

PART 1 GENERAL

01.1.01 DESCRIPTION

- A. This section of the Contract Documents includes Special Construction Performance Requirements, commonly referred to as “Special Provisions” related to the Work.
- B. Special Provisions included herein shall take precedence over other Project Manual information as specified in the Specifications.
- C. Upon submission of USACE mandated submittals the district will initiate a 30-day completeness determination. If the District determines the submittal is incomplete, the district will notify you what information is needed. Once the USACE determines the information submitted for the second milestone is complete, the district will review in a minimum of 60-days and provide a decision on whether to approve or deny.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

01.3.01 SPECIAL PROVISION #1 – PREPARATION OF DRILLING AND INVASIVE PROGRAM PLAN (DIPP)

- A. A drilling and invasive program plan (DIPP) must be submitted to the USACE, compliant with Engineer Regulation (ER) 1110-1-1807 Drilling and Invasive Activities at Dams and Levees and Engineering Manual (EM) 1110-2-2902 Conduits, Pipes, and Culverts Associated with Dams and Levee Systems (hyperlinks below). The submittal should be provided to USACE to allow at least 60 days for review and comment, as the DIPP requires USACE Risk Management Center review and District Dam Safety Officer (DSO) Approval. A DIPP Checklist is included at the end of this section. The DIPP submittal must include but is not limited to the following:
 - 1. ER 1110-1-1807, Section 6 and Appendix B provide the required contents of an acceptable DIPP.
 - 2. Detailed borehole locations and depths.
 - 3. Vertical and inclined borings will require two forms of hydraulic fracture calculations (e.g., Fell et al, 2018; Jaworski et al., 1981; Marchi et al., 2014; and/or Chang Huang, 2016) meeting a minimum factor of safety of 1.3. The RMC Hydraulic Fracture Toolbox can be requested from the following link for use in performing these calculations (URL link: <https://www.rmc.usace.army.mil/Software/RMC-Toolboxes/RMC-Hydraulic-Fracture-Toolbox/>). Horizontal Directional Drilling (HDD) requires separate drilling fluid pressure and hydraulic fracture calculations meeting the requirements of EM 1110-2-2902, Section 5.6.3.
 - 4. EM 1110-2-2902, Section 5.6 documents the design and submittal requirements specific to HDD construction near USACE dams and levees and their foundations, which must be provided in the DIPP or in a separate work plan for USACE review.
 - 5. Appendix B-3, Section f, subsection 7, states that an Emergency Action Plan (EAP) is required as content within a complete DIPP. The District’s Project specific EAP Guidelines are included in at the end of this specification section.
 - 6. Contingency procedures for encountering unexpected subsurface conditions.
- B. For more information on preparing a DIPP refer to specifications section 33.05.07.13.

01.3.02 SPECIAL PROVISION #2 – PREPARATION OF AN EXCAVATION AND BACKFILL PLAN

- A. An excavation and backfill plan must be submitted to the USACE, which must comply with EM 1110-2-2902 Conduits, Pipes, and Culverts Associated with Dams and Levee Systems (December 2020); must

also comply with ER 1110-1-1807 Drilling and Invasive Activities at Dams and Levees, and Contract Plans and Specifications.

1. Below are URL links for ER 1110-1-1807 and EM 1110-2-2902, respectively:

- a. <https://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER%201110-1-1807.pdf>
- b. <https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/EM%201110-2-%202902a.pdf>

B. For more information on preparing an excavation and backfill plan refer to specifications section 31.01.04.

01.3.03 **SPECIAL PROVISION #3 – PREPARATION OF A DEWATERING PLAN**

A. A dewatering plan must be submitted to the USACE, which must include, but is not limited to, the following items:

1. Expected water levels (per TM-5-818-5, dewatering to at least 2-feet below excavation is required),
2. Method for dewatering each area including design information,
3. Manufacturer information for the dewatering system,
4. Drilling and Invasive Program Plan (DIPP) in accordance with ER-1110-1-1807 for well point installation (if applicable),
5. Drawings showing locations and arrangement of dewatering equipment,
6. Discharge points,
7. Contacts for employees who will be responsible for maintaining dewatering,
8. Abandonment details.

B. For more information on preparing a dewatering plan refer to specifications section 31.23.19.

01.3.04 **SPECIAL PROVISION #4 – PREPARATION OF A CONSTRUCTION ACCESS AND STAGING PLAN**

A. The contractor shall prepare construction access and staging plan for submittal to the USACE. The plan shall consist of the following:

1. Map of the project area within USACE property or jurisdiction with any proposed construction disturbances accurately labeled, these can include but are not limited to:
 - a. Staging Areas
 - b. Parking Areas
 - c. Area following construction alignment centerline needed to install water pipeline and related fixtures.
2. The areas shown on the map must also be submitted in either GIS shapefile format or KMZ format.

01.3.05 **SPECIAL PROVISION #5 – PREPARATION OF A TREE REMOVAL PLAN (IF NECESSARY)**

A. If tree removal is necessary within USACE property or jurisdiction for the installation of the water pipeline, a tree removal plan that accounts for Endangered Species Act compliance, to include conservation conditions for the Northern Long Eared Bat (*Myotis septentrionalis*). For example: no trimming or grubbing of trees between 01-June to 15-August unless trees are surveyed by a certified biologist for the

Northern Long Eared Bat and the species is found to not be present in any trees within the area of disturbance.

- B. For more information on the Tree Removal Plan refer to specifications section 31.11.00.

01.3.06 **SPECIAL PROVISION #6 – PREPARATION OF A RE-VEGETATION PLAN**

- A. The contractor will be responsible for preparing a re-vegetation plan in accordance with Fort Peck Dam re-vegetation specifications to the USACE. The re-vegetation specifications are included in specification section 32.92.19

01.3.07 **SPECIAL PROVISION #7 – SUBMITTAL OF PIPE FUSING CONTRACTOR QUALIFICATION STATEMENT**

- A. The selected contractor will be required to submit a qualification statement for the pipe fusion contractor, subject to approval by the United States Army Corps of Engineers, Montana Fish Wildlife and Parks, and Interstate Engineering Inc. A form for this qualification statement has been included within the special provisions for the contractors' use.

01.3.08 **SPECIAL PROVISION #8 – SUBMITTAL OF HORIZONTAL DIRECTIONAL DRILLING CONTRACTOR QUALIFICATION STATEMENT**

- A. The selected contractor will be required to submit a qualification statement for the horizontal directional drilling contractor, subject to approval by the United States Army Corps of Engineers, Montana Fish Wildlife and Parks, and Interstate Engineering Inc. A form for this qualification statement has been included within the special provisions for the contractors' use.

01.3.09 **SPECIAL PROVISION #9 – ADHERENCE TO OPERATION AND MAINTAINENCE PLAN**

- A. The contractor must adhere to all procedures and guidelines outlined in the Fort Peck Fish Hatchery Water Transmission Main Operation and Maintenance Manual dated July 29th, 2024 prior to final inspection and acceptance by the owner. The Fort Peck Fish Hatchery Water Transmission Main Operation and Maintenance Manual has been included within the special provisions for the contractors' use.

01.3.10 **SPECIAL PROVISION #10 – FISH HATCHERY WATER SUPPLY MAIN TIE-IN TIME CONSTRAINTS**

- A. The tie-in to the existing Fish Hatchery Water Supply Main must occur during the hatchery summer shutdown period. This time period runs from approximately June 15th through September 1st. The contractor will need to coordinate with hatchery staff to ensure that the tie-in will not interfere with hatchery operations. Outside of this shutdown period there must be an operational water supply for the hatchery whether it is the existing pump/ filter system and/ or the new water supply main.

01.3.11 **SPECIAL PROVISION #11 – POWERHOUSE CONSTRUCTION TIME CONSTRAINTS**

- A. All work within the powerhouses must be completed within a 60 calendar day period. This 60 day period will run concurrently with the 180 calendar day overall construction timeline and starts when construction begins within the powerhouses.

01.3.12 **SPECIAL PROVISION #12 – EXPLANATION OF BID QUANTITIES (MEASUREMENT AND PAYMENT)**

- A. Refer to the measurement and payment section attached to these Special Provisions for an explanation of the bid quantities.

END OF SECTION

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DRILLING AND INVASIVE PROGRAM PLAN CHECKLIST

District DIPP Quality Control Checklist

Part I: Quality Control Review

Full Project Name: _____

Work Project Title: _____

Revision Number: _____ Date: _____

Work Project Originator: _____ GGM COP Reviewer: _____

Signature: _____ Signature: _____

Peer Reviewer¹: _____ Senior Reviewer²: _____

Signature: _____ Signature: _____

¹ Peer Review (PR) for technical content, assumptions, calculations.

² Senior Reviewer (SR) for big-picture content. Can be the same as Peer Reviewer. DSPM/LSPM should review all DIPPs.

³ The intent of this form is not to capture comments and backchecks. Additional documentation of review process is required. Remarks in red font are commonly overlooked and flagged for emphasis.

⁴ DIPP must comply with requirements outlined in ER 1110-1-1807 and additional policy requirements in Appendix A. Use of this checklist complies with ER 1165-2-217 Civil Works Review Policy.

⁵ Include completed checklist as attachment to DIPP submittal.

Part II: Quality Control Checklist

PR	SR	N/A	Item	References and Remarks ³
			Cover Page and Qualifications	
			DIPP prepared and signed by a licensed PE or PG experienced in the type of activities proposed.	6.b
			DSO/LSO Certification page with signature and required language.	6.j(1), B-3.g <i>District DSO/LSO has ultimate determination of comment resolution and approval.</i>
			Objective and Justification	
			Fieldwork conducted in the presence of PE or PG with ≥ 5 years of experience performing the work that is proposed.	6.b
			Justification and targeted objective for drilling described.	6.c(1), 6.d, B-3.a
			Plan, profile, and cross-sections showing all pertinent project features and proposed invasive locations included.	6.c(2), B-3.d
			Invasive Activity Scope and Methodology (Exploration Team and Drilling Scope)	<i>Applies to all ground disturbing activities, including excavations, drilling, dewatering systems, installing instrumentation, and HDD.</i>
			Drilling schedule, including coordinates and depths.	<i>Confirm borings are deconflicted from utilities, foundation elements, and drainage features.</i>

PR	SR	N/A	Item	References and Remarks ³
			Description of proposed equipment, methods, and processes provided, including proposed completion methodology.	6.c(4), 6.f, 6.h, B-3.e
			Description of drilling/excavation procedures/process.	<i>Includes drilling depth, diameter, sampling type and intervals.</i>
			Description of how borings will be backfilled (to include materials used and methods of placement).	
			Address the possibility of confined and separate groundwater aquifers and address methods for safe completion that reduce the risk of cross-contamination and leakage.	6.h(1) <i>Identify potential for artesian conditions and mitigation measures, especially at toe of dams or adjacent to outlet works. Examples include having casing onsite and advancing past artesian zone.</i>
			Description of project personnel (e.g., contractor, field supervisor, drill crew, logging crew) provided, including qualifications/experience.	6.c(5), 6.i, B-3.b
			Drill operators have a minimum 3 years of experience drilling with equipment, have at least 2 dam/levee projects, and will be familiar with the field procedures proposed in DIPP.	6.i(2)
			If any drilling fluid or other stabilizing or circulating medium is proposed, a technical review is required by the GGM CoP Standing Committee on Drilling and Invasive Activities and MSC DSPM or LSPM to ensure ER compliance.	6.i(2)-j(1)
			Existing Information Review	
			Existing data, if any, included, such as drawings depicting the current understanding of subsurface conditions as they relate to the proposed work (e.g., borings from as-builts, embankment construction reports, foundation completion reports, geotechnical reports, geologic mapping, instrumentation, etc.).	6.c(3), 6.e, B-3.c Attach historic data. <i>Including geophysical investigations done in advance of DIPP.</i>
			Plan, profile, and cross-sections showing all pertinent project features and proposed invasive locations?	
			Concisely summarize all relevant available existing information.	
			Risk Evaluation	
			Identify anticipated and potential adverse issues or risks posed to the dam, levee, or foundation integrity due to the planned drilling, including mitigation alternatives or measures to monitor for and reduce those identified risks.	6.c(6), 6.c(7), 6.g(1), B-3.f
			Evaluation of risk of hydraulic fracturing, erosion, contamination of drainage features, heave, or any other potential adverse damage.	
			Emergency Action Plan	Task-specific EAP, different than overall project EAP.
			Monitoring plan for investigation program, including nearby instruments and structures that may be impacted.	
			Response plan for drilling fluid loss.	6.c(8)
			Emergency response materials to be onsite.	
			Identify activities allowed/prohibited during operations.	

PR	SR	N/A	Item	References and Remarks ³
			Analysis and Calculations	
			For HDDs, “the entry and exit pits must be located at the greater of 300 feet or 20 times the embankment height from the levee centerline to ensure the horizontal gradient is low enough to protect against the progression of backwards-erosion piping should the vertical gradient allow initiation. In addition, the effective vertical stress must provide a factor of safety of at least 1.6 against heave/uplift (Equation 5-10)”.	5.6.4.4 of EM 1110-2-2902 <i>Checked gradients if going below or penetrating levee?</i>
			Analysis extents appropriate for site soils and hydraulic conductivities?	<i>For gradient checks.</i>
			Running appropriate analysis (seepage, stability, etc.)? Seep analysis (dewatering activities).	6.g(1)
			Hydraulic fracture calculations (Factor of Safety ≥ 1.3): - Vertical and Inclined Borings: at 1-foot intervals using 2 common methods (e.g., Fell et al, 2018; Jaworski et al., 1981; Marchi et al., 2014; and/or Chang Huang, 2016). - HDD: at 1-foot intervals along the bore path (EM 1110-2-2902 Section 5.6.4.4).	6.c(7) & 6.g(1) <i>minimum 2 calculation methods required.</i> <i>RMC Hydraulic Fracture Toolbox:</i> https://www.rmc.usace.army.mil/Software/RMC-Toolboxes/RMC-Hydraulic-Fracture-Toolbox/
			Appendix A: Essential geologic and engineering drawings	B-3.d
			Detailed set of foundation and structure drawings showing all previous and proposed subsurface investigation locations.	<i>Indicate drilling locations on drawings to ensure deconflicted.</i>
			Plan and Profile drawings include a summary of all data significant to the analytical and exploration needs.	<i>Including constructed features, subsurface material classification, instrumentation, SPT blow counts, etc.</i>
			Embankment sections.	
			All drawings to scale with no vertical exaggeration and show proposed work locations.	B-3.d(2)

District Specific Items and Other Considerations

			Has a geophysical investigation been performed and used to inform the preparation of DIPP?	<i>Site investigation should be used to ground-truth anomalies identified by geophysical survey.</i>
			Have lessons learned from past investigations been considered/incorporated into EAP?	

EMERGENCY ACTION PLAN GUIDLINES



Emergency Action Plan Guidance

EAP REQUIREMENTS

The outline below may be used to guide the development of an Emergency Action Plan (EAP). EAPs may be used to reduce risk when a project feature is in an unacceptable condition (e.g., a damaged drainage structure) until permanent repairs are completed. EAPs are typically required for construction or drilling/invasive investigations on or near a flood risk reduction project (FRRP) and should be submitted as part of a Section 408 request to alter a federal FRRP. EAPs are also required for horizontal directional drilling (HDD) as such activities can lead to fracture of the dam and require repairs to the dam. EAPs should be tailored to the activity and site conditions. The outline below is not an exhaustive list and not all items listed are necessary for every EAP.

EMERGENCY ACTION PLAN

- 1) Description of project/investigation location, impacted FRRP features, and work to be performed or conditions that warrant an EAP
- 2) Schedule and duration of construction activities.
- 3) Emergency Contacts (e.g., Contractor(s), Local Sponsor, Engineer of Record, USACE Omaha District Readiness Branch, Omaha FRRP Section 408 Coordinator) including a 24-hour contact.
USACE Omaha Readiness Branch 24-hour Phone number: 402-995-2448
USACE Omaha Readiness Branch E-mail: cenwo-eoc@usace.army.mil
USACE Omaha Readiness Branch POC: Captain Jacob Kelliher
USACE Omaha FRRP Section 408 Coordinator Phone Number: 402-995-2068
USACE Omaha FRRP Section 408 Coordinator email: Adam.R.Nebel@usace.army.mil
USACE Omaha District, Fort Peck Project Office Phone Number: (406) 526-3700
- 4) Discussion of Construction Activities in the Dam Critical Areas.
- 5) Because the project is located below the dam where flows are highly regulated, Fort Peck Reservoir stages and flows will also need to be monitored. <https://www.nwd.usace.army.mil/mrwm/>
- 6) Monitoring Procedures
Rainfall, dam, and river stage monitoring for the area. Generally, this includes daily monitoring of rainfall forecasts and nearby stream gages for projects further downstream of dams in a riverine setting.
 - a) Description of what should be monitored to trigger actions described in the Interim Risk Reduction Measures (IRRM)s.
 - i) Monitoring and triggers for emergency action may include:
 - (1) Daily monitoring of weather forecast, include rainfall (www.wpc.ncep.noaa.gov)
 - (2) Daily monitoring of river elevations at specific stream gages (www.water.weather.gov) relevant to the project/investigation site. This includes forecasted and actual river stages (Action, Flood, Moderate Flood, and Major Flood Stage).
 - (3) Daily reservoir and/or tailwater level (www.water.weather.gov and/or <https://www.nwd.usace.army.mil/MRWM/Current-Conditions/>)
 - b) Description of changes to monitoring procedures at each river stage, reservoir level, or tailwater level.
 - c) Identify who is monitoring and who is enacting the IRRMs in the EAP.
 - d) Instrumentation (i.e., to monitor groundwater levels or movement) used for monitoring if applicable.

- 7) Interim Risk Reduction Measures (IRRM)s
 - a) Detail list of construction equipment (type and number of pieces) to be left on or near project site (specific location) in case of emergency actions who to contact for mobilization.
 - b) Detail where construction materials (i.e., sand, cohesive material, sandbags, etc.) are located and accessible as required any time of day or night.
 - i) Discussion of when IRRMs would be activated (could be based on river stages, reservoir levels, tailwater levels, groundwater levels, or observed conditions, etc.).
 - (1) Example trigger may include an inch or more of daily rainfall in the forecast.
 - (2) Example trigger for emergency action may include the river stage within 3 feet of flood stage but is dependent on the project and if work is being executed in the channel.
 - c) Discussion of the IRRMs. IRRMs may include the following actions based on conditions or activity:
 - i) General Construction Activity
 - (1) Stoppage of work on channel bank
 - (2) Protection of partially completed construction work.
 - (3) Immediate backfill of open excavations.
 - (4) Removal of equipment and personnel to higher ground within a reasonable timeframe.
 - (5) Removal of construction materials and equipment from or within 50 feet of dam and dam features.
 - (6) Removal of construction materials and equipment from reservoir zones.
 - ii) Dam Excavations
 - (1) Emergency backfilling.
 - (2) Ring levees of height to ensure protection of protected area.
 - iii) Unacceptable Drainage Structures
 - (1) Install bladders.
 - (2) Close off riverside outlet and landside inlet.
 - (3) Fill gatewell structure.
 - iv) Unacceptable Relief Wells
 - (1) Construct sandbag ring levees around sandboils, if they are moving material.
 - (2) Construct seepage berms.
 - v) Unacceptable Closure Structures
 - (1) Utilize sandbags, Hescos (or other innovative flood fight product), or earthen fill.
 - vi) Evacuation of Workers
- 8) Should an injury occur on Federal Property it must be reported to the USACE Omaha District Safety and Occupational Health Office. Contact information below:
 - a) Phone number: 402-995-2913
 - b) E-mail Address: dll-cenwo-so@usace.army.mil
- 9) Return to Work After Emergency Actions
 - a) Note coordination between superintendent and engineers to determine timing and sequence of activities needed to return to work.

CONTRACTOR QUALIFICATION STATEMENT PIPE FUSION

QUALIFICATION STATEMENT

PIPE FUSING Contractor Information	
ITEM:	DESCRIPTION / ITEM MET:
Name of PIPE FUSING Contractor	
PIPE FUSING Contractor: Minimum of 10,000 LF - of continuous experience involving work of a similar size, length and configuration.	
Project Reference	
Project Reference	
Project Reference	
Superintendent/Foreman/Locator: The above stated personnel must have a minimum of (5) – years of continuous experience involving work of similar size, length and configuration.	
Superintendent (Name/Years' Experience)	
Foreman (Name/Years' Experience)	

I CERTIFY THE ABOVE INFORMATION TO BE TRUE AND ACCURATE. I HEREBY AUTHORIZE INTERSTATE ENGINEERING AND/OR THE OWNER TO PERFORM DUE DILIGENCE AS NEEDED TO SATISFY THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

PRINT NAME/TITLE OF CONTRACTORS AUTHORIZED REPRESENTATIVE

SIGNATURE

DATE

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CONTRACTOR QUALIFICATION STATEMENT HORIZONTAL DIRECTIONAL DRILLING

QUALIFICATION STATEMENT

HDD Contractor Information	
ITEM:	DESCRIPTION / ITEM MET:
Name of HDD (Sub)Contractor	
HDD (Sub)Contractor: Minimum of (5) - years of continuous experience involving work of a similar size, length and configuration.	
Project Reference	
Project Reference	
Project Reference	
Superintendent/Foreman/Locator: The above stated personnel must have a minimum of (5) – years of continuous experience involving work of similar size, length and configuration.	
Superintendent (Name/Years' Experience)	
Foreman (Name/Years' Experience)	

I CERTIFY THE ABOVE INFORMATION TO BE TRUE AND ACCURATE. I HEREBY AUTHORIZE INTERSTATE ENGINEERING AND/OR THE OWNER TO PERFORM DUE DILIGENCE AS NEEDED TO SATISFY THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

PRINT NAME/TITLE OF CONTRACTORS AUTHORIZED REPRESENTATIVE

SIGNATURE

DATE

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FORT PECK FISH HATCHERY WATER TRANSMISSION MAIN OPERATION AND MAINTAINENCE MANUAL

FORT PECK FISH HATCHERY WATER TRANSMISSION MAIN OPERATION AND MAINTENANCE PLAN

PREPARED FOR: MONTANA FISH WILDLIFE AND PARKS

I.E. # S18-00-053.01

July 29, 2024



PREPARED BY: INTERSTATE ENGINEERING



6066 MT HWY 24 S.
Glasgow, MT 59230
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INTRODUCTION

This document's purpose is to outline the responsibilities and procedures for long term operation and maintenance of the Fort Peck Fish Hatchery Water Transmission Main. Montana Fish Wildlife and Parks (MT FWP) is the owner of the transmission main and are therefore the responsible party for maintenance. MT FWP is responsible for maintaining and overseeing operations of the main from the location where the main exits the powerhouse building to the discharge at the Fish Hatchery. The United States Army Corps of Engineers (USACE) is responsible for the maintenance and oversight within the powerhouse structure.

PIPES NEAR EMBANKMENT

The water transmission main is located approximately 700 feet downstream from the toe of the dam embankment. The main is designed so that the lines and joints can accommodate small movements in the embankment and foundation from long term settlement, slides, or seismic activities. The main located parallel to the toe of the dam utilizes a pipe in pipe system in conjunction with combination air vac manholes to monitor for potential leaks in the main. The pipeline is designed with a minimum lifespan of 50 years, and follows the guidance of EM 1110-2-2902, TM 5-813-5, and American Water Works Association Standards. Concrete markers will be installed along the surface above the pipeline at 500-foot intervals and any changes in pipeline direction to aid in locating the main. Along with the concrete markers both metallic warning tape and tracer wire will be installed with the pipeline to aid in locating the main should any maintenance or nearby work need to occur.

PIPE CONNECTIONS

All pipe connections within this transmission main are mechanical connections. The portion of the transmission main located within the powerhouse consists of steel pipe utilizing either welded or bolted connections. The pipeline within the pipe in pipe section will be Poly Vinyl Chloride (PVC). All pipe connections in this section of the project will be thermally fused or restrained with the use of Restrained Joint Integral Bell (RJIB) Pipe connections. The remaining pipeline up to the Fish Hatchery will be composed of PVC and will have either fused or bell and spigot connections between pipe segments. All PVC to metal fittings will have mechanical joint restraint connections.

HYDRAULIC TRANSIENT PRESSURE ANALYSIS

Hydraulic Transient Pressure Analysis has been conducted for the transmission main and has proven the ability of the pipeline to withstand maximum anticipated surge pressure. This analysis is based on water pressures created by a theoretical top of dam water elevation. All pipe sections and fittings have been analyzed and are appropriately sized to withstand the anticipated transient surge pressures generated throughout normal system operation pressures.

CORROSION PROTECTION

This project does have any steel pipe buried underground. There are underground steel fittings, which will be protected from corrosion by factory applied Fusion Bonded Epoxy coatings, and polyethylene encasement film.

TESTING OF PRESSURIZED WATER LINES

Upon completion of the transmission main it shall be subjected to hydrostatic and leakage testing prior to being put into service. Hydrostatic testing on the new line shall be performed at 1.5 times the maximum hydraulic transient pressure, with a minimum pressure of 100 psi. Per the requirements of NWDR 1110-1-1 The Montana FWS will be required to perform

hydrostatic and leakage tests on a 25-year basis. Any leaks found in the pipeline at any time shall be reported to the USACE immediately.

OPERATION AND MAINTENANCE PROCEDURES

Responsible Parties

Montana Fish Wildlife and Parks

Responsible for all pipeline operations and maintenance outside of the powerhouse.

United States Army Corps of Engineers

Responsible for all pipeline operations and maintenance inside of the powerhouse.

Pipeline

The pipeline route shall be inspected monthly for any signs of leakage, ground movement, damage, etc. The route must be kept as free and clean of debris as is practical to ensure thorough inspections and ease of access for smooth operation. While inspecting the pipeline route, signs to identify a leak include but are not limited to standing water, sinkholes, missing or damaged concrete pipeline markers, nearby utility work, damage to valve risers, damage to manhole risers. Any major signs of potential pipeline failure must be reported to USACE and further investigated. Minor issues must be noted and corrected as soon as time allows. It is recommended that in the summer months all surface pipeline accessories are kept neatly mowed to prevent damage and ease of operation. If there are suspected or known issues with the pipeline the inspection frequency shall be increased to ensure safe operation.

Combination Air/Vac Manholes

The combination air/vac manholes shall be inspected monthly. These manholes should be inspected for water, damage, corrosion, proper operation of ventilation, or damage to surface accessories. If water is identified in an air vac manhole it may be an indication of a leak from somewhere within the encased piping section. The source of the water should be investigated. In the event it is determined that there is a leak, a report to USACE shall be made, and further investigated. Minor issues must be noted and corrected as soon as time allows. The manholes must be kept clear and free of debris both inside and on the surface. If there are suspected or known issues with the pipeline the inspection frequency shall be increased to ensure safe operation.

Valves

The all valves shall be operated yearly to ensure long term smooth operation of the valves. If valves are not operated for long periods of time they tend to stick and may become inoperable. Operation of the valves for maintenance purposes preferably should occur while the pipeline is offline to avoid water hammer. Electronically actuated valves have a programmed closure time to operate them within a specified time. Should a valve become inoperable it must be noted and replaced at the time of earliest convenience. The number of turns to open or close the manually operated valves and minimum closure times are listed in the table below. Valves with electronic position indicators should be checked for proper function yearly.

Valve Type	Valve Size	Number of Turns	Minimum Closure Time (seconds)
Butterfly	18"	40	40
Butterfly	14"	30	30
Gate	12"	38.5	38.5

EXPLANATION OF BID QUANTITIES (MEASUREMENT AND PAYMENT)

PART 1 GENERAL

01.1.01 DESCRIPTION

- A. The total bid price for each item of the contract shall cover all work described in the Project Manual and required by the specifications and other Contract Documents. All costs in connection with the work, including furnishing all materials, equipment, supplies and appurtenances; providing all construction plans, equipment and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. No item that is required by the Contract Documents for the proper and successful completion of the work will be paid for outside of or in addition to the prices submitted in the bid. All work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices.

01.1.02 ESTIMATED QUANTITIES

- A. All estimated quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished.
- B. Either the Owner or the Contractor may demand in writing that a supplemental agreement or change order be prepared to authorize an adjustment in the unit price of any major contract item if the quantity of said major contract item increases or decreases by more than 25 percent (25%) from that shown in the Contract Documents. A major contract item is defined as any item having an original contract value in excess of 10 percent (10%) of the total original contract per **SECTION 00 73 00 SUPPLEMENTARY CONDITIONS** of these Specifications.

01.1.03 METHOD OF MEASUREMENT

- A. Lump Sum: The term "lump sum" when used as a unit of measurement shall mean complete payment for that item of work as shown on the Drawings and specified herein.
- B. Length: All items that are measured by the linear measurement will be measured parallel to the axis of item being measured.
- C. Individual Unit or Each: When a complete item or unit is specified as the unit of measurement, the unit will be measured by physical count and will include all necessary accessories and appurtenances.
- D. Area: Dimensions for area will be made parallel to the plane of the work that is being measured.

01.1.04 BASIS OF PAYMENT

A. MOBILIZATION, TAXES, BONDS AND INSURANCE

1. Item No(s): 101

The lump sum (LS) price bid for **MOBILIZATION, TAXES, BONDS AND INSURANCE** shall not exceed 12% of the total project awarded and shall be considered full compensation for the work complete in place as required in these specifications. This work consists of preparatory work and operation performed by the Contractor, including, but not limited to, those necessary for: preparing schedules, the movement of his personnel, equipment, supplies, and incidentals to the project site, the establishment of all offices, buildings, project sign(s) and other facilities necessary for all work in the project, and for other work and operation that must be performed or costs incurred before beginning work and throughout the project on the various items on the project site, taxes, bonds and insurance, project coordination, scheduling, submittals and quality control, construction facilities and temporary controls, safety at the site, environmental quality control, applicable permits, Storm Water Pollution Prevention Plan if required, product shipment, handling, storage and protection, manufacturer's services, operation and maintenance manuals, completed record drawings, final cleanup and contract closeout (all the requirements contained in the GENERAL CONDITIONS). 40% of the amount bid for **MOBILIZATION, TAXES, BONDS AND INSURANCE**

shall be paid when 5% of the Contract amount is paid for the Contract items and/or invoiced material in storage. Subsequent mobilization payments shall be based on percent of construction completed and accepted, excluding previous mobilization payments.

B. 18" PVC WATER MAIN

1. *Item No(s): 102*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **18" PVC WATER MAIN** furnished and installed, including pipe, pipe bedding material, non-shrink backfill (as required), trenching, backfilling, compaction, quality control testing, existing utility verification, additional fittings, mechanical joint/bell restraints, insulation board, detectable warning tape, removal and disposal of existing water main, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.

- a. PVC pipe located between upper vertical bends shall have fully restrained joints via pipe selection or use of mechanical joint/bell restraints as shown on the Drawings.
- b. Removal and/or abandonment in place of existing water mains shall be considered incidental to this item.
- c. Removal of existing gate valves within trench excavation shall be considered incidental to this item.
- d. Installation of insulation board shall be placed at locations indicated on the drawings or as directed by the Engineer, and shall be considered incidental to this item.
- e. Damage to roadways, existing utilities, and property (both public and private) occurring due to the work being performed shall require complete restoration to the satisfaction of the Owner. No separate payment will be made for cleanup or restoration due to damage caused by the Contractor's operations outside of specified pay limits.

C. 18" DUCTILE IRON BENDS

1. *Item No(s): 103*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" DUCTILE IRON BENDS** shall be considered full compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

E. **18" X 14" REDUCER**

1. *Item No(s): 104*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" X 14" REDUCER** shall be considered full compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

F. **18" X 14" REDUCING TEE**

1. *Item No(s): 105*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" x 14" REDUCING TEE** shall be considered full compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

G. **18" BUTTERFLY VALVE w/ ELECTRIC OPERATOR**

1. *Item No(s): 106*

One unit is defined as one each (EA) furnished and installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit for **18" BUTTERFLY VALVE w/ELECTRIC OPERATOR** shall be considered full compensation for the work complete in place of one unit of butterfly valve and valve box, furnished and installed, including valve, valve box, valve box riser, extensions, trench excavation and backfill, dewatering, special compaction required for installation/backfill, thrust blocking, mechanical joint restraints, epoxy coating, concrete support block, poly wrapping, cleaning, disinfection, testing, adjustments to finish grade, all materials, tools, labor, equipment, trucking, supplies, coordination with Johnson Controls to integrate valve into existing Fish Hatchery controls system, and other work necessary for the complete in place installation of one unit as

shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** and **33 14 19 VALVES AND HYDRANTS FOR WATER UTILITY SERVICE** for additional information.
 - a. This bid item is intended to be used for the Butterfly Valve located in the Doghouse Manhole as shown on Plan Sheet C-1.

H. **20" FUSED PVC CASING PIPE**

1. *Item No(s): 107*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **20" FUSED PVC CASING PIPE** furnished and installed, including pipe, pipe bedding material, non-shrink backfill (as required), trenching, backfilling, compaction, quality control testing, existing utility verification, additional fittings, mechanical joint/bell restraints, insulation board, detectable warning tape, removal and disposal of existing water main, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Built), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM, 33 05 07.13 UTILITY DIRECTION DRILLING 33 05 31.19 FUSIBLE POLYVINYL CHLORIDE PIPE** for additional information.

I. **AIR VAC MANHOLE**

1. *Item No(s): 108*

One unit is defined as one each (EA) manhole assembly in place. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work necessary to install manhole assembly, surface and surplus material removal and disposal, surface restoration, trench excavation and backfill, dewatering, special compaction required for abandonment/backfill, and all materials, tools, labor, equipment, trucking, disposal and fees, supplies, and other work necessary as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications..

- a. This bid item is intended include all items excluding the butterfly valve as shown on the COMBO AIR VAC MANHOLE detail of the plans.
2. Refer to **33 05 61 CONCRETE MANHOLES** and **DETAIL DRAWINGS** for additional information.

I. **AIR VAC ASSEMBLY**

1. *Item No(s): 109*

One unit is defined as one each (EA) air vac assembly in place. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work necessary to install air vac assembly, surface and surplus material removal and disposal, all materials, tools, labor, equipment, trucking, disposal and fees, supplies, and other work necessary as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications..

- a. This bid item is intended include the air vac assembly as shown on the control valve building detail of the plans.
2. Refer to **DETAIL DRAWINGS** for additional information.

J. **INSPECTION MANHOLE**

1. *Item No(s): 110*

One unit is defined as one each (EA) manhole assembly in place. Measurement will be made to the nearest 1 unit. The unit price bid per unit for shall be considered full compensation for the work necessary to install manhole assembly, surface and surplus material removal and disposal, surface restoration, trench excavation and backfill, dewatering, special compaction required for abandonment/backfill, and all materials, tools, labor, equipment, trucking, disposal and fees, supplies, and other work necessary as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications. This bid item is intended include all items as shown on the INSPECTION MANHOLE detail of the plans.

2. Refer to **33 05 61 CONCRETE MANHOLES** and **DETAIL DRAWINGS** for additional information.

K. **DOGHOUSE MANHOLE**

1. *Item No(s): 111*

One unit is defined as one each (EA) manhole assembly in place. Measurement will be made to the nearest 1 unit. The unit price bid per unit for shall be considered full compensation for the work necessary to install manhole assembly, surface and surplus material removal and disposal, surface restoration, trench excavation and backfill, dewatering, special compaction required for abandonment/backfill, and all materials, tools, labor, equipment, trucking, disposal and fees, supplies, and other work necessary as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

- a. This bid item is intended include all items as shown on the DOGHOUSE MANHOLE detail of the plans.
2. Refer to **33 05 61 CONCRETE MANHOLES** and **DETAIL DRAWINGS** for additional information.

L. **14" HDD PVC WATER MAIN**

1. *Item No(s): 112*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **14" HDD PVC WATER MAIN** furnished and installed, including but not limited to, bore plan submittal, pipe bedding material, non-shrink backfill (as required), entrance/exit pit excavation, backfilling, and compaction, quality control testing, existing utility verification and backfill, potholing, additional fittings, removal and disposal of surplus material and drill fluid, dewatering, shoring, bracing, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 05 07.13 UTILITY DIRECTIONAL DRILLING** and **33 05 31.19 FUSIBLE POLYVINYL CHLORIDE PIPE** for additional information.
- a. Item shall be in reference water main installed via directional drilling methods in lieu of the open-cut methods as shown on the Drawings.
- b. Contractor shall coordinate with Engineer on entrance/exit pit locations to limit surface disturbance. Surface restoration associated with entrance/exit pits outside of pay limits is eligible for payment under respective bid items, as approved by Engineer.
- c. Damage and repair to existing utilities and property (both public and private) as a result

of (HDD) installation shall require complete restoration to the satisfaction of the Owner, including but not limited to, labor, materials, equipment, and site restoration shall be considered incidental to this bid item.

M. **14" OPEN CUT PVC WATER MAIN**

1. *Item No(s): 113*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **14" OPEN CUT PVC WATER MAIN** furnished and installed, including pipe, pipe bedding material, non-shrink backfill (as required), trenching, backfilling, compaction, quality control testing, existing utility verification, additional fittings, mechanical joint/bell restraints, insulation board, detectable warning tape, removal and disposal of existing water main, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.

- a. PVC pipe located between upper vertical bends shall have fully restrained joints via pipe selection or use of mechanical joint/bell restraints as shown on the Drawings.
- b. Removal and/or abandonment in place of existing water mains shall be considered incidental to this item.
- c. Removal of existing gate valves within trench excavation shall be considered incidental to this item.
- d. Installation of insulation board shall be placed at locations indicated on the drawings or as directed by the Engineer, and shall be considered incidental to this item.
- e. Damage to roadways, existing utilities, and property (both public and private) occurring due to the work being performed shall require complete restoration to the satisfaction of the Owner. No separate payment will be made for cleanup or restoration due to damage caused by the Contractor's operations outside of specified pay limits.

N. **14" DUCTILE IRON WATER MAIN**

1. *Item No(s): 114*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **14" DUCTILE IRON WATER MAIN** furnished and installed, including pipe, quality control testing, existing utility verification, pipe insulation, removal and disposal of existing pipe, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES**, and other Related Work sections of these Specifications.

N. **14" DUCTILE IRON BENDS**

1. *Item No(s): 115*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **14" DUCTILE IRON BENDS** shall be considered full

compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

P. **14" BUTTERFLY VALVE**

1. *Item No(s): 116*

One unit is defined as one each (EA) furnished and installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit for **14" BUTTERFLY VALVE** shall be considered full compensation for the work complete in place of one unit of butterfly valve and valve box, furnished and installed, including valve, valve box, valve box riser, extensions, trench excavation and backfill, dewatering, special compaction required for installation/backfill, thrust blocking, mechanical joint restraints, epoxy coating, concrete support block, poly wrapping, cleaning, disinfection, testing, adjustments to finish grade, all materials, tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit of butterfly valve and riser as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** and **33 14 19 VALVES AND HYDRANTS FOR WATER UTILITY SERVICE** for additional information.

Q. **14" X 14" TEE w/Cap**

1. *Item No(s): 117*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **14" X 14" TEE w/Cap** shall be considered full compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

R. **14" BUTTERFLY VALVE ELEC. ACTUATED**

1. *Item No(s): 118*

One unit is defined as one each (EA) furnished and installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit for **14" BUTTERFLY VALVE ELEC. ACTUATED** shall be considered full compensation for the work complete in place of one unit of butterfly valve and valve box, furnished and installed, including valve, valve box, valve box riser, extensions, trench excavation and backfill, dewatering, special compaction required for installation/backfill, thrust blocking, mechanical joint restraints, epoxy coating, concrete support block, poly wrapping, cleaning, disinfection, testing, adjustments to finish grade, all materials, tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit of butterfly valve and riser as shown on the Drawings, coordination with Johnson Controls to integrate valve into existing Fish Hatchery controls system, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** and **33 14 19 VALVES**

R. **14" FLOW METER**

1. *Item No(s): 119*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **14" Flow Meter** shall be considered full compensation for the work complete in place of one unit furnished and installed including trench excavation and backfill, bedding, concrete support block, thrust blocking, poly wrap, epoxy coating, gaskets, mechanical joint restraints, shoring, bracing, dewatering, compaction, cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES** and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION PIPING** for additional information.

S. **CURB AND GUTTER REMOVAL/REPLACEMENT**

1. *Item No(s): 120*

One unit is defined as one lineal foot (LF) of **CURB AND GUTTER REMOVAL/REPLACEMENT** regardless of type or depth, or method of removal and replacement. Measurement will be made to the nearest 1 unit. Measurement will be made along the back of curb. The unit price bid shall be considered full compensation for the work necessary to complete in place one unit of curb and gutter removal and replacement to the nearest control joint, including removal and disposal, disposal fees, supplies to complete in place one unit of concrete curb and gutter replacement regardless of installation method, subgrade preparation, placement, and compaction, crushed aggregate base course as shown on the Drawings, M4000 concrete, dowels, epoxy coating, cure/sealants, joint filler, expansion board, surface restoration, and all labor, materials, equipment, trucking, supplies, testing and other work necessary for a complete curb and gutter removal and replacement as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 32 EXTERIOR IMPROVEMENTS** and other Related Work sections of these Specifications.

2. Refer to **32 16 13 CURBS AND GUTTERS** for additional information.
- a. Item shall be in reference to curb and gutter removed and replaced at perpendicular crossings of water mains, water services, and/or hydrant leads.
 - b. Pay limits for **CURB AND GUTTER REMOVAL/REPLACEMENT** shall be as follows:
 - i. Maximum 12 – foot wide (W) per main crossing and 10 – foot wide (W) per service and hydrant lead crossing.
 - ii. Curb and gutter removed and replaced outside the payment limits as included herein shall be at the Contractor's expense, unless directed by the Owner or the Owner's Representative.

T. **CONCRETE REMOVAL/REPLACEMENT**

1. *Item No(s): 121*

One unit is defined as one square yard (SY) regardless of type or depth, or method of removal. Measurement will be made to the nearest 0.5 unit. The unit price bid per unit for **CONCRETE REMOVAL/REPLACEMENT** shall be considered full compensation for the work necessary to complete in place one unit of sidewalk removed to the nearest control joint, including all labor, disposal, equipment, trucking, supplies, and all other work necessary for a complete sidewalk removal/replacement as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 32 EXTERIOR IMPROVEMENTS** and other Related Work sections of these Specifications.

2. Refer to **32 16 43 SIDEWALKS, DRIVEWAYS, AND VALLEY GUTTERS** for additional information.
- a. Item shall be in reference to concrete sidewalk removed due to crossings of mains, services, and hydrant leads and/or parallel to new water main alignments.

- b. Pay limits for **CONCRETE REMOVAL/REPLACEMENT** shall be as follows:
 - i. Maximum 12 – foot wide (W) as centered over mains and 10 – foot wide (W) centered over services and hydrant leads for crossings.
 - ii. Concrete removed outside the payment limits as included herein shall be at the Contractor's expense, unless directed by the Owner or the Owner's Representative. Disposal fees are incidental to this item.

U. **GRAVEL RESTORATION**

1. *Item No(s): 122*

One unit of is defined as one square yard (SY). Measurement will be made to the nearest 0.5 unit. The unit price bid per unit for **GRAVEL RESTORATION** shall be considered full compensation for the work necessary to complete in place one unit of gravel restoration including removal and/or salvage of existing gravel surface, subgrade preparation, placement and compaction, crushed aggregate base and surface courses as shown on the Drawings, including all labor, materials, equipment, trucking, supplies, disposal fees, and all other work necessary for complete gravel restoration as shown on the Drawings and as specified in the **GENERAL CONDITIONS, DIV 32 EXTERIOR IMPROVEMENTS** and other Related Work sections of these Specifications.

2. Refer to **32 11 23 AGGREGATE BASE COURSE** for additional information.

- a. Pay limits for **GRAVEL RESTORATION** shall be as follows:
 - i. Maximum 12 – foot trench width (W) along centerline of mains.
 - ii. Gravel restoration along services/hydrant leads shall be incidental to those items.
- Gravel restoration installed outside the payment limits as defined in the Plans and Specifications shall be at the Contractor's expense, unless directed by the Owner or the Owner's Representative.

V. **ASPHALT RESTORATION**

1. *Item No(s): 123*

One unit is defined as one square yard (SY). Measurement will be made to the nearest 0.5 unit. The unit price bid per unit for **ASPHALT RESTORATION** shall be considered full compensation for the work necessary to complete in place one unit of asphalt restoration, including subgrade preparation, placement, and compaction, crushed aggregate base course and bituminous asphalt pavement as shown on the Drawings, tack, installation, placement and compaction, including all labor, materials, equipment, trucking, supplies, and all other work necessary for complete asphalt restoration as shown on the Drawings and as specified in the **GENERAL CONDITIONS, DIV 32 EXTERIOR IMPROVEMENTS** and other Related Work sections of these Specifications.

2. Refer to **32 12 16 ASPHALT PAVING** and **DETAIL DRAWINGS** for additional information.

- a. Pay limits for **ASPHALT RESTORATION** shall be as follows:
 - i. Maximum 12 – foot trench width (W) along centerline of mains and 10 – foot trench width (W) along centerline of services/hydrant leads.
- b. Asphalt replacement installed outside the payment limits as defined in the Plans and Specifications shall be at the Contractor's expense, unless directed by the Owner or Owner's Representative.

W. **SEEDING RESTORATION**

1. *Item No(s): 124*

One unit of is defined as one square yard (SY). Measurement will be made to the nearest 0.5 unit. The unit price bid per unit for **SEEDING RESTORATION** shall be considered full compensation for

the work necessary to complete in place one unit of grass restoration, including all work necessary to import, strip, stockpile, and reuse topsoil for areas to be excavated in grassy areas if approved by Owner/Engineer, all work necessary to restore disturbed areas, including the removal and disposal of excess materials, subgrade preparation, compaction, removal and reinstallation or replacement of landscape features, topsoil, permanent seeding and/or sod, removal and reinstallation or replacement of irrigation systems including sprinkler heads and piping, planters, all labor, materials, equipment, trucking, supplies, disposal fees and all other work necessary for complete grass and landscape surface restoration as shown on the Drawings and as specified in the **GENERAL CONDITIONS, DIV 32 EXTERIOR IMPROVEMENTS** and other Related Work sections of these Specifications.

2. Refer to **32 92 19 SEEDING** and **DETAIL DRAWINGS** for additional information.
 - a. Pay limits for **SEEDING RESTORATION** shall be as follows:
 - i. Maximum 12 – foot trench width (W) along centerline of mains.
 - ii. Grass restoration along services/hydrant leads shall be incidental to those items.
 - b. Grass restoration installed outside the payment limits as defined in the Plans and Specifications shall be at the Contractor's expense, unless directed by the Owner or the Owner's Representative.
 - c. Contractor shall be responsible for maintaining landscaped areas until permanent vegetation is established.
 - d. Seed mix will need to be approved by the Property Owner and may vary by location within the project limits.

X. **12" WELDED STEEL PIPE**

1. *Item No(s): 125*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **12" WELDED STEEL PIPE** furnished and installed, including pipe, quality control testing, existing utility verification, pipe insulation, removal and disposal of existing pipe, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS**, and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

Y. **12" WELDED STEEL BEND**

1. *Item No(s): 126*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **12" WELDED STEEL BEND** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, dewatering, , cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

BB. 12" MSS STEEL FLOOR SUPPORTS

1. *Item No(s): 127*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **12" MSS STEEL FLOOR SUPPORTS** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications.
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

CC. 12" MSS STEEL WALL SUPPORTS

1. *Item No(s): 128*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **12" MSS STEEL WALL SUPPORTS** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications.
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

DD. 12" MSS STEEL CEILING SUPPORTS

1. *Item No(s): 129*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **12" MSS STEEL CEILING SUPPORTS** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.

- b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

EE. 12" GATE VALVE w/Handwheel

1. *Item No(s): 130*

One unit is defined as one each (EA) furnished and installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit for **12" GATE VALVE w/Handwheel** shall be considered full compensation for the work complete in place of one unit of gate valve and valve box, furnished and installed, including valve, handwheel, epoxy coating, insulating, cleaning, disinfection, testing, adjustments to finish grade, all materials, tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS**, and other Related Work sections of these Specifications.

- 2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.

All welding shall be performed by a Certified Pipeline Welder.

- b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

FF. 12" CONNECT TO EXISTING

Item No(s): 131

One unit is defined as one each (EA) permanent connection to an existing water main, complete in place. Measurement will be made to the nearest 1 unit. The unit price bid per unit for **12" CONNECT TO EXISTING** shall be considered full compensation for the work complete in place of one unit of connection of a new water main to an existing water main, including but not limited to, existing utility verification, welding, insulating, dewatering, cleaning, flushing, disinfection, testing connection to an existing water main as shown on the Drawings, and in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications

- 2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.

a. All welding shall be performed by a Certified Pipeline Welder.

- b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

c. This bid item shall include all items necessary to connect to existing waterlines which includes the 12" x 12" WELDED STEEL TEE'S as shown on the drawings.

GG. 18" WELDED STEEL PIPE

1. *Item No(s): 132*

One unit is defined as one lineal foot (LF) measured along the horizontal centerline of the pipe installed. Measurement will be made to the nearest 1 unit. The unit price bid per unit shall be considered full compensation for the work complete in place of one unit of **18" WELDED STEEL PIPE** furnished and installed, including pipe, quality control testing, existing utility verification, pipe insulation, removal and disposal of existing pipe, appurtenances, and surplus material, dewatering, cleaning, testing, all labor, equipment, trucking, supplies, means of purging air from the water lines, protecting existing structures, utilities and property both public and private regardless of whether shown on the plans or not, cleaning up the site, monitoring and Record Drawings (As-Builts), and all other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS**, and other Related Work sections of these Specifications.

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

HH. **18" X 12" WELDED STEEL REDUCER**

1. *Item No(s): 133*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" X 12" WELDED STEEL REDUCER** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, dewatering, , cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

II. **18" X 18" WELDED TEE**

1. *Item No(s): 134*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18' X 18' WELDED TEE** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, dewatering, , cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

JJ. **18" WELDED BENDS**

1. *Item No(s): 135*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" WELDED BENDS** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, dewatering, , cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications
2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.

- a. All welding shall be performed by a Certified Pipeline Welder.
- b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

KK. TRANSITION COUPLING (PVC/STEEL)

1. *Item No(s): 136*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **TRANSITION COUPLING (PVC/STEEL)** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, dewatering, , cleaning, disinfection, testing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

LL. 18" MSS STEEL CEILING SUPPORTS

1. *Item No(s): 137*

One unit is defined as one each (EA) furnished and installed. Measurement will be to the nearest 1 unit. The unit price bid per unit for **18" MSS STEEL CEILING SUPPORTS** shall be considered full compensation for the work complete in place of one unit furnished and installed shoring, bracing, furnishing all tools, labor, equipment, trucking, supplies, and other work necessary for the complete in place installation of one unit as shown on the Drawings, and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS** and other Related Work sections of these Specifications

2. Refer to **33 14 13 PUBLIC WATER UTILITY DISTRIBUTION SYSTEM** for additional information.
 - a. All welding shall be performed by a Certified Pipeline Welder.
 - b. All above grade/exposed piping shall be insulated as described in **40 42 13 PROCESS PIPING INSULATION**.

MM. CONTROL VALVE BUILDING

1. *Item No(s): 138*

The lump sum (LS) price bid for **CONTROL VALVE BUILDING** shall include all items necessary to provide a complete structure as outlined on Plan Sheets B-1 to B-4 and as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS**, and other Related Work sections of these Specifications.

2. Refer to **DIV 03 CONCRETE** for additional information.
 - a. This bid item is intended to include all items necessary, including concrete slab/foundation for the completed structure is indicated in the plans and specifications.

OO. PREPARATION OF USACE MANDATED PLAN SUBMITTALS

1. *Item No(s): 139*

The lump sum (LS) price bid for **PREPARATION OF USACE MANDATED PLAN SUBMITTALS** shall be considered full compensation for the work completed in place as required in these specifications. This work consists of preparatory work performed by the Contractor performed prior to construction, including, but not limited to, preparing, submitting, and receiving approval for six plans:

1. Drilling and Invasive Program Plan / Horizontal Directional Drilling Plan
2. Excavation and Backfill Plan
3. Dewatering Control Plan
4. Construction Access and Staging Plan
5. Tree Clearing Plan (if necessary)
6. Re-vegetation Plan

These plans are outlined in the following specification sections: Special Provisions, 33.05.07.13, 31.01.04, 32.92.19, 31.11.00, and 31.23.19. 50% of the amount bid for **PREPARATION OF USACE MANDATED PLAN SUBMITTALS** shall be paid when all submittals have been submitted to USACE and the remaining 50% shall be paid when all submittals have been approved by USACE.

PP MISCELLANEOUS WORK

1. *Item No(s): 140*

This item shall be paid for by the single unit (UNIT), each unit representing one dollar. The unit price bid for **MISCELLANEOUS WORK** is an allowance for work to be done that may be discovered during the course of the project as directed by the Owner's Representative. Starting work before approval by the Owner's Representative may result in no payment for the work. Contractor shall submit to the Owner invoices for item(s) and/or work paid under this bid item unless otherwise approved by the Owner. Payment for work under this item will be in accordance with the provisions as specified in the **GENERAL CONDITIONS, DIV 33 UTILITIES, DIV 40 PROCESS INTERCONNECTIONS**, and other Related Work sections of these Specifications.

END OF SECTION