PERFORMANCE WORK STATEMENT (PWS)

INSPECT SPILLWAY SUBDRAINAGE SYSTEM
CHATFIELD DAM AND LAKE
LITTLETON, COLORADO

US Army Corps of Engineers, Tri-Lakes Project Office
9307 S. Wadsworth Blvd.
Littleton, Colorado 80128

PART 1
GENERAL INFORMATION

1. GENERAL: This is a services contract to inspect the spillway sub-drainage system at Chatfield Dam in Littleton, Colorado.

1.1. Description of Services / Introduction: The subsurface drainage system is an integral component of the Spillway structure at Chatfield Dam. A visual inspection of the drains and collector pipes with remote-operated camera equipment is required to document the existing condition of the system.

The Contractor shall provide all personnel, equipment, supplies, facilities, transportation, tools, materials, supervision, and other items and services necessary to inspect the spillway sub-drains and collector pipes as defined in this Performance Work Statement except for those items specified as government furnished property and services. The Contractor shall perform to the standards in this contract.

1.2. General Project and Spillway Structure Information:

1.2.1. General Project Information: The Chatfield Dam and Lake Project is a multiple purpose project composed of a rolled earthfill dam, an ungated concrete spillway and stilling basin, an outlet works intake structure, a two-barrel conduit and a stilling basin.

Chatfield Dam is located on the South Platte River about 8 miles south of Denver, Colorado. The right abutment of the dam is located in Douglas County, Colorado, in Section 7, T6S, R68W and the left abutment is located in Jefferson County, Colorado, in Section 1, T6S, R69W. The Chatfield Dam and Lake Project is a federally owned facility. Vicinity and location maps for the Project are shown on Sheet 1. The general location of the spillway with relation to local streets and highways along with Contractor access routes are provided on Sheet 2.

1.2.2. General Spillway Structure Information. The chute-type concrete spillway is located in the left (north) abutment of the dam. The spillway consists of an approach slab, a 500-feet wide by 10-feet high ungated ogee weir, a chute slab 838-feet in length

and varying in width from 500 to 390-feet, and a stilling basin 390-feet wide and 154-feet long. The stilling basin floor is 148 feet vertically below the crest of weir.

An extensive system of sub-drainage and collector pipes (over 21,000 feet) exist beneath the approach slab, the ogee weir, the chute slab and stilling basin and behind the chute walls. The pipes range in diameter from 3 to 12 inches. Pipe material types include solid and perforated PVC, solid and perforated vitrified clay pipe, solid asbestos cement pipe and perforated CMP.

1.3 Objectives: The overall objective of this contract is to thoroughly document the current condition of the sub-surface drains and collector pipes of the spillway structure.

1.4 Scope: Work generally consists of visual inspecting the drainage pipe (both vertical and horizontal) with remote-operated camera equipment and producing a detailed formal report to thoroughly document the condition of these features. To enable visual inspection of the vertical chute slab foundation drains (18 total), mechanical cleaning (brushing and flushing with water) will be required for these pipes. Deliverables from this work will include DVD(s) of the inspection footage and a report that summarizes the procedures and findings of all inspections and includes individual inspection logs that summarizes the condition each pipe segment and documents the location of any significant observation. The Contractor shall perform these services as noted in this PWS. All work shall be conducted in accordance with current professional standards, Corps of Engineers policies, regulations, and procedures. The Contractor is responsible for supplying all equipment, supplies, materials and personnel necessary for the completion of this work.

1.5 Scope Period of Performance: The period of performance for the PWS shall be 180 days from the date of Notice to Proceed (NTP). Upon receipt of NTP, the Contractor shall submit a draft baseline schedule for completion of the tasks in this PWS for approval to meet the milestones as indicated below. The baseline schedule shall be based on calendar days and shall include milestones for completion of each task provided herein.

Schedule Milestones	
ITEM	**Duration (Calendar Days)**
Draft Baseline Schedule & Work Plan	14 days after NTP
Final Baseline Schedule & Work Plan	21 days after NTP
Kick-Off Meeting	Prior to start of work
On-Site Field Work Start	30 days after NTP
On-Site Field Work Complete	90 days after NTP
Field Work Documentation /Draft Inspection Reports Complete	120 days after NTP
Completion of all Work	180 Days after NTP

1.6 General Information:

1.6.1 Quality Control: The Contractor shall develop and maintain an effective quality control program to ensure services are performed in accordance with this PWS. The Contractor shall develop and implement procedures to identify, prevent, and ensure non-recurrence of defective services. The Contractor's quality control program is the means by which he assures himself that his work complies with the requirement of the contract. A QC Plan will be included in the Work Plan as indicated in Para 1.6.4 below.

1.6.2 Quality Assurance: At any time during the period of performance, representatives of the Contracting Officer may review: work progress; adherence to this PWS and the subsequent Work Plan; and work quality and adequacy. This may include oversight of field operations. Such review shall not relieve the Contractor from performing all contract requirements.

1.6.3 Safety: The Contractor shall be responsible for site safety of Contractor and subcontractor employees and any visitors to the work area. The Contractor shall supply the required safety equipment and shall ensure that all Contractor employees and subcontractor employees are properly equipped and trained in all safety procedures and precautions.

An Accident Prevention Plan (APP) shall be developed, maintained on-site during fieldwork and shall be available for review at any time during the period of performance. The APP shall be submitted as part of the Work Plan.

At a minimum, all work shall be conducted in accordance with OSHA requirements and the requirements in EM 385-1-1, (USACE, 2008). This safety manual is available at the following internet site: http://www.usace.army.mil/SafetyandOccupationalHealth. All other applicable local, state and federal rules and requirements shall be adhered to.

It is anticipated that some, if not the majority, of the inspection work can be conducted from the spillway chute slab, top of the spillway walls, or ground surface without physical confined space entry. However, some confined space entry will be required as part of this contract. The spillway gallery is a non-permit required confined space and is equipped with a ventilation system. The ventilation system shall be operating at all times during work activities in the spillway gallery. The Contractor shall not enter the gallery without ventilating the work area for a minimum of 30 minutes. The access manholes on the outside of the spillway walls (wall manholes 1-S through 6-S and 1-N through 6-N) are permit required confined spaces for entry. The depth of these manholes vary from 15 feet to 35 feet. The access manholes on the approach and chute slabs are permit required confined spaces for entry. The depth of these manholes vary from 4 feet to 6 feet. The Contractor shall conduct his/her own investigations and make his/her own determination whether or not confined space entry is required to complete the inspection requirements for this contract when considering his bid.

The Contractor shall abide by all Corps of Engineers and OSHA confined space requirements. The Contractor shall not enter any manholes or other confined spaces without full coordination and prior approval of the Government Representative. The Contractor's APP shall specifically address on-site confined space procedures.

Insects, rodents, snakes and other wildlife could be encountered in the area of the manholes and pipe entrance and exit points. The Contractor shall take appropriate safety precautions and provide appropriate personnel protection equipment. The Contractor shall be responsible to submit to the Government Representative, Material Safety Data Sheets (MSDS) for any materials delivered to the work site.

1.6.3.1 Site Safety and Health Officer: Site Safety and Health Officer (SSHO) shall be designated at the work site at all times to assure adherence to the APP, perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO role and responsibilities may be assigned to one of the personnel working at the site.

1.6.3.2 Tailgate Safety Meetings: A tailgate safety meeting shall be held at the beginning of the project and daily thereafter for the duration of the project or any time the hazards associated with the work change significantly, whichever is more frequent. The Contractor shall document the occurrence of the safety meeting on a Tailgate Safety Meeting form. The Tailgate Safety Meeting form shall consist of the safety topics covered, date of the meeting, and printed names and signatures of all participants of the field team. In addition, emergency and Contractor POC phone numbers and the location, direction, and route to the nearest hospital shall be verified and discussed for situational awareness at the Tailgate Safety Meeting.

1.6.4 Work Plan: The Contractor shall develop and submit a Work Plan that details the Contractor's plan for executing this PWS to include procedures for completing tasks and gathering relevant data. Fieldwork shall not commence until the Corps of Engineers reviews and approves the Work Plan. The Contractor shall submit for acceptance a written APP including an Activity Hazard Analysis (AHA) as part of the Work Plan. The APP and AHA shall be in accordance with the criteria described in EM 385-1-1, with reference to this manual in the APP (USACE, 2008). At a minimum and as applicable to task(s), the following information will be provided in the Work Plan.

- Project Summary
- Project Management
- Baseline Project Schedule
- Accident Prevention Plan Including Activity Hazard Analysis
- Quality Control Plan
- Procedures and Equipment for Conducting Remote Camera Inspection and Cleaning Vertical Chute Slab Foundation Drains.
- Points of Contact

1.6.5 Draft and Final Inspection Report: An Inspection Report shall be developed at the completion of the work. The Inspection Report shall contain all documentation and results specified in Paragraph 5.9, and delivered as shown in Technical Exhibit 2. The inspection report shall also describe all pertinent field activities, problems encountered and measures taken to alleviate these problems, and all other appropriate information and data.

1.6.6 Submittals: The following table outlines the schedule and format of submittals presented in this PWS. Any deviation from this submittal schedule shall be approved by the Contracting Officer or approved designee. A draft inspection report including all required documentation shall be submitted to the Corps of Engineers for review within 120 days after Notice to Proceed (NTP). The Corps of Engineers will review the draft inspection reports and information submitted and provide comments that the Contractor shall address in the final inspection report. The final inspection report, incorporating resolution of all comments, will be submitted to the Corps of Engineers within 180 days after NTP.

Submittal Schedule	
Submittal	**Schedule**
Draft Baseline Schedule & Work Plan	14 days after NTP
Final Baseline Schedule & Work Plan	21 days after NTP
Tailgate Safety Meeting Forms	Daily
Field Work Documentation/Draft Inspection Reports Complete	120 days after NTP
Final Inspection Report Complete/All Work Complete	180 days after NTP

Draft Work Plans and Draft Inspection Reports will be provided by hard copy and digital PDF format. One copy of each shall be provided to the Dam Safety Engineer and Project Office POC listed in paragraph 1.6.14. Tailgate Safety Meeting Forms should be provided to the Tri-Lakes Project Office POC. Format and number of copies for the Final Inspection Report shall be as indicated in paragraph 5.9.5.

1.6.7 Recognized Holidays: Contractor's shall not be required to work on Federal Holidays as listed below.

New Year's Day
Martin Luther King Jr.'s Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

1.6.8 Hours of Operation: The Contractor is responsible for conducting business, between the hours of 0700-1630, Monday thru Friday except Federal holidays or when the Government facility is closed due to local or national emergencies, administrative closings, or similar Government directed facility closings. Work on the weekend may be acceptable subject to approval of the Tri-Lakes Project POC prior to the start of

weekend work. For other than firm fixed price contracts, the Contractor will not be reimbursed when the government facility is closed for the above reasons. The Contractor must at all times maintain an adequate workforce for the uninterrupted performance of all tasks defined within this PWS when the Government facility is not closed for the above reasons.

1.6.9 Place of Performance: The work to be performed under this contract will be performed at the Chatfield Dam Project Spillway, located near Littleton, Colorado.

1.6.10 Type of Contract: The government will award a Firm Fixed Price Contract.

1.6.11 Security Requirements: All Contractor and all associated sub-contractors employees shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). The Contractor shall also provide all information required for background checks to meet installation access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. Contractor workforce must comply with all personal identity verification requirements as directed by DOD, HQDA and/or local policy. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FPCON) at any individual facility or installation change, the Government may require changes in Contractor security matters or processes. For background checks see paragraph 1.6.11.3.

1.6.11.1 Submit a complete, updated and signed, list of all Contractor and subcontractor personnel, including their titles and intended working hours, who will be working on site prior to start of work. This listing shall be revised and resubmitted when personnel changes occur.

1.6.11.2 Personnel Risk Assessment: A minimum of seven days prior to engaging in work submit, to the CO or Project POC, a Personnel Risk Assessment (PRA) for each employee requiring authorized unescorted access to the Jobsite. The Contractor employee will only be allowed authorized unescorted physical access after the PRA is shown to and approved by the Government.

1.6.11.3 Authorized Unescorted Access Requirements: Perform a PRA on all Contractor personnel that require authorized unescorted access to the Jobsite. Costs associated with the execution of the PRA shall be at the expense of the Contractor. The content of the PRA is defined by the requirements as follows:

a. Criminal Check - Obtain a criminal background check, completed within the last seven years, on all Contractor personnel that require authorized unescorted access to the Jobsite. A minimum of a 7-year criminal background check with the state patrol office shall be performed from all states of residence and employment, for the past seven years. The Government Representative through the Contacting Officer will approve**, disapprove, or revoke authorized** unescorted access to the Jobsite as a

result of the seven-year background check in accordance with Army Directive 2014-05 Enclosure 2.

b. Identity Verification - Contractor employees shall provide positive verification of individual identity prior to authorized unescorted access to the Jobsite. Acceptable forms of identity verification are documents issued by a federal Government agency that include: the individual's photograph, name, and date of birth, such as a passport or military identification (ID) card. Additionally, a state issued driver's license or ID card is acceptable for identity verification.

c. The Criminal Check and Identity Verification shall be updated at least every seven years for each employee requiring authorized unescorted access to the Jobsite.

d. Escort Requirements - Contractor personnel not cleared for authorized access to the Jobsite may be escorted by Government or Contractor personnel that have authorized unescorted access to the Jobsite. All costs related to the escorting of non-cleared personnel shall be at the expense of the Contractor. Additional burden shall not be placed upon the Government to provide these escorts. Prior to access, coordination with the Project Security Officer is required, including but not limited to:

(1) Verification of identity with photo identification
(2) Name of escorting individual and verification of unescorted status
(3) Time of entry into the Jobsite
(4) Time exiting the Jobsite.

1.6.12 Special Qualifications:

1.6.12.1 All contract employees, including subcontractor employees who are not in possession of the appropriate security clearance, will be escorted in areas where they may be exposed to classified and/or sensitive materials and/or sensitive or restricted areas. There are NO classified materials at this project location.

1.6.12.2 The Contractor must pre-screen Candidates using the E-verify Program (http://www.dhs.gov/E-Verify) website to meet the established employment eligibility requirements. The Vendor must ensure that the Candidate has two valid forms of Government issued identification prior to ensure the correct information is entered into the E-verify system. An initial list of verified/eligible Candidates must be provided to the Government Representative no later than 3 business days after the initial contract award.

1.6.13 Physical Security: The Contractor shall be responsible for the security of all contactor equipment at all times. The Contractor shall coordinate with, and acquire approval from the Tri-Lakes Project Office POC regarding leaving vehicles or equipment at the dam site overnight or otherwise unattended. The Contractor shall also coordinate with, and acquire approval from the Tri-Lakes Project Office POC regarding acceptable staging areas for the work. The Contractor shall be responsible for safeguarding any

government equipment, information and property provided for Contractor use. At the close of each work period, government facilities, equipment, and materials shall be secured.

1.6.13.1 Key Control. The Contractor shall establish and implement methods of making sure all keys/key cards issued to the Contractor by the Government are not lost or misplaced and are not used by unauthorized persons. NOTE: All references to keys include key cards. No keys issued to the Contractor by the Government shall be duplicated. The Contractor shall develop procedures covering key control that shall be included in the Quality Control Plan. Such procedures shall include turn-in of any issued keys by personnel who no longer require access to locked areas. The Contractor shall immediately report any occurrences of lost or duplicate keys/key cards to the Contracting Officer or designated representative.

In the event keys, other than master keys, are lost or duplicated, the Contractor shall, upon direction of the Contracting Officer or designated representative, re-key or replace the affected lock or locks; however, the Government, at its option, may replace the affected lock or locks or perform re-keying. When the replacement of locks or re-keying is performed by the Government, the total cost of re-keying or the replacement of the lock or locks shall be deducted from the monthly payment due the Contractor. In the event a master key is lost or duplicated, all locks and keys for that system shall be replaced by the Government and the total cost deducted from the monthly payment due the Contractor.

The Contractor shall prohibit the use of Government issued keys/key cards by any persons other than the Contractor's employees. The Contractor shall prohibit the opening of locked areas by Contractor employees to permit entrance of persons other than Contractor employees engaged in the performance of assigned work in those areas, or personnel authorized entrance by the Contracting Officer or designated representative.

1.6.13.2 Lock Combinations. The Contractor shall establish and implement methods of ensuring that all lock combinations are not revealed to unauthorized persons. The Contractor shall ensure that lock combinations are changed when personnel having access to the combinations no longer have a need to know such combinations.

1.6.14 Post Award Conference/Periodic Progress Meetings: The Contractor agrees to attend any post award conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation Subpart 42.5. The Contractor shall attend one kick-off meeting prior to the work commencing. The Contracting Officer, Government Representative, and other Government personnel, as appropriate, may meet periodically with the Contractor to review the Contractor's performance. At these meetings the Contracting Officer or designated representative will apprise the Contractor of how the government views the Contractor's performance and the Contractor will apprise the Government of problems, if any, being experienced. Appropriate action shall be taken to resolve outstanding issues. These meetings shall

be at no additional cost to the government. Meeting minutes shall be developed by the contactor and provided to the government.

1.6.15 Government Representative: The Government Representative monitors all technical aspects of the contract and is authorized to perform the following functions: assure that the Contractor performs the technical requirements of the contract; perform inspections necessary in connection with contract performance; maintain written and oral communications with the Contractor concerning technical aspects of the contract; issue written interpretations of technical requirements, including Government drawings, designs, specifications; monitor Contractor's performance and notifies both the Contracting Officer or designated representative and Contractor of any deficiencies; coordinate availability of government furnished property, and provide site entry of Contractor personnel. The Government Representative is not authorized to change any of the terms and conditions of the resulting order. The Government Representative(s) for this contract are the Tri-Lakes Project Office POC or the Tri-Lakes Project Office Alternate POC. Government and Technical Representatives for this contract are provided in the table below.

USACE Points-of-Contact				
Function	Name	Office Phone	Cell Phone	E-Mail
Tri-Lakes Project Office POC	**Scott Franklin**	**(720) 922-3845**	**(303) 507-1368**	**J.Scott.Franklin@usace.army.mil**
Tri-Lakes Project Office Alternate POC	**Carl Voss**	**(720) 922-3855**	**(303) 507-7443**	**Carl.H.Voss@usace.army.mil**
Dam Safety Engineer, Technical POC	**Ben Letak**	**(402) 995-2247**	**NA**	**Ben.J.Letak@usace.army.mil**

1.6.16 Key Personnel: The follow personnel are considered key personnel by the government: Contract Manager, Alternate Contract Manager, and Lead On-Site Field Representative. The Contractor shall provide a contract manager who shall be responsible for the performance of the work. The name of the contract manager, alternate contract manager, and lead on-site field representative shall be designated in writing to the Contracting Officer or designated representative. The contract manager or alternate shall have full authority to act for the Contractor on all contract matters relating to daily operation of this contract. The contract manager or alternate shall be available between 0700 to 1630, Monday thru Friday, except Federal holidays or when the government facility is closed for administrative reasons. Contact information shall include office phone, cell phone, and e-mail address for each individual. In addition, the Contractor shall provide a 24-hour phone number that can be utilized to contact the Contractor's POCs outside of normal business hours. The Contractor will provide the updated contact lists anytime there is a change in personnel or contact information. All

employees shall possess required licenses/certificates/insurance as required by federal, state, and local authorities.

1.6.17 Identification of Contractor Employees: All contract personnel attending meetings, answering Government telephones, and working in other situations where their Contractor status is not obvious to third parties are required to identify themselves as such to avoid creating an impression in the minds of members of the public that they are Government officials. They must also ensure that all documents or reports produced by Contractor's are suitably marked as Contractor products or that Contractor participation is appropriately disclosed.

1.6.18 Public Affairs: The Contractor shall not make available to the news media or publicly disclose any data generated in the performance of this work. If approached by the news media or general public, the Contractor shall refer them to the Tri-Lakes Project Office for a response.

1.6.19 Contractor Travel: N/A

1.6.20 Other Direct Costs: N/A

1.6.21 Data Rights: The Government has unlimited rights to all documents/material produced under this contract. All documents and materials, to include the source codes of any software, produced under this contract shall be Government owned and are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. These documents and materials may not be used or sold by the Contractor without written permission from the Contracting Officer or designated representative. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. This right does not abrogate any other Government rights.

1.6.22 Organizational Conflict of Interest: N/A

1.6.23 PHASE IN /PHASE OUT PERIOD: N/A

PART 2
DEFINITIONS & ACRONYMS

2. **DEFINITIONS AND ACRONYMS:**

2.1. DEFINITIONS:

2.1.1. CONTRACTOR. A supplier or vendor awarded a contract to provide specific supplies or service to the government. The term used in this contract refers to the prime.

2.1.2. CONTRACTING OFFICER. A person with authority to enter into, administer, and or terminate contracts, and make related determinations and findings on behalf of the government. Note: The only individual who can legally bind the government.

2.1.3. DEFECTIVE SERVICE. A service output that does not meet the standard of performance associated with the Performance Work Statement.

2.1.4. DELIVERABLE. Anything that can be physically delivered, but may include non-manufactured things such as meeting minutes or reports.

2.1.5. GOVERNMENT REPRESENTATIVE. An employee of the U.S. Government and designated representative of the Contracting Officer that monitors the technical aspects of the contract, maintains communications between the Contractor and the government, and monitors the contractor's performance. This individual has authority to provide technical direction to the Contractor as long as that direction is within the scope of the contract, does not constitute a change, and has no funding implications. This individual does NOT have authority to change the terms and conditions of the contract.

2.1.6. KEY PERSONNEL. Contractor personnel that are evaluated in a source selection process and that may be required to be used in the performance of a contract by the Key Personnel listed in the PWS. When key personnel are used as an evaluation factor in best value procurement, an offer can be rejected if it does not have a firm commitment from the persons that are listed in the proposal.

2.1.7. PHYSICAL SECURITY. Actions that prevent the loss or damage of Government property.

2.1.8. QUALITY ASSURANCE. The government procedures to verify that services being performed by the Contractor are performed according to acceptable standards.

2.1.9. QUALITY ASSURANCE Surveillance Plan (QASP). An organized written document specifying the surveillance methodology to be used for surveillance of Contractor performance.

2.1.10. QUALITY CONTROL. All necessary measures taken by the Contractor to assure that the quality of an end product or service shall meet contract requirements.

2.1.11. SUBCONTRACTOR. One that enters into a contract with a prime Contractor. The Government does not have privity of contract with the subcontractor.

2.1.12. WORK DAY. The number of hours per day the Contractor provides services in accordance with the contract.

2.1.12. WORK WEEK. Monday through Friday, unless specified otherwise.

2.2. <u>ACRONYMS</u>:

AFARS	Army Federal Acquisition Regulation Supplement
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
AR	Army Regulation
CFR	Code of Federal Regulations
CMP	Corrugated Metal Pipe
COTS	Commercial-Off-the-Shelf
DA	Department of the Army
DOD	Department of Defense
EM	Engineer Manual
FAR	Federal Acquisition Regulation
IAW	In Accordance With
KO	Contracting Officer
NTP	Notice to Proceed
OCI	Organizational Conflict of Interest
OCONUS	Outside Continental United States (includes Alaska and Hawaii)
POC	Point of Contact
PRS	Performance Requirements Summary
PVC	Polyvinyl chloride
PWS	Performance Work Statement
QA	Quality Assurance
QASP	Quality Assurance Surveillance Plan
QC	Quality Control
SSHO	Site Safety and Health Officer
TE	Technical Exhibit

PART 3

GOVERNMENT FURNISHED PROPERTY, EQUIPMENT, AND SERVICES

3. GOVERNMENT FURNISHED ITEMS AND SERVICES:

3.1. Services: N/A.

3.2. Facilities: N/A.

3.3. Utilities: Potable water to be used for water flushing operations may be obtained from the Tri-Lakes Project Office at no cost to the Contractor.

3.4. Equipment: N/A.

3.5. Materials: NA

PART 4

CONTRACTOR FURNISHED ITEMS AND SERVICES

4. CONTRACTOR FURNISHED ITEMS AND RESPONSIBILITIES:

4.1. General: The Contractor shall furnish all supplies, equipment, facilities and services required to perform work under this contract that are not listed under Section 3 of this PWS.

4.2. Secret Facility Clearance: N/A.

4.3. Supplies and Materials: The Contractor shall provide all supplies and materials to meet the requirements under this PWS. This includes, but is not limited to, those supplies and materials necessary to inspect and flush, as required, the sub-drains. Additionally supplies and materials shall be provided to collect and capture materials flushed from the chute slab vertical foundation drains.

4.4. Equipment: The Contractor shall provide all equipment necessary to meet the requirements under this PWS. This includes, but is not limited to, downhole camera equipment with remote controlled crawler unit designed for horizontal pipes, and mechanically cleaning and flushing equipment, as required, for the chute slab vertical foundation drains.

This also includes a crane and operator, as needed, for lowering equipment and supplies into the spillway gallery, into the spillway wall manholes, or onto the spillway slab from above the spillway walls.

Access to the spillway gallery by contract personnel is by ladder. Equipment and supplies may be lowered through a 7 ft. x 7 ft. shaft in the spillway abutment structure. The shaft is constructed from the roof level to the gallery access level. A removable hatch covers the opening on the roof. The Contractor shall be responsible for providing the crane and operator for lowering equipment and supplies down the shaft.

PART 5

SPECIFIC TASKS

5. SPECIFIC TASKS:

5.1. Basic Services - General: The work for this contract shall consist of providing services to perform a visual inspection of the drainage system pipes below the spillway approach slab, ogee weir and chute slab paving and behind the chute walls at Chatfield Dam. The Contractor shall inspect all piping included in this contract with remote-operated camera equipment, shall mechanically clean and flush the Chute Slab Foundation Drain piping (18 vertical pipes), and shall document the condition of all piping inspected. A detailed formal report shall be produced to thoroughly document the condition of these features.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length between the ends identified in Tables 5.2 through 5.6 attached to the end of this PWS (Exhibit 3 in Part 7).

The total approximate length of pipe to be inspected is 8,945 lineal feet. The diameter of pipe to be inspected ranges from 3 to 12 inches. Pipe materials for the pipe to be inspected are solid and perforated PVC, solid and perforated vitrified clay, solid asbestos cement, and solid CMP pipe.

All sub-drainage systems for the spillway are shown in plan and profile view on Sheet 3. Pipes to be inspected under this contract are shown in plan and profile view on Sheets 4 through 8. As-built details for the sub-drainage pipes and access manholes are provided on Sheets 9 through 13.

The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative. Pipe segment names, access locations, beginning and ending information, pipe material types, pipe diameter and segment lengths are summarized in Tables 5.2 through 5.6 attached at the end of this PWS (Exhibit 3 in Part 7).

Deliverables from this work will include DVD(s) of the inspection footage and a report that summarizes the procedures and findings of all inspections and includes individual inspection logs that summarizes the condition each pipe segment and documents the location of any significant observation.

Basic work and bid schedule items for this contract are grouped by drainage systems of a specific spillway component and considerations for pipes of similar size, access conditions to pipes, whether the pipe is to be mechanically cleaned or not (vertical pipes), etc. as follows:

- *Approach Slab Drain Outlet and Drain Collector Pipe*. Inspect 1,465 Lineal Feet of Drain Outlet and Collector Pipe Beneath the Spillway Approach Slab as Shown on Sheet 4.

- *Ogee Weir Gallery Drain and Outlet Pipe*. Inspect 1,110 Lineal Feet of Drain and Outlet Pipe Beneath the Spillway Ogee Weir as Shown on Sheet 5.

- *Chute Slab Drain and Foundation Drain Collector Pipe*. Inspect 2,850 Lineal Feet of Slab Drain and Foundation Drain Collector Pipe Beneath the Spillway Chute Slab as Shown on Sheets 6 and 7.

- *Chute Slab Foundation Drains (Vertical Pipes)*. Clean and Inspect 720 Lineal Feet of Foundation Drain Pipe Beneath the Spillway Chute Slab as Shown on Sheet 7.

- *Chute Wall Collector Drain and Wall Backfill Drain Pipe*. Inspect 2,800 Lineal Feet of Collector Drain and Backfill Drain Pipe on the Back Side of the Spillway Chute Walls as Shown on Sheet 8.

Task descriptions, site-specific requirements, and other pertinent information for the inspection work are provided below.

5.2. Approach Slab Drain Outlet and Drain Collector Pipe Inspection: This work shall consist of performing a remote camera inspection, and documenting the condition of approximately 1,465 lineal feet of 8 inch diameter drainage pipe below the spillway approach slab. The pipes to be inspected are shown on Sheet 4. As-built details for these pipes and for access manhole(s) for these pipes are provided on Sheet 9. The pipe materials for this work are solid and perforated vitrified clay pipe. Pipe segment names, access locations, beginning and ending information, pipe material type, pipe diameter and segment lengths are summarized in Table 5.2.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length between the ends identified in Table 5.2. It shall be assumed that all pipes are less than 20% filled with sediment and require no flushing for a complete and thorough inspection.

The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative.

5.3. Ogee Weir Gallery Drain and Outlet Pipe Inspection: This work shall consist of performing a remote camera inspection, and documenting the condition of approximately 1,110 lineal feet of 8-inch diameter drainage pipe below the spillway ogee weir. The pipes to be inspected are shown on Sheet 5. As-built details for these pipes and for access manhole(s) for these pipes are provided on Sheets 9, 10 & 12.

The pipe materials for this work are solid asbestos cement and vitrified clay pipe. Pipe segment names, access locations, beginning and ending information, pipe material types, pipe diameter and segment lengths are summarized in Table 5.3.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length between the ends identified in Table 5.3. It shall be assumed that all pipes are less than 20% filled with sediment and require no flushing for a complete and thorough inspection.

The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative.

5.4. Chute Slab Drain and Foundation Drain Collector Pipe Inspection: This work shall consist of performing a remote camera inspection, and documenting the condition of approximately 2,850 lineal feet of 6-inch diameter drainage pipe below the spillway chute slab. The pipes to be inspected are shown on Sheets 6 and 7. As-built details for these pipes and for access manhole(s) for these pipes are provided on Sheets 10, 12 & 13. The pipe materials for this work are solid and perforated vitrified clay pipe. Pipe segment names, access locations, beginning and ending information, pipe material types, pipe diameter and segment lengths are summarized in Table 5.4.

Access to the chute slab drains and foundation drain collector pipe are through a 2'x2' square frame and cover manhole that has a surface seal and is bolted down on the chute slab surface. The Contractor will be required to remove and replace 8-12 bolts when accessing these drains for inspection. Care shall be taken not to damage the cover seal. Seals or bolts damaged by the Contractor during this contract shall be replaced at the Contractor's expense.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length between the ends identified in Table 5.4. It shall be assumed that all pipes are less than 20% filled with sediment and require no flushing for a complete and thorough inspection.

The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative.

5.5. Chute Slab Foundation Drains Cleaning and Inspection (Vertical Pipes): This work shall consist of cleaning (brushing and flushing with water), performing a remote camera inspection, and documenting the condition of approximately 720 lineal feet of 3-inch diameter vertical foundation drainage pipe below the spillway chute slab at spillway stations 5+41 and 6+88.5. The pipes to be inspected are shown on Sheet 10. As-built details for these pipes and for access manhole(s) for these pipes are provided on Sheet 7. The pipe materials for this work are solid and perforated PVC pipe. Pipe segment

names, access locations, beginning and ending information, pipe material types, pipe diameter and segment lengths are summarized in Table 5.5.

Access to the chute slab foundation drains are through a 12” diameter frame and cover manhole that has a surface seal and is bolted down on the chute slab surface. The Contractor will be required to remove and replace 4-6 bolts when accessing these drains for cleaning and inspection. Care shall be taken not to damage the cover seal. Seals or bolts damaged by the Contractor during this contract shall be replaced at the Contractor’s expense.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length identified in Table 5.5. It shall be assumed that these pipes are 10% filled with sediment and biofouled material and require cleaning (brushing and flushing) for a complete and thorough inspection.

Mechanical Cleaning: The drains shall be cleaned (brushed and flushed) prior to the camera inspection. The Contractors work plan shall address the methods, equipment and procedures that will be used to clean the drains. The work plan shall also discuss their method to prevent sediments from washing into the spillway stilling basin pool. All materials flushed from the drains must be captured in a containment area or storage container and removed from the spillway slab. Disposal of the sediments shall be at a location directed by the Tri-Lakes Project POC on government land. It should be noted that there is a foundation drain collection system that is connected to each vertical drain. Details of these features are provided on Sheet 10. Care should be taken during cleaning operations to avoid washing sediments into these lines. The Contractor’s work plan shall identify the method to limit the amount of sediment from entering these pipes, as well as preventing sediments from washing into the spillway stilling basin pool.

Cleaning is required to mechanically remove biomass, mineral scale, and sediment from the vertical foundation drains. The following procedures for cleaning shall be followed. Measure and document the drain depth below top of pipe:

Mechanically scrub the entire length of the drain with a brush of appropriate diameter and stiffness to remove biofoul and mineral scale within the drain casing and screen, yet not so stiff as to induce deterioration of the casing and screen. The brush shall be no more than 0.5-inch larger than the actual well screen and riser casing diameter. The brush shall be composed of plastic bristles, no metal shall be used. Before any actual scrubbing is initiated, a pre-pass test shall be conducted which consists of the brush assembly being slowly lowered the entire length of the drain to determine if the brush assembly will pass without binding or encountering obstructions. Document whether or not the brush assembly can pass without binding or encountering obstructions. Record pertinent details (depth, etc.) in field notes and as pass/fail. After initiation of the scrubbing process, the brushing will be performed with stroke lengths of no more than 3 feet. The brush assembly should be periodically removed and cleaned to prevent binding in the well. Pump the water column in the well utilizing an airlift or other appropriate method until clear of biomass/sediment. All materials flushed from the

drains must be captured in a containment area or storage container and removed from the spillway slab. Flush water may be discharged to the spillway basin pool if flushed materials are captured to the satisfaction of the Contracting Officer or designated representative. Confirm the bottom depth of the well is the same or greater than previous measurements.

Following completion and approval of cleaning operations, the pipes shall be inspected by remote camera. The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative.

5.6. Chute Wall Collector Drain and Wall Backfill Drain Pipe Inspection: This work shall consist of performing a remote camera inspection, and documenting the condition of approximately 2,800 lineal feet of 6-inch and 12-inch diameter drainage pipe behind the spillway chute walls. The pipes to be inspected are shown on Sheet 8. As-built details for these pipes and for access manhole(s) for these pipes are provided on Sheets 12 & 13. The pipe materials for this work are solid asbestos cement pipe and perforated CMP pipe. Pipe segment names, access locations, beginning and ending information, pipe material types, pipe diameter and segment lengths are summarized in Table 5.6.

All inspection equipment and procedures for this work shall conform to this PWS and inspections shall be inclusive of the full pipe length between the ends identified in Table 5.6. It shall be assumed that all pipes are less than 20% filled with sediment and require no flushing for a complete and thorough inspection.

The Government Representative shall be notified immediately if any portion of pipe segment cannot be inspected. Payment will not be made for uninspected portions of pipe without prior approval from the Government Representative.

5.7 Access Restrictions and Controls: All access to the project site shall be fully coordinated with the Tri-Lakes Project Office POC in advance of mobilization to the site. A Contractor staging area and equipment storage area can be provided nearby. The staging areas shall be fully coordinated with the Tri-Lakes Project Office POC in advance of mobilization to the site.

It should be noted that there is no drivable access onto the spillway slab due to 30-ft-tall retaining walls on either side of the chute paving. The Contractor will be responsible for procuring their own crane services for mobilizing equipment onto, and removing all materials/equipment from the chute slab. Crane access is available on the south side of the wall. Acceptable methods for temporary equipment storage on the chute slab shall be coordinated through the Tri-Lakes Project Office POC. Site access shall be coordinated with the Tri-Lakes Project Office POC.

5.8 Site Restoration: The Contractor is responsible for site restoration to the satisfaction of the Tri-Lakes Project Office POC. The project site and any staging areas, access roads, haul roads, or other areas disturbed by the Contractor shall be restored to original conditions after completion of work. This includes removing excess materials and equipment, repairing any rutting or erosion damages and seeding disturbed areas. A healthy stand of grass shall be established by the Contractor in disturbed areas within a period of 90 days following completion of all field work to the satisfaction of the Tri-Lakes Project Office POC. If not acceptable, the Contractor shall reseed these areas at his/her expense. The Contractor shall be responsible for providing all equipment, persons, and material to complete site restoration. The Contractor shall coordinate with, and acquire approval from the Tri-Lakes Project Office POC regarding final disposition of the project site.

5.9 Inspection and Inspection Reporting Requirements:

5.9.1 Camera Equipment: The inspection shall be performed with the use of down-hole camera equipment including a remote controlled crawler unit for horizontal pipes. All equipment shall be rugged, constructed of non-corrosive/non-hazardous material, and be designed for the intended purpose of this type of inspection work. The camera shall be equipped with high-resolution lenses capable of a clear view (subject to water clarity) of the various pipe components. The camera head shall be capable of continually rotating 360 degrees, panning from side to side +/- 120 degrees, and possess an automatic upright feature for image orientation. The camera shall also be equipped with remote controlled focus, zoom and a variable intensity LED light source. The camera equipment shall have the capability of providing continuous depth/length measurements. Date, time, and crawler distance readout must appear on-screen at all times. The camera equipment shall have the capability of providing continuous audio and video documentation in digital format and have the ability to capture still photos of damage or problem areas for inclusion into reports. The camera equipment shall have the capability of inspecting vertical and horizontal pipe diameters and conditions specified in the site-specific requirements.

5.9.2 Field Inspection: The field inspection shall include a detailed inspection and evaluation of all features for each drainage pipe as applicable to include, but not limited to the following:

- Perforated drainage pipe (interior and exposed exterior)
- Non-perforated drainage pipe (interior and exposed exterior)
- Pipe joints (interior and exposed exterior)
- Manholes (interior and exposed exterior)
- Manhole covers and locking mechanisms

5.9.3 Documentation: The Contractor shall provide complete documentation all features inspected. General documentation requirements for all items inspected include the following:

- Drain pipe designation
- Date of inspection per drain pipe
- Personnel performing inspection per drain pipe
- Modifications / problems encountered
- Continuous video and audio documentation of the condition of each drain pipe
- Still photographic (exterior & interior from video tape) documentation of inspection showing representative deterioration/damage and areas of concern in each pipe inspected.
- Delineation of the location of each identified deficiency including total length in a graphic log.
- Condition of interior and exposed exterior of drain pipes (structural damage, corrosion, deposition, etc.)
- Map delineating areas that could not be inspected due to unanticipated field conditions.

5.9.4 Drain Pipes: Specific documentation for all drain pipes shall include, but not limited to, the following:

- Condition of perforated drain pipes (structural damage, corrosion, encrustation, sedimentation/deposition, apparent plugging of perforations, etc.)
- Condition of interior and exposed exterior of non-perforated drain pipes (structural damage, corrosion, sedimentation/deposition, etc.)
- Estimated depth of sedimentation/deposition in drain pipes
- Continuous length measurement from top of manhole or pipe entrance point. The zero reference point shall be recorded at the time of the inspection and provided in the written documentation.
- A table indicating the length to adjacent manholes, discharge/outfall pipes, sedimentation/deposition or any areas of concern/damage.

5.9.5 Reports: The Contractor shall develop and submit three (3) copies of a professionally prepared formal hard-bound inspection report to the Contracting Officer or designated representative a maximum of 180 days following Notice to Proceed (NTP). The report shall also be supplied in electronic format (5 DVD's), and include DVD(s) of the inspection footage. The report shall address as a minimum each item specified in Section 5.7.

5.10. CONTRACTOR MANAGEMENT REPORTING (CMR): N/A

PART 6

APPLICABLE PUBLICATIONS

6. APPLICABLE PUBLICATIONS (CURRENT EDITIONS):

6.1. The Contractor must abide by all applicable regulations, publications, manuals, and local policies and procedures. Title 36, Code of Federal Regulations, Standards of Conduct, DOD 5500.7-R (DOD Joint Ethics).

6.2. The Contractor shall follow all Safety Requirements detailed in the applicable Safety & Health Requirements Manual per EM 385-1-1. EM 385-1-1 is available on-line at: http://www.usace.army.mil/CESO/Pages/EM 385-1-1.

PART 7

ATTACHMENTS / TECHNICAL EXHIBIT LISTING

7. ATTACHMENTS / TECHNICAL EXHIBIT LIST:

7.1. Attachment 1/Technical Exhibit 1 – Performance Requirements Summary

7.2. Attachment 2/Technical Exhibit 2 – Deliverables Schedule

7.3 Attachment 3/Technical Exhibit 3 – Tables 5.2 through 5.6

TECHNICAL EXHIBIT 1

Performance Requirements Summary

The Contractor service requirements are summarized into performance objectives that relate directly to mission essential items. The performance threshold briefly describes the minimum acceptable levels of service required for each requirement. These thresholds are critical to mission success.

Performance Objective	Standard	Performance Threshold	Method of Surveillance
PRS # 1. Base Contract: PWS paragraphs 5.2 through 5.6	The Contractor shall inspect 8,945 lineal feet of drains and collector pipes IAW Para 5.2 through 5.6	Zero deviation from standard. Payment will not be made for uninspected portions of pipe.	100 PERCENT INSPECTION
PRS # 2 Site Restoration: PWS paragraph 5.8	The Contractor shall be required to restore the site IAW Para 5.8	Zero deviation from standard. Restoration costs shall be deducted if not accomplished 180 days from NTP	100 PERCENT INSPECTION
PRS #3 Inspection Reporting: PWS paragraph 5.9	The Contractor shall document inspection results IAW Para 5.9	Zero deviation from standard.	100 PERCENT INSPECTION

TECHNICAL EXHIBIT 2

DELIVERABLES SCHEDULE

This technical exhibit lists any reports or documentation that is required as a deliverable to include the frequency, # of copies, medium/format and who/where it is to be submitted. A deliverable is anything that can be physically delivered but may include non-physical things such as meeting minutes.

Deliverable	Frequency	# of Copies	Medium/Format	Submit To
Draft Work Plan IAW PWS Para 1.6.4	Once, NLT 14 days after NTP	2 copies	Paper (hard copy)	Scott Franklin, US Army COE Tri-Lakes Project Office 9307 S Wadsworth Blvd. Littleton, Colorado 80128 Ben Letak US Army COE CENWO-ED-GB 1616 Capitol Ave., Suite 9000 Omaha, NE 68102-9000
Final Work Plan IAW PWS Para 1.6.4	Once, NLT 21 days after NTP	2 copies	Paper (hard copy)	Scott Franklin, Same as above Ben Letak Same as above
Tailgate Safety Briefing Forms	Daily	1 copy	Paper (hard copy)	Scott Franklin, Same as above
Draft Inspection Report	Once, NLT 120 days after NTP	3 copies 5 copies	Hard-bound PDF on CD	Scott Franklin, Same as above Ben Letak Same as above
Final Inspection Report	Once, NLT 180 days after NTP	3 copies 5 copies	Hard-bound PDF on CD	Scott Franklin, Same as above Ben Letak Same as above
Inspection Footage	Once, NLT 120 days after NTP	3 copies	DVD	Scott Franklin, Same as above

TECHNICAL EXHIBIT 3

Tables 5.2 through 5.6

TABLE 5.2

Spillway Component	Drainage Pipe Name (and # of pipes if greater than one & length for each)	Access Location	Drainage Pipe Beginning and Ending Points		Pipe Material	Pipe Diameter (inches)	Total Pipe Length (feet)
			Beginning	End			
Approach Slab	Approach Slab Drain Outlet	Approach Slab Manhole	Approach Slab Manhole	Outfall	VCP	8"	1445
Approach Slab	Approach Slab Drain Collector	Approach Slab Manhole	Approach Slab Manhole	T-Section	Perf. VCP	8"	20

TABLE 5.3

Spillway Component	Drainage Pipe Name (and # of pipes if greater than one & length for each)	Access Location	Drainage Pipe Beginning and Ending Points		Pipe Material	Pipe Diameter (inches)	Total Pipe Length (feet)
			Beginning	End			
Ogee Weir	Gallery Drain	Gallery	Gallery	Slab M.H. #3-S	Asbestos Cement	8"	360
Ogee Weir	Gallery Drain	Gallery	Gallery	Slab M.H. #3-N	Asbestos Cement	8"	360
Ogee Weir	Gallery Drain Outlet	Slab M.H. #3-S	Slab M.H. #3-S	Wall M.H. #3-S	VCP	8"	120
Ogee Weir	Gallery Drain Outlet	Slab M.H. #3-S	Slab M.H. #3-S	Slab M.H. #3-N	VCP	8"	150
Ogee Weir	Gallery Drain Outlet	Slab M.H. #3-N	Slab M.H. #3-N	Wall M.H. #3-N	VCP	8"	120

TABLE 5.4

Spillway Component	Drainage Pipe Name (and # of pipes if greater than one & length for each)	Access Location	Drainage Pipe Beginning and Ending Points		Pipe Material	Pipe Diameter (inches)	Total Pipe Length (feet)
			Beginning	End			
Chute Slab	Slab Drain	Slab M.H. #1	Slab M.H. #1	Wall M.H. #1-S	Perf. VCP	6"	240
Chute Slab	Slab Drain	Slab M.H. #1	Slab M.H. #1	Wall M.H. #1-N	Perf. VCP	6"	240
Chute Slab	Slab Drain	Slab M.H. #2	Slab M.H. #2	Wall M.H. #2-S	Perf. VCP	6"	210
Chute Slab	Slab Drain	Slab M.H. #2	Slab M.H. #2	Wall M.H. #2-N	Perf. VCP	6"	210
Chute Slab	Slab Drain	Slab M.H. #3-S	Slab M.H. #3-S	Wall M.H. #3-S	Perf. VCP	6"	120
Chute Slab	Slab Drain	Slab M.H. #3-S	Slab M.H. #3-S	Slab M.H. #3-N	Perf. VCP	6"	150
Chute Slab	Slab Drain	Slab M.H. #3-N	Slab M.H. #3-N	Wall M.H. #3-N	Perf. VCP	6"	120
Chute Slab	Slab Drain	Slab M.H. #4	Slab M.H. #4	Wall M.H. #4-S	Perf. VCP	6"	195
Chute Slab	Slab Drain	Slab M.H. #4	Slab M.H. #4	Wall M.H. #4-N	Perf. VCP	6"	195
Chute Slab	Slab Drain	Slab M.H. #5	Slab M.H. #5	Wall M.H. #5-S	Perf. VCP	6"	195
Chute Slab	Slab Drain	Slab M.H. #5	Slab M.H. #5	Wall M.H. #5-N	Perf. VCP	6"	195
Chute Slab	Foundation Drain Collector	Slab M.H. #4	Slab M.H. #4	Wall M.H. #4-S	VCP	6"	195
Chute Slab	Foundation Drain Collector	Slab M.H. #4	Slab M.H. #4	Wall M.H. #4-N	VCP	6"	195
Chute Slab	Foundation Drain Collector	Slab M.H. #5	Slab M.H. #5	Wall M.H. #5-S	VCP	6"	195
Chute Slab	Foundation Drain Collector	Slab M.H. #5	Slab M.H. #5	Wall M.H. #5-N	VCP	6"	195

TABLE 5.5

Spillway Component	Drainage Pipe Name (and # of pipes if greater than one & length for each)	Access Location	Drainage Pipe Beginning and Ending Points		Pipe Material	Pipe Diameter (inches)	Total Pipe Length (feet)
			Beginning	End			
Chute Slab	Slab Foundation Drains (Vertical) at Spillway Station 5+41 (9 Pipes, 40' Each)	Chute Slab	Not Applicable	Not Applicable	Slotted PVC / PVC	3"	360
Chute Slab	Slab Foundation Drains (Vertical) at Spillway Station 6+88.5 (9 Pipes, 40' Each)	Chute Slab	Not Applicable	Not Applicable	Slotted PVC / PVC	3"	360

TABLE 5.6

Spillway Component	Drainage Pipe Name (and # of pipes if greater than one & length for each)	Access Location	Drainage Pipe Beginning and Ending Points		Pipe Material	Pipe Diameter (inches)	Total Pipe Length (feet)
			Beginning	End			
Chute Wall	Collector Drain	Wall M.H. #1-S	Wall M.H. #1-S	Wall M.H. #2-S	Asbestos Cement	12"	120
Chute Wall	Collector Drain	Wall M.H. #2-S	Wall M.H. #2-S	Wall M.H. #3-S	Asbestos Cement	12"	160
Chute Wall	Collector Drain	Wall M.H. #3-S	Wall M.H. #3-S	Wall M.H. #4-S	Asbestos Cement	12"	140
Chute Wall	Collector Drain	Wall M.H. #4-S	Wall M.H. #4-S	Wall M.H. #5-S	Asbestos Cement	12"	140
Chute Wall	Collector Drain	Wall M.H. #5-S	Wall M.H. #5-S	Wall M.H. #6-S	Asbestos Cement	12"	140
Chute Wall	Collector Drain	Wall M.H. #1-N	Wall M.H. #1-N	Wall M.H. #2-N	Asbestos Cement	12"	120
Chute Wall	Collector Drain	Wall M.H. #2-N	Wall M.H. #2-N	Wall M.H. #3-N	Asbestos Cement	12"	160
Chute Wall	Collector Drain	Wall M.H. #3-N	Wall M.H. #3-N	Wall M.H. #4-N	Asbestos Cement	12"	140
Chute Wall	Collector Drain	Wall M.H. #4-N	Wall M.H. #4-N	Wall M.H. #5-N	Asbestos Cement	12"	140
Chute Wall	Collector Drain	Wall M.H. #5-N	Wall M.H. #5-N	Wall M.H. #6-N	Asbestos Cement	12"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #1-S	Wall M.H. #1-S	Wall M.H. #2-S	Perf. CMP	6"	120
Chute Wall	Wall Backfill Drain	Wall M.H. #2-S	Wall M.H. #2-S	Wall M.H. #3-S	Perf. CMP	6"	160
Chute Wall	Wall Backfill Drain	Wall M.H. #3-S	Wall M.H. #3-S	Wall M.H. #4-S	Perf. CMP	6"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #4-S	Wall M.H. #4-S	Wall M.H. #5-S	Perf. CMP	6"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #5-S	Wall M.H. #5-S	Wall M.H. #6-S	Perf. CMP	6"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #1-N	Wall M.H. #1-N	Wall M.H. #2-N	Perf. CMP	6"	120
Chute Wall	Wall Backfill Drain	Wall M.H. #2-N	Wall M.H. #2-N	Wall M.H. #3-N	Perf. CMP	6"	160
Chute Wall	Wall Backfill Drain	Wall M.H. #3-N	Wall M.H. #3-N	Wall M.H. #4-N	Perf. CMP	6"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #4-N	Wall M.H. #4-N	Wall M.H. #5-N	Perf. CMP	6"	140
Chute Wall	Wall Backfill Drain	Wall M.H. #5-N	Wall M.H. #5-N	Wall M.H. #6-N	Perf. CMP	6"	140