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SECTION 011100 – SUMMARY OF WORK

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 011100 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY
Supply all labor, equipment, materials, supervision and other incidental items required to perform the Work as identified within the Specifications, Contract Drawings, Additional Information, and Bidder’s Data.

1.02 RELATED DOCUMENTS
Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 PROJECT LOCATION
Tumwater Dam, Tumwater Canyon, Leavenworth, WA 98826

1.04 WORK COVERED BY CONTRACT DOCUMENTS
Work to be completed under this Contract shall include, but is not limited to the following:

A. Snow removal
B. Traffic control and access to the work area
C. Remove and reinstall fencing, and other necessary items for access to the work area.
D. Installation of river diversion material, formwork, turbidity boom, and cementitious grout in accord with the Contract Drawings and Specifications.

1.05 PROVIDED BY THE CONTRACTOR
A. Contractor shall provide all labor, supervision, materials, equipment, temporary facilities, utilities, inspection, and other services and incidental items necessary to complete work required by the Contract Documents.
B. All Work, material, and services, even if not expressly called for in these Specifications, if necessary or appropriate for the complete and proper operation of the Work, shall be provided and installed by the Contractor.
C. The Contractor shall be responsible for all transportation and housing costs and subsistence expenses of its personnel.
D. Contractor shall provide all survey and layout necessary to perform work.
E. Contractor shall provide any third party testing required for the work.
F. Contractor shall provide equipment and/or materials necessary to access the work area.
1.06 OTHER DISTRICT WORK
District may have operations and maintenance work and capital construction projects ongoing 24-hours per day, 7-days a week, during the course of this Contract. Other work includes but is not limited to: normal fishway operation and maintenance.

1.07 WARRANTIES
Furnish manufacturer standard warranties to the District before or during Contract Closeout for provided workmanship and materials.

1.08 ACCESS TO SITE AND CONDITIONS
A. General: Contractor shall have limited use of Project site for construction operations as indicated on Contract Drawings by the Contract limits and as indicated by requirements of this section.

B. Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated. Use staging and lay down area provided by the District.

C. Driveways, Walkways and Entrances: Keep driveways, loading areas and entrances serving premises clear and available to Washington Department of Fish and Wildlife (“WDFW”), Yakama Nation, the District, and emergency response vehicles at all times. Do not use these areas for parking or storage of materials.
   1. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

D. Contract Drawings include information regarding the general arrangement of the fishway, adjacent retaining wall and area around it to be modified by the Contractor. Dimensional and geometric differences between the Contract Drawings and existing conditions shall be expected and accommodated by the Contractor and shall not be a basis for claims for extra Work. The Contractor shall have attended the mandatory pre-bid meeting and shall identify any dimensional discrepancies between site conditions and the Contract Drawings that may otherwise affect the Work.

1.09 COORDINATION WITH OCCUPANTS
Full Operational Occupancy: WDFW, Yakama Nation, and the District will occupy site and adjacent facilities during entire construction period. Cooperate with WDFW, Yakama Nation and District during construction operations to minimize conflicts and facilitate usage. Perform the Work so as not to interfere with their day-to-day operations. Maintain existing exits unless otherwise indicated.

A. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from District and approval of Authorities Having Jurisdiction (“AHJ”).

B. Notify District not less than 72-hours in advance of activities that will affect operations.
1.10 WORK RESTRICTIONS

A. On-Site Work Hours: Limit work in the existing facility to normal business working hours of 7:00 am to 5:00 pm, Monday through Friday, unless otherwise indicated.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by District or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify District not less than 2-days in advance of proposed utility interruptions.
   2. Obtain written permission from District’s Project Manager before proceeding with utility interruptions.

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to District occupancy with District.
   1. Notify District not less than 7-days in advance of proposed disruptive operations.
   2. Obtain written permission from District’s Project Manager before proceeding with disruptive operations.

D. Nonsmoking: Smoking is not permitted within the buildings or within 25-feet of entrances, operable windows, or outdoor-air intakes.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 - General Requirements: Requirements of sections in Division 01 apply to the Work of all sections in the Specifications.

1.12 CONTRACTOR’S STAFF

A. General:
   1. Contractor shall provide an experienced and competent workforce for the Work. The positions and functions described herein shall be included. All members of Contractor’s on-site workforce shall work safely and harmoniously with co-workers, District, and others’ personnel.
   2. Contractor’s personnel shall meet the minimum requirements identified. Any changes of personnel identified in the Contractor’s Bid Proposal shall be subject to approval by the District. The District shall have the right to require Contractor to replace any person who does not possess the skills to perform the Work, shows incompetence, or fails to comply with Contract Document requirements.
B. Contractor’s Superintendent:

1. The purpose of the Contractor’s Superintendent will be to provide one (1) focal point within the Contractor’s organization, for all interfaces and communications with the District, and others, relevant to successful implementation and Completion of the Project.

2. The Contractor’s Superintendent shall direct, coordinate and be responsible for all efforts of all entities performing services for or supplying components to Contractor on the Project, and shall provide the lead and impetus necessary to properly achieve Project objectives, the schedule and Contract obligations. To accomplish this, the Contractor’s Superintendent shall be authorized to perform the following:

   a. Be the primary contact for the Contractor with the District and its agents or representatives;
   b. Determine the overall Project plan and approve the individual schedules of the Contractor’s Subcontractor forces;
   c. Control and approve all Subcontractors’ Work;
   d. Monitor Project progress with right to decide corrective action and resolve problems that adversely affect Project objectives and Contract commitments;
   e. Execute changes to the Contract; and
   f. Monitor, control, and direct the Contractor’s Superintendent, Subcontractors, and other staff.

3. Contractor Superintendent shall have experience on a minimum of three underwater grout placement projects within the past ten years, including work similar to that shown on the Contract Drawings and described in Specification Section 31 32 23. Experience shall include direct supervisory responsibility for the on-site grouting operation. Contractor Superintendent shall be fluent in the English language, both written and oral.

4. The Contractor Superintendent shall be present at the site of Work during shifts when work is in progress and must be able to be present on the site within 2-hours at District’s request. The Contractor Superintendent shall be supported by competent assistants as necessary. All directions delivered or mailed to the Contractor Superintendent by District, shall be binding as if given to Contractor.

5. See also Specification Section 014311.
6. The Contractor Superintendent shall oversee all activities of the Contractor’s crews. These crews shall report directly to the Contractor Superintendent. As a minimum, the Contractor Superintendent shall have the authority to perform the following:
   a. General Layout and Work Schedule;
   b. Qualifications and Composition of Crews;
   c. Increasing/Decreasing Crew Size As Required to meet Contract requirements;
   d. Reassignment of Crew Members;
   e. Disciplinary action and removal off-site of Contractor’s personnel, if necessary;

7. The Contractor Superintendent shall also have the responsibility to:
   a. Provide to the District and maintain an accurate and up-to-date list of all Contractor personnel on-site. List shall identify all Contractor and Subcontractor personnel.
   b. Ensure crew members meet minimum qualifications as specified in Contract;
   c. Ensure Contract Materials are on-site;
   d. Ensure proper quality of the Work;
   e. Ensure proper installation procedures are being followed;
   f. Ensure consumables and installation tools, equipment and materials are in adequate supply;
   g. Monitor Work status and progress;
   h. Represent the Contractor at site progress meetings, providing updates on the Work in progress;
   i. Establish and ensure safe work practices for Contractor’s personnel.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
DIVISION 01 – GENERAL REQUIREMENTS
SECTION 012001 – MEASUREMENT AND PAYMENT

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 012001 – MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 SCOPE

A. This section further defines Measurement and Payment for this Project.
B. All items that are not specifically included in any payment item shall be considered incidental to the Project and shall be included in the Unit Price or Lump Sum Bid Price Items requiring the item.

1.02 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 MEASUREMENT

Measurement for all items shall be as indicated in these Specifications for Lump Sum and Unit Price Bid Items, and are outlined in detail in this Section of the Specifications, and further are designated in the Bid Price Schedule in the Contract Documents, Exhibit A – Bid Form.

1.04 MATERIALS ON HAND

No payment will be made for materials on hand. Items will only be paid for upon satisfactory installation as determined by the District.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 BID PRICE SCHEDULE ITEMS

A. Performance and Payment Bond, Project Submittals and Mobilization (Bid Item 1)

1. Unit of Measurement: Lump Sum.

Mobilization will be allowed only one (1) time each for all Work scope. If the Work cannot be completed in one (1) Mobilization, the District will not compensate the Contractor for Demobilization and subsequent re-mobilization. Payment for Project Submittals and Mobilization shall not exceed 7% of Total Bid Price. If the amount exceeds 7% of the Total Bid Price, the remainder will be paid after completion of Demobilization.
2. Description: The Lump Sum price bid for Project Submittals and Mobilization shall include the cost for furnishing, scheduling, installing and testing, complete and in place, all Work and materials necessary to complete the work described in Division 01 – General Requirements and accomplish all other items of Work not specifically listed in other sections.

3. Shall include the performance and payment bond.

4. Shall also include all work required to mobilize required equipment, tools and materials to the project site and move them to the staging/work area.

B. Labor, Equipment and Consumables to Install, Maintain and Remove Temporary River Diversion and Water Quality Protection System (Bid Item 2)

1. Unit of Measurement: LS

2. Description: Installation, maintenance and removal of temporary River Diversion including cofferdam, flashboards, sandbags or similar to divert water and reduce velocities in the work area. Installation, maintenance and removal of Water Quality Protection System including floating booms, turbidity curtains, or similar to isolate work area. Includes water quality monitoring and reporting.

C. Dive Inspections (Bid Item 3)

1. Unit of Measurement: Lump Sum

2. Description: Pre- and post-construction inspections by divers to assess the existing condition of the void and to confirm adequacy of the repair. The pre-construction inspection shall support development of the Underwater Grouting Plan. The inspections shall include observations, measurements, sketches, photographs and/or video of the void and adjacent areas. Work includes all equipment, setup, support and delivery of findings data and information to District. Work shall be complete when grout repairs have been performed per the Contract documents and to the satisfaction of the District.

D. Labor, Equipment and Consumables to Prepare for Grout Placement (Bid Item 4)

1. Unit of Measurement: LS

2. Description: Installation and removal of all temporary formwork and bracing, equipment and personnel platforms, and equipment at the work location. Includes preparation of the void area to receive grout. Includes removal and reinstallation of existing fencing, etc. as required to provide access for grout placement and to restore the site to the original condition.

E. Grout Placement (Bid Item 5)

3. Unit of Measurement: CY

4. Description: Placement of grout will be measured per CY, as measured below the bottom of the tremie concrete footing, and as installed and accepted. Work includes placement of grout as required to complete the installation as specified.

5. The Unit Price Bid for Grout Placement shall include costs for the labor and
consumables necessary to perform all work listed above.

F. **Demobilization (Bid Item 6)**

1. Unit of Measurement: Lump Sum.
   
   Demobilization will be allowed only one (1) time for all Work scope.

2. Description: The Lump Sum price bid for Demobilization shall include all costs to remove all temporary facilities, clean the Project site; remove Contractor equipment, tools, excess materials, and trash; restore the site to original condition upon completion of the work; and provide As-Built Drawings.

### 3.02 PAYMENT

A. Payment for all Work will be made at the Contract Unit Price or Lump Sum Bid Price as indicated in the Bid Price Schedule, payment of which shall constitute full compensation, for a complete installation.

END OF SECTION
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013000 – ADMINISTRATIVE REQUIREMENTS

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PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013000 – ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

This section describes the requirements and procedures for all correspondence, documents and drawing submittals to the District, Engineer and all parties involved with the Contract. The District reserves the right to revise or modify these procedures and/or implement a different software communication system as necessary to facilitate proper and consistent communication between related parties at no additional cost.

1.02 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 PROJECT CORRESPONDENCE

A. Correspondence between the Contractor and the District will be handled through Submittal Exchange® as administered by the District. All correspondence (as listed in this section) will be posted to the website. The following are also required for efficient correspondence processing:

1. A high speed internet connection;
2. Document scanning capability;
3. Bluebeam® or Adobe® Acrobat Professional for use and creation of PDF (*.pdf) files;
4. Autodesk® Design Review for viewing DWF (*.dwf) files;
5. Acceptable file formats are as listed in Paragraph 1.12, Submittals, sub-paragraph G, Format of this section.

B. The following Project correspondence will be utilized for the duration of the Contract:

1. Requests for Information (“RFI”);
2. Serialized Letters;
3. Serialized Speedy Memos;
4. Records of Conversation (telephone and personal contacts);
5. Emails;
6. Serialized Contractor Submittals;
7. District Submittal Responses.

1.04 REQUESTS FOR INFORMATION
RFIs are for the Contractor to use when inquiring the District for additional information on the various aspects of the Project.

1.05 SERIAL LETTERS

A. Serial letters shall be used for all correspondence from any Project entity that addresses **Contract scope, budget, schedule or other contractual issues**.

B. Serial letters shall be posted to the Submittal Exchange® website and followed immediately by the signed original via regular or express mail, by courier service or hand carried to the District.

C. If the District determines that there is any change to the Contract scope, budget, or schedule, then the District will issue a Field Work Order/Change Order (FWO/CO).

D. All Serial Letters shall include (on the first page):
   1. Contract Number and Title;
   2. Sender’s Name;
   3. Sender’s Company Name;
   4. Date: MM/DD/YYYY;
   5. Serial Letter Number.

E. Additionally, each page shall indicate page number and total number of pages, formatted as “Page X of Y”, and Serial Letter Number.

1.06 SPEEDY MEMOS

Speedy Memos shall be used by the District for requesting information from the Contractor.

1.07 TELEPHONE AND PERSONAL CONTACT RECORDS

Telephone and personal contact discussions (except meeting minutes) and particularly those which could result in a change to scope, schedule or budget, shall be recorded by the Contractor and posted to Submittal Exchange®.

1.08 EMAIL COMMUNICATIONS

A. Parties to the Project may use email for items other than those identified in the list of Project correspondence.

B. Email shall not be used for official correspondence as direction to proceed or to alter terms of the Contract.

C. Email may be used as a mechanism to transmit courtesy copies of other documents. Each email shall contain a single subject. In rare cases similar subjects may be combined in a single email if necessary for understanding. The subject line shall reference the following:
   1. Contract Number;
   2. Project Name;
   3. The email contents, clearly described.

1.09 CONTRACTOR SUBMITTALS
The Contractor shall provide submittals using Submittal Exchange® in accordance with the timelines stated in the individual Specification sections.

1.10 DISTRICT SUBMITTAL RESPONSE

A. The District will respond to submittals and resubmittals within five (5) days after posting to Submittal Exchange®.

B. District will review and mark submittal status with one (1) of the following:
   
   - APP .................. Approved
   - AAN ................. Approved as Noted
   - AAN-SR .......... Approved as Noted – Resubmit for Record
   - ANR ................. Approval Not Required
   - NOT APP ....... Not Approved

C. Any Work undertaken by the Contractor prior to submittal approval shall be at the Contractor's sole risk.

1.11 ADDRESS INFORMATION

All mailed or packaged Project correspondence shall be addressed as follows:

   US Mail:
   Chelan County PUD
   Project Name: Tumwater Fishway Entrance Structure Foundation Maintenance
   Project Manager: Justin Fletcher
   P.O. Box 1231
   Wenatchee, WA 98807-1231

   Physical Address, (Fed Ex, UPS, oversized mail):
   Chelan County PUD
   Project Name: Tumwater Fishway Entrance Structure Foundation Maintenance
   Project Manager: Justin Fletcher
   327 North Wenatchee Avenue
   Wenatchee, WA 98801

1.12 SUBMITTALS

A. General:

1. Any items furnished by the Contractor for permanent installation on the Project shall be submitted in accordance with this Specification.

2. The Contractor shall develop and submit, 5-days after Notice of Award, a list of all anticipated submittals including a schedule for submittal delivery.

3. The Project Manager may, at any time throughout the duration of the Contract, require the Contractor to provide additional information pertaining to the Work. The Contractor shall comply by providing the information in the form of a Submittal.
4. Non-paper submittal items such as hardware, samples, material items, etc. that cannot be posted to Submittal Exchange® shall be mailed or delivered to the Project Manager. A submittal for these items shall still be posted with a note of the method of delivery and expected arrival time.

5. Documents shall be submitted in a timely manner to support Contractor’s engineering, design and fabrication process. All delays due to untimely submittal of documents to District shall be the responsibility of the Contractor. Contractor shall arrange the Submittal Schedule such that no more than 25 documents or Shop Drawings are posted per week, except as otherwise Approved in writing (in advance), by the Engineer, or in the case of As-Built Drawings.

6. It is in the Contractor’s best interest to post submittals and re-submittals far enough in advance of the District’s submittal review time so that mobilization and construction start dates are not delayed while waiting for submittal approval. The District has the right to delay Work if required pre-construction submittals are not Approved. On-site Work will not be allowed to proceed prior to the approval of the Contractor’s Work Plan, and/or Safety Plan. No increase in Contract Price or extension of the Completion date will be allowed if this delay occurs.

7. The Contractor shall provide equipment documentation and Shop Drawings in sufficient detail for the District’s Project Manager to review with the intent of verifying the Work is being performed in accordance with these Specifications. Where both design calculations and drawings are prepared, they shall be posted together to allow complete review.

8. Contractor shall be responsible for the accuracy and correctness of dimensions and details on the documents and Shop Drawings. The approval of such documents and Shop Drawings by the District’s Project Manager shall not relieve Contractor of this responsibility.

9. Information and product data submittals shall be in a clean, consistent and orderly electronic format. Product items shall be highlighted or otherwise distinctly identified. Sloppy and difficult to interpret submittals will be returned with a Revise and Re-submit response.

10. Any document required by this Specification which is produced by a sub-supplier, or Subcontractor shall first be reviewed and noted as being approved by Contractor and then submitted to the District for review and approval.

11. Contractor shall assume all responsibility and risk for conditions due to any error on Shop Drawings regardless of drawing approval or field acceptance of material or delivery.

12. Any fabrication or other Work performed in advance of Contractor’s receipt of review comments and approval shall be entirely at Contractor’s risk. After review, Contractor shall not deviate in any way from the design, details, dimensions, or other information shown on the Contract Drawings without the written approval of Project Manager.

13. The Contractor shall maintain one (1) hard copy set of all Approved and pending submittals at the Project site in the Contractor’s Field Office.

B. Documents and Drawings:
1. Documents and drawings submitted by the Contractor, as a minimum, refer to information specifically required in the submittal schedule and elsewhere in this Specification. This information shall include all drawings, diagrams, illustrations, manufacturer's product data, catalog data, brochures, performance charts and other information required to illustrate distinct portions of Work.

2. Documents and drawings shall include all the details necessary for fabrication, assembly, installation, repair and maintenance of furnished items. The minimum drawings required are specified in individual sections of the technical Specifications. Contractor shall furnish detailed fabrication drawings (Shop Drawings) and procedures for installation and assembly of all items provided.

3. If standard drawings or catalog cut sheets are submitted, the applicable items and devices furnished shall be clearly marked, e.g., arrows pointing to text, text highlighted, and/or items enclosed with boxes, separating the intended item from others on the page.

4. Failure of the Contractor to submit drawings conforming to specified formats and drafting standards may result in a reduction of payment (as bid) to the Contractor as determined by the District.

C. Submittal Schedule:

1. Contractor shall prepare and submit a Submittal Schedule inclusive of all drawings, calculations, procedures, and other documentation specified in these Contract Documents. The Submittal Schedule shall be prepared and submitted in Microsoft Excel (*.xlsx) or other Approved file format. The Submittal Schedule shall reflect submittal number, revision, description, anticipated submittal date, actual submittal date, District reference number (if applicable) and Specification section number.

2. The Submittal Schedule shall be updated and maintained over the course of the Contract. The Submittal Schedule shall be updated and re-submitted monthly to reflect changes and for Progress Meetings, or as requested by Project Manager.

D. District's Review:

1. The purpose for requiring Contractor submittals is to permit the District to monitor the Contractor's progress and to determine conformance with the intent of these Specifications.

2. Contractors and Subcontractors who use unapproved documents do so at their own risk and may be required to repeat activities that were performed if the document used is subsequently rejected by Project Manager.

3. Submittals reviewed by the District do not become Contract Documents and are not Change Orders.

4. District review, acceptance, or approval of schedules, Shop Drawings, lists of materials, and procedures submitted or requested by the Contractor shall not add to the Contract amount and additional costs shall be solely the obligation of the Contractor.

5. The District will not be precluded, by virtue of review, acceptance, or approval, from obtaining a credit for fabrication and/or construction savings.
resulting from allowed concessions in the Work or materials provided. Any savings shall be mutually agreed upon by the District and the Contractor.

6. The Project Manager’s review of Contractor submittals is not intended to be a rigorous engineering analysis of the Contractor’s design or proposal. Project Manager reserves the right to require the Contractor to make changes to Contractor’s submittals, which may be necessary, in their opinion, to make the Work conform to the provisions and intent of these Specifications. Any additional cost to correct a submittal, including work to maintain the schedule that may result from any delay to review a re-submittal, shall be solely the obligation of the Contractor.

7. The District will not be responsible for furnishing engineering or other services to protect the Contractor from additional costs accruing from submittals.

E. Ownership:

All documents (i.e., Shop Drawings, data, manuals, calculations, schedules, digital photographs, etc., as well as plans and procedures for installation or testing) shall become the property of the District. The District shall have full rights to reproduce and submit to others any document for bids on future Projects, notwithstanding any indication otherwise on the Contract Drawing or elsewhere.

F. Language:

All documents (i.e. Shop Drawings, data, manuals, plans, procedures, calculations, schedules, digital photographs, etc.) submitted to the District shall be in the English language. Dual language is acceptable on drawings, provided all information is also provided in English. All elevations shall be dimensioned in feet unless otherwise indicated.

G. Format:

1. The following list of software and file formats shall be used for all submitted documentation or as Approved by the Project Manager.

<table>
<thead>
<tr>
<th>Software</th>
<th>File Format</th>
<th>Usage Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>MathCAD®</td>
<td>MCD (*.mcd)</td>
<td>Engineering calculations</td>
</tr>
<tr>
<td>Microsoft® Word</td>
<td>DOCX (*.docx)</td>
<td>Text files, forms</td>
</tr>
<tr>
<td>Microsoft® Excel</td>
<td>XLSX (*.xlsx)</td>
<td>Spreadsheets, forms, calculations</td>
</tr>
<tr>
<td>Microsoft® Access</td>
<td>MDB (*.mdb)</td>
<td>Databases</td>
</tr>
<tr>
<td>Bluebeam® or Adobe Acrobat®</td>
<td>PDF (*.pdf)</td>
<td>Text, pictures, reports, manuals, calculations</td>
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<td>JPG (*.jpg)</td>
<td>Digital photographs, scanned files</td>
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<td>DWG (*.dwg)</td>
<td>Shop Drawings</td>
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<tr>
<td>Autodesk® DWF Viewer™</td>
<td>DWF (*.dwf)</td>
<td>Shop Drawings</td>
</tr>
</tbody>
</table>

2. All software used shall be the latest version or as Approved by the Project Manager. Contractor development of AutoCAD files for submittal shall
H. Project drawings include the following:
   1. Contract Drawings (provided by District with the Bid);
   2. Shop Drawings (all drawings provided by Contractor or Subcontractor, As Required by Contract);
   3. Reference Drawings (may be provided by the District with the Bid or at the Contractor’s request and are not to be relied upon. All dimensions and locations of existing equipment identified on the Reference Drawings shall be field verified, as necessary, by the Contractor). These Reference Drawings may be hard copy or electronic or both.

I. Contractor Project Record Documents:
   1. The Contractor shall maintain at the jobsite, in the Contractor’s Field Office, one (1) complete set of Contract Documents, Shop Drawings and, if applicable, Reference Drawings. Contract Documents that are part of the Contract as awarded include all exhibits, including but not limited to Specifications and Contract Drawings. Also included are Addenda(s), Field Work Order/Change Order(s) and one (1) complete set of all Contractor prepared drawings.
   2. Each of these documents shall be clearly marked “Project Record Copy,” and shall be maintained in a clean and neat condition available for District and Contractor personnel, and shall not be used for any other purpose during the performance of the Work.
   3. The Contractor shall record on the Project Record Copy all deviations in the actual Work from the Contract Drawings, Reference Drawings or Shop Drawings. This shall include changes to the Work resulting from any Field Work Order/Change Orders, or which may be required during assembly, installation or inspection of the Work. Markings to the Contractor’s Project Record Drawings shall be in accordance with Paragraph 1.12, Sub-Paragraph N of this Specification.

J. Information shall be recorded concurrently with construction progress within 24-hours after receipt of information that a change to a Contract Drawing, Reference Drawing or Shop Drawing has occurred. Work shall not be covered or concealed until the change is recorded.

K. The Contractor’s Project Record shall be submitted to the District at Substantial Completion. Acceptance of the Project Record is required by the District as a condition of final acceptance. Incomplete or otherwise deficient records may constitute a deduction in the mobilization/demobilization pay item.

L. The Contractor shall maintain documents in a clean, dry, legible condition and in good order. Record documents shall not be used for in-the-field purposes.

M. Documents shall be made available at all times for observation by the District.

N. Making Entries on Drawings: Using an erasable colored pencil (not ink or indelible pencil), Contractor shall clearly describe the change by marking it on the drawing and providing a note As Required. These entries shall be dated.

Color Coding:
**GREEN** is used when showing information deleted from drawings.

**RED** is used when showing information added to drawings.

**BLUE** and circled in blue is used to show notes. The entry shall be highlighted by a “cloud” drawn around the area or areas affected.

O. Shop Drawings:

1. Each Shop Drawing shall be identified with the following data:
   a. Project Designation: *Tumwater Fishway Entrance Structure Foundation Maintenance*;
   b. Date: YYYY-MM-DD;
   c. Contract Number: 19-87;
   d. Drawing information:
      1) Title:
      2) Number:
      3) Revision Number.
   e. Contractor information:
      1) Name;
      2) Job Reference Number.

2. Each Shop Drawing shall include:
   a. A revision-tracking log to indicate changes made since the last revision;
   b. Date revised;
   c. A clear mark near each change indicating the revision of the change;
   d. An area of 3-inches x 3-inches left clear, located near the title block for the District’s use in marking the drawing’s review and approval status.

3. District drawing numbers shall be placed on all Shop Drawings by the Contractor. This identification number will be supplied by the Project Manager at earliest appropriate time prior to final Shop Drawing approval and added by the Contractor to each individual Shop Drawing.

4. The Contractor shall be responsible in making sure that all Subcontractors conform to these same standards.

5. A graphical scale and component weights shall be included on each physical drawing.

6. Non-destructive examination scope, procedures, and acceptance criteria shall be indicated on physical drawings where applicable.

7. All deviations from the Contract Documents shall be conspicuously marked on the Shop Drawings or noted on the submittal form and accompanied by a request for deviation.

P. Calculations: The District shall have the right to review any and all of the Contractor’s calculations, including all manual and computerized design
calculations. If specified and/or requested by the District, the Contractor shall provide all backup calculations, assumptions, flow charts, computer program documentation, and all other data necessary for proper review of the material by the District.

Q. Digital Photographs:

1. Digital photographs shall be taken to record and demonstrate progress throughout the duration of the Contract.

2. All digital photographs shall be submitted in JPG (*.jpg) file format or other District Approved file format. Photos shall have sufficient resolution values and pixel count to clearly show the documented Work in the photos when printed in 8-inch x 10-inch format. Acceptable digital photograph resolution values and pixel count shall remain at the discretion of the District and Approved by the Engineer.

3. Identify photographs with:
   a. Chelan County PUD;
   b. Date: MM/DD/YYYY;
   c. Project Designation: Tumwater Fishway Entrance Structure Foundation Maintenance;
   d. Photograph Details;
   e. Contract Number: 19-87;
   f. Time;
   g. Location;
   h. Contractor’s Name;
   i. Job Reference Number.

4. The photograph identification data shall be added to the photograph by including it in the ‘meta-data’ section of the JPG file.

5. Submit digital photographs following Project correspondence procedure on a bi-monthly basis or after significant progress. Digital photographs shall be submitted in electronic format to the Project Engineer, unless directed otherwise by the Project Engineer.

1.13 PROJECT SCHEDULES

A. General:

1. The Contractor shall prepare and maintain its Project Schedules in Microsoft Project, or other District Approved software format. Schedule logic shall be included and the critical path calculated and indicated.

2. Schedules shall be updated to reflect all changes and to show progress, and submitted at least two (2) business-days prior to each scheduled Progress Meeting. Updates shall indicate actual progress against a baseline schedule established at the beginning of the Project. Additionally, the schedule shall be updated and re-submitted within five (5) business days of any change known by the Contractor that could cause actual Completion dates to exceed the Contract Time specified in the Contract Documents.
B. Overall Project Schedule:

1. The Contractor shall prepare and maintain a time scaled Critical Path Method (CPM) Schedule showing all significant activities from Contract award to final closeout. This schedule shall show all major events, activities, milestones, and Completion dates required for Completion of the Work.

2. The Overall Project Schedule shall include, as a minimum, the start date, duration time in days and the completion date for the following work items:
   a. Planning and Design;
   b. Submittal preparation;
   c. District response to Submittals;
   d. Re-submittals (preparation and review) as applicable;
   e. Procurement and Fabrication;
   f. Mobilization;
   g. Shipment & Delivery of equipment/material to Job Site;
   h. Construction (as a rollup);
   i. Construction Phases (as children to the rollup);
   j. Substantial Completion;
   k. Completion Date stated in Specific Requirements Completion Schedule/Contract Time;
   l. Demobilization.

3. The Contractor shall assign such forces and perform the Work in such a manner as to assure compliance with the Approved Schedule and the Contract. The Contractor shall inform the Project Engineer of any schedule changes.

1.14 CONTRACT CLOSE-OUT SUBMITTALS

A. Record Drawings

1. After District’s final approval, submit the following as part of the final As-Built Record Drawings Submittal, which will include all Shop Drawings and marked-up Reference Drawings including any changes made up to the time that the Work is completed and accepted, and all As-Built and field changes, in accordance with this section:

   a. One (1) complete, hard copy set of full-size, reproducible, final drawings (Shop and Reference);
   b. One (1) electronic media copy (soft copy) set of all drawings (Shop and Reference as required) on CD, including an enclosed master drawing list (with all reference files included);
   c. Post final As-Built Drawings (Shop and Reference as required) to the Submittal Exchange® Website.
B. Record Documents

1. Post record documents to the Submittal Exchange® Website and furnish one (1) complete set of record documents in hard copy to the District, including, but not limited to, the following:
   a. QA/QC Documentation.
   b. Operation and Maintenance Manuals
   c. Certificates of Compliance and Proper Installation.
   d. Warranty Documentation.

2. Furnish duplicate copies of warranty documents that are executed and transferable from Subcontractors, suppliers, and manufacturers as applicable.

3. Final Documentation Submittal shall be a compilation of documents described above, in order shown, into a 3-ring binder. Provide four (4) copies. Cover sheet for this binder shall include similar formatting and the following:

   Tumwater Fishway Entrance Structure Foundation Maintenance

   NAME OF DOCUMENT
   (i.e., OPERATIONS AND MAINTENANCE MANUAL, QA/QC, etc.)

   (NAME OF CONTRACTOR)

   CONTRACT NO.  19-87

   (Date)

   PART 2 – PRODUCTS (NOT USED)

   PART 3 – EXECUTION (NOT USED)

   END OF SECTION
PART 1 – GENERAL

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PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013118 – COORDINATION AND MEETINGS

PART 1 - GENERAL

1.01 GENERAL

A. Contractor shall submit to District:
   1. The Contractor’s official correspondence address.
   2. The address, telephone number, and fax number of Contractor’s representative who will be the Project Manager for the Contract.

B. Throughout the duration of the Contract, submit to the District in writing the names, addresses, telephone numbers, e-mail addresses, and fax numbers of Contractor’s and Subcontractor’s representatives.

C. Expenses: For attendance at all meetings described in this section, all participants will be responsible for their own expenses without additional compensation by the District.

1.02 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 COORDINATION

A. District and other contractors may need access to the site during construction. Contractor shall plan for and accommodate such activities as a normal part of Contractor’s work. Contractor shall fully coordinate its activities with the District and other contractors. This includes promptly bringing any conflicts or coordination problems to the District’s attention.

B. Contractor shall be responsible for coordinating the manufacture, testing, inspection, delivery, and storage of all products furnished under this Contract. Contractor shall be responsible for delivery, on-site storage, and handling of all equipment and material to the Project site.

C. Contractor shall be responsible for the coordination of its Work to the work of other trades, contractors, and with the District.

1.04 PRE-CONSTRUCTION MEETING

A. General: Prior to construction of the Work a Pre-Construction Meeting (also referred to as Post-Award Conference) will be held at the location, date, and time to be designated by the District.
B. Agenda: The matters to be discussed at the Pre-Construction Meeting include:
   1. Installation schedule and progress reports to be submitted by Contractor.
   2. Communication and general correspondence procedures between the parties.
   3. The names and titles of all persons authorized by the Contractor to represent and execute documents for it with samples of all authorized signatures.
   4. The names, addresses, and telephone numbers of all those authorized by the Contractor to act for it in emergencies.
   5. Access and right-of-ways furnished by the District.
   6. Other administrative and general matters as needed.
   7. Emergency telephone numbers for doctors, hospital, ambulance service, etc.
   8. Site layout. Location of field office.
   9. Safety regulations as required by Occupational Safety and Health Administration (OSHA).

C. Meeting Participants: Contractor and representatives from principal Subcontractors, and others, As Required by the District, shall participate in the Pre-Construction Meeting.

1.05 WEEKLY PROGRESS MEETINGS

A. General:
   1. Progress meetings shall be conducted weekly over the course of the Work, or more frequently As Directed by the District.
   2. The District shall have the final determination of the need for additional meetings and of the meeting locations.

B. Meeting Agenda: The meeting’s agenda will be prepared by the District in advance of the meeting and will include, but not be limited to, review of the following:
   1. Safety
   2. Previous meeting minutes.
   3. Unresolved issues.
   4. Cost and schedule issues.
   5. Work in progress, problems, difficulties, or delays.
   6. Site improvement coordination.
   7. Scheduled activities for the current and subsequent week.
   8. Methods being employed for the Work.
   9. Workmanship, quality issues, and other deficiencies in the Work.
   10. Incidents, accidents, and injuries.
   11. Observations and decisions.
C. All matters bearing on the progress and performance of the Work since the preceding progress meeting will be discussed and resolved; including, without limitation, any previously unresolved matters; deficiencies in the Work or the methods being employed for the Work; and problems, difficulties, or delays which may be encountered; in order that the Work may be constructed on schedule and within cost.

D. Meeting Participants: Contractor and representatives from principal Subcontractors and others, As Required by the District, shall participate in the Pre-Construction Meeting.

1.06 RECORD DRAWINGS REVIEW MEETING

A. A Record Drawing review meeting will be held at the District’s office or Project office to discuss and summarize the changes to Contract Drawings, to discuss the punch list items, and to discuss contractual matters.

B. Upon Completion of the Project, the Contractor shall submit Project Record Drawings, including manufacturers’ reproducible Record Drawings reflecting all field changes concerning the Contract Drawings and Specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014311 – CONTRACTOR’S MINIMUM EXPERIENCE & QUALIFICATIONS CRITERIA

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014311 - CONTRACTOR’S MINIMUM EXPERIENCE & QUALIFICATIONS CRITERIA

PART 1 - GENERAL

1.01 SUMMARY
Section includes Contractor’s experience and qualifications.

1.02 RELATED DOCUMENTS
Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 CONTRACTOR’S OR SUBCONTRACTOR’S EXPERIENCE AND QUALIFICATIONS

A. Contractor shall provide an experienced and competent workforce for the Work. The positions and functions described herein shall be included. All members of Contractor’s on-site workforce shall work safely and harmoniously with co-workers, District, and others’ personnel. One person may fill the role of Superintendent, Project Manager, and Safety Representative.

B. Contractor’s personnel shall meet the minimum requirements identified. Any changes of personnel identified in the Contractor’s Bid Proposal shall be subject to approval by the District. The District shall have the right to require Contractor to replace any person who does not possess the skills to perform the Work, shows incompetence, or fails to comply with Contract Document requirements.

C. Contractor’s On-Site Superintendent:

1. The Contractor’s Superintendent shall have experience on a minimum of three (3) underwater grout placement projects within the past ten (10) years, including work similar to that shown on the Contract Drawings and described in Specification Section 31 32 23. Experience shall include direct supervisory responsibility for the on-site grouting operation. Contractor’s Superintendent shall be fluent in the English language, both written and oral. See Instructions to Bidders (ITB), Bidder’s Data.

2. The Contractor’s Superintendent shall direct, coordinate and be responsible for all efforts of all entities performing services for or supplying components to Contractor on the Project, and shall provide the lead and impetus necessary to properly achieve Project objectives, the schedule and Contract obligations.

1.04 CRAFT LABOR

A. Contractor shall provide a skilled labor force with experience in subsurface drilling, fabrication, manufacturing, assembly, testing, and installation.

B. Prior to commencement of the field work, and each time the Contractor makes any change to the craft labor, resumes and any other documentation which the District may reasonably request shall be promptly provided to the District.
1.05 EVIDENCE OF QUALIFICATIONS

A. The Contractor shall submit resumes with satisfactory evidence of experience and qualifications as required in Instruction to Bidders, and Exhibit W at the time of bid.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014500 – QUALITY CONTROL

PART 1 - GENERAL

1.01 SCOPE

A. This section includes control tests, test sample collection, and testing.

B. This section includes administrative and procedural requirements applicable to Contractor for quality assurance and quality control.

C. All testing As Required by this section shall be paid for by the Contractor.

D. Testing inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with other Contract Document requirements.

E. Specific quality-assurance and control requirements for individual construction activities are specified in the sections that specify those activities. Requirements in those sections may also cover production of standard products.

F. Specified tests, inspections, and related actions do not limit Contractor’s other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.

G. Requirements for Contractor to provide quality assurance and control services required by the District or Authorities having Jurisdiction (“AHJ”) are not limited by provisions of this section.

1.02 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 DEFINITIONS

A. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to AHJ, to establish product performance and compliance with industry standards.

B. Source Quality Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

C. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency. Testing agencies shall be qualified to conduct the specified tests. Tests shall be performed by an NRTL or
an NVLAP or a qualified factory representative or a testing agency acceptable to the District.

1.04 QUALITY ASSURANCE
General: Qualifications paragraphs in this section establish the minimum qualification levels required; individual Specification sections specify additional requirements.

1.05 FACTORY AUTHORIZED SERVICE REPRESENTATIVE QUALIFICATIONS
An authorized representative or manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer’s products that are similar in material, design, and extent to those indicated for this Project.

1.06 QUALITY CONTROL
A. Perform quality control services required of Contractor by AHJ according to Washington State Department of Transportation ("WSDOT") Standard Specifications, whether specified or not.
   1. Where services are indicated as Contractor’s responsibility, engage a qualified testing agency to perform these quality-control services.
   2. Notify testing agencies at least 24-hours in advance of time when Work that requires testing or inspecting will be performed.
   3. Where quality-control services are indicated as Contractor’s responsibility, submit a written report to the District, in duplicate, of each quality-control service.
   4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor’s responsibility.
   5. Submit additional copies of each written report directly to AHJ, when so directed.

B. Manufacturer’s Field Services: Where indicated, engage a factory authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 – General Requirements.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor’s responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with the District and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify the District and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which insitu tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a written report to the District, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.

E. Associated Services: The Contractor shall cooperate with the District and agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities with District representative to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

G. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.07 WITNESS AND HOLD POINTS

A. Witness points require receipt in writing of notification at least five (5) working days in advance of the scheduled time of performance. The District or designee may witness the event; however, the Contractor may proceed without their presence. The District may require activities performed without proper notification to be repeated for the District’s observation at the Contractor’s expense.

B. Hold Points are those tests, inspections and operations which require witnessing by the District and beyond which operations shall not proceed without written consent of the District. The Contractor’s failure to stop at a Hold Point may be cause for rejection of those items for which notification was not provided, or the Contractor may be requested to repeat the operation at its expense. The Contractor shall provide written notification of Hold Points at least two (2) working days in advance for work on-site and at least five (5) working days in advance for work off-site.

1.08 PAYMENT

A. All testing As Required by this section shall be paid for by the Contractor and shall therefore be included in the Bid Price for Work items requiring testing.
B. Retesting and reinspektion required because of defective Work and testing performed for the convenience of the Contractor shall also be paid for by the Contractor.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL
   A. The Contractor shall provide all labor, equipment and apparatus necessary for testing of the cementitious grout as required by the Specifications and Contract Drawings and any applicable permits and codes.
   B. The Contractor shall furnish all labor, equipment, tools and materials necessary to obtain and deliver samples as herein designated. The Contractor shall also provide and repair any test holes required in order to facilitate the testing and sampling and to provide for the laboratory's exclusive use for storage and curing of test samples until removed to the laboratory.
   C. Testing requirements shall not be cause for claims for delay by the Contractor and all expenses accruing thereafter shall be deemed incidental to the performance of the Contract.

3.02 SAMPLING AND TESTING FREQUENCY
   A. The Contractor shall employ a certified independent testing laboratory subject to approval of the District and the Engineer to provide quality control tests at the number and frequency described herein.
   B. The Contractor shall cooperate with the District in taking of samples, replacing any material(s) removed for testing, and furnish other samples for testing as required at no additional cost to the District. In addition, any areas tested and further failing compliance with the Specifications shall be retested at the Contractor's expense, until a successful test indicating compliance with these Specifications has been achieved.

END OF SECTION
DIVISION 01 – GENERAL REQUIREMENTS
SECTION 014524 – INSPECTIONS AND TESTS

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APPENDIX
Appendix 014524-1, Inspections Elements – Summary Matrix
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014524 – INSPECTIONS AND TESTS

PART 1- GENERAL

1.01 GENERAL REQUIREMENTS

A. All materials, products and components manufactured, procured or fabricated by Contractor as part of the Work shall be subjected to such tests and inspections as may be necessary to verify compliance with the requirements of the Contract Documents.

B. All expenses for the tests shall be fully borne by Contractor. Contractor shall prepare and provide all labor, material and equipment necessary for performing specified or required tests. Contractor shall submit the test results to District for approval.

C. Inspections shall be performed in accordance with the approved Contractor Quality Control Plan. Inspection results shall be part of the quality documentation. Follow up inspections shall be conducted after correction of all deficiencies. Satisfactory follow up inspections shall be completed and documented prior to beginning subsequent Work that may be affected by the unsatisfactory Work. Contractor shall not build upon or conceal non-conforming Work.

D. Contractor shall perform tests as specified or required to verify that the control measures are adequate and the Work meets the requirements of the Contract and applicable standards and codes.

E. Approval of assemblies, tests and test procedures, etc., and acceptance of pertinent test certificates, inspection or waiving of inspections and tests shall in no way relieve Contractor of its contractual obligations for furnishing the Work in accordance with the provisions of these Contract Documents.

1.02 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.03 SUBMITTALS

A. The Contractor shall submit a Contractor Quality Control (CQC) Plan.

B. The Contractor shall submit an Inspection and Test Plan

1.04 RELATED WORK SPECIFIED ELSEWHERE

Section 013000 – Administrative Requirements
Section 014500 – Quality Control
PART 3 – EXECUTION

3.01 TESTS

A. General:

1. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Testing includes operation and/or acceptance tests when specified. A list of tests to be performed shall be furnished as a part of the CQC Plan. The list shall give the test name, frequency, Specification paragraph containing the test requirements, the personnel responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

   a. Verify that testing procedures comply with Contract requirements.
   b. Verify that facilities and testing equipment are available and comply with testing standards.
   c. Check test instrument calibration data against certified standards.
   d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
   e. Results of all tests taken, both passing and failing tests, shall be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be recorded. Actual test reports may be submitted later, if approved by the Project Manager, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility shall be provided directly to the Project Manager.

2. At the Completion of all Work or any increment thereof, the CQC system manager shall conduct an inspection of the Work and develop a “punch list” of items which do not conform to the approved Contract Drawings and Specifications. Such a list of deficiencies shall be included in the CQC documentation, As Required by Paragraph 3.02 below, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Project Manager. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time stated for Completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.
3. Contractor shall perform checks and tests in accordance with the following:
   a. Field Inspections and Tests as specified in these Specifications
   b. Manufacturer’s and/or Contractor’s standard practices and recommendations
   c. Reference and applicable testing standards
   d. Mutual agreement of Contractor and District based upon conditions or circumstances that may arise in the shop or in the field

4. Contractor shall evaluate test results and advise District immediately of any discrepancy between test results and test limits or the failure of any item to meet the test criteria.

5. Contractor at its own expense shall furnish, set up and operate test equipment and facilities in Contractor’s shops or on-site. If facilities for conducting required tests are unavailable, Contractor may conduct tests elsewhere or have them performed by an independent agency subject to approval by District.

6. Contractor shall protect all material and equipment during and after testing and checking to provide that subsequent testing of other equipment or systems does not disturb, damage, or otherwise interfere with functional capability of material and equipment.

7. In the event that test results do not fulfill the requirements specified in these Specifications or that any defects attributable to Contractor are found in test results, Contractor shall repair, adjust or correct and retest at its own expense to the satisfaction of District. Repairs shall be subject to the approval of District. Even in such an event, Contractor shall be responsible for maintaining the Project schedule.

B. Inspection and Test Plans

1. Contractor shall submit for review and approval by the District, not later than ten calendar days after the Notice to Proceed, an Inspection and Test Plan (ITP). The ITP shall address those sections of ANSI/ASQC E2 “Inspection Planning” that are applicable to activities performed by the Contractor as related to these Specifications.

2. The Contractor’s ITP shall contain an Inspection Elements – Summary Matrix, similar to the one contained in these Contract Documents. A sample Inspection Elements – Summary Matrix is provided at the end of this section, but only outlines major definable features. The Contractor’s Inspection Elements – Summary Matrix shall expand on this outline to list all required Inspections and Tests for each definable feature of Work, references to test methods, applicable standards and procedures, acceptance criteria, and results.

3. The District will review the Contractor’s ITP and establish Witness or Hold Points for those tests, inspections, and operations to be witnessed by District. The Contractor shall incorporate the Witness and Hold Points into the ITPs and resubmit them to District. The ITP shall be revised as necessary if the planned tests change. Any changes to the ITP shall be resubmitted for approval.
4. The ITPs shall include as a minimum:
   a. Material test certificates
   b. Visual inspections
   c. On-site testing method, location, frequency, acceptance criteria
   d. Shall list each technical Specification and declare testing to be performed if any.

3.02 DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the Work of Subcontractors and suppliers. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

A. Contractor/Subcontractor and its area of responsibility.

B. Operating plant/equipment with hours worked, idle, or down for repair.

C. Test and/or control activities performed with results and references to Specifications/Contract Drawing requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

D. Off-site surveillance activities, including actions taken.

E. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

F. List instructions given/received and conflicts in Contract Drawings and/or Specifications.

G. Work performed today, giving location, description, and by whom.

H. Material received with statement as to its acceptability and storage.

I. Identify submittals reviewed, with Contract reference, by whom, and action taken.

J. These records shall indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the Work and workmanship comply with the Contract. The original and one (1) copy of these records in report form shall be furnished to the District daily within 24-hours after the date(s) covered by the report, except that reports need not be submitted within 24-hours for days in which no Work is performed. As a minimum, one (1) report shall be prepared and submitted for every 7-days of no Work and on the last day of a no Work period. All calendar days shall be accounted for throughout the life of the Contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.
3.03 CERTIFICATE OF COMPLIANCE FOR MATERIALS AND TESTS

A. Certificate of Compliance for Materials and Tests shall be furnished for products manufactured to a recognized standard or code prior to the use of such products in the Work.

B. District may permit use of certain products or assemblies prior to sampling and testing if accompanied by a Certification of Compliance.

C. Certifications shall be signed by the manufacturer of the product and certify that the components involved comply in all respects with the requirements of the Specifications.

D. Products used on the basis of a Certification of Compliance may be sampled and tested at any time. The fact that a product is used on the basis of a Certificate of Compliance shall not relieve Contractor of responsibility for ensuring that the products conform to the requirements of the Contract Documents. Products not conforming to such requirements shall be subject to rejection whether in-place or not.

E. District reserves the right to refuse permission for use of products on the basis of a Certificate of Compliance.

3.04 MEASUREMENT AND TEST EQUIPMENT

Measurement and test equipment (meters, gauges, torque wrenches, sensors, etc.) supplied or used by Contractor for taking or recording of data shall:

A. Have accuracy equal to or greater than stated acceptance criteria tolerances for test or Work being performed.

B. Have current calibration with traceability to National Institute of Standards and Technology (NIST). Calibration records shall be maintained as required by ANSI/ASQC E2 and submitted if requested by District.

C. Have traceability to national standards in the country of use, subject to approval by District, where such equipment is supplied and used in facilities outside the United States.

3.05 SHOP TESTS

A. General:

1. All materials, components, and assemblies shall be completely shop tested in accordance with the CQC Plan, Shop Inspection and Test Plan, and these Specifications. Contractor shall provide all procedures, equipment, materials, and labor for shop testing.

2. Contractor shall give full cooperation to District's inspection at the shop. During manufacture, Contractor shall request District's observation of those in-progress tests, which are impossible to be checked if the manufacture is advanced or completed.

3. Shop tests shall be performed by personnel experienced in the type of test being performed under the direct supervision of Contractor's Test Districts.
B. Shop Test Procedures:

1. Contractor shall prepare and maintain complete detailed procedures for all shop inspections and tests. Tests and procedures identified in the specific equipment sections shall be prepared or translated to the English language and submitted for review and approval. Other procedures shall be available for inspection at Contractor’s facilities and submitted upon request. Procedures shall include, as a minimum, the following:
   a. Table of Contents
   b. Purpose
   c. Precautions
   d. References
   e. Test Equipment
   f. Prerequisites
   g. Step-by-Step Procedures
   h. Acceptance Criteria
   i. Data or Record Sheets
   j. Drawings or Data, as applicable
   k. Sign-off for Hold and Witness

2. Step-by-step procedures shall be in sufficient detail to perform the test without reference to documentation or information not contained in the procedure or the need for interpretation as to intent or methods.

C. Inspection and Test Documentation: The results of all inspections and tests shall be fully documented. Results for tests identified in these Specifications shall be included in complete test reports and submitted to District for review and approval. Approval of test results is a requirement for shipping release.

3.06 FIELD TESTS

A. General:

1. All components and assemblies installed at site shall be completely tested in accordance with the CQC Plan, Field ITP, and these Specifications. Contractor shall provide all procedures, equipment, materials, and labor for field testing.

2. Contractor shall give full cooperation to District's inspection at the site during installation and testing. During assembly and installation, Contractor shall request District's observation of those in-progress tests, which are impossible to be checked if the installation works are advanced or completed.

3. Field tests shall be performed by personnel experienced in the type of test being performed under the direct supervision of the Contractor.
B. Field Test Procedure:

1. Contractor shall prepare and submit for review and approval field test procedures for all field tests. Procedures shall include, as a minimum, the following:
   a. Table of Contents
   b. Purpose
   c. Precautions
   d. References
   e. Test Equipment
   f. Prerequisites
   g. Step-by-Step Procedures
   h. Acceptance Criteria
   i. Data or Record Sheets
   j. Drawings or Data, as applicable
   k. Sign-off for Hold and Witness

2. Step-by-step procedures shall be in sufficient detail to perform the test without reference to documentation or information not contained in the procedure or the need for interpretation as to intent or methods.

C. Field Test Reports

1. Within 24-hours of completion of each field test, Contractor shall submit one (1) copy of the test results to District, unless specified otherwise. After completion of all field tests for an assembly, Contractor shall furnish two (2) copies of a complete report of all field tests performed. The report shall include a description (at a minimum) of the following:
   a. Item Tested
   b. Test Instrumentation
   c. List of Test Personnel
   d. Calibrations of Measuring Equipment
   e. Test Procedure
   f. Tabulations of Measurements
   g. Sample Calculations, as appropriate
   h. Test Results, including final adjustments and settings
   i. Conclusions and/or Remarks

2. To the fullest extent possible, all data gathered electronically shall be in a form easily imported to Microsoft Excel. District shall be furnished an electronic copy of all original and manipulated test data.
D. In-Process Tests: In-Process tests are those required to verify the proper installation of equipment in accordance with the Site Quality Control Plan and Field Inspection and Test Plan. In-Process Tests shall be conducted by Contractor as part of its Site Quality Control Plan.

E. Construction Testing

1. During the Work, Contractor shall perform necessary and required inspections to ensure that completed installations are in accordance with the Contract Documents.

2. Construction tests shall demonstrate that all materials and equipment meet the Specifications and design documents, are properly installed, are functional, and free from damage.

APPENDIX

Appendix 014524-1, Inspection Elements – Summary Matrix

END OF SECTION
## Inspection Elements – Summary Matrix

**Name of Project:** Tumwater Fishway Entrance Structure Foundation Maintenance  
**Responsible party:** Chelan County PUD

**Notes:**  
1) Indicate Specification reference with criteria.  
2) Results and Inspector’s name can be placed in last two columns.

<table>
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<th>Identification of Item to be Inspected</th>
<th>Inspection Schedule/Date</th>
<th>Inspection Conditions</th>
<th>Characteristics to be Inspected</th>
<th>Acceptance Criteria</th>
<th>Inspection Method/Test</th>
<th>Extent of Inspection</th>
<th>Factory Inspection</th>
<th>Witness/Hold Points</th>
<th>Results</th>
<th>Inspector</th>
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<td>Visual/Submittal</td>
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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.02 REFERENCES

The following is a list of standards which may be referenced in this section:

E. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30-Minutes to 24-Hours and Return Periods from 1-Year to 100-Years.

1.03 SUBMITTALS

A. Informational Submittals
   1. Provide copies of permits and approvals for construction beyond those already obtained by the District, if any, As Required by laws and regulations and governing agencies.
   2. Submit and post copies of Safety Data Sheet’s (SDS’s) for any new chemicals brought onto the site which were not included in the original submittal of SDS information.

B. Temporary Construction Facilities: Submit Construction Facilities and Temporary Controls Site Plan which provides details on the following items:
   1. Fencing and protective barrier locations and details.
   2. Stockpile Area Locations Plan.
1.04 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:

1. Obtaining required permits beyond those already obtained by the District, if any.
2. Moving Contractor’s field office and equipment required for first month operations onto site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing on-site communication facilities, including telephones and internet.
5. Providing on-site sanitary facilities and potable water facilities as specified and As Required by laws and regulations and governing agencies.
6. Arranging for and erection of Contractor’s work and storage yard.
7. Posting OSHA required notices and establishing safety programs and procedures.
8. Having Contractor’s Superintendent at site full time.

B. Use area designated for Contractor’s temporary facilities as shown on Contract Drawings unless otherwise requested by Contractor in Construction Facilities and Temporary Controls Site Plan submittal and Approved by the District.

1.05 PROJECT WORK AREAS AND ACCESS

A. Access by District Personnel: Clear access shall be maintained for District personnel and equipment through all Project Work areas.

B. Access by Contractor Personnel: All Contractor access shall be planned and coordinated with District personnel. Contractor and deliveries for Contractor shall not be allowed site access unattended by the District representative(s).

1.06 VEHICULAR TRAFFIC

Construction Access and Entrances: The Contractor shall maintain the entrances to work areas identified and as Directed by the District.

1.07 PROJECT SITE WORKING HOURS

A. District Personnel Working Hours: The working hours of the District’s staff and maintenance crews are Mondays through Fridays, excluding District holidays, from 7:00 am until 5:00 pm.

B. Contractor’s Working Hours: At the Pre-Construction Meeting, Contractor’s schedule of working hours and days shall be reviewed. The Contractor shall furnish notification of any change of schedule of regular work hours, overtime work hours, and shifts of work crews and personnel at the site. Contractor shall provide to District this notification a minimum of 72-hours prior to any schedule change to allow suitable scheduling of District personnel and inspection. Contractor shall not work on District holidays without prior written approval by the District’s Project Manager.
PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 TEMPORARY UTILITIES

A. Power: Limited electric power is available at or near the Project site. Determine type and amount available and make arrangements for obtaining temporary electric power service if required.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Water: Construction water is not available at the sites. Contractor shall arrange for and bear costs of providing water at the site.

D. Sanitary Provisions: Sanitary facilities are on-site and available for Contractor use. Facilities are maintained weekly. If more frequent maintenance is necessary, coordinate with the District.

E. Fire Protection: Furnish and maintain on-site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

F. Water Pollution Control

1. Divert non-storm waste flow interfering with construction and requiring diversion to Contractor designed collection and treatment locations. Do not cause or permit non-storm waste flow to occur which would cause an overflow to existing waterway.

2. Prior to commencing drilling and construction, Contractor shall obtain Engineer’s approval of Contractor-prepared, activity-specific Spill Prevention, Containment and Countermeasures (SPCC) Plan. A SPCC Plan shall be prepared by Contractor and accepted by Engineer prior to performance of any Work activity which could potentially lead to a discharge of pollutants and/or contaminants. The SPCC Plan shall show procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges. The SPCC Plan shall also contain detailed plans showing procedures intended to prevent unauthorized discharges into the environment, and containment and countermeasure plans which will be employed by Contractor in the event an accidental or otherwise unauthorized discharge occurs. Prevention plans shall include Best Management Practices (BMP) for the handling of water flow, and for the handling, containment and control of fuel and lubricants.

3. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, “Guidelines for Erosion and Sedimentation Control Planning” and “Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity,” and “Erosion and Sediment Control-Surface Mining in Eastern United States.”

4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner on District property or in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.
G. Erosion, Sediment, and Flood Control
   1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.02 TEMPORARY FENCING
   A. The Contractor shall provide temporary construction fencing to keep Project site secure when site fencing is removed for longer than one (1) work day.
   B. Temporary fencing shall be 8-foot tall chain link security fencing.
   C. Fencing shall be installed in a secure manner to prevent collapse in strong wind.

3.03 LAYDOWN AREAS FOR STOCKPILING, STAGING OR STORAGE BUILDINGS
   A. The Contractor shall prepare laydown areas at or within the locations shown on the Contract Drawings unless otherwise Approved in writing by the District or through approval of Construction Facilities and Temporary Controls Site Plan submittal.
   B. At the Contractor’s option, the Contractor may install one (1) office trailer at the Project site. The Contractor shall coordinate location of any office trailers and Contractor parking with the District.
   C. Construction shanties, sheds, and temporary facilities provided by Contractor shall be maintained in good condition and neat appearance.
   D. All storage, staging, field fabrication and field office operations shall be confined to the approved staging areas. Staging areas shall be kept clean and orderly.
   E. Storage of equipment and materials will be permitted only in designated staging areas and as set forth below, unless otherwise approved. All equipment and materials proposed for temporary storage areas within the District allocated staging areas shall be approved in advance. Combustible materials (such as paints, solvents, fuels) shall be stored in a well ventilated and remote building meeting applicable safety standards.

3.04 ACCESS ROADS
   Existing Access Roads: Upon Completion of Work, restore access roads to pre-existing conditions.

3.05 PARKING AREAS
   Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, District’s operations, or construction operations. Privately owned vehicles will be restricted to designated parking areas established within the Project Work areas shown on the Contract Drawings. Only Contractor’s work vehicles and
equipment that are essential to the conduct of the Work will be allowed in the Project Work areas.

3.06 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer’s instructions, with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity ranges required by manufacturer’s instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation and heating, as required, to avoid condensation.

C. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

D. After installation, provide coverings to protect products from damage from weather and construction operations, remove when no longer needed.

E. The Contractor shall be responsible for loss, damage, vandalism, theft, etc. of the products and plant until acceptance by the District.

3.07 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.

B. All Work areas at the Project site shall be kept reasonably neat on a daily basis. All debris resulting from the Contractor’s Work, such as unused or excess materials, packing cases, oil and grease spills, and other debris shall be collected, removed, and properly disposed of off the Project site. The District's trash cans, dump boxes, and other containers shall not be used.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

END OF SECTION
DIVISION 01 – GENERAL REQUIREMENTS

SECTION 017700 – CONTRACT CLOSEOUT

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SECTION 017700 - CONTRACT CLOSEOUT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS
Contract Drawings, Additional Information, and other provisions of the Contract Documents, including but not limited to, General Conditions (GC-) and Specific Requirements (SR-) apply to all sections.

1.02 SUBMITTALS
A. Informational Submittals: Submit prior to application for final payment.
B. Record Documents: As Required in Contract Documents.
C. Approved Shop Drawings: As Required in the Contract Documents.
D. Special Bonds, Special Guarantees, and Service Agreements.
E. Releases from agreements.

1.03 RECORD DOCUMENTS
A. Quality Assurance: Furnish qualified and experienced person, whose duty and responsibility shall be to maintain Record Documents.
B. Accuracy of Records:
   1. Coordinate changes within Record Documents, making legible and accurate entries on each sheet of drawings and other documents where such entry is required to show change.
   2. Purpose of Project Record Documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
C. Make entries within 24-hours after receipt of information that a change in the Work has occurred.
D. Prior to submitting each request for progress payment, request District’s review and approval of current status of Record Documents. Failure to properly maintain, update, and submit Record Documents may result in a deferral by District to recommend whole or any part of Contractor’s Application for Payment, either partial or final.

PART 2 – PRODUCT (NOT USED)
PART 3 – EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General

1. Promptly following commencement of Contract, secure from District at no cost to Contractor, one (1) complete set of Contract Documents. Contract Drawings will be full size.

2. Label or stamp each Record Document with title, “RECORD DOCUMENTS,” in neat large printed letters.

3. Record information concurrently with construction progress and within 24-hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes.

2. Make documents and samples available at all times for observation by District and Engineer.

C. Making Entries on Contract Drawings

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.

2. Color Coding:
   a. Green when showing information deleted from Contract Drawings.
   b. Red when showing information added to Contract Drawings.
   c. Blue and circled in blue to show notes.

3. Date entries:
   a. Call attention to entry by “cloud” drawn around area or areas affected.
   b. Legibly mark to record actual changes made during construction, including, but not limited to:
      1) Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
      2) Horizontal and vertical locations of existing and new underground facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two (2) measurements to permanent surface improvements.
      3) Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
      4) Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
5) Changes made by Addenda, Field Work Order/Change Orders, Work Change Directive and/or Engineer’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

D. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as described in previous subparagraph above.

1. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.

2. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).

3. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At Completion of the Work or a part thereof and immediately prior to Contractor’s notice of Completion, clean entire site or parts thereof, as applicable.

B. Areas that have been used for temporary buildings, construction parking, staging areas and access shall be restored by removing buildings, temporary utilities, debris and waste, and restoring and neatly grading the areas to a condition as close as reasonably possible to the conditions they were in when the Work commenced.

END OF SECTION
SECTION 31 32 23
UNDERWATER GROUTING FOR VOID REPAIR AND SCOUR PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. This section includes underwater grouting to fill voids beneath an unreinforced tremie-placed concrete slab as shown on the Contract Drawings and as specified herein. The objective of the Work is to restore foundation support below the existing tremie concrete slab which supports the Tumwater Fishway and associated Retaining Wall and provides limited protection against hydraulic scour of structure subgrade materials. The objective of this Project is to restore support beneath the tremie concrete slab by establishing formwork and injecting cementitious grout to completely fill voids beneath the slab within the limits shown.

B. Contractor is responsible for coordinating access and furnishing all materials, products, accessories, tools, equipment, services, transportation, labor and supervision, and manufacturing techniques required to obtain complete grouting of the voids which exist beneath the tremie concrete slab.

C. The following general steps are required for this Work:

1. Divert Wenatchee River: Calm the water around the work area by installing a temporary river diversion on the crest of Tumwater Dam (and apron if needed). The temporary river diversion shall divert Wenatchee River flows away from the left (northerly) side of the Dam to reduce turbulence and river velocities as necessary to complete the Work.

2. Install Water Quality Protection System: Install floating booms, turbidity curtain or similar devices to isolate the work area from the River.

3. Perform Dive Inspection: Following installation of the temporary river diversion, a detailed pre-construction dive inspection shall be conducted to document the location, geometry, and conditions of the existing void(s) beneath the tremie slab. This data will be used by the Contractor to develop a formwork and grouting plan.

4. Prepare Formwork and Grouting Plan: Using the results of the Contractor’s pre-construction dive inspection, the Contractor shall prepare a detailed plan describing the approach for preparation of the void(s) for grouting, installation of formwork and other grout containment measures, and injection of grout.

5. Place Grout: Grout shall be injected into the void to restore support beneath the tremie slab and to completely fill all voids. Grout shall be contained within the formwork and using redundant means to ensure that grout does not wash out or enter the Wenatchee River.

6. Perform Dive Inspection: Following grout installation, a detailed post-construction dive inspection shall be conducted to confirm the adequacy of the repair.
7. Remove Temporary Facilities: All formwork, materials, river diversion materials, and related materials and equipment shall be removed from the site following successful completion of grouting.

D. Contractor shall select the grout repair means and methods, including temporary river diversion, void preparation, formwork, and grout mix design and placement, subject to the approval of the Engineer.

E. All work shall be completed in the “wet.” No dewatering is permitted due to concerns about developing dangerous hydraulic gradients beneath the tremie slab and structure foundations. Loss of buoyancy effects on existing overhung tremie concrete slab may further jeopardize this element.

1.02 CONTRACTOR QUALIFICATIONS

A. Contractor Experience and Personnel Qualification Submittals. Submit at time of bidding. (See Exhibit W Bidder’s Data)

B. Contractor’s Superintendent shall have a minimum of 10 years of relevant experience in underwater construction, cofferdam installation, and grouting on comparable projects. Contractor’s other personnel shall have minimum 5 years of relevant experience.

1. Relevant experience includes that with similar anticipated site and subsurface conditions, materials, river conditions and depths, cold weather and water, difficult access considerations, grout mix design and placement, and any special construction techniques required to execute the work.

2. Comparable projects include those where grout was placed underwater to repair structures such as dams, fishways, intakes, outfalls, bridge piers, or other facilities adjacent to rivers or other large bodies of water.

C. The Engineer may suspend the work if the Contractor substitutes unapproved personnel during construction. Submit requests and experience resumes for substitution of key personnel to the Engineer, who will have an additional 7 calendar days to respond to each request.

1.03 DEFINITIONS

A. Admixture: Substance added to the grout to either control bleed and/or shrinkage, improve flowability, reduce water content, retard setting time, or resist washout.

B. Contractor: The person/firm responsible for performing the Work.

C. Formwork: Temporary structure(s) placed across the openings of voids to allow for grout injection and containment of fluid grout within the void until the grout has set without loss of grout to the Wenatchee River. Also acts as a velocity barrier to control water velocity within the voids. Could conceivably be wood, steel, grout
bags, sand bags, or other materials which meet the requirements of this specification.

D. Grout bags: Grout bags are water-permeable fabric bags used to contain fluid grout and prevent grout loss to the surrounding waterbody. Grout bags shall be made of high strength water-permeable flexible fabric. Each bag shall be provided with a self-closing inlet valve which accommodates insertion of the Contractor’s grout delivery conduit. Seams shall be folded and double-stitched.

E. Grout tubes: Pipes or conduits used to isolate the grout delivery conduit from the Wenatchee River. Includes seal against existing tremie concrete slab or formwork, as appropriate, and extends into the void. Includes means to maintain position until completion of grouting construction. May be a rigid steel conduit, flexible conduit, or other material.

F. Post Grouting: The injection of additional grout into a void after the initial grouting has been completed and the grout has hardened.

G. PPE: Personal Protective Equipment.

H. Temporary River Diversion: Structure to be placed or affixed to the crest of Tumwater Dam to divert Wenatchee River flows away from the work area, thereby reducing river velocity and turbulence as needed to conduct dive inspections and complete the Work. Previous work in the tailrace downstream of the dam has successfully used PortaDam-type barriers, multi-row sandbags, and flashboards and stanchions with plastic film to control flows over the crest.

I. Tremie Grouting: The placement of grout underwater via a grout pipe introduced to the bottom of the hole or void. During grouting, the exit of the pipe is kept below the level of the grout in the hole to the maximum extent possible to minimize washout.

J. Void Preparation: Removal of debris, trash, wood, and soft or loose sediment within voids prior to grouting and preparation of formwork areas to obtain an adequate seal between the tremie concrete slab and the sides and edges of the void(s) to contain the grout.

1.04 GROUND CONDITIONS

A. The subsurface conditions at the site are described in the following sources provided in Exhibit U, Reference Materials:

2. Geotechnical Data Report Addendum 1 memorandum prepared by CH2M, dated February 1, 2019;
3. Tumwater Canyon Dam Inspection Report prepared by Ballard Marine Construction, LLC, dated October 2019 and including associated photographs, videos, survey, and bathymetry results.
B. In general, the conditions in the area consist of existing reinforced concrete structures underlain by varying thicknesses and extents of existing of unreinforced tremie-placed concrete which overlies existing boulder alluvium. In some locations, tremie-placed concrete may not be present. The native boulder alluvium may be relatively undisturbed, or may consist of reworked material disturbed by a variety of different mechanisms, including, but not limited to, original dam or fishway construction, highway or railroad construction, landslides, rockfalls, floods, or other mechanisms. It is understood that tremie concrete underlying the fishway and retaining wall was placed in several lifts using multiple different methods. Open joints, soil-filled joints, weak zones, voids, or washed out concrete may exist within the tremie concrete. All materials underlying the existing structure foundations are hydraulically connected to the Wenatchee River and Lake Jolanda, with significant hydraulic gradients.

C. Void repair using underwater grouting will generally require installation using equipment staged in the areas shown on the shoulder of U.S. Highway 2 or near the top of existing concrete structures located on the bank of the Wenatchee River. Equipment access is by crane, winching, or other means originating from the adjacent shoulder of U.S. Highway 2. Temporary river diversion could conceivably be installed using a small barge or watercraft operating in Lake Jolanda. Divers and other personnel may also access the Wenatchee River downstream of Tumwater Dam by scrambling down the riverbanks downstream of the retaining wall. Access to Lake Jolanda is available upstream of the Tumwater fishway on the northerly bank of the lake for launching of small hand-portable or crane-assisted equipment.

D. Because the size and locations of the voids are not as thoroughly understood as needed, Contractor shall perform a one-time pre-construction underwater dive inspection of the existing tremie slab, voids, and tailrace following installation of the temporary river diversion. The temporary river diversion is needed to provide calm water around the fishway and tremie slab which will facilitate an accurate dive inspection. The dive inspection conducted in September 2019 was significantly impeded by the velocities and turbulence in this area, even at very low river flows around 400 cfs. The results of the Contractor’s pre-construction dive inspection will be used by the Contractor to confirm the nature and extents of the void formation below the tremie slab, the estimated thickness of the tremie slab, and to develop a detailed plan for void repair.

E. Due to uncertainty in the conditions and support of the existing tremie concrete slab, the pre-construction dive inspection may be dangerous. Contractor is solely responsible for diver safety and for preparation and execution of a Dive Safety Plan. At Contractor’s option, installation of bracing or temporary supports below the tremie slab may be appropriate to protect diver safety.

F. The pre-construction dive inspection shall employ multi-beam sonar scanning techniques to determine the location and extents of the voids beneath the tremie concrete slab as they relate to the fishway and retaining wall structures and footings and be tied to the project survey control. Further, the dive inspection shall identify the location, size, geometry, and conditions in and around the void or voids which extend beneath the tremie concrete slab. The dive inspection shall
collect photos, videos, written observations, and detailed measurements which define the void conditions and establish the basis for selection of means and methods for void preparation, formwork construction, and grouting.

G. Utilize tape measures, measuring tools, sonar scans, underwater lighting, cameras, and other tools as appropriate to complete the inspection.

H. Pertinent void conditions to be documented during the pre-construction dive inspection include, but are not limited to, the following:

1. The presence or absence of debris, trash, or wood within the void(s);
2. Conditions on the bottom and sides of the void(s), including the materials exposed, such as sand, gravel, cobbles, boulders, or manmade rubble and their distributions, and whether they appear generally loose or dense.
3. Conditions on the top of the void, whether concrete or other materials and the location(s) of high points under the slab with the potential to trap air or water in the void when tremie grouting;
4. The geometry of the void including descriptions of how the void size varies spatially and where the void may be separated into multiple voids;
5. Geometry and description of the void openings along the edge of the void which are to be used for access, debris removal, and to be formed to retain grout pumped into the void;
6. Descriptions of conditions in the vicinity of the void opening(s), including the presence of debris, loose sediment, or boulders which may be relevant to the placement of formwork or grout.
7. Observations and measurements to investigate water flow through the void which may be the result of seepage beneath the fishway structure or retaining wall.
8. Observations of the presence of rebar, cracks, joints, or other features inside and around the void(s).
9. Observations and judgements regarding the ability of the existing tremie slab integrity and ability to remain stable during the construction period and under temporary loads applied during completion of the work.

I. Using the dive inspection results, the Contractor shall develop plan, profile, and cross sectional sketches which clearly show the locations, geometry, and extents of the voids observed beneath the tremie slab. At a minimum, the height of the void, depth of the void (measured horizontally below the tremie slab), and the width of the void shall be clearly shown on scaled drawings. In the event that multiple voids exist, such interpretations shall be prepared for each void.

J. Contractor shall develop an estimate of the volume of grout required to fill each void, including losses during grouting and filling of open work cobbles and boulders which may exist on the edges of the void.

K. It is the Contractor’s responsibility to determine the appropriate means and methods for void filling after completion of the pre-construction dive survey subject to review and approval of the Engineer.
L. Coordination between the Contractor and Engineer shall follow completion of the pre-construction dive inspection to decide if these conditions warrant additional investigation work or changes in the proposed grout repair.

M. The tremie slab is anticipated to be unreinforced, underwater video from 2019 shows rebar doweling protruding from the tremie concrete. Although it is considered unlikely, it is possible that rebar could be encountered in the tremie concrete if drilling through the tremie concrete is required.

1.05 REFERENCES

A. The following is a list of standards referenced in this section:

1. American Association of State Highway Transportation Officials (AASHTO):
   a. T26, Quality of Water to be used in Concrete.

2. ASTM International (ASTM):

1.06 SUBMITTALS

A. Action Submittal – Dive Safety Plan for Pre-Construction Dive Inspection.

B. Action Submittal – Provide a detailed River Diversion Plan prepared and sealed by a professional engineer registered in the State of Washington which summarizes the proposed approach for installing the temporary river diversion on the crest of Tumwater Dam. Describe, in detail, equipment, materials, products, means and methods, and step-by-step sequencing for installing the temporary river diversion.

C. Action Submittal – within 3 Calendar Days of completion of the dive inspection, provide a detailed Pre-Construction Dive Inspection Report which summarizes the findings. Include survey results, field notes and measurements, photos, videos, and other recorded data via electronic submittal.

D. Action Submittals – within 5 Calendar Days of completion of the dive inspection, submit an Underwater Grouting Plan to the Engineer for review and approval. The Underwater Grouting Plan shall include, but not be limited to the following information:

   1. Detailed step-by-step description of the proposed formwork installation and grouting procedure, construction sequencing (including, but not limited to; access, formwork construction, grouting sequence, use of grout injection ports/conduits and vent tubes), and any special construction requirements to assure quality control and verification that the work performed has filled the voids with grout and restored support to the tremie slab without damaging or displacing the tremie slab. Include sufficient detail to allow the Engineer to assess the quality of proposed procedure.

   2. Detailed list of all equipment and tooling to be used for the grouting, including the model, size, and type of equipment along with appropriate manufacturer’s literature for review. Provide information on the methods...
and tools and sizes to be used and the proposed method for removal and disposal of trash, debris, and unsuitable materials from the void(s). Include information on access requirements, if appropriate, for equipment that shows the proposed equipment is appropriate for the site conditions and constraints.

3. Proposed schedule including start date, and schedules for void preparation, formwork construction, and grout injection. Provide for each void if multiple voids are identified.

4. Details clearly describing how formwork will be constructed and installed, sealed against the void opening, and held in position to prevent exchange of water and loss of grout to the river.

5. Plan clearly describing how the formwork and grouting will maintain upstream fish passage through the fishway by maintaining fish access to at least one (1) of the existing fishway entrance gates shown.

6. Plan describing how excess waste grout will be contained, controlled and disposed of in accordance with the requirements of this specification and all applicable permits and regulations.

7. Plan clearly describing details of grout injection equipment access and support necessary to complete the work. Plan shall clearly describe how the grout will be mixed and how related equipment, tooling, supplies, and materials will be mobilized to the site and maneuvered to the work area to support grout injection within the voids and behind the formwork. Include details of cranes, winches, temporary work platforms, and dunnage which the Contractor indicates are required to complete the work and protect the retaining wall and fishway structure. Dunnage and temporary work platforms used to protect the retaining wall and fishway structure, if required to complete the Work, shall be designed and sealed by the registered professional engineer licensed in the state of Washington and subject to the review and approval of the Engineer.

8. Grouting Plan, including complete descriptions and details for the following:
   a. Grout mix design and type of materials to be used in the grout including certified test data and trial batch reports. Include in the mix designs, anti-washout admixtures, grout bags, and certified test results verifying that the mix designs provide the required grout strength, as specified, under the actual conditions placed. Provide grout consistency and density requirements.
   b. Equipment and procedures used to mix and place the grout, including the grout pressures to be used and descriptions of any post-grouting methods, if applicable.
   c. Estimated grout quantities.
   d. Methods and equipment for accurately monitoring and recording the grout depth, grout volume, and grout pressure as the grout is being placed.
   e. Methods and equipment used to control grout pressures and prevent jacking or uplift of the tremie concrete slab.
f. Estimated curing time for grout to achieve initial set that resists washout, and time to achieve specified strength. Previous test results for the proposed grout mix completed within one year of the start of grouting may be submitted for initial verification and acceptance and start of production work subject to the review and approval of the Engineer and Contractor’s grouting specialist.

9. Plan for inventory, takedown, and reinstatement of existing equipment, load frames, fencing, railings, and structures at the work site which must be removed to complete the Work.

10. Erosion and sediment protection plan;

11. Health and safety plan;

12. Weather and water level monitoring and response plan;

13. Manufacturer’s product data for grout materials and admixtures to be used;

14. Grout mix designs, including details of all materials to be incorporated, and the procedure for mixing and placing the grout to the Engineer for approval. This submittal shall include certified test results verifying the acceptability of the proposed mix designs.

15. Within 2 days of submission of the Underwater Grouting Plan, Contractor and Grouting Specialist shall plan to participate in an in-person on-site meeting with the Engineer and the District at the District’s office in Leavenworth, Washington to discuss the plan and approach for completing the work.

E. Action Submittal – within 3 Calendar Days of completion of the dive inspection, provide a detailed Post-Construction Dive Inspection Report which summarizes the findings. Include multi-beam sonar survey results tide to the project datum, along with field notes and measurements, photos, videos, and other recorded data via electronic submittal.

F. As Built Information:

1. Provide as-built details for the void repair as specified herein.

1.07 QUALITY ASSURANCE

A. Grouting specialist, the following experience requirements shall be submitted at time of bidding and shall apply for the duration of the project:

1. Must have at least 15 years of relevant experience in designing grout and concrete mixes for work similar in scope to Work specified for this Contract.

2. Provide reference list of at least three (3) projects completed within last five (5) years. Include: name of project, description and time of work, contact information of project owner’s representative.
PART 2  PRODUCTS

2.01  GENERAL

A. Furnish materials new and without defects. Remove defective materials from the jobsite at no additional cost to the District.

2.02  WATER

A. Furnish all needed water for grouting and related activities. If water is withdrawn from the Wenatchee River, obtain and comply with all necessary permits.

B. Water for mixing grout shall be potable, clean and free from substances which may be in any way deleterious to grout or steel. If water is not potable, it shall be tested in accordance with AASHTO T26 for acceptability.

C. Water shall contain less than 500 ppm of chlorides.

2.03  GROUT

A. The Contractor shall provide a stable, homogenous, neat cement grout or a sand cement grout with a minimum 28-day unconfined compressive strength of 4,000 psi and including an anti-washout admixture. The grout shall not contain lumps or any other evidence of poor or incomplete mixing. Other admixtures, if used, shall be mixed in accordance with manufacturer’s recommendations and subject to the approval of the Engineer.

B. The Contractor’s Grouting Specialist shall design the grout mix and assist the Contractor with preparation of the grout mixing and placement plan. The grouting specialist will assist the Contractor in the grout mix design to control washout, manage set times in accordance with proposed placement methods, account for anticipated air and water temperatures, establish formwork requirements, and related guidance.

2.04  ADMIXTURES

A. Admixtures shall conform to the requirements of ASTM C494. Admixtures which control bleed, improve flowability, reduce water content, and retard set may be used in the grout subject to the review and acceptance of the Engineer.

B. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer’s recommendations. Their use will only be permitted after appropriate field tests on fluid and grout set properties.

C. Admixtures with chlorides or other corrosive chemicals shall not be permitted.

D. Admixtures used shall be compatible with each other.

E. Anti-washout admixtures shall be used to facilitate grouting and to limit grout bleeding into river.
2.05 CEMENT

A. All cement shall be Portland cement conforming to ASTM C150, Type II, and shall be the product of one manufacturer. If the brand or type of cement is changed during the project, additional grout mix tests shall be conducted to ensure consistency of quality and performance in-situ.

2.06 FILLERS

A. Inert fillers such as sand or fine gravel aggregate are not required, but may be used in the grout if approved by the Engineer.

B. Use of fillers in grout shall be compatible with selected grout pumping system, grout delivery conduit, vent tubes and tremie placement tubes.

2.07 GROUT BAGS

A. Grout bags are not required. If used, grout shall be of appropriate size and construction for use in the application described in Contractor’s Underwater Grouting Plan.

B. Shall be made of high strength water permeable material and constructed as flat mats.

C. Shall be provided with a self-closing inlet valve to accommodate insertion of grout delivery conduit. Grout bags exceeding 15 feet in length shall have at least two valves.

D. Seams shall be folded at double stitched.

2.08 FORMWORK

A. Actual sizes, shapes, and exact locations of voids are not known. Contractor shall accurately survey repair areas prior during pre-construction dive inspection for the layout and design of the form system. Form system shall be designed to fit field conditions.

B. Forms shall be designed for the full hydrostatic pressure of grout placement and plus any additional pressure applied during grout placement whether permanent or transient and remain in position without deflection until the grout hardens.

C. Provide vent ports to allow release of displaced water. Vent ports shall be equipped with shutoff valves and drain lines to underwater waste containment bags which shall be removed and disposed of at the conclusion of grouting.

D. Locate vent ports at high point of the forms or existing concrete tremie slab.

E. Provide injection ports to place tremie concrete into the low point of grout placement.
F. Do not remove forms until grout strength is such that form removal will not result in perceptible cracking, spalling, or breaking of edges or surfaces, or other damage to grout.

G. Remove forms in a manner which prevents damage to grout and existing tremie concrete slab.

H. Permanent forms which remain following grouting may be considered by the District.

PART 3 EXECUTION

3.01 GENERAL

A. Furnish all materials, equipment, tools, services, labor, and supervision required to setup for the work and to complete the installation of temporary river diversion, pre-construction dive inspection, void preparation, formwork construction, grouting, post-construction dive inspection, and verification all void repairs completed for this project.

B. Installation of temporary river diversion shall not begin until the River Diversion Plan submittal has been received, reviewed, and accepted in writing by the Engineer.

C. Void Preparation, Formwork, and Grouting shall not begin until the Dive Inspection Report and Underwater Grouting construction submittals have been received, reviewed, and accepted in writing by the Engineer.

D. Contractor is responsible for the safety of Contractor’s personnel and lower tiered subcontractors.

E. Maintain fish passage in the Wenatchee River and through the Fishway structure via one (1) of the three (3) existing fishway entrance gates shown. Limit blockage of fishway passage to the fishway entrance. Coordinate periods of temporary blockage of access with the District.

3.02 TEMPORARY RIVER DIVERSION

A. The temporary river diversion structure shall be constructed upon the crest of Tumwater Dam. Additional facilities may be placed on the spillway apron if needed, subject to approval by the District.

B. The temporary river diversion shall be installed such that it is consistent with the geotechnical, hydraulic, logistical, and environmental conditions of the project and shall divert water away from the left (northerly) side of Tumwater Dam to provide calm water for completion of the pre-construction dive inspection and subsequent Work.

C. Calming the pool around the work area is needed for accurate and complete dive inspections. Water shall be sufficiently calm that divers performing dive
inspections may maintain their position without a tether, and such that sonar
survey scans around the perimeter of the tremie slab can be conducted without
interfering river velocities, air bubbles, or turbulence.

D. The Contractor is solely responsible for the location, selection, design,
installation, removal, cleanup, maintenance, and repair of the temporary river
diversion for all Wenatchee River flows up to the Design River Flow.

E. The Design River Flow is 6,000 cubic feet per second as measured on the U.S.

F. The design of the temporary river diversion structure is the responsibility of the
Contractor. Failure of the temporary river diversion structure during the
construction period will necessitate re-establishment of the temporary river
diversion structure, and reassessment of conditions around the tremie slab
repair.

G. River diversion shall be temporary in nature and completely removed at the
completion of the work without causing any damage to the existing Dam, fishway,
adjacent property, or completed work.

H. Monitor weather forecasts, river flows, and climatic conditions which have the
potential to influence river flows. Contractor shall take all reasonable and prudent
precautions to protect personnel, equipment, materials, temporary structures,
and completed work from imminent high flows.

I. In the event that the temporary river diversion fails or is overtopped by river flows
which are less than the Design River Flow, Contractor shall be solely responsible
for all delays, cleanup, repairs, materials, and other costs without additional
compensation.

J. Contractor may implement river diversion measures which are designed for flows
less than the Design River Flow; however, the Contractor bears full responsibility
for flows up to and equal to the Design River Flow.

3.03 VOID PREPARATION

A. The voids beneath the tremie slab shall be prepared to ensure that the formwork
develops a tight seal against the existing tremie concrete slab and the void
opening(s). The void preparation shall also be performed to facilitate complete
filling of the void(s) with grout and permitting the grout to conform directly to firm
subgrade and sides of the void(s) and establishes direct contact with the
overlying tremie concrete.

B. Details of void preparation will be determined by the Contractor using the results
of the Dive Inspection and subject to review by the Engineer. Void preparation is
generally expected to include, but not be limited to, the following:

1. Removal of loose wood, debris, trash, or loose manmade materials present
within the void.
2. Removal of excessive amounts of loose sediment within the void, if encountered.
4. Manipulation or adjustment of conditions in front of the void to facilitate formwork construction and sealing against the void openings.
5. Documentation that void preparation is completed, such as through the use of before-and-after photographs and videos of the voids.

3.04 FORMWORK INSTALLATION

A. The formwork installation shall be such that it is consistent with the geotechnical, logistical, and environmental conditions of the Project. The Contractor shall select the formwork method used to contain grout within the voids and beneath the tremie slab, subject to the approval of the Engineer.

B. Prior to formwork installation, the void(s) shall be prepared as specified herein.

C. The formwork and related materials, installation, and methods shall be suitable for the conditions observed in the Contractor’s pre-construction dive inspection and Dive Inspection Report submittal. Formwork shall be installed with minimal disturbance to Tumwater Dam, Fishway, Retaining Wall or the Wenatchee River and any overlying or adjacent structure or service.

D. The installed formwork shall, in combination with the grouting and/or post-grouting methods employed, be suitable to contain the injected grout without release of cementitious materials into the Wenatchee River and to permit complete filling of the void(s) below the tremie slab.

E. The formwork shall form a seal across the opening(s) of the void(s) and allows grout to be placed within the void and prevent exchange and loss of grout to the river. Particular attention should be paid to the sealing against the existing tremie concrete, the bouldery river bottom, and the geometry of the void opening.

F. The formwork system installed shall include installation of tremie grout tubes, post grout tubes (if required), vent tubes, and a secondary turbidity curtain.

1. The grout tubes and vent tubes shall be configured in locations selected by the Contractor which permit tremie placement of grout at the low point(s) and deep (inshore) extents of the void(s) to permit grouting of the voids from the inshore to the offshore (formwork) ends of the voids.

2. The formwork system installed shall also accommodate incorporation of vent tubes. The vent tubes shall penetrate the formwork and the existing concrete tremie slab to allow excess water and air to escape from the voids as the tremie grout is placed, to prevent uplift of the existing concrete tremie slab, and to provide a means of verification of complete grouting by observing clean grout flowing from the vent tubes.

3. All vent tubes shall discharge into waste collection bags which collect excess grout for disposal offsite. The waste collection bags shall be equipped with quick connect fittings which allow direct connection to the vent tubes.
4. The number of vent tubes shall be selected by the Contractor and shall include several vent tube locations at each void to allow that verification of complete grouting of the void. Vent tubes shall be installed at the high point(s) under the tremie slab, at distant inshore locations of the void, and near the top of the formwork to allow excess water and air to escape as grout is placed, to prevent uplift of the existing concrete tremie slab, and to prevent loss of the formwork.

5. Multiple grout tubes shall be included in the formwork for each void to permit tremie grouting in the low points and far inshore areas of the void(s). Contractor shall include redundant grout tubes to allow multiple grouting options to complete filling of the voids, including primary, secondary, and tertiary grouting, if needed, to complete filling of the void(s) with grout.

G. The foundation conditions under the tremie concrete foundation are known to consist of pervious sand and gravel with cobbles and boulders. Although generally believed to be well-graded, pockets of sand and gravel exist that are loose and subject to grout losses to the river.

H. Drilling and coring equipment, if used, shall be configured to collect all cuttings returned to surface into containers for inspection and to prevent release of cuttings to the river.

I. A secondary turbidity containment structure such as a weighted floating boom with silt curtain shall be placed around the perimeter of the formwork. Secondary sediment containment structure shall be appropriate for the hydraulic conditions established by the temporary river diversion structure and shall prevent downstream transport of fine particles in the Wenatchee River.

J. Maintain fish passage in the Wenatchee River and provide for fish access to the Fishway by providing for access to at least one (1) of the three (3) existing fishway entrance gates shown. Coordinate with District regarding all temporary blockage of fish passage.

K. Unless otherwise approved in writing by the District, formwork shall be removed from the river once the grout contained behind the form has achieved its initial set.

3.05 GROUTING

A. Methods and equipment used shall prevent the washing of the cement from the grout mixture, minimize the formation of laitance, and prevent flow of water through the grout before it has hardened.

B. Place grout within voids and behind formwork using tremie methods to place grout from low points in the back (inshore) side of the void and flow pumped grout upwards from the back side of the void towards the formwork and upwards to the underside of the tremie slab until clean grout is observed flowing from the vent tubes into the waste containment bags. Grout flowing from the vent tubes shall be collected in water-permeable grout bags which can be disconnected and...
disposed of offsite. The vent tubes shall include self-closing check valves which prevent grout loss once the bags are removed.

C. Multiple stages of grout may be required to successfully complete grouting of the voids.

D. The Contractor is responsible for estimating the grout volumes required to fill the void(s) beneath the tremie slab using the results of pre-construction dive inspection and the formwork plan.

E. The Contractor shall provide systems and equipment to measure the grout quality, quantity, and pumping pressure during the grouting operations. This information is to be measured and recorded by the Contractor.

F. Secure formwork into position at all voids before placing grout.

G. The grout pump shall be equipped with a pressure gauge to monitor grout pressures. Grout pressures shall be monitored continuously during grouting and particular attention given to preventing uplift of the tremie slab or damage to the formwork.

H. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The grout should be kept in constant agitation prior to pumping.

I. If grout bags are used, whether part of the formwork or void filling, the grout shall be placed to fill the grout bags in accordance with manufacturer’s recommendations and with sufficient care and monitoring of grout pressures to prevent rupture of the grout bags.

J. Grout shall be placed to completely fill the void(s) identified beneath the tremie slab without voids or zones of weakness or washout. Grout support beneath the tremie slab shall occupy the entire void and extending, at a minimum, to a vertical projection downward from the outer edge of the tremie slab.

K. All void(s) shall be completely filled with grout to the underside of the tremie slab.

L. The grout shall be injected into the lowest point of the void (i.e. by tremie methods) until clean, pure grout flows from a vent tube located at the top of the formwork or drilled into the tremie slab and captured by the waste grout containment bags.

M. Subsequent to tremie grouting, all grouting operations associated with extraction of grout delivery conduits, pipes, or equipment must ensure complete continuity and protection of the grout until it has hardened.

N. Contractor shall use a grout pump with a grout delivery conduit having a diameter suitable for the grout mix used. The discharge end of the conduit shall include a device to seal out water while the tube is filled and at all times during the grout placement. The end closure device shall be capable of isolating the conduit from
the formwork and allowing the repositioning of the conduit from one injection port to another if necessary.

O. The end of the grout delivery conduit shall be equipped with a quick-connect type coupler to attach the tube end to the grout tubes.

P. Provide standby pump, conveyor system, or other system onsite during pumping, for adequate redundancy to assure completion of grout placement without cold joints in case of primary placing equipment breakdown.

Q. Replace pumping equipment and hoses (conduits) that are not functioning properly.

R. Place grout as soon as possible after leaving mixer, without segregation or loss of ingredients. Ensure that grout is delivered to the point of placement without free-fall.

S. All vent / inspection ports shall remain open during pumping of grout into the voids to minimize internal pressure on the formwork and existing concrete tremie slab.

T. Place concrete in a continuous manner from the low point of the repair area to the high point of formwork or tremie concrete slab as appropriate to allow complete filling of the void with grout.

U. The grout delivery conduit shall be completely filled with grout and secured to the injection port before opening the end closure device to allow grout placement into the void(s).

V. Vent / inspection ports shall remain open until all water is evacuated from the formwork and good clean grout is flowing from the vent ports into the waste containment bag(s). Vent ports shall only be closed once the grout delivery conduit has be isolated from the formwork.

W. If the Contractor uses a post-grouting system, all relevant details including grouting pressure, volume, location and mix design, shall be submitted as part of the installation records.

X. Continuously monitor the existing tremie concrete slab during grouting for signs of damage or uplift.

3.06 QUALITY CONTROL

A. Contractor shall Notify the District immediately of test results showing failure of materials to meet Specifications. Notify the District within 2 hours of test results showing materials meet Specifications.

B. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
C. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, samples used shall be taken from discharge end of pump hose.

D. Installation Records: At a minimum, include the following information as part of the as-built void repair log:

1. Location and extents of each void identified and repaired along with drawings showing clearly plan, cross sections, opening characteristics, and bottom conditions, and formwork approach actually used;
2. Estimated volume of each void repaired;
3. Formwork approach used, including grout tube and vent tube location, diameter, length, and configuration;
4. Type of grout used to fill each void, including details of admixtures, and other tests required by this specification;
5. Grout quantities pumped into each void; grouting duration, including start and stop times for all work associated with each void and observations during placement;
6. Description of void conditions encountered, elevations, heights, extents, bottom conditions, tremie concrete conditions, rebar if encountered, interfaces, and cracks if encountered;
7. Tip and top elevation of any temporary casing used or any casing abandoned in the tremie slab;
8. Log showing details of grouting process;
9. Description of unusual grouting behavior or conditions, and any deviations from the intended process or expected results;
10. Grout pressures attained during grouting;

3.07 PROTECTION OF INSTALLED WORK

A. Protect grout from damage until final acceptance by the District. Do not load or remove forms until grout has gained sufficient strength to safely support its weight and imposed loads.

END OF SECTION