and carried out by the contractor to prevent pollution related to construction operations.

The Contractor shall submit a Notice of Intent and the appropriate General Construction permit for this project.

Information concerning these requirements can be found at http://deq.wyoming.gov/wqd/storm-water-permitting/resources/construction-general-permits/

The plan will include a drawing and narrative that addresses:

1. Site-specific practices to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.
2. Site-specific practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

B. Submit in accordance with 01300.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 5000

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.3 SECTION INCLUDES:

A. Product Requirements

B. Product Substitution Submittals

C. Substitutions

D. Product Storage and Handling Requirements

1.4 RELATED REQUIREMENTS

A. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.5 PRODUCT REQUIREMENTS

A. Submittals

a Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

1.6 PRODUCT SUBSTITUTION SUBMITTALS

A. Action Submttals

a Documentation:

b Justification.

c Coordination information.

d Detailed comparison.

e Product Data.

f Samples.

g Certificates and qualification data.

h List of similar installations.

i Material test reports.

j Research reports.

k Detailed comparison of Contractor's construction schedule.

l Cost information.

m Contractor's certification.

n Contractor's waiver of rights to additional payment or time.

B. COR's Action: If necessary, COR will request additional information within 7 days of receipt of a request for substitution. COR will notify Contractor through Construction Manager of acceptance or rejection within 15 days of receipt, or 7 days of receipt of additional information.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Not later than 15 days prior to time required for preparation and review of submittals.

B. Substitutions for Convenience: Not allowed unless otherwise indicated.

1.8 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Contractor furnished materials shall be shipped, handled, stored, and installed in ways that will prevent damage to the items. Damaged items will not be permitted as part of the work, except in cases of minor damage that have been satisfactorily repaired and are acceptable to the COR. Materials supplied by the Owner shall be protected as contractor furnished materials upon delivery to the project site.

PART 2 - PRODUCTS

2.1 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.2 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 - EXECUTION

3.1 SUBSTITUTION LIMITATIONS

A. See Part 1.7.

3.2 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

3.4 DELIVERY OF MATERIAL

A. The Owner's and COR's personnel will not accept material deliveries for the Contractor.

END OF SECTION 01 6000

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

PART 2 - PRODUCTS

1.1 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis fabrication.

E. Verify location of existing utilities with local utility company.

F. Verify that utility services are available, of the correct characteristics, and in the correct locations.

G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.4 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Match work that has been cut to adjacent work.
4. Repair areas adjacent to cuts to required condition.
5. Repair new work damaged by subsequent work.
6. Remove samples of installed work for testing when requested.
7. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Restore work with new products in accordance with requirements of Contract Documents.

E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

3.5 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.6 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.7 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.8 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Remove all labels that are not permanent.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.9 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify COR when work is considered ready for COR's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for COR's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing COR's and Contractor's comprehensive list of items identified to be completed or corrected and submit to COR.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify COR when work is considered finally complete and ready for COR's Substantial Completion final inspection.

H. Complete items of work determined by COR listed in executed Certificate of Substantial Completion.

3.10 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in site design, specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 01 7000

SECTION 01 7113 - MOBILIZATION

PART 1 - GENERAL

1.1 MOBILIZATION

A. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site. Mobilization includes obtaining any permits not provided by the Contracting Agency and obtaining project-specific bonds.

B. Mobilization shall also include the construction of temporary ramps and access ways, temporary roads, grading, salvaging of weed free topsoil, removing noxious weeds from areas within the construction limits, and the necessary preparatory work required to allow for the safe and stable movement of all vehicles that are required to construct the improvements outlined in the Contract Documents. Black henbane is present in the area and may persist and/or spread. Aggressive species that would persist or spread should be monitored through site-inspections and/or treated using current management practices established in the RMP. Stored sediment that is planned to be removed or used for fill material should be treated for weeds if present.

C. Equipment

1. All construction equipment shall be staged in a location and manner to minimize air, soil and water pollution. All equipment shall be washed prior to mobilization to the site to minimize the introduction of foreign materials and fluids to the project site. All equipment shall be free of oil, hydraulic fluid, and diesel fuel leaks. To prevent invasion of noxious weeds or the spread of whirling disease spores, all equipment shall be power washed or cleaned to remove mud and soil prior to mobilization into the project area. It will be the contractor's responsibility to ensure that adequate measures have been taken.
2. Equipment shall be in a well-maintained condition to minimize the likelihood of a fluid leak. If a fluid leak does occur, the COR shall be notified immediately, and all work ceased until the leak has been rectified. At all times during the construction phase, fluid spill containment equipment shall be present on-site and ready for deployment should an accidental spill occur.
3. Storage of fuel and lubricants -all fuel and lubricants shall be stored in containers and areas that are in conformance with the State Department of Environmental Quality, biological opinion or biological assessment terms and conditions, and local, state and federal regulations.

D. Servicing and refueling equipment -all fuel and lubricants used in the servicing of construction equipment shall be done in a manner that avoids spills and over filling and shall be done at least 150 feet from all waterbodies. The State Department of Environmental Quality shall be notified immediately of any spill and the operator shall contain the spillage.

1. If a spill of chemical pollutants such as fuel or hydraulic fluid should occur, immediately attempt to contain the spilled material. The following procedures shall be followed:
2. for spillage on land, construct earthen berms or use other suitable barricade material of sufficient size to contain the spill and keep it from spreading.
3. for spillage on water, attempt to isolate and contain the spilled material. Commercial booms or other suitable materials shall be kept on site during construction to contain fuel and oil spills on water.
4. Sanitary facilities -sanitary facilities such as chemical toilets shall be located at least 150 feet from water bodies to prevent contamination of surface or subsurface water.

1.2 DEMOBILIZATION AND SITE RECLAMATION

A. Demobilization shall consist of work and operations necessary to disband all mobilized items and clean up the site. The removal of all temporary ramps, access ways, roads, signs, temporary fencing, construction debris including rock chips, wood debris, construction stakes, and other construction-related refuse, and temporary facilities or works and the restoration of surfaces to an equal or better than existing condition, including replacement of salvaged or other topsoil, fertilization based on soil testing, and seeding with a landowner-approved seed mix, shall also be included as part of demobilization.

B. Site reclamation is included under demobilization. Site reclamation includes reclamation of any other areas not included under A that are disturbed during construction including replacement of salvaged or other topsoil, fertilization based on soil testing, and seeding with a landowner-approved seed mix, to pre-project conditions or better.

C. All damaged or disturbed streambanks are to be restored to a natural slope pattern and profile for establishment of permanent woody vegetation.

D. All disturbed streambank and wetland vegetation is to be replaced. Use a variety of species native to the project area, region or as specified on project drawings and specifications. Replant or reseed each area requiring re-vegetation before the end of the first planting season following construction.

E. Boulders, rock, woody materials and other natural construction materials used for the project shall be obtained beyond the bank full elevation and at least 150 feet from any water bodies, except for native materials obtained from within the project footprint to be stockpiled and reused on site. Leave native materials, e.g., down wood, where they are found, if possible. If native materials (e.g., downed wood) are destroyed, replace them with a functional equivalent during site restoration.

F. Stockpiled materials (i.e., trees, vegetation, sand, topsoil, and other excavated material from restoration project areas) shall be used to rehabilitate areas disturbed by equipment to pre-work conditions. Short-term stabilization measures will be implemented until permanent erosion control measures (plant restoration) are effective, and include seeding and planting as specified on project drawings and specifications. Reclamation planting shall be completed no later than spring planting season of the year following completion of construction.

1.3 RELATED WORK:

A. Section 01 3300, Submittals

PART 2 - PRODUCTS

2.1 Materials and product specifications are included on drawings and in related specifications.

PART 3 - EXECUTION – Not Used

END OF SECTION 01 7113

SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

E. The following sources may be useful in developing the Waste Management Plan:

F. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

1. Provide containers as required.
2. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

B. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

C. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

END OF SECTION 01 74199

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to COR with claim for final Application for Payment.

B. Operation and Maintenance Data:

1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
2. Submit one digital copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with COR comments. Revise content of all document sets as required prior to final submission.
3. Submit digital sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Addenda.
3. Change Orders and other modifications to the Contract.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Record Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION 01 7800

SECTION 314000

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work is the excavation, trenching and backfilling for storage tank demolition and replacement, pipelines and appurtenances. It includes all clearing, grubbing, site preparation, removal and disposal of debris from the excavation, handling and storing materials for fill and backfill, all bracing, shoring and trench protection, construction dewatering, all backfill, subgrade preparation, thrust blocks, final grading, site dressing and cleanup.

1.2 REFERENCES

A. The current publications listed below form a part of this specification.

AASHTO T99	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5kg) Rammer and 12-inch (305mm) Drop
ASTM D698	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5kg) Rammer and 12-inch (305mm) Drop
AASHTO T191 (ASTM D1556)	Density of Soil In-Place by the Sand-Cone Method
AASHTO T238 ASTM D2922)	(Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
AASHTO T239 (ASTM D3017)	Moisture Content of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
AASHTO T11 (ASTM C117)	Materials Finer Than 75mm (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T27 (ASTM C136)	Sieve Analysis of Fine and Coarse Aggregate
AASHTO T89	Determining the Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
ASTM D4318	Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils

1.3 TESTING

A. Field Density Testing

1. Tests and inspections not explicitly assigned to the Government are Contractor's responsibility. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

2. In-place field density tests for quality assurance are at Contractor expense meeting AASHTO T191 (ASTM D1556), Sand Cone Method; or by AASHTO T238 and T239 (ASTM D2922 and D3017), Nuclear Densometer Methods. Quality assurance field density testing frequency shall be as follows:

   For trenches up to eight (8) feet in depth, density tests shall be taken at twelve (12) inches above the pipe bedding, at one-half the trench depth and at the top of the backfill. For trenches greater than eight (8) feet in depth, density tests shall be taken at twelve (12) inches above the pipe bedding, at one-third and two-thirds the trench depth levels, and at the top of the backfill.

   The minimum density shall be 95% Standard Proctor. All locations shall have ±3% optimum moisture.

   Horizontal Frequency:
   1. Utility Mains and Services (to include all Storm Drain, Water, and Sanitary Sewer) – One set of tests every 100 feet.
   3. Open Pit – Minimum of one set of tests (Open Pit – at each manhole, water valve, storm inlet, etc.

   Each test location shall be separated horizontally from a prior test location.

3. Re-testing failing areas is at the expense of the Contractor.

   If a failing test occurs, the contractor shall follow the following procedures for retesting.

   a. Excavate 8" into the backfill at the location of the failing test to find the last passing lift. For every 8" excavated, Contractor shall excavate along the pipe alignment 10' in both directions for the full trench width to the depth of the passing test. At the extents of the horizontal excavation, one test shall be performed at both 10' horizontal excavation limits. If the result is a passing tests, no more horizontal excavation shall be necessary for that direction along the pipe alignment. If these limits do not pass, repeat this procedure until no more failing tests are found.

   b. While recompacting, perform tests at each location where failing test occurred.

4. At the direction of the Contracting Officer, provide necessary equipment and labor to excavate and replace materials for test holes up to 5 feet deep into the compacted backfill to allow testing below the surface of any layers covered without inspection and approval by the Contracting Officer.

B. Laboratory Maximum Density and Optimum moisture

1. Quality assurance tests will be made by the Contractor for each on-site natural soil or each source of off-site material, including borrow material, to determine the laboratory maximum density values and optimum compaction moisture content according to AASHTO T-99 or ASTM D698.

C. Materials Submittals

1. Submit to the Contracting Officer material quality test results including Type 1 Bedding gradation and plasticity index; and Type 2 Bedding gradation.

PART 2 - PRODUCTS

2.1 PIPE BEDDING MATERIALS

A. TYPE 1 PIPE BEDDING

1. Type 1 Pipe Bedding includes the material placed from 4 inches (100mm) below the bottom of the pipe, around the pipe, and up to 6 inches above the pipe.

2. Provide Type 1 Bedding consisting of sand, sandy gravel, or fine gravel having a maximum 3/4 inch size (19mm) and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

3. Where trench excavation encounters wet or unstable material, Type 1 Pipe Bedding must be free draining and nonplastic.

4. Refer to details on Construction Plans and Special Provisions for other requirements.

2.2 TRENCH BACKFILL MATERIALS

A. Materials From Trench Excavations

1. Native backfill material obtained from trench excavations must be free of cinders, ash, refuse, organic or frozen material, boulders, or other deleterious materials. Backfill materials and placement are further described in the execution Section of this specification.

2.3 DETECTABLE BURIED WARNING TAPE

A. Detectable buried warning tape is to have a minimum 6 inch (15cm) width and 5 mil (0.12mm) thickness and a solid aluminum core running the full length and width of the tape enclosed in a color coded inert plastic jacket, impervious to alkalis, chemical reagents and solvents in the soil. The tape is to meet APWA/ULCC Color Code requirements and is to have a maximum 36 inch (90cm) imprint.

2.4 CAST-IN-PLACE THRUST BLOCKS

A. Concrete

a. Minimum compressive strength: 3,000 psi at 28 days (unless geotechnical or hydraulic calculations require higher strength).

b. Slump: 3–5 inches unless otherwise approved.

c. Air content: 4–6% when exposed to freeze-thaw environments.

d. Cement: ASTM C150 Type I/II.

e. Aggregate: ASTM C33.

f. Water: Clean, potable, free of deleterious materials.

g. Admixtures: ASTM-compliant water reducers or air-entraining admixtures permitted; no calcium chloride.

B. Bearing Surface Preparation

a. Thrust blocks shall bear directly on undisturbed native soil or compacted structural fill (95% modified Proctor minimum).

b. Remove unsuitable material as necessary to expose competent bearing soil.

PART 3: EXECUTION

3.1 PROTECTION OF EXISTING PROPERTIES

A General

1. Take precautions to protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures, and fences. Restore or replace all disturbed or damaged facilities to its original condition at Contractor's expense.

   The Contractor will take necessary steps and precautions to keep trenching widths to a minimum and provide the necessary shoring required to protect adjacent buried utilities.

2. Contact utility Owners using the One Call System for utility locates before starting work. Protect the utilities exposed during the work and prevent damaging underground utilities adjacent to excavations. Immediately notify the utility owner of any construction damage. Repairs of damage to marked utilities are at the expense of the Contractor.

3. Re-locate existing water mains, sanitary sewers and storm drains shown on the plans that conflict with new pipelines or structures as indicated in the contract documents.

4. Cut and replace existing service lines interfering with trenching operations only with the Contracting Officer's permission and at the contractor's expense. Show all repaired and/or adjusted water and sewer lines on the As-Built Plans.

5. Protect existing water and sewer mains and water and sewer services from freezing at all times during construction.

B. Privately Owned Utilities

1. If any existing private utility interferes with the work in either alignment or grade, and has to be moved, the work will be performed by the appropriate Utility Owner, unless otherwise specified in the contract documents. Such private utilities may include gas mains, underground electrical and telephone cables, telephone poles, light poles, etc.

2. It is the Contractor's responsibility to coordinate utility relocations with the utility owner.

C. Existing Structures

1. Prevent damage to existing buildings or structures in the work area. Repair all construction related damage to the satisfaction of the Government.

D. Existing Overhead Utilities

1. Use extreme caution to avoid conflict, contact or damage to overhead utilities during the work.

E. Exploratory Excavation

1. The location of existing buried utilities may need to be verified by exploratory excavation before construction.

2. Exercise care to prevent damaging all utilities and repair any utility damage caused by exploratory excavation.

F. Pavement Removal and Stripping

1. Where trench excavation or appurtenant structure excavation requires removing curb and gutter, concrete sidewalks, asphalt concrete pavement, or Portland cement concrete pavement, cut the concrete or pavement in a straight line parallel to the excavations edge using a spade-bitted air hammer, concrete saw or other suitable equipment to produce a straight, square and clean break. Re-cut edges broken during construction, before concrete or paving operations.

2. For trenches passing through existing pavement, cut the pavement along a neat vertical line at least 12 inches (30cm) from the trench edge. Where the neat line cut is less than 3 feet (0.9m) from the edge of the existing pavement, remove and replace the entire pavement section between trench and edge of pavement.

3. Dispose of the asphalt concrete and/or Portland cement concrete debris off-site according to applicable state and local regulations.

G. When excavating across existing gravel streets or other developed surfaces, remove the surfacing material full depth and stockpile for inclusion as trench backfill or legally dispose of the surfacing material.

H. When excavating across cultivated or sodded areas, remove topsoil full depth or to a maximum 12 inch (30cm) depth, whichever is less, and stockpile for possible project use.

I. Re-sod or reseed, as specified in the contract documents, all established lawn areas cut by trenching or damaged during the construction to the satisfaction of the Contracting Officer.

3.2. MAINTENANCE OF FLOWS

A. Maintain the flow of sewers, drains and water courses encountered during construction. Restore culverts, ditches, fences, crosswalks and structures disturbed by construction to their original condition upon completion of the work.

3.3 TRENCH EXCAVATION

A. General

1. Meet current OSHA Safety and Health Standards for all excavation, trenching, shoring, and related work.

2. Excavate at the specified locations for pipeline installations and appurtenant structures.

3. Crossings under sidewalks or curbs may be made by tunneling, if approved by the Contracting Officer. If a portion of a sidewalk or curb is removed, use a concrete saw to make joints, compact the backfill as specified, and replace the removed section with new concrete sidewalk or curb.

4. During excavation, stockpile backfill materials away from the trench banks to assure trench wall stability. Stockpile excavated materials on only one side of the trench without obstructing existing fire hydrants, valves, manholes and other appurtenances. Assure surface drainage of adjoining areas is unobstructed.

5. Remove and dispose of all excess or unsuitable excavated materials.

6. Prevent surface water from flowing into excavations. Promptly remove all water accumulating in trench excavations. Do not permit water to accumulate in any open trench. Remove and re-lay all pipe out of alignment or grade caused by trench flooding.

7. Grade the trench bottoms to the specified lines and grades. Assure bedding material provides uniform bearing and support for each pipe section along its entire length. Excavate for bell and joints after the trench bedding is graded, limiting the excavation to the required length, depth and width for making the particular type of joint used.

8. No differentiation between common and rock trench excavation is made, except when listed as separate bid items on the bid proposal or bid form. Excavation includes removing and subsequent handling of all earth, gravel, bedrock or other material encountered regardless of the type, character, composition or condition of the material.

9. The use of trench digging machinery is permitted, except in places where its operation is likely to cause damage to existing structures or features, in which case hand methods are to be employed.

B. Trench Dimensions

1. Excavate to the trench dimensions specified below.

2. Width.

a. Excavate to provide room to install and join the pipe as specified. The minimum trench width is 2’-0” (0.6m), for outside pipe diameters of 18 inches (0.5m) or less. The minimum trench width is 2'-0" (0.6m) plus the outside pipe diameter, for pipe sizes exceeding 18 inches (0.5m). Maximum trench width may be specified in the contract documents.

3. Depth.

a. Excavate the trench as required for the invert grade or pipe bury as specified in the contract documents, plus 4 inches (10cm) for the Type 1 Pipe Bedding. If bedrock, boulders or large stones are encountered at the bottom of the trench, excavate at least 6 inches (15cm) below the bottom of the pipe for backfilling with Type 1 Pipe Bedding.

C. Pavement Damage Caused By Equipment

1. Equip all track mounted equipment operated on pavement surfacing with pads to prevent pavement damage.

2. Restore all pavement damaged by construction to its original condition.

D. Shoring, Bracing and Sheeting

1. Provide all shoring, bracing and tight sheeting required to prevent caving and protect workers, meeting current Occupational Safety and Health Act Requirements, and to protect adjacent property and structures. The cost of this work is included in the cost for trench excavation.

E. Excavations for Appurtenances

1. Make excavations for manholes, hydrants, structures and other appurtenances of the size and depth to permit compacting of backfill on all sides to the specified density. The requirements for removing water and other applicable portions of these specifications apply to excavation for appurtenances.

3.4 DEWATERING

A. Remove all ground water encountered in trench excavations. Do not place pipe, bedding or backfill materials below the groundwater elevation established by dewatering operations. The cost of dewatering operations is considered a part of the excavation cost.

3.5 EXCAVATION STABILITY AND SAFETY

A. The stability of construction excavations and associated worker safety, including slope geometry and shoring/bracing considerations, are the responsibility of the Contractor. Meet current OSHA regulations. This may require design of temporary slopes and/or shoring by a licensed professional. Provide all documentation to the Contracting Officer.

3.6 TRENCH FILLING AND BACKFILLING

A. General

1. Backfill all trenches with native on-site material as specified immediately after grade, alignment and pipe jointing has been inspected and approved by the Contracting Officer. Conduct any pipe testing as specified in the respective water distribution, sewerage/drainage sections. Correct all defects discovered by tests prior to backfilling.

B. Pipe Bedding Placement

1 Type 1 Bedding.

a. Place Type 1 Pipe Bedding material 4 inches (10cm) under the pipe, around the pipe, and up to 6 inches above the pipe. Place in maximum lifts of 6 inches (15cm), using hand or other compaction methods without damaging or disturbing the pipe. Thoroughly compact each layer. Use special care to assure compaction under the pipe haunches.

b. Place bedding material in equal lifts (6-inch max. lifts) on both sides of the pipe for the full trench width. Take care to prevent migration of Type 1 Bedding into surrounding soils during placement and compaction. Compact Type 1 Bedding to at least 95 percent of maximum dry density determined by AASHTO T99 or by ASTM D698.

C. Trench Backfill.

1. After the pipe bedding materials are placed and compacted as specified, backfill the trench. Use native backfill material from the site free of cinders, ash, refuse, organic or frozen material, boulders, or other deleterious materials. From the top of the Select Type 1 Pipe Bedding to 6 inches (15cm) below the ground surface, or the subgrade elevation, material containing rock up to 8 inches (20cm) in the greatest dimension may be used.

2. Watering

a. Apply uncontaminated water, when required, at the locations and in the amounts required to compact the backfill material to the specified requirements. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application.

b. Apply water during the work to control dust and to maintain all embankment and base courses in a damp condition in accordance with these contract documents.

c. Water required for compacting trench backfill may be obtained from the water system if approved by the Government, or from other sources.

3. Remove, replace, and re-compact backfill in trenches where settlement has occurred as directed by the Contracting Officer at the Contractor's expense.

4. Trench backfill compaction shall be as follows:

a. Place trench backfill in maximum 6 inch compacted lifts within 3 percent of optimum moisture content, and compact to at least 95 percent of maximum dry density determined by AASHTO T99 or by ASTM D698.

D. Replacement of Unsuitable Backfill Materials

1. Remove and dispose of excavated soils that are saturated, contain deleterious materials or have characteristics that, in the opinion of the Contracting Officer, render the soils unsuitable as backfill.

2. Replace unsuitable soils with material obtained from trench excavations within the project limits at the expense of the Contractor. If suitable replacement material is not available within project limits, notify COR before proceeding with the work.

3. Place and compact all imported material according to the applicable backfill specification requirements.

E. Backfill for Appurtenances

1. Place and compact backfill for appurtenances to finished grade around manholes, inlets, valve boxes and other underground items without disturbing appurtenance alignments.

2. Meet the backfill material, placement, and compaction requirements specified for the adjoining trench.

F. Detectable Buried Warning Tape

1. Provide warning tape as described in PRODUCTS Section 2.3. Bury tape a maximum 18 inches (45cm) below finish surface grade.

2. The Contactor shall install blue warning tape directly above new waterlines and green tape directly above new sanitary sewer lines

3.7 SURVEY MARKERS AND MONUMENTS

A. Protect all survey markers and monuments. Protection includes marking with flagged high lath and supervising work near markers and monuments. Do not disturb monuments without prior approval from the Contracting Officer.

B. Replace all Contractor disturbed or destroyed survey markers or monuments, not approved during construction, using a licensed land surveyor.

3.8 CLEANUP

A. As work progresses, remove debris and complete to finish grade each portion of the work. Once the work is complete, clear debris and finish the entire site to smooth, uniform slopes presenting a neat and workmanlike appearance. Remove and dispose of all rocks brought to the surface during excavation or backfilling.

B. During final cleanup, the Contractor shall be responsible for street sweeping and washdown of paved areas that may have been affected during construction.

C. All existing gravel surfaces contaminated by trench excavation material shall be removed to a minimum depth of 1-inch and replaced with crushed gravel surfacing.

3.9 TIME AND DISTANCE OF OPEN TRENCHES

A. Perform the work so that trenches will remain open the minimum time required to accomplish the work.

B. Do not begin trench excavating until appropriate compaction equipment is at the excavation site.

END OF SECTION 314000

SECTION 331200

WATER UTILITIES

PART I - GENERAL

1.1 DESCRIPTION

A. Furnish all water pipe, fittings, and storage tank meeting the Contract documents or specified as follows.

B. Furnish and install valves and valve boxes for potable water utilities, together with related appurtenances.

C. Related Sections:

1. Section 314000 – Trenching and Backfill

1.2 CERTIFICATION BY MANUFACTURER

A. Furnish a manufacturer's certification covering all pipe and fittings furnished, certifying that the pipe and fittings meet applicable specifications.

1.3 REFERENCES

ANSI B16.1	Tapping Sleeves
ASTM B88-62	Copper Pipe
ASTM D3350	High Density Polyethylene Pressure Pipe
AWWA B300	Hypochlorite for Disinfecting
AWWA B301	Liquid Chlorine for Disinfecting
AWWA C 104	Ductile Iron Cement-Mortar Lining
AWWA C110	Ductile Iron Fittings
AWWA C111	Ductile Iron Joints
AWWA C151	Ductile Iron Pipe
AWWA C153	Ductile Iron Compact Fittings
AWWA C301	Concrete Cylinder Pipe
AWWA C500	Gate Valves
AWWA C502	Fire Hydrants
AWWA C504	Butterfly Valves
AWWA C509	Gate Valves
AWWA C651	Disinfecting Water Mains
AWWA C900	PVC Water Main Pipe

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish pipe and fittings as specified in the Contract Documents and meeting the material and testing requirements of this Section. Pipe strength classifications are shown on plan drawings and/or are listed in the Contract Documents.

B. References made to ASTM, ANSI, AWWA, USASI or AASHTO designations are the latest revision at the time of call for bids.

2.2 PIPE MATERIALS

A. General

1. Furnish the pipe specified in the contract documents meeting the materials and testing requirements as outlined in this section.

2. Assure all pipe is clearly marked showing type, class and/or thickness Lettering must be legible and permanent under normal handling and storage conditions.

B. Ductile Iron Fittings

1. Fittings

a. Furnish fittings meeting one of the following;

1) Class 250 fittings meeting AWWA C110, latest edition, Gray-Iron and Ductile Iron Fittings For Water And Other Liquids
2) Compact fittings meeting AWWA C 153.

2. Joints

a. Assure joints are mechanical joints meeting AWWA C111. Assure the fitting interior is cement mortar lined meeting AWWA C104. Assure the fitting exterior is bituminous tar coated 1 mil thick. Use compact fittings having a rated working pressure of 350 psi (2410 kPa) following manufacturer recommended laying lengths.

3. Couplings

a. Use pipe couplings meeting one of the following:

1) Cast type with cast iron or ductile iron sleeves and malleable or ductile iron flanges.
2) Gray iron or ductile iron, mechanical joint solid sleeves, with a minimum 12 inch lengths (30 cm).
3) Limit use of the first type to a maximum 16 inch (40 cm) diameter. Use the manufacturers' standard gasket for use in potable water systems. Use stainless steel bolts and nuts. Coating to be "manufacturers ' standard".

C. Polyvinyl Chloride (PVC) Pressure Pipe

1. Furnish PVC water main pipe meeting AWWA C900 requirements, made to ductile iron O.D.'s for "Push-On" joints. Assure pipe joints are bell and spigot having an elastomeric gasket. Use DR 25 Class 165 pipe.

D. High Density Polyethylene (HDPE) Pressure Pipe

1. Use High Density Polyethylene pipe in water line construction as specified in the contract documents and meeting the following specifications:

a. Furnish pipe of the size or sizes specified. Provide SDR 11 HDPE 4710 piping.

b. High Density Polyethylene Pipe

1) Use pipe meeting AWWA Specification C901, “Polyethylene (PE) Pressure Pipe, Tubing and Fittings, ½ inch through 3 inch for Water” and ASTM D3350 – Standard Specification for Polyethylene Plastic Pipe and fittings materials.

2) Fittings. Type: HDPE fittings compatible with PE4710 pipe. Joining method: Butt fusion or electrofusion per ASTM F2620. Pressure Rating: Equal to or greater than pipe fitting.

3) Markings. Pipe shall be marked with: Manufacturer’s name, nominal size, SDR, Material Designation (PE4710), AWWA Certification, NSF/ANSI 61 certification.

2.3 TAPPING SLEEVES AND VALVES

A. Use tapping sleeves meeting either:

1. Gray iron or ductile iron, split-sleeve, mechanical joint type with end and side gaskets,

2. Split-body type with circular gasket forming a seal around the circumference of the outlet.

3. Assure both types have a class 125, ANSI B16.1 outlet flange, are rated for a minimum 150 psi (1030 kPa) working pressure and contain a threaded test plug on the neck or body of the tapping sleeve. Assure gaskets are manufacturers' standard for use in potable water systems. Use stainless steel bolts and nuts. Assure mechanical joint type is fusion-bonded, 12-mil thickness, and epoxy coated. Limit the use of mechanical joint type to metal pipe. Assure tapping valves meet the applicable requirements for gate valves, as outlined in this section, with flanged inlets compatible with the flange of the tapping sleeve and mechanical joint outlet.

2.4 CORPORATION STOPS

1. Furnish brass corporation stops with inlet end to meet tapping requirements and flared outlet for copper tubing or pressure coupling for polyethylene tubing.

2.5 SERVICE CLAMPS

1. Furnish flat, double strap, bronze metal service clamps with Neoprene gaskets and corporation stop threads. Assure service clamps for PVC provide full support around the pipe circumference with a bearing area of the width along the axis of the pipe so the pipe is not distorted when the clamp is tightened.

2.6 CURB STOPS

1. Furnish no-lead non-draining curb stops with bronze plug, tee head key with Minneapolis pattern and screw box mount.

2.7 CURB BOXES

1. Furnish extension type curb boxes having a 6- 1/2 foot (2 meters) extended length.

2.8 VALVES

A. Gate Valves

1. Furnish iron body gate valves, resilient seat or double disc gate valves with non-rising stems with design, construction and pressure rating meeting AWWA C500 or AWWA C509 requirements and the following.

2. Assure stem seals are double "O" ring seals capable of replacing the seal above the stem collar with the valve under pressure in full open position.

3. Furnish gate valves for underground installation equipped with a 2-inch (3 1 mm) square operating nut for key operation. All valves to open COUNTERCLOCKWISE. Valves to be equipped with mechanical joints for pipe connections.

2.9 VALVE BOXES

A. Furnish cast iron valve boxes, 5-1/4-inch (13 cm) diameter, adjustable valve boxes with the required base for the valve size used. Assure valve boxes are screw type and of the specified length for the pipe bury. All water valve boxes shall not be extended by more than 50%. Assure the valve box cast iron cover has an arrow indicating the opening direction and stamped with the word "Water". All water valve boxes shall be aligned to allow a 4-inch diameter PVC pipe to be inserted in the valve box and centered over the valve nut.

2.10 SPECIAL FITTINGS

A. Furnish special fittings meeting the Contract Documents. The Contracting Officer will specify gasket materials for contaminated soil or special groundwater situations.

2.11 POLYETHYLENE ENCASEMENT

A. Furnish polyethylene encasement in accordance with AWWA C105, "Polyethylene Encasement for Fray and Ductile Cast - Iron Pipe for Water and other Liquids".

2.12 Water Storage Tank

A. See contract drawings for new Water Storage Tank requirements and installation requirements.

PART 3 - EXECUTION

3.1 TRENCH EXCAVATION AND BACKFILL FOR WATER MAINS

A. This work includes all excavation, backfilling, disposal of surplus and unsuitable material, and all other work incidental to trench construction, including excavation for valves, fittings, hydrants, thrust blocks or other pipeline structures and not classified as "Structural Excavation."

B. Perform this work in accordance with Section 314000: TRENCHING AND BACKFILLING.

3.2 PIPE INSTALLATION FOR WATER UTILITY PIPING

A. General

1. Install pipe following the manufacturer's specifications and instructions. Provide all tools and equipment required to install each type of pipe used.

2. The Contractor is responsible for all contractor furnished material. Replace all defective material or material damaged by handling after delivery by the manufacturer. This includes the furnishing of all materials and labor required to replace installed material discovered damaged or defective before final acceptance of the work, or during the guarantee period.

3. Store all material safely and to prevent damage. Keep pipe interior and other accessories free from dirt and foreign matter at all times.

4. Deliver and distribute all Contractor furnished pipe at the site. Load and unload pipe, fittings, specials, valves and accessories to prevent damage. Do not permit pipe handled on skidways to skid or roll against pipe already on the ground.

5. When distributing material at the work site, lay each piece adjacent to its installation point. Repair or replace all damaged pipe at Contractor's expense on the jobsite.

B. Dewatering of Trench

1. Remove all water in the trench during pipe laying and maintain a dry trench until the pipe ends are sealed. Do not permit the pipe to float. Do not allow any trench water to enter the pipe at any time.

C. Laying of Pipe

1. Inspect the pipe and pipe coating for damage or defects before installation. Lay pipe without damaging the pipe coating. Repair all pipe coating damage following the manufacturer's instructions before laying the pipe. When using belt slings to lower the pipe into the trench, remove the slings without damaging the pipe coating.

2. Lay pipe to the specified lines and grades with fittings and valves at the required locations. Plumb all valve stems.

3. Grade and alignment on un-graded streets will be provided using hubs set parallel to the pipe line, and on graded streets from established points on the existing curbs or sidewalks, when directed by the Contracting Officer. Excavate pipe trenches to the lines and grades given or to the standard cover depth specified. Transfer lines and grades to the pipe from hubs or from existing concrete curbs or sidewalks as an incidental part of this work.

4. Use implements, tools and facilities satisfactory to the Contracting Officer for the safe and convenient prosecution of the work. Carefully lower all pipe, fittings and valves into the trench using a derrick, rope or other tools or equipment, without damaging pipe materials and protective coatings and linings. Do not drop or dump materials into the trench.

5. Take every precaution to prevent foreign material from entering the pipe as it is placed in the line. During laying operations, do not permit debris, tools, clothing or other materials to be placed in the pipe. At times when pipe laying is not in progress, close the open ends of the pipe using a watertight plug or other approved methods to prevent material entering the pipe.

6. Place pipe bedding in the bottom of the trench meeting Section 314000; TRENCHING AND BACKFILLING. Voids may be left in the bedding material to remove pipe slings and for pipe bells to allow support along the full length of the pipe barrel.

7. Long radius curves, either horizontal or vertical, may be laid with standard pipe with deflections at the joints where approved. If the pipe is shown curved on the plans and no special fittings are shown, assume that the curves can be made by deflection of the joints with standard lengths of pipe. If shorter lengths are required, the plan will indicate maximum lengths that can be used.

8. The Contracting Officer will determine the method of deflection or curving where required but not specified. No additional payment will be made for laying pipe on planned curves, nor for field changes involving standard pipe lengths deflected at the joints.

9. Do not exceed the applicable material and joint specifications of AWWA or the pipe manufacturer's recommendations at pipe joints for various types of pipe. When rubber gasketed pipe is laid on a curve, joint the pipe in a straight alignment and then deflect to the curved alignment. Excavate trenches to accommodate deflections and curves.

10. Construct reaction or thrust blocks at all tees, plugs, valves, reducers, caps and at bends deflecting 22-1/2 degrees or more. Construct thrust blocks at tapping sleeves where the outlet diameter exceeds one-half the diameter of the main being tapped. Limit using metal rods or straps for thrust restraint to those specified on the plans, or where the use of concrete thrust blocks would be impractical. Do not use metal rods or straps without the Contracting Officer's approval. Construct reaction blocks from concrete having a minimum compressive strength of 2,000 pounds per square inch (14,000 kPa) at 28 days. Place blocking between undisturbed ground and the fitting to be anchored, as shown in the Contract drawings. Place the blocking so that the pipe and fitting joints are accessible for repair.

11. Cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damaging the pipe or coating and leaving a smooth end at right angles to the pipe axis. Do not cut pipe using an oxyacetylene torch.

D. Pipe Jointing

1. Rubber Gasket, "Push-On" Joints

a. Follow the manufacturer's recommendations for jointing of pipe and fittings with a rubber gasket, "push-on" type. Wipe the rubber gasket and gasket seat inside the bell clean with a cloth. Wipe the plain end of the adjoining pipe clean, lubricate and insert into the bell to make contact with the gasket. Force the plain end "home" using a crow bar, fork tool, or jack assembly.

2. Mechanical Joints

a. Thoroughly brush the bell and the outside of the spigot of the mechanical joint fitting with a wire brush to remove all loose rust or other foreign material just before assembly. Brush the cleaned surfaces with soapy water just before slipping the gasket over the spigot end and into the bell.

b. Center the spigot end of the pipe or fitting in the bell before jointing is begun. Once the gasket is in place, bring the gland up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. Partially tighten the bolts, alternately around the socket, maintaining approximately equal tension until the final tension is reached.

c. Use the following bolt torque range for the joints:

Bolt Size		Range of Torque	
Inch	(Millimeters)	Ft.-Lb.	(joules)
5/8	(16)	40-60	(54-81)
3/4	(19)	60-90	(81-122)
1	(25)	70-100	(95-135)
1-1/4	(32)	90-120	(122-163)

d. Apply the torque loads with torque measuring or indicating wrenches, or apply using regular socket wrenches, checked with torque wrenches.

e. If the joint is not sealed using the maximum torque indicated above, disassemble and re assemble the joint after thorough cleaning. Do not overstress bolts to provide the seal.

3. Connections to Existing Mains

a. Make all connections to existing water mains in use unless otherwise specified. Furnish the special fittings, as shown on the plans, and all other material required. Make all necessary excavations to assure gradual transition between the new and existing water main, and perform all necessary backfilling.

b. Where the connection of new work to old requires a service interruption and customer notification, the Contracting Officer and the Contractor are to mutually agree upon a date for connections to permit adequate time to assemble labor and materials, and to notify all affected customers. All notifications are the Contractor's responsibility and shall be provided a minimum of 24 hours prior to performing the work.

3.3 POLYETHYLENE ENCASEMENT

A. Double wrap all direct bury cast iron or ductile iron pipe and fittings including hydrants, valve boxes, curb boxes, and all other metal parts and surfaces, in polyethylene encasement.

3.4 TESTING, CLEANING & DISINFECTING WATER SYSTEM

A. Hydrostatic and Leakage Testing

1. Perform hydrostatic and leakage testing in accordance with AWWA C600. Once the pipe is laid and backfilled, test for at least 2 hours, all newly laid pipe, or any valved section, to a hydrostatic pressure of at least 1.5 times the normal operating pressure at the test point or 1.25 times the normal operating pressure at the highest point along the test section.

2. Slowly fill the pipe with water, purging all air, and apply the test pressure using a pump hooked up so that the pressure and leakage can be measured. To purge the pipe of air during the test, it is necessary to tap the pipe at its highest points if permanent air vents, water services, hydrants, etc. are not located at the high points. Use corporation stops for this purpose. Furnish the pump connections, gauges, stops, and all necessary apparatus for testing.

3. Disassemble and reassemble all joints showing leakage after thorough cleaning. Remove and replace all cracked or defective pipes or fittings discovered in during the pressure test with sound material and repeat the test.

4. Conduct the leakage test concurrently with the pressure test for 2 hours. Leakage is defined as the quantity of water supplied into the pipe, or any valved section

thereof, necessary to maintain pressure within 5 PSI of the pressure test after the pipe has been filled with water and purged of air.

5. The pipe installation will be rejected if the leakage exceeds that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{148{,}000}$$

6. In which L equals the allowable leakage in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

7. Should any test of pipe laid disclose leakage exceeding that specified above, locate and repair the defective joints until the leakage is within the specified allowance.

8. Conduct the pressure and leakage tests with the Contracting Officer present.

9. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gallon per hour per inch of nominal valve size is allowed. Repair all visible leaks regardless of the amount of leakage.

10. Pressure test tapping sleeves after installation and before tapping.

B. Disinfecting Water Lines and Existing System

1. Clean and disinfect per AWWA C651-23. Due to Iron bacterial present in the old piping that remains, apply 100 mg/l chlorine solution to all old and new piping prior to filling the new storage tank and hold for 24 hours. Drain water lines prior to filling new storage tank.

2. Disinfect the existing water well per AWWA C654-13. Apply 100 mg/l chlorine solution and hold for 24 hours. Well disinfection should be completed prior to filling the storage tank.

C. Disinfecting Storage Tank

1. Disinfect per AWWA C652-19 and ANSI/AWWA C652-11. Wipe all interior services of new tank per Method 1 – apply 200mg/l chlorine cleaning solution to all interior services. Then perform cleaning per Method 3 – Fill tank to maximum capacity with 10 mg/l of chlorine solution and hold for 24 hours. At 12 hours sample your chlorine residual and verify it remains above 10 mg/l.

D. Bacteriological Tests

1. After final flushing and before the water system is placed in service, test a sample, or samples, collected from the system for turbidity and organisms. Collect at least one sample from the new piping and one from each branch.

2. Redisinfection

a. If the initial disinfection fails to produce approved bacteriological or turbidity samples, re-flush and resample the system. If check samples show bacterial contamination, re-chlorinate the system until approved results are obtained.

3. Swabbing

a. Where connections are made to existing piping and the connections are not disinfected along with the newly installed main, swab or spray the interior of all pipe and fittings used in making the connections with a 1 percent hypochlorite solution before installation.

3.5 WATER AND SEWER MAIN SEPARATION

A. Maintain horizontal and vertical separation between water mains and sewer mains in accordance with Montana Public Works Standard Specifications Drawing No. 02660-2.

3.6 VALVES

A. Set and joint gate valves and butterfly valves to the pipe as specified for pipe laying and jointing. Set valves with operating nut vertical. Center and plumb valve boxes over the operating nut to prevent shock or stress being transmitted to the valve.

B. Valve Boxes

1. Center and plumb valve boxes over the valve operating nut. Set valve box tops flush with the ground surface or street surfacing.

2. Place bedding gravel around all water main valves and under the valve box bottom to drain any water entering the valve box.

C. Valve Thrust Blocks

1. When specified, install valves with thrust blocks per the contract drawings.

3.7 FIRE HYDRANTS

A. Set all hydrants plumb with the pumper nozzle facing the street. Set the hydrant with the ground line at the location indicated by the hydrant manufacturer.

B. Provide drainage at the hydrant base by placing clean gravel under and around it. Place gravel at least 1 foot (30 cm) on all sides from the base of the hydrant to at least 6 inches (15 cm) above the drain opening. Brace the hydrant against unexcavated earth at the trench end with concrete backing as detailed on the plans. Furnish hydrants with the specified gate valves.

3.8 SERVICE LINE INSTALLATION

A. Provide all work and materials for the complete service line installation, including trench excavation and backfill; making the water main tap; furnishing and installing the corporation stop, curb stop and box, service clamp where necessary, and service line with fittings to make the connections to the stops. Bend the service line adjacent to the water

main into a figure "S" in a horizontal or vertical plane to avoid a rigid connection. Assure all services have a minimum 6-1/2 feet (2 meters) of cover.

3.9 TAPPING

A. Tap the newly installed water mains unless specified otherwise.

B. Perform tapping using an approved tapping machine using clean, sharp drill taps and/or shell cutters. Do not tap directly into AWWA C900 PVC pipe. 3/4-Inch (19 mm) and 1-inch (25 mm) taps may be made directly into the barrel of ductile iron pipe without using service saddles. Direct tap into the pipe barrel to the depth exposing a maximum three threads of the corporation stop. Use maximum direct tap sizes of l- 1/2-inch (3 8 mm) for 6-inch (1 5 cm) diameter mains and 2-inch (5 1 mm) for larger mains.

END OF SECTION 02660