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SECTION 01009 - GENERAL INFORMATION AND REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Description of Work: The Work includes:

1. Demolition of two existing concrete pond kettles and constructing new concrete replacement kettles including retaining walls as shown on the plans.
2. Earth work: Reshaping of pond side-slopes at kettle area to ensure a smooth and uniform pond slope and subgrade and base preparation as specified beneath kettles.
3. New kettles shall be constructed at the given elevations (see attached plans).
4. Demolition of existing and installation of new drain and water supply lines per the plans.

B. Location: Work under this contract is at the Inks Dam National Fish Hatchery located in Burnet County, (345 Clay Young Road, Burnet, TX. 78611-5529) approximately 14 miles from Burnet, Texas. See Vicinity Map in drawings.

C. Site Visit: Contractors are encouraged to visit the project site and inspect existing conditions prior to submitting quotes. For Site Visit, Contact Jeff Conway, Hatchery Manager, at (512) 793-6868 to arrange a site visit.

1.2 REFERENCES

A. Referenced Specifications/Standards with Abbreviations and/or Acronyms: Wherever the following acronyms are used in these specifications or on the drawings, they are to be construed the same as the respective expressions represented. Copies of the referenced specifications/standards referred to herein may be procured by the Contractor, from the following:

ACI American Concrete Institute
P.O. Box 19150
Detroit, MI 48219

ASTM American Society for Testing and Materials
100 Barr Harbor Dr.
West Conshohocken PA 19428-2959

EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460

OSHA Occupational Safety and Health Administration
US Department of Labor
200 Constitution Ave., NW
Washington DC 20210

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol Street, N.W., Suite 249
Washington, DC 20001

1.3 DEFINITIONS

A. Approvals: Approval of the submittals is an indication that the Contractor's submittals have been reviewed and that there are no objections, except as noted. Approval of deviations shall apply only to those deviations or omissions from the requirements of the drawings and specifications brought to the Contracting Officer Representative(COR) attention in writing. Approval of submittals does not relieve the Contractor of errors, omissions, or from complying with the Contract's requirements.

1.4 SUBMITTALS

A. Submit manufacturer's literature, testing reports, and samples.

B. Requirements: Refer to specifications for submittals required. Allow at least 10 working days for review. Submittals shall be delivered to the Contracting Officer's Representative, Division of Engineering. P.O. Box 1306, Albuquerque, NM 87103-1306 (email submittals are required).

C. The Contractor shall review and approve all submittals required under the Contract. Submittals that do not indicate the contractor's review and approval will be returned without review. Submittals shall come directly from the contractor with their stamp and signature of approval; submittals will not be accepted from sub-contractors or suppliers.

D. As-built Drawings: Upon completion of the work, the Contractor shall furnish one set of "as built" drawings, either hard copy, pdf, or AutoCAD. These drawings shall be contract drawings corrected in red ink to show any differences between contract drawings and actual construction. All changes made during construction shall be noted. Provide sketches and details where necessary to more fully describe the work performed. Each drawing showing changes in dimensions, details, or containing supplemental information shall be plainly marked "As Built" and shall contain the signature of both the Government Project Inspector and the Contractor.

E. Identification of Submittals: Completely identify each submittal by showing at least the following information:

1. Name and address of submitter, plus name and telephone number of the individual to contact for further information.
2. Name of project as it appears in these specifications.
3. Contract number, drawing number, and specification section number to which the submittal applies.
4. Whether this is an original submittal or re-submittal.
5. Each item shall clearly note the manufacturer's name and address, trade name, product, lot, style, color, catalog designation or model number, and locations of use.

1.5 QUALITY ASSURANCE

A. Codes and Standards: The work shall comply with codes and standards applicable to each type of work and as listed in the individual sections of these specifications. This Contract incorporates materials, applications, and tests by reference, with the same force and effect as if they were given in full text.

B. Conflict: Where a conflict occurs between reference documents and project specifications, the most stringent shall govern.

C. Measurements: Where approved manufacturer's diagrams and shop drawings give specific measurements or rough-in dimensions for equipment, these dimensions shall take precedence

over dimensions indicated on the drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Protect products incorporated into the work from damage while in transit to the site. Products must be delivered in original unopened containers with manufacturer's name, brand designation, and contents legibly indicated.

B. Storage: Provide temporary storage facilities for products. Storage shall comply with the manufacturer's instructions. The storage area shall permit access for inspection and handling.

C. Handling: Load and unload products protecting them from damage.

1.7 PROJECT CONDITIONS

A. Access to the Work: The Contractor shall coordinate the use of the premises with the Hatchery Manager to avoid interruption of station operations. The Contractor is responsible for protection and safekeeping of the site and all furnished or constructed items until final acceptance by the Government. The Contractor may use existing roads for access to the site. The Contractor shall maintain existing roads and access ways affected by the Contractor’s operations. Any damage done by the Contractor’s operations shall be repaired or restored at the Contractor's expense.

B. Housekeeping: Routinely, or upon notice by the Government, the Contractor shall clean up and remove from the job site all waste, debris, equipment and surplus material resulting from operations. In the event he fails to complete the requested clean-up of any specific area within seven calendar days following notification, the Government may cause this work to be performed at the Contractor’s expense.

C. Staging Areas: All operations of the Contractor, including storage of materials, on Government premises shall be confined to areas authorized or approved by the Government. Government premises adjacent to the construction area may be made available for use by the Contractor without cost whenever such use will not interfere with other Government uses or purposes. Areas used for staging shall be delineated by the Hatchery Manager prior to commencement of work. Note that storage of Contractor’s equipment on Government premises is at its own risk and the Government assumes no responsibility for vandalism or theft.

D. Availability of Utilities: Power and potable water for construction is not available at the site. The Contractor shall make all arrangements to provide power and water if needed for its operations. Non-potable water may be available at no charge from various natural sources near the site. The Contractor shall make all arrangements to provide non-potable water from these sources. Access to lakes and canals (if available) for non-potable water shall be coordinated with the Government and is subject to the approval of the Hatchery.

1.8 SEQUENCING AND SCHEDULING

A. Work Schedule: The schedule shall be submitted at the pre-work conference. When requested, submit an updated schedule within 3 calendar days. As a minimum, the estimated start and completion dates shall be shown in the schedule.

B. The Contractor’s normal work schedule shall be 7:30 a.m. to 4:00 p.m., Monday through Friday. No work shall be performed on Saturdays, Sundays, or federal holidays, unless authorized in

writing by the Contracting Officer.

1.9 SAFETY

A. The Contractor shall comply with all applicable safety codes and regulations including but not limited to Occupational Safety and Health Administration (OSHA) regulations, 29 CFR, Part 1926. The Contractor shall perform required operations so as to ensure safety of the workers, public, and Government personnel.

PART 2 - PRODUCTS

(There are no applicable requirements.)

PART 3 - EXECUTION

3.1 PROJECT MEETINGS

A. Pre-Work Conference:

1. Will be held prior to the start of work. The Contractor will be notified in advance of meeting time, date and place. The purpose will be to review required work, project drawings and specifications, construction schedules, payroll and payments, and administrative provisions of the Contract.
2. The Contractor, subcontractors and the persons responsible for coordination of the work shall be present at the meeting.
3. Be prepared to summarize and explain procedures planned for the project.

B. Progress Meetings:

1. To be held at the project site, or as determined by the Contracting Officer Representative
2. May be called by either the Contracting Officer Representative or the Contractor. Request shall state who should attend and include an agenda.

C. Final Inspection:

1. To be held at the project site, or as determined by the Contracting Officer Representative
2. Notify the Contracting Officer in writing at least 10 working days before the completion date to allow the Government to schedule a final inspection.

3.2 DISPOSAL OF DEBRIS

A. Items or debris not designated as salvage shall be disposed of by the Contractor off station grounds in a legal manner and in accordance with applicable local codes.

3.3 WARRANTY

A. Requirements: Materials and equipment furnished under this Contract shall be covered by the most favorable commercial warranties given to customers for such materials or equipment. The rights or remedies provided herein are in addition to and do not limit rights afforded to the Government of this Contract. With respect to warranties, expressed or implied, from manufacturers or suppliers for materials or equipment furnished under the Contract the Contractor shall:

1. Obtain warranties that would be given in normal commercial practices.
2. Require warranties to be executed, in writing, for the benefit of the Government.
3. Submit warranties to the Contracting Officer prior to the final inspection.

END OF SECTION 01009

SECTION 01410 - TESTING LABORATORY SERVICES

PART 1: GENERAL

1.1 SUMMARY - Section includes requirements for the Contractor to engage and pay for a certified, independent testing laboratory to conduct specific tests on, fill, fill density and compaction, asphalt, concrete and other items as called for by individual sections of the specifications.

1.2 SUBMITTALS

A. The Testing Laboratory shall provide a copy by email of test reports to the COR within 24 hours of performing the test. Reports shall include testing facility name, address, telephone number, and names of full-time responsible officers.

B. Submit qualifications of the Testing Laboratory to demonstrate that they meet the standards in this specifications.

1.3 QUALITY ASSURANCE - The Testing Laboratory must have authority or be licensed to operate in the State of Texas as a materials testing laboratory.

PART 2: PRODUCTS

2.1 REPORTS

A. Reports shall include:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specification sections.
6. Location in the project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with contract documents.

2.2 INTERPRETATION - When requested by the COR, provide interpretation of test results.

END OF SECTION

SECTION 01505 - MOBILIZATION

PART 1 - GENERAL

1.1 SUMMARY: Section includes preparatory work and operations, including those necessary to the movement of personnel, equipment, supplies and incidentals to the project site; and for other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site.

1.2 MEASUREMENT AND PAYMENT:

Units: Progress payments will be made as follows:

1. When 5% of the original contract amount is earned from other Schedule of Value items, 50% of the amount bid for mobilization or 5% of the original contract amount, whichever is lesser, will be paid.
2. When 10% of the original contract amount is earned from other Schedule of Value items, 100% of the amount for mobilization or 10% of the original contract amount, whichever is lesser, will be paid.
3. Upon completion of work for the project, payment of the amount for mobilization in excess of 10% of the original contract amount, will be paid.
4. The total sum of all payments shall not exceed the original Schedule of Values amount for mobilization, regardless of the fact that the Contractor may have shut down the work on the project or moved equipment away from the project and then back again.

PART 2 - PRODUCTS (Not Used.)

PART 3 - EXECUTION (Not Used.)

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes excavation, backfill, and engineered fill, around and under the kettles, and around pipes.

1.2 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

B. Borrow:

1. Satisfactory soil imported from off-site for use as engineered fill or backfill under kettles.

C. Excavation: Removal of material encountered above sub-grade elevations.

1. Additional Excavation: Excavation below sub grade elevations as directed by Contracting Officer Representative(COR.) Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

2. Unauthorized Excavation: Excavation below sub grade elevations or beyond indicated dimensions without direction by Contracting Officer. Unauthorized excavation, as well as remedial work directed by Contracting Officer, shall be without additional compensation.

D. Fill: Soil Material used to raise existing grades.

E. Sub-grade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.

1.3 SUBMITTALS

A. Submit soil classification and Standard Proctor laboratory test results for all material to be used as fill, including sand, crushed gravel, and other acceptable materials.

B. Submit field test results for required compaction as described in Section 3.5.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: The Contractor shall provide borrow soil materials from offsite borrow sources when sufficient satisfactory soil materials are not available from excavations. If soils are not available, it is the Contractors' responsibility to source sufficient soil.

B. Satisfactory Soils under kettles: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils under kettles: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

D. Backfill, Fill and Engineered Fill: Satisfactory soil materials.

E. Gravel Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-1/2 inch sieve and not more than 8 percent passing a No. 200 sieve or Grade 57 crushed gravel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, freezing temperatures or frost, and other hazards created by earthwork operations. Provide protective insulating materials as necessary.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties.

C. Prevent surface water and ground water from entering excavations, from ponding on prepared sub-grades, and from flooding Project site and surrounding area.

D. Protect sub-grades from softening, undermining, washout, and damage by rain or water accumulation.

3.2 EXCAVATION

A. Perform excavation to the lines and grades shown on the drawings or as directed. Blasting will not be permitted. Slope or shore trench excavation shall be in accordance with OSHA regulations for safety. Excavate to sub-grade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Through sections containing rock and where directed through sections of hard and compact material and through sections containing coarse gravel, cobbles, and boulders that cannot be excavated and trimmed efficiently with excavating and trimming machinery, excavate so that there will not be less than 3 inches between any point of the excavated surface and the underside of the structure.

C. Proof roll sub grades, before filling or placing aggregate courses, with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated sub-grades.

D. Reconstruct sub grades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities. Do not place material in ponds when either the material or the surfaces on which the material is to be placed are frozen.

E. Stockpile borrow materials and satisfactory soil materials, without intermixing, in shaped, graded, drained, and covered stockpiles. Stockpile soil materials away from edge of excavations and outside drip line of remaining trees.

F. Excavate unsuitable material from pond surfaces to receive backfill. Dispose of excavated unsuitable material in the onsite waste area designated by the Hatchery Manager.

3.3 BACKFILLS, FILLS AND COMPACTION

A. Fill: Place and compact fill material in layers to required elevations.

B. Uniformly moisten or aerate sub grade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

C. Compaction: Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, scarify and re-compact top 12 inches of existing sub-grade and each layer of backfill or fill material at 90 percent.

F. Backfill pipes with compacted sand to 95 percent of Standard Proctor (ASTM D 698) as shown on the drawings.

G. Grading: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Grade unpaved sub-grades to tolerances of plus or minus 1 inch.

3.4 GRAVEL BEDDING

A. Under slabs-on-grade or as indicated, place gravel bedding on prepared subgrade, compacted fill and compacted gravel bedding as follows:

1. Compact gravel bedding to required cross sections and thickness to a minimum relative density of 90 percent according to ASTM D 698 Standard Proctor.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage, at its expense, a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports. All testing results shall be submitted to the Contracting Officer Technical Representative, for review and acceptance, a maximum of 48 hours after completion of test.

B. Allow testing agency to test and inspect sub grades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. A minimum of two (2) soil density tests shall be made at even intervals for every layer within the footprint of the kettles and under the pipes.

D. When testing agency reports that sub grades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.6 PROTECTION AND DISPOSAL

A. Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction.

END OF SECTION 02300

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes water-distribution piping, drain piping, pipe couplers, wall penetration seals, water control valves, canal/slide gates, and related components.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data and warranties.

1.5 QUALITY ASSURANCE

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

B. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

1.6 WARRANTIES

A. Provide manufacturer's warranties on piping, piping fittings, valves, slide gates, pipe wall penetration seals, and pipe couplers.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Construction Inspector no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Construction Inspector's written permission.

1.8 COORDINATION

A. Coordinate connection to main water supply with Construction Inspector.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. PVC, AWWA Pipe: AWWA C900 and AWWA C905 Class 100 (100 psi) minimum, with bell end with gasket, and with spigot end.
   1. PVC Fabricated Fittings: AWWA C900 and AWWA C905, Class 100 minimum, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
   2. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
   3. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

      a. Gaskets: AWWA C111, rubber.

   4. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

      a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.2 JOINING MATERIALS

A. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.

B. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

   1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

      a. Standard: AWWA C219.

C. Pipe Couplers: Smith-Blair Style 462 Pipe Coupling, or equal, sized per manufacturer's requirements for pipe sizes and materials being joined.

2.4 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American AVK Co.; Valves & Fittings Div.
   b. American Cast Iron Pipe Co.; American Flow Control Div.
   c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
   d. Clow Valve Company.
   e. Crane Co.; Crane Valve Group; Stockham Div.
   f. East Jordan Iron Works, Inc.
   g. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   h. McWane, Inc.; Kennedy Valve Div.
   i. McWane, Inc.; M & H Valve Company Div.
   j. McWane, Inc.; Tyler Pipe Div.; Utilities Div.
   k. Mueller Co.; Water Products Div.
   l. NIBCO INC.
   m. Northcoast Valve & Gate Inc.
   n. U.S. Pipe and Foundry Company.
   o. Waterman Industries.

2. Nonrising-Stem, Resilient-Seated Gate Valves:

   a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.

      1) Standard: AWWA C509.
      2) Minimum Pressure Rating: 50 psig.
      3) End Connections: Push on or Mechanical joint.

2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal:

   a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
   b. East Jordan Iron Works, Inc.
   c. Flowserve.
   d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   e. McWane, Inc.; Kennedy Valve Div.
   f. McWane, Inc.; M & H Valve Company Div.
   g. Mueller Co.; Water Products Div.
   h. U.S. Pipe and Foundry Company.

2. Description: Sleeve and valve compatible with drilling machine.

a. Standard: MSS SP-60.
b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," or "WATER METER" per drawings, and bottom section with base that fits over valve and with a barrel diameter providing at least 3 inches of clearance around all associated valve mechanisms.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

2.6 PIPE WALL PENETRATION SEALS

A. Basis-of-Design Product: Metraseal by Metraflex.

B. Description: Water-tight mechanical seal between pipe and concrete wall. Product shall have the ability to accommodate off-center piping if needed.

C. Materials:
1. Body: EPDM.
2. Nuts and Bolts: Stainless Steel.
3. Compression plates: Glass reinforced.

2.7 SLIDE GATES/CANAL GATES

Manufacturers:

1. .Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Clarkson.
b. Keckley Co.
c. Keystone.
d. Northcoast Valve & Gate, Inc.
e. Pentair.
f. Waterman Industries.

2. Description: Slide Gates shall meet the following requirements:
a. Meet leakage requirements of AWWA C-562.
b. Shall be designed for operation under 1 to 10 feet of head.
d. Gate frame shall be a rigid unit composed of guide rails with seats upstream and downstream.

e. Allowable leakage rate shall be no more than 0.2 gallons per minute per peripheral foot of perimeter opening for seating and unseating heads.

2.8 BUTTERFLY VALVES

A. Butterfly valves shall be PRM Filtration ERA Sch 80 PVC 8 inch Butterfly, Lever Handle valves, or equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

3.3 PIPING INSTALLATION

A. Water Connections: Where existing underground conditions are unknown or at variance from drawings, alert the COR and, upon approval of connection method, follow industry standard practice in ASTM F 645 and AWWA M23.

B. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

C. Bury piping with depth of cover over top at least 24 inches.

D. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, or other supports.

3.4 JOINT CONSTRUCTION

A. Make pipe joints according to the following:
1. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
2. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.5 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks, as shown on the drawings.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
1. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.

3.6 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

3.7 SLIDE GATE INSTALLATION

A. Install slide gates per drawings, manufacturer's requirements, and AWWA standards.

3.8 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 50 psi for two hours.

1. Increase pressure in 25-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig . Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints or the proportional amount if less than 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.9 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section "Earthwork."

3.10 CLEANING

A. Clean water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Flush piping system with water until dirty water does not appear at points of outlet.

B. Prepare reports of purging activities.

END OF SECTION 02510

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes cast-in-place concrete for the kettles.

1.2 SUBMITTALS

A. Submit proposed mix design to Contracting Officer's Representative for review and acceptance, a minimum of 10 working days prior to commencement of work.

B. Provide concrete batch tickets complying with ASTM C 94 with each batch of concrete delivered to the site.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, shall be prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, and bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Kettle Concrete Form Inspection: All forms to be reviewed and inspected prior to concrete delivery and work. Forms are to be inspected for squareness and verticalness prior to placing any concrete. Contractor to receive inspector's acceptance prior to placing concrete**.**

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement: ASTM C 150, Type I or II

B. Fine and Coarse Aggregates: ASTM C 33, graded, 1-inch nominal maximum coarse-aggregate size.

1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Clean, not detrimental to concrete, free from harmful amounts of sediments, salts, or organic impurities, comply with ASTM C 94, paragraph 4.1.3.1 including table 1.

D. Air Entrainment Admixture: ASTM C 260.

E. Curing compound conforming to ASTM C 309.

2.2 CONCRETE MIX

A. Compressive Strength at 28 days, ASTM C 31 and C 39: 3,500 pounds per square inch.

B. Water-to-cement ratio: not to exceed 52 percent.

C. Each cubic yard of concrete shall contain not less than 4.5 bags of cement.

D. Slump: 2 to 4 inches at placement.

E. Entrained air content: 2 to 7 percent by volume.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

2. Rocks or blocks used to support rebar will not be allowed.

PART 3 - EXECUTION

3.1 BATCHING, MIXING, PLACING AND CURING

A. Contractor to notify Inspector after forms are set to allow inspection of the forms for squareness and verticalness prior to placing any concrete. Contractor to receive acceptance of forms prior to placing concrete.

B. Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The completed job shall be workmanlike and shall present a good appearance.

C. The temperature of the concrete shall be maintained below 90 °F during mixing, conveying and placing.

D. Comply with ACI 305 - Hot Weather Concreting, when air temperatures exceed or are expected to exceed 90 °F.

E. Concrete shall be mixed and delivered in conformance with ASTM C 94.

F. Concrete shall be discharged from the mixer no later than 1-1/2 hours after water is added to the cement and aggregates.

G. The use of accelerators or antifreeze compounds shall not be allowed.

H. The concrete shall be placed on moist, compacted surfaces free of debris, loose soil, mud or water. If the foundation soils are not adequately moist, moisten them by sprinkling immediately before placing the concrete.

I. Concrete shall not be placed during freezing weather unless adequate protection is provided to keep the concrete temperature between 50 and 90 °F for a period of not less than 7 days.

J. Construction of concrete structure shall not be permitted when minimum 24 hour temperatures are expected to drop below 32 °F unless the method of applying artificial heat to the lining has prior approval by the Contracting Officer's Representative.

K. Concrete shall not be placed against frozen surfaces.

L. All concrete exposed to view shall have a float finish or its equivalent and shall be free of honeycombed or sand-streaked areas.

M. Chamfer exterior corners and edges of permanently exposed concrete. Chamfer size shall be 3/4 inch.

N. Provide a minimum concrete coverage over reinforcement of 3".

O. Apply curing compound to the concrete surface within 30 minutes after placing and finishing the concrete. The application rate shall be not less than 1.0 gallon of curing compound per 200 square feet of surface. Use only white pigmented compounds. Spray the compound over the surface so that a continuous white cover is obtained. Two applications to achieve the required application rate may be required.

P. Protect all concrete against damage until final acceptance by the Government.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.4 TOLERANCES

A. Concrete structures shall be installed to design lines and elevations within the tolerances of ACI 117:

B. Wall thickness shall meet or exceed the specified dimension.

C. Finished screen and stoplog slots shall be tested for ease of operation and modified if not within tolerances or not functioning properly.

D. Finished slab slopes shall be tested for positive drainage and modified if not within tolerances or not draining properly.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage, at its expense, a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports. All testing results shall be submitted to the COR, for review and acceptance, a maximum of 48 hours after completion of test.

B. Mixed concrete shall be tested for consistency (slump), temperature, air content, and unit weight. Concrete cylinders shall be collected for compression tests. Contractor shall obtain a sample of each type of concrete once each day that concrete is placed. Samples shall be representative of the concrete placed during the day the sample is taken. Concrete samples shall be sufficiently large to make all tests without reuse of concrete in other tests or in cylinders.

3.6 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Government. Remove and replace concrete that cannot be repaired and patched to Government's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two

and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Government.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Government's approval, using epoxy adhesive and patching mortar.

#
END OF SECTION 03300

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Aluminum guides at kettle
   2. Aluminum grating at kettle
   3. Aluminum screen modules.

1.2 SUBMITTALS

A. Product Data: For the following:

   1. Aluminum guides at kettle.

   2. Aluminum grating at kettle.

   3. Aluminum screen modules.

B. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

C. Templates: For anchors and bolts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

B. Ferrous Metals:

   1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

   2. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

3. Iron Casting: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

4. Concrete inserts: Smooth, threaded or wedge type; galvanized ferrous castings, ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, hot-dipped galvanized per ASTM A 153/A 153M.

5. Aluminum Grating.

   a. Aluminum Alloy 5052

6. Aluminum Slots: 6061-T6, ¼" Thickness.

7. Screen modules:
   a. Angle frames, 2"x2"x3/8" Aluminum, 6061-T6 with radius corners, Metals Depot Stock number A3238, or equal.
   b. Screen Type 1 – Aluminum alloy 3003-H14, .1250" thick (8 gauge), 1/8" round holes on 3/16" Staggered Centers, 40% Open Area, McNichols Item 1718311238 or equal.
   c. Screen Type 2 - Aluminum alloy 3003-H14, .1250" thick (8 gauge), 3/4" round holes on 1" Staggered Centers, 51% Open Area, McNichols Item 1734011241 or equal.

8. Manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

   a. McNichols Co., phone 1-800-237-3820

2.3 FASTENERS

A. General: Aluminum Grade 6061, size per drawings.

2.4 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

B. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3500 psi, unless otherwise indicated.

2.5 FABRICATION

A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion

without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.

3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
5. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches o.c.

B. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts.

1. Provide anchors for attachment to stair framing, either integral or applied to units.
2. Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

PART 3 - EXECUTION

INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
3. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with non-shrink, nonmetallic grout.

END OF SECTION 05500

SECTION 05530 - GRATINGS

1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Aluminum bar gratings.
2. Aluminum frames and supports for gratings.

1.2 PERFORMANCE REQUIREMENTS

A. Grating Structural Performance: Capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved:

1. Walkways and Elevated Platforms: Uniform load of 60 lbf/sq. ft. Limit deflection to L/360 or 1/4 inch, whichever is less.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Extruded-aluminum plank gratings.
2. Clips and anchorage devices for gratings.

All product data shall be submitted to COR, for review and acceptance, prior to installation.

B. Shop Drawings: Detail fabrication and installation of gratings.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

All shop drawings shall be submitted to COR, for review and acceptance, prior to installation.

1.4 QUALITY ASSURANCE

A. Metal Bar Grating Standards: Comply with applicable requirements in the following:

1. NAAMM MBG 531, "Metal Bar Grating Manual for Steel, Stainless Steel, and Aluminum Gratings and Stair Treads."
2. NAAMM MBG 532, "Heavy-Duty Metal Bar Grating Manual."

1.5 COORDINATION

A. Furnish Setting Drawings, templates, and directions for installing frames and anchorages, including concrete inserts. Deliver frames and built-in anchorages, including concrete inserts, to Project site as needed to make progress and avoid delays.

2 PRODUCTS

2.1 METALS

A. Aluminum:

1. Extruded Bars and Shapes: ASTM B 221ASTM B 221M, alloy 6061-T6 or 6063-T6, for bearing bars of gratings and shapes; alloy 6061-T1, for grating crossbars.
2. Aluminum Rivets: ASTM B 316/B 316M, alloy 6053-T4 or 6061-T6.
3. Aluminum Sheet: ASTM B 209ASTM B 209M, alloy 5052-H32.

2.2 GRATINGS

A. Metal Bar Gratings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Alabama Metal Industries Corp.
   b. All American Grating, Inc.
   c. Barnett/Bates Corp.
   d. Harris Steel Ltd., Fisher & Ludlow Div.
   e. IKG Borden.
   f. Klemp Corp.
   g. Ohio Gratings, Inc.

h. Seidelhuber Metal Products, Inc.
i. Tru-Weld Grating, Inc.
j. McNichols Co.

2. Pressure-Locked, Rectangular Bar Aluminum Gratings: P-7-4 (1 x 1/8) ALUMINUM: 1-by-1/8-inch bearing bars at 7/16 inch o.c., and crossbars at 4 inches o.c.
3. Traffic Surface for Aluminum Bar Gratings: Plain.
4. Aluminum Finish: Mill.
5. Fabricate removable grating sections with banding bars attached by welding to entire perimeter of each section.

   a. Anchoring Method: Use not less than four saddle clips for each grating section.
   b. Fasteners: Galvanized malleable-iron flange clamp with galvanized bolt for securing grating to supports designed to be installed from above grating by one person.

      1) Product: Struct-Fast Inc.; Grate-Fast.

6. Fabricate cutouts in grating sections for penetrations indicated. Edge-band openings with bars of the same size and material as bearing bars.

2.3 FASTENERS

A. Fasteners: Provide aluminum 6061 bolts as shown on drawings.

2.4 FABRICATION

A. Fabrication, General: Provide material in size, thickness, and finish indicated or, if not indicated, as recommended by manufacturer for indicated applications and as needed to support indicated loads.

1. Use connections that maintain structural value of joined pieces. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
2. Shear and punch metals cleanly and accurately. Remove burrs.

3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing gratings. Set units accurately

in location, alignment, and elevation.

B. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded.

END OF SECTION 05530