SACRAMENTO AREA SEWER DISTRICT
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CONTRACT DOCUMENTS FOR THE CONSTRUCTION OF
ECHOWATER RESOURCE RECOVERY FACILITY

Primary Deck WRH Piping Replacement Project

BOARD OF DIRECTORS

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BID SET

VOLUME 1 OF 2

PART A – CONTRACT REQUIREMENTS (DIV 00 AND DIV 01)
PART B – TECHNICAL SPECIFICATIONS (DIV 02 THROUGH DIV 40)

AUGUST 2025

RFB 8515

CONTRACT NUMBER

SECTION 00 01 10

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BIDDER'S QUALIFICATIONS

NOTE: This experience statement shall be submitted by the three (3) apparent low bidders in accordance with the BID FORM Section (00 41 00). At a minimum, bidders should provide a listing of applicable past projects, a brief description of each project, size or value of construction, duration and/or completion date, and most importantly, contact information for the project owner.

The following is a description of the bidder's experience with work similar in magnitude and character to that contemplated under this Contract.

Additional numbered pages outlining this portion of the bid may be attached to this page. Each page shall be headed BIDDER'S QUALIFICATIONS and shall be signed by the bidder.

****END OF SECTION****

SECTION 00 45 14

BIDDER'S SAFETY PERFORMANCE

1.01 GENERAL

A. Information specified below shall be submitted by the three (3) apparent low bidders in accordance with the BID FORM Section (00 41 00).

B. The Contractor shall submit their Workers Compensation Experience Modification Factor (EMF), and the previous year's Cal/OSHA Form 300A-Summary of Work Related Injuries and Illnesses.

C. Enter EMF here: _____. Attach a copy of Cal/OSHA Form 300A from the previous year.

D. In accordance with the California Code of Regulations, Title 19, Section 2760.12, the District may obtain and evaluate the Contractor's safety performance and programs when work involves performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process (chlorine, sulfur dioxide, and/or digester gas systems). The Contractor shall submit a copy of their current safety program(s) as it pertains to contract work performed on or adjacent to a covered process. Examples of documents required may include items such as safety manuals, Injury and Illness Prevention Program, training documentation, and certifications.

****END OF SECTION****

SECTION 00 72 00

GENERAL CONDITIONS

PART 1 -- GENERAL INFORMATION

1.01 DEFINITIONS AND TERMS

A. Whenever the following terms, titles, or abbreviations are used in these specifications or in any document or instrument where these specifications govern, the intent and meaning shall be as herein defined. The meanings shall be applicable to the singular, plural, masculine and feminine of the words and terms.

Accept	The receiving by either the District or the Contractor with the intent to retain. In so doing, the recipient may or may not acknowledge compliance with the requirements. Acceptance does not convey approval.
Acceptance of Work	Formal action of the Board in determining that the Contractor's work has been completed in accordance with the contract and in notifying the Contractor in writing of the acceptability of the work.
Act of God	Tidal waves and earthquakes above 3.5 on the Richter scale, in accordance with Section 7105 of the Public Contracts Code.
Addenda	Supplemental written specifications or drawings issued after the Notice to Contractors and prior to execution of the contract which modify or interpret the contract documents by addition, deletion, clarification, or corrections.
As-Built Documents	The information which is specified for submission to the Engineer in accordance with the PROJECT RECORD DOCUMENTS Section (01 78 39) of the Contract Documents.
As Shown, Etc.	Where "as shown," "as indicated," "as detailed," "as specified," or words of similar import are used, it shall be understood that reference is made to the contract documents unless specifically stated otherwise. Where "as directed," "as permitted," "approved," or words of similar import are used, it shall be understood that the direction, permission, requirements, or acceptance of the Engineer is intended unless stated otherwise.

Bid	When submitted on the prescribed bid form, properly signed and guaranteed, the Bid constitutes the offer of the Bidder to complete the Work at the price shown on the Bidder's bid form.
Bidder	Any individual, firm, partnership, corporation, or combination thereof, submitting a bid for the Work, acting directly or through a duly authorized representative.
Board	The Board of Directors of the Sacramento Area Sewer District, a sanitation district of the State of California.
Bypass	Discharge of untreated or partially treated wastewater to surface waters or drainage courses of the United States as further defined in the NPDES permit.
Calendar Day	Calendar day shall be defined as every day shown on the calendar, Sundays and holidays included.
Change Order	The authorization from the Board for additions, deletions or revisions to the Work which may have been directed by Field Instruction.
Conflict	A case where an item of work is shown or specified differently in two or more places in the contract documents. An item of work shown in one portion of the contract documents but not in another is not a conflict.
Conformed Set	The original contract documents revised to incorporate all supplement information issued by addenda.
Consultant	An individual, firm or organization retained by the District to provide professional services. The authority of the consultant will be designated by the Resident Engineer.
Contract	The written agreement covering the performance of the work and the furnishing of labor, materials, tools, and equipment in the construction of the work. The Contract shall include the Notice to Contractors, Bid Form, plans, specifications, addenda, and contract bonds; also any and all supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments, or extensions to the contract and include contract change orders.

Contract Documents	The plans, specifications, addenda, and change orders for a particular project for construction or installation at the EchoWater Resource Recovery Facility (formerly known as the Sacramento Regional Wastewater Treatment Plant and commonly referred to as the Plant).
Contract Price	The Total Bid Amount as listed on the Bidding Schedule. Also known as the Bid Price.
Contract Time	Number of days stated in the contract for the completion of the work or portions thereof.
Contractor	The person or persons, firm, partnership, corporation, or combination thereof, private or municipal, who has entered into a contract with the District as party or parties of the second part or their legal representatives.
Contractor's Plant and Equipment	Equipment, material, supplies, and all other items, except labor, brought onto the site by the Contractor to carry out the work, but not to be incorporated in the work.
Controlling Operations or Critical Path	Any activity which, if delayed, would cause a postponement in the completion of the Work.
Day	Day shall mean calendar day unless preceded by the word "working" or “business”.
Design Consultant	The individual, firm or organization that prepared the plans and specifications for the Work. May also be referred to as the Design Engineer.
Direct	Instructions from the District, the Engineer, the Resident Engineer, or the District Representative to the Contractor for execution.
District	The Sacramento Area Sewer District (formerly known as the Sacramento Regional County Sanitation District), a sanitation district of the State of California. May also be referred to as Owner.
District Representative	The individual designated to act as the agent of the District on specific matters related to the Contract. Also known as the Resident Engineer.
Diversion	The process or act of ceasing discharge of EchoWater Facility effluent to the Sacramento River and discharging instead to emergency storage Basin A. The liquid so diverted.

Drawings	The graphical representation of the Work which depicts design intent, measurements, and information for a project or portion thereof. Also referred to as the "plans."
EchoWater Facility	EchoWater Resource Recovery Facility (formerly known as the Sacramento Regional Wastewater Treatment Plant or SRWTP).
Engineer	The Administrator of the Sacramento Area Sewer District, who is the District Engineer. This individual may act individually or through designated representatives (District Representative).
Equipment	Equipment shall be defined as meeting any of the following criteria: 1. Mechanical, electrical, instrumentation, or other device with one or more moving parts. 2. Devices requiring an electrical, pneumatic, electronic, or hydraulic connection. 3. Anything having an equipment tag number formally assigned by District staff.
Field Instruction	The written directive from the Resident Engineer requiring an addition, deletion, or revision to the Work which may result in a change in the Total Contract Amount or the Contract Time.
Furnish	To provide and deliver to the work site or another location for incorporation into the Work.
Herein	Refers to information presented in the contract documents.
Inspector	The individual authorized to act as the agent for the Resident Engineer in the observation of the Work for conformance with the requirements of the Contract.
Install	Placing, erecting, or constructing complete in place including testing any item, equipment, or material.
Maintenance-Managed Item	A subset of the Master Equipment List, a Maintenance-Managed Item (MMI) is an item that the District determines a need for ongoing maintenance and uploads the data into the District Maintenance Management System.
Major Equipment	Specific items of equipment, materials or systems that have been designated in the Technical Specifications. These items typically are new to the EchoWater Facility, have long lead times, are critical to training and commissioning schedules, and are subject to special

	progress payment procedures in accordance with the PROGRESS PAYMENT PROCEDURES Section (01 29 76).
Master Equipment List	The EchoWater Facility maintains a plant-wide Master Equipment List (MEL) in a database format. The MEL contains specific information for each piece of mechanical, electrical, and instrumentation equipment (including all accessories), as well as, each manual valve, slide gate, process manhole, electrical manhole and handhole, control unit, and utility station. All existing equipment abandoned in-place, demolished, replaced, relocated, renumbered, or modified by the project, as well as all future equipment, is also included.
May	Refers to permissive actions.
New	An item which has never been used and has been manufactured, produced and supplied within the last 12 months.
Notice to Proceed	Direction from the District to the Contractor to begin the Work.
Operation and Maintenance (O&M) Information	The information which is specified for submission in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23).
Outage	An unplanned and/or unintentional disabling of a process or equipment item which makes it unsuitable to perform its intended function.
Paragraph	For reference or citation purposes, paragraph shall refer to the paragraph, or paragraphs, called out by section number and alphanumeric designator. For example, this definition is found in paragraph 1.01 of the GENERAL CONDITIONS Section (00 72 00); Contractor equipment is discussed in paragraph 2.03B of the GENERAL CONDITIONS Section (00 72 00).
Person	The term, person, includes firms, companies, corporations, partnerships, and joint ventures.
Plans	The official project plans and standard drawings, profiles, typical cross sections, general cross sections, working drawings, and supplemental drawings, or reproductions thereof, approved by the District, which show the locations, character, dimensions, and details of the work to be performed. All such documents are to be considered as a part of the plans whether or not reproduced in the contract documents.

Process Area	The existing facilities, channels, tanks, basins, conduits, pipes, tunnels, galleries, buildings, structures, and systems at the EchoWater Resource Recovery Facility.
Project Plans	The project plans and specific details and dimensions peculiar to the work and are supplemented by the standard drawings insofar as the same may apply. When the term “drawings” is used herein, it shall also be deemed to mean “plans”.
Project	The undertaking to be performed under the provisions of the Contract.
Project Schedule	The organization and sequencing of activities to complete the Work within the Contract Time.
Provide	Furnish and install, modify, relocate, complete and in place including testing.
Punch List	A list of items or activities which must be accomplished in order to complete the Work and comply with the requirements of the Contract.
Resident Engineer	The on-site District Representative who is the authorized agent of the Engineer and who is responsible for the administration of the contract and inspection of the work to be performed under these specifications.
Shall	This term refers to the mandatory requirements of the Contract that must be accomplished by the Contractor.
Shop Drawings	All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by the Contractor to illustrate material or equipment for some portion of the work.
Shutdown	A planned action which makes the existing process, system or equipment unable to perform its intended function.
Specifications	The directions, provisions, and requirements contained in the contract documents as supplemented by the Sacramento County Standard Specifications. When the term "specifications" or "these specifications" is used, it means the provisions as set forth in the contract documents.

Specify/Specified	Refers to information described, shown, noted or presented in any manner in any part of the contract.
SacSewer	Sacramento Area Sewer District. Also known as the District.
Subcontractor	An individual, firm or organization which has a contract to do a portion of the Work regardless of tier. A subcontractor may have a contract with the Contractor or with another subcontractor.
Submittal Approved	The marking of a submittal to indicate "No Exceptions Taken" or "Make Corrections Noted."
Supplier	An individual, firm or organization which provides materials, equipment, supplies, systems or specially fabricated items for the Work.
System	A set or arrangement of equipment and associated tanks, channels, piping, electrical, instrumentation and controls so related as to form a unit function.
Tag Number	A unique identification number assigned by the District to each piece of equipment; manholes, handholes, device, or component including electrical raceways, enclosures, cables, and instrumentation loops and points.
Technical Specifications	Divisions 2 through 50 of the Contract.
Time Extension	An increase in the Contract Time.
Will	This term refers to actions by the District, the Engineer, or the Resident Engineer that are required during the course of the Contract.
Work	The activities and construction that are contemplated, required or designated by the plans, the specifications or other contract documents including changes directed by the District.

1.02 JOINT VENTURE CONTRACTOR

A. In the event the Contractor is a joint venture of two or more contractors, the grants, covenants, provisos and claims, rights, power, privileges and liabilities of the contract shall be construed and held to be several as well as joint. Any notice, order, direct request or any communication required to be or that may be given by the District or the Engineer to the Contractor under this contract, shall be well and sufficiently given to all persons being the Contractor if given to any one or more of such persons. Any notice, request or

other communication given by any one of such persons to the District or the Engineer under this contract shall be deemed to have been given by and shall bind all persons being the Contractor.

1.03 CONTRACT REQUIREMENTS

A. SUCCESSORS' OBLIGATIONS:

1. The grants, covenants, provisos and claims, rights, powers, privileges and liabilities contained in the contract documents shall be read and held as made by and with, and granted to and imposed upon, the Contractor and the District and their respective heirs, executors, administrators, successors and assigns.

B. SUBCONTRACTING AND ASSIGNMENT:

1. If any part of the Work to be done under this Contract is subcontracted, the subcontract shall be in writing and shall provide that all work to be performed thereunder shall be performed in accordance with the terms of the Contract Documents, and further that the terms and conditions of the Contract Documents, including those provisions relating to the resolution of disputes and claims, are expressly incorporated therein. The subcontracting of any or all of the Work to be done will in no way relieve the Contractor of any part of its responsibility under the Contract. Certified copies of subcontract agreements and purchase orders for materials and equipment will be provided by the Contractor to the District upon request.

2. The performance of the contract may not be subcontracted or assigned except upon written consent of the District, and no such subcontracting or assignment shall be permitted which would relieve the original Contractor or sureties of their responsibilities under the contract.

3. The Contractor shall not, without the written consent of the District, (a) substitute any party as subcontractor in place of the subcontractor designated in the original bid, or (b) permit any such subcontract to be assigned or transferred, or allow it to be performed by anyone other than the original subcontractor listed on the bid. Consent to such substitution or subletting shall only be given: (1) When the subcontractor listed in the bid after having had a reasonable opportunity to do so fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans, and specifications for the project involved or the terms of such subcontractor's written bid, has been presented by the prime contractor; or (2) when the listed subcontractor becomes bankrupt or insolvent; or (3) when the listed subcontractor fails or refuses to perform the assigned subcontract; or (4) when the listed subcontractor fails or refuses to meet the bond requirements of the prime contractor as set forth in Section 4108 of the Public Contract Code; or (5) when the prime contractor demonstrates to the Engineer, subject to the further provisions set forth in Section 4107.5 of the Public Contract Code that the name of the subcontractor was listed as a result of an inadvertent clerical error; or (6) when the

listed subcontractor is not licensed pursuant to the Contractor License Law as set forth in the Business and Professions Code; or (7) when the Engineer determines that the work performed by the listed subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specification, or that the subcontractor is substantially delaying or disrupting the progress of the work.

4. In the event of such substitution, the District shall give at least three working days' notice in writing to the listed subcontractor unless the said subcontractor involved has advised the District in writing of having knowledge of the prime contractor's request for the substitution.

5. The Contractor may assign monies due under the contract, and such assignment will be recognized by the District, if given proper notice thereof, to the extent permitted by law, but any assignment of monies shall be subject to all deductions provided for in the contract, and all money withheld shall be subject to being used by the District for the completion of the work, in the event that the Contractor should be in default therein.

C. WAIVER OF RIGHTS:

1. Except as herein provided, no action or want of action on the part of the Contractor, District, or Engineer, at any time with respect to the exercise of any right or remedies conferred upon them under this contract shall be deemed to be a waiver on the part of the Contractor and District of any of their rights or remedies. No waiver shall be effective except in writing by the party to be charged. No waiver of one right or remedy shall act as a waiver of any other right or remedy or as a subsequent waiver of the same right or remedy.

D. AMENDMENT OF GENERAL CONDITIONS:

1. These general conditions may be amended after agreement has been signed only by mutual consent of the District and the Contractor in writing.

1.04 COMPLIANCE WITH LAWS AND REGULATIONS

A. The Contractor shall keep fully informed of, and shall observe and comply with, and shall cause any and all persons, firms, or corporations employed by the Contractor or under the Contractor, to observe and comply with all State and National laws and County and municipal ordinances, regulations, orders, and decrees which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any worker affect the conduct of the work. Particular attention is called to the following:

1. HOURS OF LABOR:

a. Eight (8) hours of labor shall constitute a legal day's work and the Contractor or any Subcontractor under the Contractor, in the execution of the Contract, shall not require more than eight (8) hours of labor in any Calendar Day, and forty (40)

hours of labor in any calendar week, from any person employed by the Contractor in the performance of the Work under the Contract, except as permitted under the provisions of Labor Code Sections 1810 to 1815 of the Labor Code of the State of California. The Contractor shall forfeit, as penalty to the District, twenty-five dollars ($25) for each worker employed by the Contractor or any Subcontractor under the Contractor in the execution of the Contract for each Calendar Day during which any worker is required or permitted to labor more than eight (8) hours and for each calendar week during which any worker is required or permitted to labor more than forty (40) hours, in violation of the provisions of such Labor Code.

b. Overtime and shift work may be established by the Contractor with reasonable notice and the written permission of the District. No work other than overtime and shift work shall be done between the hours of 6:00 p.m. and 6:00 a.m., except such work is necessary for the proper care and protection of work already performed or except in case of an emergency.

c. The establishment of regular overtime and shift work does not alter the definition of a working day as specified in the CONTRACT TIME Section (01 14 20).

2. STATE PREVAILING WAGE:

a. Pursuant to Labor Code Section 1770, the Contractor and the Contractor's Subcontractors and all lower tier subcontractors must pay not less than the prevailing rate of per diem wages, including, but not limited to, overtime, Saturday, Sunday, and holiday work, travel and subsistence, as determined by the Director of the California Department of Industrial Relations pursuant to Labor Code Section 1773. Copies of such prevailing rate of per diem wages are available upon request at the office of the County of Sacramento Labor Compliance Program, 9700 Goethe Road, Suite D, Sacramento, CA 95827. The prevailing wage determinations are also available on the internet at http://www.dir.ca.gov/DLSR/PWD.

b. The wage rates determined by the Director of the California Department of Industrial Relations refer to the expirations dates. Prevailing wage determinations with a single asterisk (*) after the expiration date which are in effect on the date of Advertisement for Bids remain in effect for the duration of the project. Prevailing wage determinations with double asterisk (**) after the expiration date indicate that the basic hourly wage rate, overtime, and holiday wage rates, and employer payments be paid for work performed after this date, the new rate must be paid and should be incorporated in contracts entered into. The Contractor should contact the Prevailing Wage Unit, DSLR, (415) 703-4774 or the Sacramento County Labor Compliance Section, (916) 875-2711, to obtain predetermined wage changes. All determinations that do not have double asterisk (**) after the expiration date remain in effect for the duration of the project.

c. The Contractor and all subcontractors shall forfeit, as penalty to the District, not more than two hundred dollars ($200) for each Calendar Day, or portion thereof, for each worker paid less than the stipulated prevailing wage rates for any work done under the Contract by the Contractor or by any Subcontractor, in violation of the provisions of such Labor Code. The Contractor and all subcontractors must comply with the provisions of Labor Code Section 1774 and 1775. In addition to the said penalty, the Contractor or Subcontractor shall pay each worker the difference between the prevailing wage and the amount paid for every hour the worker was paid less than the prevailing wage.

3. LABOR DISCRIMINATION:

   a. Attention is directed to Section 1735 of the Labor Code of the State of California, which prohibits discrimination in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, or sexual orientation of such persons and provides for penalties therefore.

4. SACRAMENTO COUNTY RESIDENTS:

   a. Attention is directed to the fact that, under the provisions of Article V, Section 15(i), of the Charter of the County of Sacramento, preference must be given to Sacramento County Residents.

5. APPRENTICES:

   a. Attention is directed to Section 1777.5 of the Labor Code of the State of California, concerning the employment of apprentices, and the Contractor is required to comply with the provisions of said section including compliance by all subcontractors.

6. TRAVEL AND SUBSISTENCE PAYMENTS:

   a. Attention is directed to the requirements of Section 1773.8 of the Labor Code of the State of California. The Contractor shall make travel and subsistence payments to each worker workman, needed to execute the work, in accordance with the requirements in said Section 1773.8.

7. WORKER'S COMPENSATION:

   a. Pursuant to the requirements of Section 1860 of the Labor Code, the Contractor will be required to secure the payment of worker's compensation for employees in accordance with the provisions of Section 3700 of the Labor Code.

8. USE OF PESTICIDES:

a. The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations, and all other agencies which govern the use of pesticides required in the performance of the work on the contract.

b. Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilands, and repellents.

c. Any substance or mixture of substances intended for preventing repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered a pesticide.

9. PAYROLL RECORDS:

a. Attention is directed to Section 1776 of the California Labor Code, a portion of which is quoted below. Regulations implementing said Section 1776 are located in Section 16000 and Sections 16401 through 16403 of Title 8, California Code of Regulations. The Contractor shall be responsible for compliance by subcontractors.

b. "Each contractor and subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in conjunction with the public work."

c. "The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or authorized representative on request.

A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection and copies thereof made; provided, however, that a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested

payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

d. Each contractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

e. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address and social security number. The name and address of the contractor awarded the contract or performing the contract shall not be marked or obliterated.

f. The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

g. In the event of noncompliance with the requirements of this section, the contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the contractor must comply with this section. Should noncompliance still be evident after the 10-day period, the contractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit one hundred dollars ($100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due."

The penalties specified in subdivision (h) of Labor Code Section 1776 for noncompliance with the provisions of said Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

10. REPORTING REQUIREMENTS AND SANCTIONS:

a. Failure to provide specific information, records, reports, certifications, or any other documents required for compliance with these specifications shall be considered noncompliance. The minimum documents required include the following:

FORM SCLC-0001 - LIST OF SUBCONTRACTORS: Required from the prime contractor and each subcontractor with a lower tier subcontractor. Due

within 10 days after the date of the pre-construction conference or within 10 days after the date of award of the subcontract. The later of the two dates will apply.

CERTIFIED PAYROLL REPORTS: Required from the prime contractor and each subcontractor, regardless of the subcontract amount or the type of procurement, for every payroll period in which work is performed. Due within 10 working days of the ending date of the payroll period. The payroll shall be accompanied by a "Statement of Compliance" signed by the employer or the employer's agent indicating that all of the information in the payroll is true, correct and complete, and the wage rates contained therein are not less than those required by the contract. The "Statement of Compliance" shall be on forms furnished by the Agency or on any form with identical wording. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

FRINGE BENEFIT STATEMENT: Required from the prime contractor and each subcontractor if fringe benefits are paid to an approved plan, fund, or program. Due with first certified payroll report and any time the fringe benefit amounts change. Not required if the fringe benefits are paid in cash to the employees.

CONTRACTOR'S DAILY REPORTS: The Contractor shall maintain daily job reports recording all significant activity on the Project, including number of workers on site, names and job classification of employees, active construction equipment used, notable deliveries, work activities, delays, interruptions or any problems encountered. Worker craft or classification must be identified with hours worked. Equipment make and model must be identified with active or idle determination.

i. The Contractor shall submit a Contractor's Daily Report form, for approval by the Construction Manager, to record this information and submit this form to the Construction Manager no later than the following morning for the previous work day.

ii. If there is no work performed on any given day, the Contractor shall note the reasons for no work and submit a daily report to the Construction Manager on those days also.

iii. Failure to stay current with daily reporting will be just cause for the District not processing a progress payment until reports are submitted.

iv. Other documentation may be required depending on the source of funding for the project.

b. Contractors found to be in noncompliance will be advised of the specific deficiencies and urged to make immediate corrections. They should also be

advised that monetary deductions may be made for failure to effect corrections or delinquencies.

c. If the Contractor fails to correct a deficiency within fifteen (15) Calendar Days after notification, a deduction may be made. In such cases, the deduction shall be 10 percent (10%) of the estimated value of the work done during the month, except that the deduction will not exceed ten thousand dollars ($10,000), nor be less than one thousand dollars ($1,000), and shall be deducted from the next progress payment.

d. Deductions for noncompliance will be in addition to all other deductions provided for in the Contract and will apply irrespective of the number of instances of noncompliance. Deductions may be made separately and additively for each estimate period in which a new deficiency appears. When all deficiencies for a period have been corrected, the deduction covering that period will be released on the next progress payment. Otherwise, the deduction will be retained.

11. WEEKEND, HOLIDAYS, AND NIGHT WORK:

a. It is understood that to complete the Work within the Contract Time, it may be necessary to operate a two or three shift operation for portions of the work. Two or three shift operations may be established as a regular procedure by the Contractor upon notification of the Resident Engineer. Such notification shall be given at least 1 week in advance and shall include the anticipated duration of the additional shifts. Such permission may be revoked by the Resident Engineer if the Contractor fails to maintain adequate force and equipment for reasonable prosecution and to justify inspection of the work, or fails to provide sufficient artificial light to permit the work to be carried on properly and to permit proper inspection, or if the additional shifts create a public nuisance.

b. Unless established as part of the regular work shifts, request to work between 6 p.m. and 6 a.m. or on Sundays or legal holidays must be submitted in writing at least 2 working days in advance of the intended work. In case of an emergency, the Contractor will be allowed to work at night or on Sundays or legal holidays, but must notify the Resident Engineer and the EchoWater Facility Control Center at (916) 875-9400 immediately. An emergency shall be considered an unforeseen event that poses a danger to the public or to the uncompleted work.

c. The Contractor shall give the Resident Engineer one working day prior written notice of any work to be done on a Saturday, with the location and type of work to be done specified; and any work done without such notice and without the supervision of an inspector may be ordered removed and replaced at the Contractor's expense.

1.05 LAWS, REGULATIONS, AND PERMITS

A. GENERAL:

1. The Contractor shall give all notices and shall procure and pay for all permits and licenses of any kind that may be required to start, carry on, and complete the contract work. Refer to the PERMIT REQUIREMENTS Section (01 41 26) for permits to be obtained by the District. The Contractor shall comply with all laws, ordinances, rules and regulations pertaining to the conduct of the work. The Contractor shall be liable for violations of the law in connection with the Work. If the Contractor observes that the plans, specifications or other portions of the contract documents are at variance with any laws, ordinances, rules or regulations, the Engineer shall be promptly notified in writing of such variance. The Engineer shall promptly review the matter and, if necessary, shall issue a Field Instruction or take any other action necessary to bring about compliance with the law, ordinance, rule or regulation in question. Contractor agrees not to perform work known to be contrary to any laws, ordinances, rules or regulations.

2. Unless otherwise specified herein, permits and licenses from governmental agencies which are necessary only for and during the prosecution of the work and the subsequent guaranty period thereafter shall be secured by the Contractor and paid for by the District.

3. The District will reimburse the Contractor for filing fees required to secure such permits upon presentation of proof of payment of said fees, except that no reimbursement will be paid for the following permits:

   a. Overload, overwidth, and other hauling permits.

   b. Permits required by the California Occupational Safety and Health Act of 1973.

   c. Other permits obtained by the Contractor solely for convenience and are not essential for conduct of work.

4. Permits and licenses of regulatory agencies which are necessary to be maintained after the completion of the guaranty period of the contract will be secured and paid for by the District.

B. PROTECTION OF DISTRICT AGAINST PATENT CLAIMS:

1. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the District, its officers, employees, and agents from all suits at law or claims brought or made by the holder of any invention or patent for, or on account of, the use of any patented materials, equipment, devices, or processes in the construction of, or subsequent operation of, the project. If requested

by the Engineer, the Contractor shall furnish acceptable proof of a proper release from all such fees or claims before the final payment is made on this contract.

1.06 LANDS AND RIGHTS-OF-WAY

A. The District shall provide the lands, rights-of-way, and easements upon which the work under this contract is to be done, and such other lands as may be designated on the plans for the use by the Contractor, and the Contractor shall confine the operations to within these limits.

B. Any additional land and access thereto that may be required for temporary construction facilities or storage of materials shall be provided at the Contractor's expense.

1.07 HEADINGS

A. Headings to parts, divisions, sections, paragraphs, subparagraphs and forms are inserted for convenience of reference only and shall not affect the interpretation of the contract documents.

1.08 SURVEY LAND MONUMENTS

A. Survey land monuments and property marks shall not be moved or otherwise disturbed by the Contractor until an authorized agent, of the agency having jurisdiction over the land monuments or property marks setting, has witnessed or otherwise referenced their location, and only then in accordance with the requirements of the agency having jurisdiction.

PART 2 -- DISTRICT-CONTRACTOR RELATIONS

2.01 AUTHORITY OF DISTRICT

A. AUTHORITY OF ENGINEER:

1. GENERAL:

a. All claims of the Contractor or questions which may arise as to quality or acceptability of materials furnished and work performed, and as to the manner of performance and the rate of progress of the work; all questions as to the interpretation of the contract, plans and specifications; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to compensation shall be referred to the Engineer for decision.

2. CHANGES:

a. The District reserves the right to make such modifications or alterations, reductions or omissions, to the specifications and plans, including the right to increase or decrease the quantity of any item or portion of the work or to omit

any item or portion of the work, as may be deemed by the Engineer to be necessary or advisable, and to require such extra work as may be determined by the Engineer to be required for the proper completion or construction of the contemplated work.

b. No change or deviation from the plans or specifications shall be made by the Contractor without written authorization from the Engineer setting forth a complete description of the change.

3. ACCEPTABILITY OF WORK:

a. The Engineer has the authority to make the final determination of the acceptability of the work. The Engineer also has the authority to accept or reject the Resident Engineer's recommendations regarding retention of defective work.

B. AUTHORITY OF THE RESIDENT ENGINEER

1. GENERAL:

a. The Resident Engineer is the construction site representative of the District (or District Representative). The Engineer has delegated authority to the Resident Engineer to make decisions regarding questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the Work. The Resident Engineer interprets the intent and meaning of the Contract and makes initial decisions with respect to the Contractor's fulfillment of the Contract and the Contractor's entitlement to compensation.

2. INSPECTION:

a. Properly authorized Inspectors shall be considered to be representatives of the Engineer. An Inspector shall have the authority to order the Work stopped, if such action becomes necessary, until the Engineer is notified and has determined that the work may proceed.

b. The inspection of the work does not relieve the Contractor of any obligation to fulfill the contract as prescribed. Any work, materials or equipment not meeting the requirements and intent of the plans and specifications shall be rejected, and unsuitable work or materials shall be made good, notwithstanding the fact that such work or materials may have previously been inspected or accepted and payment therefore may have been made.

c. Re-examination of any work may be ordered by the Engineer, and such work must be uncovered by the Contractor. The Contractor shall pay the entire cost of such uncovering, re-examination and replacement if the work does not conform to the plans and specifications.

3. CHANGE ORDERS:

    a. The Resident Engineer has the authority to initiate change orders.

2.02 RESPONSIBILITIES OF DISTRICT

A. ATTENTION TO WORK:

1. The District shall notify the Contractor in writing of the name of the Engineer and of the Resident Engineer. The Resident Engineer normally will be at the site of the work. During absences, the Contractor may contact a previously designated representative of the Resident Engineer.

B. DISTRICT'S EMPLOYEES:

1. The District shall be responsible for the adequacy, efficiency, and sufficiency of employees and of any consultant, supplier or contractor employed by the District.

C. LIABILITY OF DISTRICT OFFICIALS:

1. Neither the Engineer, Resident Engineer, nor officers, employees, agents, nor representatives of the District, nor any of them shall be responsible for any liability arising under this contract, except such obligations as are specifically set forth herein.

2.03 AUTHORITY OF CONTRACTOR

A. CONTRACTOR'S REPRESENTATIVE:

1. The Contractor shall notify the District in writing of the name of the person who will act as the Contractor's representative and shall have the authority to act in matters relating to this contract. This person shall have authority to carry out the provisions of the contract and to supply materials, equipment, tools and labor without delay for the performance of the work.

B. CONTRACTOR'S EQUIPMENT:

1. The Contractor shall provide adequate and suitable equipment and means of construction to meet the requirements of the Contract, including completion within the time allotted. Only equipment suitable to produce the quality of work required will be permitted, and specific types of equipment may be requested on component parts of the work.

2. In any case where the use of a particular type or piece of equipment has been banned, or in cases where the Engineer has condemned for use on the work, any piece or pieces of equipment, the Contractor shall promptly remove such equipment from the site of the work. Failure to do so within a reasonable time shall be evidence of a breach of contract.

C. NONRECOGNITION OF SUBCONTRACTORS:

1. No subcontractor will be recognized as such, and all persons engaged in the Work will be considered employees of the Contractor, and their work shall be subject to all the provisions of the Contract.

2.04 RESPONSIBILITIES OF CONTRACTOR

A. RESPONSIBILITY OF THE CONTRACTOR:

1. The Contractor shall do all of the work and furnish all labor, materials, tools, equipment, and appliances, except as otherwise herein expressly stipulated, necessary or proper for performing and completing the work herein required, including any changes authorized by change order, in conformity with the meaning and intent of the plans, specifications, and all provisions of the contract, within the time specified.

2. The work shall be under the Contractor's responsible care and charge until its completion and final acceptance, bearing the entire risk of injury, loss, or damage to any part thereof by causes of any nature whatsoever. The Contractor shall rebuild, repair, restore, and make good all injuries, losses or damage to the Work or the materials occasioned by any cause, and shall bear the entire expense thereof.

3. If any discrepancies are discovered during the course of the work between the plans and conditions in the field, or any errors or omissions in the plans, the specifications, or in the layout given by stakes, points, or instructions, it shall be the duty of the Contractor to inform the Engineer immediately, and the Engineer shall promptly verify the same. Any work done after such discovery until authorized by the Engineer, will be done at the Contractor's risk.

4. In no case shall the use of subcontractors in any way alter the position of the Contractor or any sureties with relation to this contract. When a subcontractor is used, the responsibility for every portion of the work shall still remain with the Contractor.

5. The Contractor shall pay all valid claims of subcontractors, suppliers, and workers.

B. CONDUCT OF EMPLOYEES:

1. The District is committed to providing a safe, secure, and healthful working environment where individuals are free from the threat of violence, aggression, intimidation, harassment, or retaliation. The Contractor, subcontractors and employees shall conduct themselves in a proper and respectful manner. Any person who threatens, is abusive or harasses another individual shall be immediately removed from the site of the Work and shall not return.

2. Inappropriate behavior by District staff shall be immediately reported.

3. Any employee of the Contractor who fails to follow instructions from the District or is incompetent, unfaithful, intemperate, disorderly, or unsatisfactory behavior shall be immediately removed from the site of the Work and shall not return.

C. TERMINATION OF UNSATISFACTORY SUBCONTRACTS:

1. When any portion of the work which has been subcontracted by the Contractor is not being prosecuted in a satisfactory manner, the subcontract for such work shall be terminated immediately by the Contractor upon written notice from the Engineer, and the subcontractor shall not again be employed on the type of work in which such performance was unsatisfactory.

D. PAYMENT FOR LABOR AND MATERIALS:

1. The Contractor shall pay and require subcontractors to pay any and all accounts for labor including Workers Compensation premiums, State Unemployment and Federal Social Security payments and other wage and salary deductions required by law. The Contractor also shall pay and cause subcontractors to pay any and all accounts for services, equipment, and materials used during the performance of work under this contract. Such accounts shall be paid as they become due and payable. If requested by the District, the Contractor shall furnish proof of payment of such accounts to the District.

E. PERSONAL ATTENTION AND SUPERINTENDENCE:

1. The Contractor shall give personal attention to, and shall supervise the work to the end that it shall be faithfully prosecuted. A competent superintendent, who shall represent the Contractor during cases of absence, shall keep on the work throughout its progress and shall have complete authority to represent and act for the Contractor. Whenever the Contractor or the superintendent is not present on a particular part of the work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the foreman or other representative who may have charge of the particular work in reference to which the orders are given, or the Engineer may stop the work until the Contractor or superintendent arrives.

2. The Contractor shall be liable for the faithful observation of any instructions. Any order given by the Engineer not otherwise required by the specifications to be in writing, will, on request of the Contractor, be given or confirmed by the Engineer in writing.

F. COOPERATION WITH ENGINEER:

1. The Contractor, when requested, shall assist the Engineer in obtaining access to work which is to be inspected. The Contractor shall provide the Engineer with information requested in connection with the inspection of the work.

G. CONTRACTOR NOT AN AGENT OF THE DISTRICT:

1. The right of general supervision shall not make the Contractor an agent of the District. The liability of the Contractor for all damages to persons or to public or private property, arising from the execution of the work, shall not be lessened because of such general supervision.

H. OVERLOADING:

1. The Contractor shall not overload any structure or roadway beyond its design load capacity during construction. In addition to assuming full responsibility for bodily injury resulting from any such overloading, the Contractor shall repair to the Engineer's satisfaction or reimburse the District for the costs of repairing damage resulting therefrom. The Contractor shall submit load data to the Engineer upon request.

I. THIRD PARTY CLAIMS:

1. The Contractor shall be responsible for all third party claims and for costs or injuries incurred by a third party which result from the operations of the Contractor.

J. RESPONSIBILITY FOR ACCURACY:

1. The Contractor shall obtain all necessary measurements for and from the work, and shall check dimensions, elevations, and grades for all layout and construction work and shall supervise such work, the accuracy for all of which the Contractor shall be responsible. The Contractor shall adjust, correct and coordinate work with that of subcontractors and others so that no discrepancies will result.

K. PROHIBITED ACTIVITIES:

1. Firearms, fireworks, explosives, or alcoholic beverages are not permitted on District facilities. Pets and animals are also prohibited. These items may not be kept in vehicles which are operated or parked on District property.

L. MOTOR VEHICLES:

1. Individuals and motor vehicles operated at the EchoWater Facility shall comply with the Vehicle Code of the State of California. All roadways shall be considered public thoroughfares and the posted signs shall be observed.

2.05 DISTRICT-CONTRACTOR COORDINATION

A. LEGAL ADDRESS OF THE CONTRACTOR:

1. Both the address given in the Bid and the Contractor's office in the vicinity of the work are hereby designated as places to which plans, letters, notices, or other articles or communications to the Contractor may be mailed or delivered. The mailing or

delivery at either of these places shall be deemed sufficient notice thereof, upon the Contractor. Nothing herein contained shall be deemed to preclude the service of any plan, letter, notice, article, or communication to or upon the Contractor or representative personally.

B. SUGGESTIONS TO CONTRACTOR:

1. Any plan or method suggested to the Contractor by the Engineer or an inspector, but not specified or required, if adopted or followed in whole or in part, shall be used at the risk and responsibility of the Contractor; and the District and the Engineer will assume no responsibility therefor.

C. COOPERATION WITH OTHERS:

1. It is likely that the District, utility companies, and other contractors will be working within or adjacent to the area of the Work. The Contractor shall cooperate and coordinate with these other forces to avoid or minimize delays and interferences. The Contractor does not have exclusive use of the work area. Conflicts shall be referred to the Resident Engineer for resolution.

2. The Contractor shall be responsible for any expenses, damages or delays to others as a result of failure to cooperate.

D. DIFFERING SITE CONDITIONS:

1. The Contractor shall promptly, and before such conditions are disturbed, notify the District in writing of:

   a. Subsurface or latent physical conditions at the site differing materially from those indicated in this contract.

   b. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract.

2. The Engineer shall promptly investigate the conditions. If such conditions do materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of the Work whether or not changed as a result of such conditions, an equitable adjustment will be made and the contract modified in writing accordingly. The equitable adjustment will be made in accordance with the CONTRACT MODIFICATION PROCEDURES Section (01 26 00).

3. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required, except that the District may extend the prescribed time.

4. No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment.

E. RECEIPT OF CONTRACTOR'S PLAN:

1. The receipt by the Engineer of any drawing or any method of work proposed by the Contractor shall not relieve the Contractor of responsibility for any errors therein, and shall not be regarded as any assumption of risk or liability by the District or any officers or employees thereof, and the Contractor shall have no claim under this contract on account of the failure or partial failure or inefficiency of any plan or method so received. Such receipt shall mean merely that the Engineer has no objections to the Contractor using the plan or method so proposed. The information requested below shall be submitted for information only in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

   a. EXCAVATION: The Contractor shall submit for information only to the Engineer 5 days in advance of any excavation of trenches and structural excavations with a depth greater than 5 feet an engineered system which is a detail plan of shoring, bracing, sloping, or other provisions to protect workers from the hazards of caving ground or flooding during the operations. All plans for excavation shall be prepared and signed by a California registered civil or structural engineer. A signed copy of the Engineered System must be on the site at the time of the work. In no case shall the protective system be less effective than that required by the Construction Safety Orders of the Division of Industrial Safety of the California Department of Industrial Relations.

   b. The above in no way relieves the Contractor from the requirements of the HEALTH AND SAFETY REQUIREMENTS Section (00 73 19).

2. EXISTING STRUCTURE ISOLATION:

   a. The Contractor shall submit to the Engineer 5 days in advance of any existing structure isolation that requires construction of bracing, bulkheads or cofferdams, an engineered system which is a detail plan of the bracing, bulkhead or cofferdam or other provisions to protect the workers from the hazards of flooding during the operations. All plans for construction of temporary bracing, bulkheads or cofferdams shall be prepared and signed by a California registered civil or structural engineer. A signed copy of the engineered system must be on the site at the time of the work. In no case shall the protective system be less effective than that required by the Construction Safety Orders of the Division of Industrial Safety.

PART 3 -- SPECIFICATIONS AND DRAWINGS

3.01 INTENT OF PLANS AND SPECIFICATIONS

A. GENERAL:

1. It is the intent of the Contract that the Work shall result in a complete, reliable and satisfactory operating system that functions as planned and designed. The plans and specifications are complementary and shall be used together to determine intent or objective.

2. No additional compensation will be provided for anything not shown but reasonably necessary or required for the proper functioning of the unit, facility or system.

3. The prices in the Bidding Schedule shall be considered full compensation for providing all labor, materials, equipment, tools and incidentals necessary to complete the Work as required by the Contract.

B. CLARIFICATION OF CONTRACT DOCUMENTS:

1. Should it appear that the work to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the drawings or in the specifications, or in the event of any doubt or question arising respecting the true meaning of the specifications, the Contractor shall apply to the Engineer for further explanations.

3.02 DIVISION OF SPECIFICATIONS AND DRAWINGS

A. Specifications and plans are divided into groups for the convenience of the District, Engineer, and Resident Engineer. These Sections are not for the purpose of apportioning work or responsibility among subcontractors, suppliers and manufacturers.

3.03 DISCREPANCIES IN SPECIFICATIONS AND PLANS

A. The specifications and the drawings are intended to be explanatory of each other. Any work shown on the contract drawings and not in the specifications, or vice versa, is to be executed as if indicated in both.

B. In case of conflict, Division 0 (Procurement and Contracting Requirements), including these General Conditions, shall govern over all. Division 1 shall govern over Divisions 2 through 50, which shall govern over the contract drawings. The contract drawings shall govern over the Sacramento County Standard Specifications. The Contractor shall comply with the provisions of the INSTRUCTIONS TO BIDDERS Section (00 21 13) prior to bid regarding any conflict during the bid period. Any conflict the Contractor becomes aware of during the conduct of the work shall be brought to the attention of the Engineer. All work shown on the drawings, the dimensions of which are not figured, shall be accurately followed to the scale to which the drawings are made; however, figured dimensions are in all cases to be followed, though they may differ from scaled measurements.

C. Any work for which there are no provisions in the specifications or on the drawings shall be performed in accordance with the provisions of the State Specifications.

3.04 PRESERVATION OF PROPERTY

A. Roadside trees and shrubbery that are not to be removed, and pole lines, fences, signs, traffic control devices, survey markers and monuments, buildings, and structures, conduits, under or above ground pipelines, and any other improvements and facilities adjacent to the work shall be protected from injury or damage, and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored to a condition as good as when the Contractor entered upon the work, and all expenses of whatever nature arising from such damage shall be borne by the Contractor. Before the Contractor removes any road sign or permanent traffic control device which interferes with the work, approval is required from the Engineer.

3.05 EXISTING UTILITIES

A. It is recognized by the District and the Contractor that the location of existing utility facilities as shown on contract drawings and specifications are approximate; their exact location is unknown.

B. Recognition is given to the fact there may be additional utilities existing on the property unknown to either party to the contract. Location of utilities as shown on the plans and specifications represent the best information obtainable from utility maps and other information furnished by the various agencies involved. The District warrants neither the accuracy nor the extent of actual installations as shown on the drawings and specifications.

C. The Contractor agrees and is required to coordinate and fully cooperate with the District and utility owners for the location, relocation, and protection of utilities. The Contractor shall submit an Access Request prior to excavating on the site. The contractor is responsible to pothole all utilities shown on the contract drawings at all excavations, trench crossings or other earth disturbing activities a minimum of 48 hours in advance of the performance of said work at no additional cost. Potholing of utilities not shown on the contract drawings will be compensated for in accordance with the CONTRACT MODIFICATION PROCEDURES Section (01 26 00) if so directed by the Engineer.

D. In accordance with Section 4215 of the Government Code of the State of California, the District shall make provisions to compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating such main and trunk line utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work. Compensation will be in accordance with the CONTRACT MODIFICATION PROCEDURES Section (01 26 00).

E. In the event the Contractor discovers utilities not identified in the plans or specifications, the Contractor shall immediately notify the Engineer and the utility owner by the most expeditious means available and later confirm in writing.

F. The County of Sacramento is a member of the Underground Service Alert (U.S.A.) one-call program. The Contractor or any subcontractor shall notify U.S.A. two (2) business days in advance of excavation work by calling 800-642-2444 or 811.

G. Each phase of the project must be called to U.S.A. and continuing excavation reported every 14 calendar days, as the markings are not permanent and will fade out. The U.S.A. will designate a U.S.A. number which must be available to the inspector at the job site along with the date it was called in. If the U.S.A. notifications are not kept up to date, the excavation may be stopped and a new U.S.A. notice required before continuing the excavation.

H. Contractor will be required to utilize white paint to outline known areas of excavation prior to calling U.S.A. This paint shall be white dots located inside the excavated area so that when construction is completed there will be no remnants of the paint. At those locations where the excavation is not known, the excavator shall make an attempt to identify the areas that will be excavated. All utility companies and contractors will be required to use the following color codes and symbols for the identification of facilities:

Color Codes and Symbols

Color	Symbol	Name
Blue	W	Water
Orange	R	Railroad
	TV	Television
	WU	Western Union
	FA	Fire Alarm
	Tel	Telephone
	Com	Communications
Green	S	Sewer
	D	Storm Drain
Red	E	Electrical
	T	Traffic Signals
	L	Street Lighting
Yellow	G	Gas
	Co. Name	Oil and Chemical

I. The utility shall have the sole discretion to perform repairs or relocation work, or permit the Contractor to do such repairs or relocation work.

J. Unless otherwise indicated on the drawings or in the specifications, the Contractor shall maintain in service all drainage, water, gas, and sewer lines, including house services,

power, lighting, and telephone conduits, and any other surface or subsurface structure of any nature that may be affected by the Work.

K. Unless otherwise indicated in the specifications, the Contractor shall be responsible for protecting all existing utilities. The utility owner in these cases may elect to provide the necessary protective measures and bill the Contractor for the cost. Existing utilities shall further include traffic control devices, conduits, street lights, and related appurtenances.

3.06 CONFORMANCE WITH CODES AND REGULATIONS

A. All work and materials shall be in full accordance with the latest adopted standards and regulations of the State Fire Marshal; the Uniform Building Code; Title 24 of the California Administrative Code; the National Electrical Code; the Uniform Plumbing Code; National Fire Protection Act; and other applicable codes, laws or regulations. Nothing in these plans or specifications is to be construed to permit work not conforming to these requirements. When the work detailed in the plans and specifications differs from governing codes, the Contractor shall furnish and install the higher standard. The Contractor shall notify the Engineer whenever a possible code violation is discovered in the Work. If the higher standard so required is more expensive than the work detailed in the plans and specifications, the Contractor will be compensated for the additional costs.

3.07 PLANS AND SPECIFICATIONS

A. A complete set of the contracts drawings and specifications revised to include all addenda issued during the contract bid period will be provided to the Contractor on electronic media. One complete hard copy set of drawings and specifications shall be available at the site of the Work at all times. Contractor and/or subcontractors are responsible for producing hard copy sets of drawings and specifications for their use if so desired.

3.08 WORKING DRAWINGS AND SUPPLEMENTAL DRAWINGS

A. In addition to the plans incorporated in the contract at the time of signing, the Engineer may furnish such working drawings and supplemental drawings from time to time as may be necessary to make clear, or to define in greater detail, the intent of the drawings and specifications. In furnishing such additional drawings and instructions, the Engineer shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the nature of the work. These working drawings and supplemental drawings shall become a part of the contract documents.

PART 4 -- MATERIAL, EQUIPMENT AND WORKMANSHIP

4.01 MATERIALS AND TESTS

A. All materials shall be new and of a quality equal to that specified. Whenever the quality or kind of material or article is not particularly specified, the materials or articles shall be of the best grade in quality and workmanship. Materials to be used in the work will be subject to inspection and tests by the Engineer. The Contractor shall furnish without charge such samples as may be required. The Contractor shall furnish the Engineer a list of sources for materials and the locations at which such materials will be available for inspection. The list shall be submitted to the Engineer in sufficient time to permit inspecting and testing in advance of their use. The list shall include type of material, specification section, source of supply, address and phone number of supplies and purchase order number.

4.02 EQUIPMENT AND METHODS

A. Only equipment and methods suitable to produce the quality of work required will be permitted on the project. If any part of the Contractor's plant, equipment, or methods of execution of the work appear to the Engineer to be unsafe, inefficient, or inadequate to insure the required quality or rate of progress of the work, the Contractor may be ordered to increase or improve the facilities or methods. However, neither compliance with such orders nor failure of the Engineer to issue such orders shall relieve the Contractor from the obligation to secure the degree of safety, the quality of work, or rate of progress required.

4.03 MATERIAL AND EQUIPMENT SPECIFIED BY NAME AND INSTALLATION

A. GENERAL:

1. When any material or equipment is indicated or specified by patent or proprietary name or by the name and catalog number of two or more manufacturers, it shall be considered as used for convenience in describing the material or equipment desired. The use of an alternative material or equipment which is of equal quality, operability, maintenance history, and reliability, and of the required characteristics for the purpose intended may be permitted. Requests for such post bid substitutions shall be made in writing by the Contractor and submitted in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) with ample time to permit approval without delaying the work. Until and unless such substitutions are approved by the District Representative, no deviations from the specifications shall be allowed. The burden of proof as to the quality and suitability of the alternative shall be upon the Contractor. The District Representative shall be the sole judge as to the quality and suitability of alternative materials or equipment.

2. Refer to the specific technical specifications for “or equal” submissions that must be made **prior to bid**, and are listed in the PROPOSED PRODUCTS FORM

Section (00 43 33). Request for such substitution shall be made in writing in accordance with the SUBSTITUTION REQUEST FORM Section (00 43 25).

B. SINGLE SOURCE PRODUCTS:

1. If material or equipment is specified by only one patent or proprietary name, or by the name of only one manufacturer, it is for the purpose of standardization or because the District knows of no equal. If standardization is the reason for using one name to specify any material or equipment, the specification will so state, and substitutions will not be considered. In other cases, the Contractor may offer substitutions of products considered to be equal to that specified in accordance with paragraph 4.03A above.

C. PREQUALIFIED VENDORS:

1. If material or equipment is specified by vendors or manufacturers, only the listed sources shall be used and substitutions will not be considered.

D. INSTALLATION TO SUIT SUPPLIED EQUIPMENT:

1. The arrangement of equipment shown on the drawings is based upon information available to the District at the time of design and is not intended to show exact dimensions peculiar to a specific manufacturer. The drawings are diagrammatic and some features of the illustrated equipment may require revision to meet actual equipment installation requirements. Structural supports, foundations, connected piping, valves, and electrical conduit specified may have to be altered to accommodate the equipment provided. As-built drawings and O&M submittals must reflect field-installed equipment, conditions, and related information. No additional payment will be made for revisions and alterations.

2. All mechanical, electrical, and instrumentation equipment shall be installed in conformity with the details specified and with the manufacturer's requirements. Should a manufacturer's installation recommendations conflict with requirements of the Contract, the Contractor shall bring the matter to the attention of the Engineer. Costs incurred to accommodate named manufacturer's installation recommendations will be reviewed for an equitable adjustment. Any additional costs incurred arising out of changes to accommodate substitution manufacturer's installation recommendations shall be the responsibility of the Contractor.

3. The Contractor shall notify the Engineer if change is needed to meet the requirements of named or substitution supplied equipment. This notification should occur as part of the equipment submittal process. The District will revise the contract documents at no additional cost to the Contractor. If the revision does not require a change order, the revised contract documents will be provided to the Contractor as part of the equipment submittal, normally within 45 days of notification. The Contractor shall notify the Engineer in writing within 20 days of receipt of the revised contract documents of the acceptance of the revision.

4.04 DEMONSTRATION OF COMPLIANCE WITH CONTRACT REQUIREMENTS

A. INSPECTION:

1. To demonstrate compliance with the contract requirements, the Contractor shall assist the Engineer with inspection. The Contractor shall grant the Engineer access to the work and to the places where work is being prepared, or where materials, equipment or machinery are being supplied. The Contractor shall provide information requested by the Engineer in connection with inspection work.

2. If the contract documents, laws, ordinances, or any public regulatory authority require parts of the work to be specially inspected, tested or approved, the Contractor shall give the Resident Engineer adequate prior written notice of the availability of the work for examination.

3. The Contractor shall provide written notification 48 hours ahead of work requiring inspection. If parts of the work are covered prior to the Resident Engineer getting adequate prior written notice of the availability of the subject work for examination, the cost of exposing the work for inspection and closing shall be borne by the Contractor regardless of whether or not the work is in compliance with the Contract.

4. If any work is covered in the absence of the Engineer's directive to the contrary, the Contractor shall, if directed by the Engineer, uncover, expose or otherwise make available for inspection, portions of covered work. If it is found that such work is defective, the Contractor shall bear the costs for uncovering and reconstructing. If the work is found to be in compliance with the Contract, the Contractor will be compensated.

5. If any equipment is installed or operated in the absence of the Engineer or the Engineer has reason to believe that damage has occurred, the Contractor shall remove and disassemble the equipment for inspection. If it is found that the work is defective or damaged, the Contractor shall bear the expense of removal, repair, and reinstallation. If no defective work or damage is found, the Contractor will be compensated.

B. PROOF OF COMPLIANCE WITH CONTRACT:

1. In order that the Engineer may determine compliance with requirements of the contract not readily enforceable through inspection and tests of materials or work, the Contractor shall, at any time when requested, submit to the Engineer documents or other proof of compliance with the requirements.

C. PLANT INSPECTION:

1. The Engineer may inspect the production of materials or manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of the Contractor and the

material producer. The Engineer shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection and tests.

2. The District assumes no obligation to inspect materials at the source of supply. The responsibility for providing satisfactory materials is the Contractor's.

3. Materials shall be furnished in ample quantities and at such times as to assure uninterrupted progress of the work. Materials, supplies, and equipment shall be properly stored and protected. The Contractor shall be responsible for damage or loss by weather or other causes.

D. EFFECT OF INSPECTION OR USE:

1. Neither the inspection, nor any measurement, approved modification, order or certificate, nor acceptance of any part or whole of the work or payment of money, nor any possession or use by the District or its agents, shall waiver any provisions of the contract or of any power or authority reserved therein, or to any right to damages thereunder; nor shall the waiver of any breach of this contract be held to be a waiver of any subsequent or other breach.

4.05 PROTECTION OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be protected in accordance with the PRODUCT DELIVERY REQUIREMENTS Section (01 65 00).

4.06 MANUFACTURER

A. Manufactured articles, material and equipment shall be stored, applied, installed, connected, erected, adjusted, tested, operated and maintained as recommended by the manufacturer, unless otherwise specified. Manufacturer's installation instructions and procedures shall be submitted in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) prior to installation of the manufactured articles, material and equipment.

4.07 DEFECTIVE WORK

A. REMOVAL OF REJECTED MATERIALS OR WORK:

1. The Contractor shall, without delay, remove from the site of the work, all rejected or defective materials. No such rejected or defective materials shall be used in any work under this contract. All work which has been rejected shall be remedied, removed and replaced at the expense of the Contractor.

2. Upon failure of the Contractor to comply within 48 hours with any written order of the Engineer, or to make satisfactory progress, the District may cause the rejected materials to be removed, or the rejected work to be remedied, or removed and replaced, and deduct the costs from any sums due the Contractor.

B. RETENTION OF DEFECTIVE WORK:

1. Prior to acceptance of the project, the District may, at its option, retain work which is not in compliance with the contract if the District determines that such defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable. The District also may retain defective work, if, in the opinion of the Engineer, removal of such work is impractical or will create conditions which are dangerous or undesirable. A just and reasonable value for such defective work shall be determined by the District and appropriate deductions shall be made in the payments due the Contractor. Final acceptance shall not act as a waiver of the District's right to recover from the Contractor an amount representing the deduction for retention of defective work.

4.08 GUARANTEE

A. Should failure of the work occur within a period of one year or longer, as required in the Contract documents, after acceptance of the project, or portions thereof by the District, which can be attributed to faulty materials, poor workmanship, or defective equipment, the needed repairs shall be performed promptly at the Contractor's expense including but not limited to disconnection, shipping, repair and reinstallation.

B. The Contractor shall provide guarantee statements in the form provided to guarantee various segments of the work for the length of time specified.

C. The Contractor is alerted that equipment and materials installed under this Contract will be used by the District during the testing periods. In addition to the one year guarantee, the Contractor shall provide an extended warranty during the District's use prior to acceptance.

D. If the Contractor fails to complete the aforesaid repairs within 10 days after receipt of written notice, the District will make repairs at the Contractor's expense without further notice and without any notice to the surety. However, in case of emergency where, in the opinion of the Engineer, delay would cause serious loss or damages, or a serious hazard to the public, the repairs may be made or lights, signs, and barricades erected, without prior notice to the Contractor or surety, and the Contractor shall pay the costs thereof.

4.09 PROPERTY RIGHTS IN MATERIALS

A. Nothing in this contract shall be construed as vesting in the Contractor any right of property in the materials used, after they have been installed, attached, or affixed to the work, but all such materials shall be the property of the Contractor and the District jointly as their interests may appear, and cannot be removed from the work without the consent of the Engineer.

4.10 QUALITY IN THE ABSENCE OF DETAILED SPECIFICATIONS

A. Where the contract requires that materials or equipment be provided or that construction work be performed, and detailed specifications of such materials, equipment or construction work are not set forth, the Contractor shall perform the work using materials and equipment of a quality comparable to the materials and workmanship specified for the other parts of the work and at least equal to the general standard of quality found within the existing work and shall follow best practices in the performance of construction work. The work performed shall be in conformity and harmony with the intent to secure the best documentation, standard of construction, and equipment of work as a whole and in part.

PART 5 -- PROGRESS AND COMPLETION

5.01 PRECONSTRUCTION CONFERENCE

A. Prior to start of construction, a conference will be held for the purpose of reviewing the construction program.

5.02 BEGINNING OF WORK

A. The return of the executed contract, together with the prescribed bonds and certifications of insurance, and when required, advance on incidental expenses and acquisitions, shall constitute authority for the Contractor to enter upon the site of the work and to begin operations. Should the Contractor start work in advance of receiving notice that the contract has been executed for the District, however, any work performed in advance of the date of approval shall be at the Contractor's own risk. Should the Contractor desire to begin work prior to the execution of the Contract, the Contractor shall furnish to the Engineer insurance certificates. When work has started, the Contractor shall diligently prosecute the work to completion within the Contract Time.

B. The Contractor shall give the Engineer at least 5 working days' notice of the intention to start work, indicating the intended beginning time, date, and location.

C. The counting of Contract Time shall begin the date of receipt of notification that the Contract has been executed for the District. Such notification will be sent by certified mail and shall be deemed to be the Notice to Proceed. In no event shall there be a period of time greater than 30 days (exclusive of such time as all completed documents are in the possession of the District) from the time the contract forms are received by the Contractor and the commencement of the Contract Time, regardless of the receipt of signed documents and/or completion of provisions regarding required bonds and certificates.

5.03 TIME OF COMPLETION AND DELAYS

A. TIME OF COMPLETION:

1. Time is of the essence on this contract. The Contractor shall complete all work called for under the contract within the times set forth in the CONTRACT TIME Section (01 14 20).

2. For the purposes of determining completion of the Work within the specified times, the Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week and the number of working days charged to date for each Work Item with a completion time. The Contractor will be allowed 15 calendar days to file a written protest of the working day statement, otherwise the counting of working days shall be deemed accepted by the Contractor.

B. UNFAVORABLE WEATHER AND OTHER CONDITIONS:

1. During unfavorable weather and other conditions, the Contractor shall pursue only portions of the work that will not be damaged. No portions of the work whose satisfactory quality or efficiency will be affected by any unfavorable conditions shall be constructed while these conditions remain, unless, by special means or precautions approved by the Engineer, the Contractor shall be able to overcome them. Costs associated with implementation of any such special means or precautions shall be paid by the Contractor.

C. DELAYS:

1. NOTICE OF DELAYS:

a. Whenever the Contractor foresees any delay in the prosecution of the work, and in any event within 24 hours of the occurrence of any delay which is regarded as an unavoidable delay, the Contractor shall notify the Engineer in writing of the probability of the occurrence of such delay and its cause, in order that the Engineer may take steps to prevent the occurrence or continuance of the delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work are to be delayed.

b. After the completion of any part or the whole of the work, the Engineer, in estimating the amount of time extensions and compensation, if any, due the Contractor, will assume that any and all delays which have occurred have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found to have been unavoidable. The Contractor will make no claims that any delay not called to the attention of the Engineer at the time of its occurrence has been an unavoidable delay.

2. AVOIDABLE DELAYS:

   a. Avoidable delays in the prosecution of the work shall include delays which could have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or subcontractors. Avoidable delays include, but are not limited to, the following:

      Delays which may in themselves be unavoidable but which affect only a portion of the work and do not necessarily prevent or delay the prosecution of controlling items of work nor the completion of the whole work within the Contract Time.

      Time associated with the reasonable interference of other contractors employed by the District which do not necessarily prevent the completion of the whole work within the Contract Time.

3. UNAVOIDABLE DELAYS:

   a. The Contractor will be granted an extension of time for delays which the Engineer has determined resulted from causes beyond the control of the Contractor and which could not have provided for by the exercise of care, prudence, foresight, and diligence.

   b. Unavoidable delays shall be those caused by acts or neglect of the District which could not have been reasonably anticipated by the Contractor; by acts of God or of the public enemy, fire, floods, epidemics, pandemics, or strikes. Material shortages and delays in utility company relocations may be classified as an unavoidable delay if the Contractor can produce satisfactory evidence of having acted in a timely manner. Any curtailment of the Contractor's operations due to the action of the Air Pollution Control Board not related to Contractor's action or inaction shall be considered an unavoidable delay. Actions by the Air Pollution Control Board as a result of Contractor's actions or inactions will be considered an avoidable delay.

   c. Delays in the prosecution of parts of the work which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of controlling items of work nor the completion of the whole work within the time specified will not be considered as unavoidable delays. Reasonable loss of time resulting from the necessity of submitting plans for approval of the Engineer, from the making of surveys, measurements, inspections by the Engineer or from interference by other contractors which does not necessarily prevent the completion of the whole work within the time herein specified, will not be considered as unavoidable delays.

D. EXTENSION OF TIME:

1. The Contractor shall be allowed an extension of time for unavoidable delays, plus any adjustments of Contract Time due to change orders. Applications for an extension of time must be made in writing before the expiration of the times fixed in the Contract for the completion of Work Items specified in the CONTRACT TIME Section (01 14 20), or of the time granted by extension.

2. Where the time for completion for a Work Item is specified as a date, rather than working days, the Contractor may not be allowed an extension of time to complete the Work Item. In such cases, the District will consider payment of costs associated with acceleration of the work.

   a. AVOIDABLE DELAYS:

      In case the work is not completed in the time specified, including extension of time as may have been granted for unavoidable delays, the Contractor will be assessed liquidated damages.

   b. UNAVOIDABLE DELAYS:

      For delays which the Contractor considers to be unavoidable, complete information demonstrating the effect of the delay on the controlling operation in the Construction Schedule shall be submitted to the Engineer. The submission shall be made within 30 calendar days of the occurrence which is the cause of the unavoidable delay. The Engineer shall review the Contractor's submission and determine the number of days of unavoidable delay and the effect of such unavoidable delay on controlling operations. The District agrees to grant an extension of time to the extent that unavoidable delays affect controlling operations. The Contractor will be granted a time extension as a result of inclement weather as provided for in Part 3 of the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16).

      It is understood and agreed by the Contractor and District that time extensions due to unavoidable delays will be granted only if such unavoidable delay involves controlling operations which would prevent completion of the Work Items within the Contract Times.

   c. EFFECT OF EXTENSION OF TIME:

      The granting of an extension of time for the completion of the Work on account of delays which are unavoidable delays, or which are granted for extra or additional work, shall in no way operate as a waiver on the part of the District of any of its rights under this contract.

E. COMPENSATION FOR DELAYS:

1. AVOIDABLE DELAYS--NO COMPENSATION: The Contractor shall not receive any additional compensation for avoidable delays.

2. UNAVOIDABLE DELAYS--NO COMPENSATION: The Contractor shall not receive any additional compensation due to inclement weather or conditions resulting therefrom; by acts of God or of the public enemy, fire, floods, epidemics, pandemics, strikes, material shortages or due to action of the Air Pollution Control Board not attributed to Contractor actions or inactions.

3. UNAVOIDABLE DELAYS--COMPENSATION: The Contractor shall be entitled to additional compensation for unavoidable delays which the Engineer has determined resulted from an act or neglect of the District, or as a result of the discovery of cultural resources as specified in the ARCHEOLOGICAL AND CULTURAL RESOURCES Section (01 35 91) except as modified below:

   a. Compensation for unavoidable delays shall not be granted when the delay could have been reasonably anticipated by the Contractor.

   b. When two or more concurrent delays occur with at least one or more being noncompensable, no compensation other than time extension shall be provided.

   c. Compensation for unavoidable delays shall be granted only if such unavoidable delay affects controlling operations which would prevent completion of the Work.

4. DAMAGES FOR DELAY: For the period of time that any portion of the work remains unfinished after the time fixed for completion of any Work Item or Contract Milestone as specified in the CONTRACT TIME Section (01 14 20), as modified by extensions of time, it is understood and agreed that liquidated damages are due.

5.04 TEMPORARY SUSPENSION OF WORK

A. The Engineer shall have the authority to suspend the work wholly or in part, for such period as deemed necessary due to unsuitable weather or for any other conditions considered unfavorable for the prosecution of the work; or for such time as deemed necessary due to the failure of the Contractor to carry out orders or to perform any provisions of the Contract. The Contractor shall immediately comply with written order of the Engineer. The suspended work shall be resumed only when conditions are favorable or methods are corrected as ordered or approved in writing by the Engineer.

B. If the Engineer orders a suspension of the work which is the current controlling operation due to unsuitable weather or to other conditions which are considered unfavorable to the prosecution of the work the days on which the suspension is in effect shall not be considered working days.

C. If a suspension of the work is ordered by the Engineer due to the failure of the Contractor to carry out orders or to perform any provisions of the Contract, the days on which the suspension order is in effect shall be considered working days. The Contractor shall not be entitled to damages or compensation due to suspension.

D. In case of suspension of work from any cause whatever, the Contractor shall be responsible for all materials and shall store them properly if necessary and shall provide suitable drainage and erect temporary structures where necessary.

5.05 TERMINATION OF CONTRACT (REFER TO RFB UNDER GENERAL TERMS AND CONDITION)

5.06 SUBSTANTIAL COMPLETION

A. When the Contractor considers the entire Work, or a specific portion of the Work as defined by Work Item in the WORK RESTRICTIONS Section (01 14 00) and Contract Milestone in the CONTRACT TIME Section (01 14 20), substantially complete, the Contractor shall certify in writing to the District that the Work is substantially complete and request that the District grant substantial completion. Within five (5) Working Days, the District and the Contractor shall inspect the Work to determine the status of completion. If the District does not consider the entire Work, or a specific portion of the Work, substantially complete, the District will notify the Contractor in writing, giving the District's reasons. If the District considers the entire Work, or a specific portion of the Work, substantially complete, the District will grant substantial completion. Unless otherwise specified in the Special Provisions, the entire Work, or a specific portion of the Work, will be considered substantially complete when all work depicted on the contract drawings and required by the Contract Documents has been performed. Only minor corrective work will be allowed to be considered as punch list work. The District will provide a list of items to be completed or corrected (punch list) before Field Inspection and Field Acceptance per paragraph 5.07 below. Within ten (10) Working Days of being provided a list of items to be completed or corrected, the Contractor shall proceed to correct or complete such items. The counting of time for liquidated damages will cease for the entire Work, or a specific portion of the Work, on the date substantial completion is granted, but shall not bind the District to Final Acceptance nor relieve the Contractor from the responsibility of completing or correcting any work. In order to achieve the Contract Milestones as defined in the CONTRACT TIME Section (01 14 20), the Contractor shall allow sufficient time for the District to determine the status of completion as defined above. The Liquidated Damages defined in the CONTRACT TIME Section (01 14 20) will apply up to the date Substantial Completion is granted by the District.

5.07 FIELD ACCEPTANCE

A. The Contractor shall notify the District in writing of the completion of the punch list per paragraph 5.06 above, and the District shall promptly inspect the Work. The Contractor or the Contractor's representative shall be present at the final inspection. The Contractor will be notified in writing of any defects or deficiencies. The Contractor shall proceed to

correct such defects or deficiencies within ten (10) Working Days of such notification. When notified that correction of the defective or deficient work is complete, the District will again inspect the Work to ascertain that the corrections are in accordance with the Contract. The District will issue a Field Acceptance letter and will record a notice of completion with the County Recorder within ten (10) Working Days. All retention not withheld due to stop notices or disputed work will be released within 60 Calendar Days of the recording of the notice of completion. Field Acceptance by the District shall cause the commencement of warranty periods, but shall not bind the Board to Final Acceptance nor relieve the Contractor from the responsibility of completing or correcting any work.

5.08 USE OF COMPLETED OR PARTIALLY COMPLETED PORTIONS OF THE WORK

A. The District shall have the right to take possession and use any completed or partially completed portions of the Work. Such possession and use shall not be deemed as substantial completion or acceptance. The District may exclude the Contractor from completing the work if construction activities might interfere with the operation or maintenance of the plant. The District may complete the work after giving the Contractor notice of intention to do so. If the District completes the work, the cost for such work will be charged to and deducted from amounts due to the Contractor. Division of responsibilities between District and Contractor, beginning of guarantee, and any other issues relating to field acceptance shall be as specified in this section.

5.09 DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE OR OTHER UNUSUAL CONDITIONS; INVESTIGATIONS; CHANGE ORDERS; EFFECT ON CONTRACT.

A. If this Contract involves digging trenches or other excavations that extend deeper than 4 feet below the surface, the following shall apply:

B. The Contractor shall promptly, and before the following conditions are disturbed, notify the District in writing of any:

1. Material that the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

2. Subsurface or latent physical conditions at the site differing from those indicated.

3. Unknown physical conditions at the site of any unusual nature different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

C. The District shall promptly investigate the conditions, and if it finds that the conditions do materially differ, or do involve hazardous waste, and cause a decrease or increase in

the Contractor's cost of, or the time required for, performance of any part of the work shall issue a Field Instruction.

D. In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of or time required for performance of the Work, the Contractor shall not be excused from any completion requirements, but shall proceed with all work. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

E. The Contractor shall be responsible and liable for the handling, storage, testing, hauling, and disposal of hazardous waste generated as a result of the work. The Contractor shall not be considered the generator of pre-existing hazardous environmental substances that the Contractor did not introduce to the site. The District Representative shall sign any required manifests for such substances as the generator.

****END OF SECTION****

SECTION 00 73 19

HEALTH AND SAFETY REQUIREMENTS

1.01 GENERAL

A. All operations shall conform to applicable occupational safety and health standards, rules, regulations and orders which include, but are not limited to: Title 29 of the Code of Federal Regulations and the Electrical, Construction, Tunnel and General Industry Safety Orders issued by the Division of Industrial Safety (Cal/OSHA) of the State of California. In the event of a conflict between the requirements in the referenced standards, the most stringent standard shall prevail.

B. The Contractor shall submit their Injury and Illness Prevention Program (IIPP) for review.

C. All contractors, vendors and visitors will wear hardhats and safety vests at all times while in construction areas. In addition, if necessary, but not limited to: appropriate foot, eye and ear protection shall be worn.

D. Contractor shall have a Site Specific Safety Plan that has been specifically prepared for the contemplated work. Site Specific Safety Plan shall comply with section 3203 of Cal/OSHA and shall be applicable to all individuals engaged in the Work, including the Contractor's subcontractors, suppliers and others.

E. An Emergency Action Plan and a Fire Prevention Plan in accordance with sections 3220 and 3221 respectively of Cal/OSHA shall be included in Site Specific Safety Plan.

F. The responsibility for safety rests with the Contractor who must provide a safe work site for workers and other individuals entering the area.

G. District reserves the right to stop any work activity that creates a serious safety violation as defined by Cal/OSHA,

H. In accordance with OSHA's National Emphasis Program (NEP), any contractor or subcontractor working on or adjacent to chlorine, sulfur dioxide, and/or digester gas systems during a Process Safety Management (PSM) inspection will also be inspected by OSHA per CPL 02-09-06.

1.02 PROJECT SPECIFIC SAFETY PROGRAM

A. Project Specific Safety Program shall include:

1. Designation of Safety Manager. A resume shall be provided.

2. Detailed description of Project Specific Safety Plan.

3. Policies and procedures to ensure compliance with regulations.

4. Staffing plan and organization chart for implementation of the safety program.

5. Training program including new employee orientation.

6. List of equipment, supplies, materials and personal protective devices that will be available and utilized.

7. Description of accountability for foreman and supervisors.

8. Site Specific Emergency Response Plan for accidents/incidents and injuries.

9. Description of accident investigation and reporting procedures.

10. Description and frequency of tailgate and regular safety meetings.

11. Participation of subcontractors, suppliers and others in Project Safety Program.

12. Method of identifying, correcting, or remedying situations that are unsafe or not in compliance with Project Safety Program.

13. Plans and procedures for confined space entries.

14. Provisions for excavation safety.

15. Procedure for preparation of Work Permits.

16. Method to remedy nonconforming situations.

B. Project Specific Safety Program and revisions shall be reviewed by a full time Safety Professional. The full time Safety Professional shall state that the Project Specific Safety Program is adequate and complies with the regulations applicable to the Work. The Project Specific Safety Program shall be submitted to the District Representative, for review, prior to commencement of work and shall remain in effect until the Work has been completed. Project Specific Safety Plan shall be reviewed, updated, and changes submitted as they occur.

1.03 SAFETY MANAGER

A. A Safety Manager shall be designated who has responsibility for safety of the Work and who has the duty to implement and secure compliance with the Site Specific Safety Plan. This individual shall have the authority to act and affect all aspects of the Project Specific Safety Program. Safety Manager shall have the authority to remedy or correct any unsafe or noncompliance situations or problems.

B. Safety Manager or designated alternate individual shall be on site when Work is being pursued. Contractor will be permitted to designate an alternate individual to act on behalf of Safety Manager when Safety Manager is absent from the work site.

C. Safety Manager shall have 5 years of industrial and heavy construction experience on projects similar to the Work. Three years of this experience shall involve full-time, construction site safety responsibilities. Safety Manager shall be knowledgeable of occupational health and safety rules and regulations.

D. Safety Manager shall prepare Work Permits for each confined space entry and shall organize and observe each entry.

E. Safety Manager and a District Representative shall tour the site on a weekly basis to observe the Work.

1.04 PROTECTION OF WORKERS

A. The EchoWater Facility receives sewage and industrial wastes. There is a possibility that solvents, fuels and hazardous material may be in the wastewater. The wastewater and the associated facilities should be considered contaminated. Individuals who contact wastewater, debris or existing facilities should take appropriate safety and health precautions such as personal protective equipment and inoculations for disease.

B. Safety equipment and precautions shall be utilized to protect workers, District personnel, and the general public during the work.

C. NIGHTTIME LIGHTING CONTROL

1. If nighttime construction lighting is required, the construction contractor shall shield and orient lighting downward and directed away from any nearby biological receptors to minimize effects. Lighting shall be directed toward active construction areas only, and shall have the minimum brightness necessary to ensure worker safety.

1.05 WORK PERMITS

A. There are areas and operations at the EchoWater Facility which are potentially hazardous or dangerous if the appropriate precautions are not taken. The Work Permit process is utilized to review proposed work activities and to ensure good work practices and appropriate safety measures are followed. Contractor is required to prepare Work Permits and comply with the stipulated conditions. A Work Permit shall provide a detailed description of the proposed activities and sequencing.

B. The Work Permit procedure is described in the COORDINATION WITH OCCUPANTS Section (01 14 16). Examples of activities which require a Work Permit are:

1. Operations that have open flames, the potential for sparks or activities that may result in high temperatures. Examples include welding, cutting, grinding and electrical work.

2. The use of tools or electrical equipment in classified areas.

3. Work on equipment or piping which contains, or has contained, a flammable or hazardous material, chemical or gas. Work on or in proximity to chemical or gas storage facilities.

4. The use of hazardous materials.

5. Activities which involve electricity at greater than 500 volts.

6. Activities that involve pressures greater than 150 psi.

7. Activities that involve work in a confined space including the opening of vaults and manholes.

8. Activities that involve special precautions required by Cal/OSHA.

1.06 REPORTING

A. Monthly, Safety Manager shall prepare and submit a narrative report describing actions, incidents, near-misses and topics related to safety. The report shall indicate past events and proposed future activities. A summary of events of weekly job site tours shall be included.

B. All incidents that are reportable on OSHA Form 300 or that result in property damage in excess of $1,000 shall be promptly reported to District. A detailed description of the incident including names and statements of witnesses shall be provided within 5 days of the occurrence.

C. Contractor shall inform the District within 5 days of any claims, suits, or citations of violations that may arise from an incident or injury.

1.07 NON COMPLIANCE

A. When a serious hazard is identified, the Contractor will receive a verbal notification of the problem and a request to rectify the situation. If the situation is not corrected in the allotted time or reoccurs, a written notification will be issued to the Contractor that will clearly describe the condition, date Contractor initially was notified, the recommended action and the expected date of compliance. If the situation is not corrected, the Contractor's worker's compensation insurance carrier will be notified.

****END OF SECTION****

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. The work may be subdivided into one or more work items. A work item shall be completed as a unit or subproject in accordance with the Contract. The required completion of a work item by a certain deadline may be necessary due to other construction constraints.

B. The details of each work item are in the specifications and on the drawings. The completion of a work item shall provide an operating system or facility that is substantially complete and available for utilization. All work shown on the plans and in the specifications is required, whether or not it is specifically addressed in the table of work items in this section.

C. The work items listed below describe phases of work and their respective requirements. Substantial completion of a work item includes successful completion of all testing. The Work Items and the Contractor Requirements are listed below in Table 1 and Table 2, respectively. Table 1 is itemized numerically and Table 2 is cross-referenced alphabetically. Likewise, Table 2 is itemized alphabetically and Table 1 is cross-referenced numerically.

D. The Contractor shall observe the following general requirements:

1. The District will drain existing piping, equipment or structures to the level of the lowest existing drain line. The depth of water remaining in a given pipe, equipment, or structure will vary depending on the distance of the drain from the leakage source. The District will remove any large deposits of solids; however, there may be a solids residue remaining on any surface. Any subsequent cleaning or further draining and/or dewatering shall be provided by the Contractor.

2. The Contractor shall provide all necessary temporary pumps, piping, electrical wiring, controls and labor during and subsequent to all shutdown activities as required. Pumps and upstream water levels shall be continuously monitored by the Contractor during all temporary pumping operations to insure against process upsets, flooding, and bypassing.

3. The Contractor shall maintain adequate access to the plant facilities, utilities, and equipment during construction to allow continued operation and maintenance by plant personnel to take place.

4. Some shutdowns will have to take place during other than normal working hours, such as early mornings, nights, holidays, and weekends. Where these are foreseen, they have been identified in this section.

5. The Contractor shall limit shutdowns of existing substations, feeders, and motor control centers to periods when workers are actually performing work on the affected equipment. Only one of the two 12kV feeds to any area substation/double-ended switchgear may be shut down at any time, unless otherwise approved by the District. Entry into electrical manholes for cable work may be prohibited on weekends or restricted during wet weather depending on the criticality or redundancy of the affected system. All electrical shutdowns shall be returned to service on nights, weekends, and holidays, unless approved by the District.

6. The Contractor shall coordinate all crafts and subcontractors to minimize the number and duration of shutdowns. Non-coordinated shutdowns that result in a cost of manpower or materials to the District shall be back-charged to the Contractor and will be deducted from progress payments.

7. The Contractor shall note that all slide gates leak, and some sluice gates and valves leak. The Contractor is required to remove leakage of any liquids including wastewater and sludge from work areas and operating areas.

8. The discharge point and rate of drainage and/or dewatering operations is subject to District approval.

9. All existing equipment and processes shall remain under control of the District. New equipment which has been connected to existing processes may be operated by the Contractor only with prior approval of the District.

10. The Contractor shall design and provide all necessary bulkheads, cofferdams, and support structures to allow isolation from work areas of basins, tanks, and/or channels which are in service. Bulkheads, cofferdams, and support structures shall conform with applicable OSHA requirements and shall be submitted in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

11. To complete a Work Item, testing of partial systems will be required. The Contractor shall provide temporary power, isolation and testing fluid supply and disposal as necessary to test the partial systems. All testing shall be in conformance with the testing forms available in Section (40 05 03).

12. Access requests are required in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16) for all activity that affects an existing facility or operation including testing and the movement of personnel and vehicles at the plant.

1.02 WORK ITEMS

Table 1. Work Items

Item Number	Work Item Description	Contractor Requirement Cross Reference
1	Each of the work items described below for the piping must be complete including testing, cleaning, startup, and As-Built documentation.	XXX
2	The scope of work includes the replacement of existing WRH piping, associated pipe supports, and other ancillary systems, as indicated in the design drawings at the primary deck level. This includes the demolition of existing WRH piping system and installation of a new 4” WRH main header running from south to north, along with seven WRH branch lines extending east to west. These branch lines supply water to the SRW piping and utility stations serving all 12 primary tanks. The scope also includes replacing the SRW piping from its connection at the WRH isolation valve to the elbow at the tank wall for each WRH branch. In addition, all utility stations connected to the 4” main header or the 3” and 4” branch pipes will be replaced.	B

Table 2. Contractor Requirements

Requirement Number	Requirement	Work Item Cross Reference
A	The West Side Segments work for Phase 1 will be executed in seven consecutive phases, avoiding parallel activities. At each designated location, spanning various columns across Batteries 1 through 4, a new isolation valve will be installed to separate the west side of the WRH piping from the east. Following isolation valves installation, existing piping in each west segment will be demolished and replaced, with tie-ins completed to the new WN piping and the corresponding WN valves opened. Each segment's shutdown duration must not exceed 8 working days.	1,2
B	Phase 2 involves work on the East Side Segments, to be carried out in seven consecutive phases, with no parallel activities. At each designated location across Batteries 1 through 4, the existing WRH valve will be closed while a secondary valve is already shut, effectively isolating the east segment. Following isolation, the existing piping will be demolished and replaced. Each segment's shutdown duration must not exceed 7 working days.	1,2
C	Phase 3 focuses on the main header and will be executed as a single operation. At each specified location across Batteries 1 through 4, the main header will be isolated by closing all seven WRH isolation valves at the deck level, along with the isolation valves in the central tunnel and equipment gallery (31WRH19 and 39WRH11). This configuration allows for safe isolation of the main header while maintaining full operation of all seven WRH branch lines (east-west piping) and the SRW piping. New isolation valves are required to be installed on the main header as indicated in the design drawings. Segmental isolation will be needed to perform individual valve installations across all batteries. This phase should be completed in 20 working days.	1,2
D	Phase 4 involves hydrostatic testing of the WRH piping system and must be completed as a single activity. The maximum allowable shutdown duration for WRH piping at the primary deck level during this phase is only one day. To perform the	1,2

Table 2. Contractor Requirements

Requirement Number	Requirement	Work Item Cross Reference
	test, both WRH isolation valves in the equipment gallery and central tunnel (31WRH19 and 39WRH11) must be closed to isolate the main header and all seven WRH headers located in the pipe chases. Additionally, all WN valves for the WRH branches, all SRW valves, and all utility station valves must be closed. Individual vent and drain fittings must be provided for each of the seven headers and the main header. At least nine calibrated pressure gauges are to be installed, one at the start and end of the test loop, and one at the end of each of the seven headers. All testing must be performed in accordance with the applicable forms and procedures outlined in Division 40 05 03.	

1.03 SCHEDULE CONSTRAINTS

A. As noted above, the Contractor may not proceed with Work Item No. 1 until the District authorizes such action.

**** END OF SECTION ****

SECTION 01 14 13

ACCESS TO SITE

1.01 PROJECT LOCATION

A. The work specified under this Contract will be performed at the EchoWater Resource Recovery Facility (EchoWater Facility). The EchoWater Facility is located south of the Sacramento City limits, west of Franklin Boulevard and north of Sims Road at 8521 Laguna Station Road, Elk Grove, California 95758.

1.02 SITE ACCESS AND ACCESS ROADS

A. Access to the Plant shall be via Dwight Road from Laguna Boulevard.

B. Contractor is required to submit an Access Request (AR) for District approval prior to mobilizing any equipment or facilities onto the construction site in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16). Contractor's AR for mobilization shall include but not limited to a site plan showing access routes, office location, sanitary facilities location, storage yard, parking areas, temporary construction fencing, and temporary walkways around construction site. Contractor shall coordinate with the District Representative prior to submitting the AR.

C. Contractor shall be aware that Dwight Road and other roads within the site will be utilized by other contractors and EchoWater Facility personnel during the duration of this contract.

D. The Contractor's personnel will be required to park personal vehicles in the approved or designated areas. Each Contractor shall be responsible for policing the common parking area for cleanliness and efficient parking procedures to ensure use by all. Existing parking in the process area may not be used by the Contractor's workers.

E. The Contractor will maintain a visitor log to document the arrival and departure of all delivery personnel and periodic visitors. In the event that a staff member leaves the site before end of shift, this action will be recorded in the Contractor's visitor log.

F. In the event of an evacuation, the contractor and all staff, subcontractors, delivery personnel and visitors will report to the congregation area with copies of the attendance sheets and visitor log for roll call. All personnel will remain at the congregation area until released by authorized District Management.

1.03 CONTRACTOR IDENTIFICATION BADGE POLICY AND PROCEDURES

A. IDENTIFICATION:

1. All Contractor and subcontractor staff assigned to work at the EchoWater Facility shall obtain an identification badge after completion of safety training and shall carry their badges at all times while at the EchoWater Facility.

B. TRAINING:

1. All Contractor staff must attend EchoWater Facility Safety Orientation and badge use training at a minimum prior to issuance of badges. Training is anticipated to be 3 hours total in duration and will include the environmental and cultural education training as described in the TEMPORARY ENVIRONMENTAL CONTROLS Section (01 57 19).

C. BADGE SECURITY LEVELS:

1. Contractors and subcontractors will have different access authority levels through process security gates depending upon the time of day, and/or their assigned duties.

2. If access is denied, contact the District Representative.

D. FORGOTTEN BADGE:

1. If a person forgets their badge, they will have to enter the EchoWater Facility as a visitor. This requires checking in and out of the EchoWater Facility with the security guard at the gate.

   a. Use the inside entry lane (closest to the guard station).

   b. Guard will ask visitor's name and other information.

   a. Guard will require visitor to contact someone from their company or project to meet them at the gate and escort them onsite.

   b. Visitor will need to report to reception to get a visitor's badge for the day. The visitor badge must be picked up and dropped off every day at reception until a replacement badge is received.

   c. Leave facility using inside exit lane (closet to guard station).

E. LOST BADGE:

1. A badge categorized as forgotten will be considered lost after 72 hours. Lost badges shall be reported to the District Representative as soon as the loss is realized. A replacement badge will be issued and the lost badge will be deactivated and will no longer work in the security system. If found, the lost badge shall be turned into the District Representative.

1.04 MAIN GATE ENTRY/EXIT PROCEDURES

A. GENERAL:

1. Badges are required to enter or exit through the guard gate stations. Every vehicle must badge through the gates, no "piggy backing" of other vehicles is allowed.

2. There are three entrance and three exit lanes at the Dwight Road Security Gate:

   a. The outside lanes are exclusively for persons with badges.

   b. The **inner lanes** are to be used by

      1) Visitors;

      2) Deliveries; and

      3) Employees without badges

3. There are three “cell-phone pullout” areas outside of the Dwight Road Security Gate. For the ingress traffic, a single pullout area is provided on the east side of Dwight Road to allow visiting vehicles and trucks to park and obtain additional information from the receiving party, if needed prior to reaching the gate. Unexpected visitors who proceed to the gate without prior notification to receiving parties could be directed to use the reject route to turn around at the gate., They would then utilize either of the two pullout areas provided for the egress traffic on the west side of Dwight Road to contact a receiving party for permission to enter. If permission is granted, the receiving party shall notify the guard at the gate to allow entry of the visitor.

****END OF SECTION****

SECTION 01 14 16

COORDINATION WITH OCCUPANTS

1.01 GENERAL

A. Contractor work activities that impact existing District operations, property or facilities (such as pipelines, ductbanks, manholes, treatment processes, environmental resources, and access roads to District facilities) require an approved, signed Access Request (AR) prior to commencement of work. Interruption of flow or connection to an existing system or interceptor requires a Shutdown Plan and Location Map to be included with the Access Request. In addition to the Shutdown Plan, any activity that requires special safety precautions to be taken will require a Safety Work Plan to be included with the Access Request.

B. Access Request:

1. Allows District Operations time to review the proposed work and to schedule and coordinate necessary process or equipment shutdowns,

2. Allows District Safety office review of proposed work and contractors' safe work practices related to the specific work to be performed,

3. Informs the contractor of any special hazards or exposures related to the specific work.

C. The District maintains permits to collect, treat and discharge wastewater. These permits establish discharge limits for wastewater, storm water, and air emissions and establish spill reporting requirements and fines. Violation of District permits shall not result from the Contractor's work. Any unauthorized discharge or spill shall immediately be reported to the EchoWater Facility Plant Control Center (916-875-9400). The District will require the Contractor to stop or restrict any activity that has or could result in an unauthorized discharge or permit violation. The District will prevent or remedy the situation by the most expeditious means. The Contractor will be responsible for all costs incurred including fines.

1.02 REQUIREMENTS

A. COORDINATION AND ACCESS:

1. Activities that affect the operation of existing District equipment, including EchoWater Facility processes, Interceptor pipelines or facilities, or access to District property will require coordination between District and Contractor.

2. Access Requests are generally required based on impending work activities discussed at weekly construction coordination meetings, and approval is issued jointly by the District O&M Support office and District Safety Office.

3. Unrestricted access for District personnel and equipment shall be provided at all times to existing facilities, unless a reduced level of access is explicitly allowed in the approved Access Request.

1.03 SCOPE

A. An Access Request provides notification of a Work Item or other activity proposed by the Contractor. An Access Request describes the contemplated work including when, where and how it will be accomplished. An Access Request shall be submitted by a qualified representative of the Contractor who is familiar with all aspects of the work and pertinent safety requirements. An Access Request may be required whenever any of the following conditions are contained in or will be affected by Contractor's work:

1. General Project mobilization or District property access,

2. Work in, connection to, or removal of any pipeline, manhole, pump station, asset or wastewater process or equipment.

3. Any work that may impact environmental resources on District property,

4. Any work that may impact or disrupt other activities on District property such as leased agricultural operations, scientific studies, or concurrent construction projects,

5. Excavation on District property by location, dewatering of any excavation, structure, tank, vessel, or piping system

6. Installation or removal of bulkheads, cofferdams and isolation devices

B. Depending on the activities within the project, multiple Access Requests may be required.

C. A fully completed Access Request form shall be submitted in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26) at least 10 working days prior to the date proposed for commencement of work. An Access

Request meeting may be required prior to the approval of the work or upon the District's request.

D. Contractors are required to describe the proposed work activity, indicate the property, system or equipment that will be affected, list the labor and equipment to be utilized, indicate the date, time and duration of the work, describe measures that will be implemented to reduce impacts to District property and facilities, and describe safety precautions to be observed. Drawing and section numbers shall be indicated where appropriate. A Shutdown plan shall be included with the Access Request when the work affects an existing system or process.

E. The Contractor shall plan and schedule Access Requests as early as possible. An Access Request will be reviewed and returned within 10 working days after submission of all necessary information. Sufficient information and detail shall be included with an Access Request to permit District to evaluate the proposed operation and the associated risks. Insufficient information on an Access Request may delay approval within 10 working days.

F. Contractor shall not be allowed to proceed with any work, or any portion of the work, described in an Access Request without complying with all the conditions, in their entirety, of the Access Request approval. All conditions of approval, including additional safety precautions added by the District Safety Office, shall be complied with and effectively communicated to Contractor's personnel and subcontractors. If the Contractor does not agree with the additional safety requirements, work shall not start until resolution is attained. Changes in the proposed activities or field conditions of an Access Request, or delay of the work, will require the submission of a new or revised Access Request.

1.04 SHUTDOWN PLAN

A. A Shutdown Plan shall be included with an Access Request whenever an existing operating system or facility such as a pipeline, basin, tank, channel, power supply, control circuit, instrumentation, equipment, pump, meter, or structure is affected. Shutdowns shall be planned and coordinated to minimize the number and duration of activities that affect existing operations.

B. The District will limit the duration of shutdowns for critical systems. Stated durations are the total time period between when the system is made available to Contractor and when it is ready for return to service. If the Contractor cannot complete the work within the allowed time, Contractor shall immediately request an extension from the District. If the District does not approve the requested extension, Contractor shall complete the work or return the system to operable condition. The District will complete the work if

Contractor does not return the system to operable condition as directed. Contractor is responsible for extra costs or damages incurred by the Contractor or the District to meet these requirements.

C. Requirements:

1. Designate the equipment or system that will be affected or removed from service. Describe the work to be undertaken. Identify the portion of the system that will be isolated, dewatered, decommissioned, de-energized, depressurized, or drained.

2. List the labor, equipment, materials, tools, utilities and incidental items to be used.

3. Indicate measures to prevent discharge of wastewater, stormwater pollution, odor or disruption of treatment processes.

4. Indicate dewatering method and means for disposal of leakage water.

5. Provide details for bulkheads, cofferdams and isolation devices.

6. Describe safety precautions and equipment.

7. Describe recovery plan if the shutdown cannot be completed as planned

8. List activities to be done by the District.

9. Indicate the time estimated to complete the shutdown.

**** END OF SECTION ****

SACRAMENTO AREA SEWER DISTRICT

ACCESS REQUEST

This document shall remain at the work site until work/tasks listed are completed

Prime Contractor	Contract #	Date:
Sub-Contractor	AR #	Revision
Contact for Contractor	Work Item #	CPM Activity #
Phone	☐ Work Plan Attached	☐ Drawing Attached

PART 1 - CONTRACTOR WORK PERMIT

Start Date/Time	Completion Date/Time
Reference Contract Drawings/Specifications	
Equipment or System to be Worked On	
Location of Work	
Provide Change Management Package (CMP) # if appropriate:	

Type of Work (check all that apply)	☐ Civil	☐ Mechanical	☐ Electrical	☐ Instrumentation
	☐ Process	☐ Coating	☐ Hotwork	☐ Other (specify)
	☐ Mobilization	☐ Traffic/Ped, Access	☐ Shutdown	

Description of Work
Anticipated Hazards

Tools/Equipment to be used	☐ Cutting/Welding Torches	☐ Arc Welders	☐ Jack Hammers
	☐ Power Saws	☐ Grinders	☐ Pneumatic Tools
	☐ Backhoe	☐ Crane	☐ Radioactive Test Device
	☐ Other		

Access Request Instructions:

1. Follow processing instructions in Access Request Procedure for either Capitol Improvement Project (CIP) or non CIP.

PART 2- CONTRACTOR SAFETY PRECAUTIONS

All items checked will be complied with/used in accordance with applicable safety standards (CalOSHA, UFC, etc.) and requested contractor's safety program.

HOT WORK PLAN
- ☐ Isolate Combustibles
- ☐ Fire Watch
- ☐ Fire Extinguishers
- ☐ Flash Protection

REVIEW EMERGENCY PROCEDURES/ALARMS
- ☐ Gas Management Areas
- ☐ Other _____
- _____

AIR MONITORING
- ☐ Continous
- ☐ Periodic
- ☐ Frequency _____

HOUSEKEEPING
- ☐ Debris Removal
- ☐ Dust Control
- ☐ Maintain access to/through worksite

POTENTIAL ATMOSPHERIC HAZARDS TO BE MONITORED
- ☐ Oxygen Deficiency
- ☐ Oxygen Enrichment
- ☐ Combustible Gases
- ☐ Toxic Gases
- ☐ Other _____

EXCAVATION/TRENCHES
- ☐ Shoring
- ☐ Sloping
- ☐ Benching
- ☐ Barricades
- ☐ Excavation Plan Submittal Number _____

HAZARDOUS MATERIALS TRAINING
- ☐ Substance(s) _____

ELEVATED AREAS
- ☐ Fall Protection
- ☐ Guardrails

ENERGY CONTROL PROCEDURES
- ☐ Lockout
- ☐ Blockout
- ☐ Tagout

PIPING/EQUIPMENT OPENING AND/OR ENTRY
(ensure prior to opening)
- ☐ Effectively Isolated
- ☐ Depressurized
- ☐ Drained
- ☐ Purged/Flushed of Hazardous Substances

VENTILATION
- ☐ Natural Only
- ☐ Auxiliary, Continuous

ABATEMENT ACTIVITIES
- ☐ Asbestos (Article 4 § 1529)
- ☐ Lead (Article 4 § 1532.1)

CONFINED SPACE PROCEDURES
- ☐ Permit Required
- ☐ Non-permit
- ☐ C-5
- ☐ Entry Permit @ site
- ☐ Personnel Retrieval System
- ☐ Communication w/Entrant
- ☐ Rescue personnel @ site
- ☐ Supplied Air

OTHER SAFETY PRECAUTIONS
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

AR SUBMITTAL SIGNATURE BLOCK

Contractor signs below after page 1 and 2 are filled out with sufficient detail to allow AR to be reviewed. Contractor identifies all anticipated safety items prior to signing below. Safety Office will initial next to any additional safety items that have been checked off during the AR review process.

Contractor Representative	Date

RE Comments	☐ See Attachment
Reviewed by Resident Engineer	Date
Part 3 - APPROVERS' REMARKS	
Area Supervisor Comments	☐ See Attachment
Approved by Area Supervisor	Date
Safety Office Comments	☐ See Attachment
Approved by: SacSewer Safety Office	Date
District Representative, Ops Support, Engineering Comments	☐ See Attachment
Approved by: District Representative, Ops Support, Engineering	Date

SIGNATURE BLOCK

The work described by this Access Request has been reviewed. The work methods described and identified in Parts 1 & 2, and the additional safety precautions identified in Parts 2 & 3 will be complied with and effectively communicated to personnel assigned this task. If the contractor does not agree with additional safety precautions, work shall not start until resolution is attained.

Contractor Representative	Date

Distribution:

☐ Operation Support
☐ Safety Office Representative
☐ Resident Engineer
Contractor (supplied by RE/District Representative)
☐ O&M Manager 1 / 2
☐ Process Team Leader
☐ Other _____
☐ Electrical Supervisor
☐ Facility Manager
☐ Project Engineer

***Note - Provide copies of approved ARs to applicable sections, always include O&M Manager I's in the distribution.**

**** END OF SECTION ****

SECTION 01 14 19

USE OF SITE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. The District's operating personnel will be responsible for operating the existing treatment plant throughout the execution of this contract. Do not adjust or operate serviceable or functioning equipment or systems.

B. Equipment presently installed in the treatment plant must be safely available to plant personnel at all times for use, maintenance, and repair.

C. If it is necessary in the course of operating the plant for the Contractor to move its equipment, materials, or any material included in the work, it shall be done promptly. The equipment or material shall be placed in an area which does not interfere with the plant operation.

D. Requirements of this section include, but are not limited to, requirements specified in the COORDINATION WITH OCCUPANTS Section (01 14 16) and the TEMPORARY UTILITIES Section (01 51 00).

E. The existing treatment plant will remain in operation throughout the execution of this contract. Schedule and conduct work to minimize necessary shutdowns and interference with normal plant operations and maintenance. An Access Request Form included and described in the COORDINATION WITH OCCUPANTS Section (01 14 16) shall be submitted to the District Representative each time access to existing facilities is necessary.

F. Comply with the safety requirements of the EchoWater Resource Recovery Facility (EchoWater Facility) Safety Manual as a minimum when working in the Plant process area. Provide additional safety considerations which are deemed necessary to protect Contractor and District employees during the conduct of the work.

G. Provide notice to the District Representative, in accordance with the COORDINATION WITH OCCUPANTS Section (01 14 16), 2 weeks prior to taking out of service any existing tank, pipeline, channel, electrical circuit, equipment or structure. Provide whatever temporary piping, pumping, power, and control facilities as required to maintain continuous plant operation and complete treatment except as otherwise specified. The integrity of existing plant utilities shall be maintained at all times.

H. Contractor laydown area within the project site is designated on the design drawings.

I. The Contractor's work force shall not use existing washrooms during the conduct of the work. Use of existing utilities shall be in accordance with the TEMPORARY UTILITIES Section (01 51 00). The Contractor shall be responsible for keeping areas in the existing treatment plant where work is done clean and safely accessible for the District's operating personnel.

****END OF SECTION****

SECTION 01 14 20

CONTRACT TIME

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. District will issue Notice to Proceed within 40 days of award by Board. Contract Time commences at receipt by Contractor of Notice to Proceed in accordance with the GENERAL CONDITIONS Section (00 72 00).

B. The completion date for the Contract shall be the date of receipt by Contractor of Notice to Proceed plus the Contract Time in working days plus the non-working days listed below.

1.02 CONTRACT MILESTONES

A. The WORK RESTRICTIONS Section (01 14 00) describes Work Items. The following contract milestones must be included in the approved baseline schedule. All work necessary to meet these milestones must be completed to the satisfaction of the District or liquidated damages will be applied as described below. Contract Milestones shall meet the requirements of Substantial Completion by the date specified.

Contract Milestone	Completion Time	Liquidated Damages
COMPLETION OF ALL WORK	220 WORKING DAYS FROM NTP	$1,000/DAY

1.03 LIQUIDATED DAMAGES

A. Time is of the essence. Damages and expenses will be sustained by District if the Work is not completed within the Contract Time or by the Contract Milestone Completion Date listed in the table above. It is agreed that the liquidated damages are reasonable compensation to District if the Work or Work Items are not completed within the

specified times. Liquidated damages are additive and cumulative for each day that the Work or Work Item is not completed.

B. Liquidated damages will be assessed against payments due under Contract.

1.04 WORKING DAYS

A. A working day is any day after Notice to Proceed except:

1. Saturday, Sunday and holidays listed below. However, weekends, holidays, and week nights may be worked as described in the GENERAL CONDITIONS Section (00 72 00).

2. Days specifically designated in Contract for cessation of Work.

3. Days that Work is suspended by District.

4. Inclement weather days as described in the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16).

1.05 HOLIDAYS

A. The following days are holidays (note that the District may observe the holiday on a preceding or subsequent business day):

DAY	DATE
New Year's Day	January First
Dr. Martin Luther King, Jr. Day	Third Monday in January
Lincoln's Birthday	February Twelfth
George Washington's Birthday Observance	Third Monday in February
Cesar Chavez Day	March Thirty-first
Memorial Day	Last Monday in May
Juneteenth	June Nineteenth
Independence Day	July Fourth
Labor Day	First Monday in September
Indigenous People's Day	Second Monday in October
Veterans Day	November Eleventh
Thanksgiving Day	Fourth Thursday in November
Thanksgiving Friday	Friday after Thanksgiving Day
Christmas	December Twenty-fifth

****END OF SECTION****

SECTION 01 26 13

REQUEST FOR INTERPRETATION

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Contractor shall prepare a Request for Interpretation (RFI) when additional information, clarification or interpretation of the Contract Documents is needed. RFIs may also be used for apparent conflicts, inconsistencies, ambiguities, or omissions. "Request for Interpretation" and "Request for Information" shall have the same meaning.

B. RFIs shall be submitted to the District Representative sufficiently in advance of the work to permit time for investigation and preparation of a response. Any work undertaken prior to receipt of a RFI response shall be at the risk of Contractor.

C. RFIs generated during submittal and shop drawing preparation must be submitted by the Contractor sufficiently in advance to not only allow for investigation and preparation of a response, but also for inclusion of the response into the submittal and shop drawing. Failure by the Contractor to provide sufficient time will not be cause for entitlement to a time extension.

D. RFIs shall not be used for submittals or for substitute of material, equipment or for waiving of requirements.

1.02 SUBMITTAL

A. RFIs shall be submitted via the District-furnished, web-based, document control system in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Each RFI shall deal with only one topic, item, issue or system.

B. RFIs shall clearly describe the problem and specifically state what is needed. Relevant portions of the Contract Documents shall be cited, marked-up and attached.

C. The Contractor shall review each RFI before submitting and compare it with the Contract Documents to verify that a response is required. RFIs will only be accepted from the Contractor and not from subcontractors or suppliers.

D. A recommendation or proposed solution may be included when appropriate or expedient.

E. Known schedule or cost impacts shall be noted in the RFI.

1.03 RESPONSE

A. The District Representative will normally respond within 10 days. The Contractor shall indicate a priority for responses if more than five (5) RFIs are pending at the same time.

B. The Contractor shall reply within 10 days if there is disagreement concerning the RFI response.

C. Subsequent resubmittals shall be identified with the same RFI number and a consecutive letter designation. Resubmittals shall clearly state the reason for resubmitting.

****END OF SECTION****

SECTION 01 31 19

PROJECT MEETINGS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Meetings will be required throughout the duration of the Contract to facilitate communication, coordination and resolution of issues. District, Contractor, Design Consultant, subcontractors, and other parties involved in the Work shall attend, as appropriate.

B. There will be meetings to discuss particular aspects of the Work such as: scheduling, coordination, submittals, procedures, Access Requests, changes orders, testing, startup, punchlist, and other topics as needed.

C. District Representative will designate the purpose, date, time, and location for meetings. Contractor may request meetings as needed.

D. All meetings shall be documented in the District-furnished, web-based, document control system in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26).

1.02 PRECONSTRUCTION

A. A preconstruction meeting will be held prior to commencement of Work. This meeting will provide an opportunity for individuals to discuss initiation of the Work. Topics to be discussed include: mobilization, access, temporary facilities, utilities, subcontractors, schedules, procedures, correspondence, progress payments, payroll records, Access Requests, coordination, safety, quality control, personnel assignments and other topics as appropriate.

B. District, Contractor, Design Consultant, and major subcontractors shall attend.

C. Refer to the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16) for additional information.

1.03 PROGRESS

A. Weekly progress meetings will be conducted throughout the duration of the Contract. The purpose of these meetings is to inform, discuss and resolve issues related to the Work. Topics to be discussed include: progress, schedules, Access Requests, Requests for Information, Change Orders, Field Instructions, field coordination, submittals, quality control, testing, startup and other topics related to the Work.

B. These meetings will also discuss time impact evaluations for change orders and time extension requests, actual and anticipated schedule activity sequence/duration changes, and Contractor delays.

C. District, Contractor, Design Consultant, subcontractors and suppliers as appropriate shall attend.

1.04 PROGRESS BILLING

A. Each month the Contractor shall attend a progress schedule and progress payment meeting with the Construction Manager. At this meeting, the Construction Manager and Contractor are to review the percentage of the work completed and establish an amount to be requested in the Application for Payment. The meeting date shall be scheduled in accordance with the District's deadline for submittal of Progress Pay Estimates. Following review of the proposed billing, the Contractor will prepare an Application of Payment and submit to the Construction Manager for final review and processing.

B. The Construction Manager can also call for special progress schedule meetings should there be schedule revisions that necessitate such a meeting.

C. Refer to the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16) for additional information.

1.05 SUBMITTALS

A. When required in the individual technical specification, or if requested by the Contractor or the Construction Manager, a meeting regarding a required submittal will be held to facilitate the timeliness of the submittal preparation and review process. This meeting will convene at a mutually agreeable place. The party responsible for preparing the submittal shall be in attendance along with the Engineer.

B. Refer to the SUBMITTAL PROCEDURES Section (01 33 00) for additional information.

1.06 QUALITY CONTROL AND ASSURANCE

A. The Contractor or the Construction Manager may request a meeting prior to the start of a particular phase of the Work to discuss how the Work shall be accomplished in accordance with the quality requirements of the Contract Documents, codes, permits and industry standards. All required inspection and testing applicable to this phase of the Work will be discussed in detail. The Contractor shall require that all management and quality control personnel employed by the Contractor for this phase of the Work are in attendance. Quality assurance meetings might be requested for such phases of the Work as earthwork, paving, landscaping, concrete, masonry, piping, mechanical, specialty subtrades and electrical/instrumentation. Representatives of subcontractors

and major suppliers related to the phase of Work covered in the requested Quality Assurance Meeting shall also attend.

B. Refer to the QUALITY CONTROL Section (01 45 00) for additional QC/QA meeting requirements.

1.07 PRE-INSTALLATION

A. When required in the individual specification, or if requested by the Contractor or Construction Manager, a pre-installation meeting will be held to review conditions of the installation, installation procedures and coordination with related work. This meeting should take place at least fourteen (14) days in advance of installation or as required in the technical specifications. Meeting is to be attended by all parties involved in the installation.

1.08 SPECIAL MEETINGS

A. Any time during progress of the Work, the District and the Construction Manager shall have the authority to require the Contractor and any subcontractor, suppliers, or service providers to attend job-site conferences on matters which require immediate or special attention. Any notice of such conference shall be duly observed and complied with by the Contractor and subcontractors, suppliers, or service providers without extra cost to District.

****END OF SECTION****

SECTION 01 31 26

ELECTRONIC COMMUNICATION PROTOCOLS

PART 1 -- GENERAL

1.01 PROJECT CONTROL SYSTEM DESCRIPTION

A. Contractor shall have hardware and software to send and receive email correspondence from the District. The District will use Microsoft Office software and the internet as the primary means of communication related to the Contractor's Correspondence, Submittals, Requests for Information (RFI), Access Requests, Progress Payment Requests, Non-Compliance Issues, and Daily Attendance Sheets.

B. The Resident Engineer will maintain the official records of the communication, however all communication to and from the Contractor shall be in electronic format (email, shared folders, or external media) in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.02 SUBMITTALS

A. Provide a list of Contractor's key personnel during preconstruction. Include descriptions of key personnel's roles and responsibilities for this project.

1.03 EQUIPMENT

A. In order to process formal correspondence and other required documentation, the Contractor must have in place the required basic components outlined below:

1. HARDWARE: The Contractor shall use computer hardware that meets the requirements of large-file size editing and transmission. The Contractor will upgrade their system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems will not be justification for a cost or time modification to the Contract.

2. SOFTWARE: Adobe Acrobat Professional Version 2022 or Bluebeam Revu 2020 or later, Microsoft Edge or Google Chrome internet browsers, Microsoft Office 2021 or higher, or Microsoft Office 365. Other software may be utilized if compatible with the District's standards and approved by the District.

3. FACILITIES: The Contractor shall be responsible for providing all computers, printers, plotters, scanners or other hardware and software for his use. All networking equipment and associated cabling within the Contractor's office is the responsibility of the Contractor.

1.04 USER ACCESS LIMITATIONS (DELETED)

1.05 CONTRACTOR RESPONSIBILITY

A. Users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution programs.

B. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their own personnel in the use of other programs indicated above, as needed.

C. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers shall be the responsibility of the Contractor.

1.06 TRAINING (DELETED)

****END OF SECTION****

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

1.01 GENERAL

A. SUMMARY:

1. This section specifies the scheduling requirements for this project. In addition to being used by the Contractor, schedules are utilized to monitor the Contractor's progress, coordinate work with plant operations, coordinate work with other Contractors and coordinate future projects. The District considers the schedule requirements to be a benefit to both the District and the Contractor. The submittal and acceptance of realistic schedules shall be given high priority. Because of its importance to plant operations and the success of this project, failure to adhere to the scheduling requirements will result in a 10% withhold on monthly progress estimates, which can become a permanent deduction if the corrections aren't made by the second month's schedule update following notification. The schedule shall comply with commonly accepted CPM scheduling practices.

B. TYPES:

1. The following terms are used in this section:

   a. Baseline Schedule: The schedule delineating the original planned sequence of construction and procurement of Major Equipment.

   b. Monthly Updated Schedule: The monthly update of the schedule which depicts completed activities and remaining duration for incomplete activities.

   c. Rolling Schedule: A look ahead which presents what work the Contractor plans to pursue in the next two weeks.

   d. Revised Schedule: A schedule which incorporates accepted changes in sequence or scope of work.

   e. Final As-Built Schedule: A schedule that reflects the final as-built sequence of construction.

C. PRE-CONSTRUCTION SCHEDULING CONFERENCE:

1. Within five (5) calendar days following Notice to Proceed, the District shall schedule and conduct a pre-construction scheduling conference to commence development of the required construction schedule. Attendance by the Contractor's Senior Construction Scheduler is mandatory. At the meeting, the requirements of this section will be reviewed with the Contractor, the Contractor shall present their proposed methodology for the Baseline Schedule preparation. The Contractor shall submit to the District a written copy of its proposed WBS structure at this meeting. The District shall review the WBS structure within five (5) calendar days after submission by the Contractor. The Contractor shall make all modifications to the proposed WBS structure that are requested by the District Representative. The WBS shall be correlated with the Contractor's Schedule of Values and the cost loaded schedule. At this conference the District shall present to the Contractor the reporting layouts, any activity codes that need to be setup in the schedule and the P6 (or MS Project) software settings necessary for processing the schedules into the District's master schedule. The Contractor shall bring to the Pre-Construction Scheduling Conference any schedules used in bid preparation.

D. FLOAT:

1. Float in any activity, milestone completion date or contract completion date shall be considered a resource available to both the District and the Contractor. Neither the District nor the Contractor has ownership of the float. Float is for the benefit of the project. Acceptance of the Baseline Schedule, Monthly Update or Revised Schedule, when based on less time than the maximum time allowed for milestone or contract completion does not serve to change any Contract duration, nor serve as a waiver of the Contractor's nor the District's right to utilize the full amount of time specified in the Contract.

E. ACCEPTANCE:

1. Review of the project schedule, up-dates or revisions is to determine conformance with the Contract Documents. Acceptance of a project schedule, updates or revisions does not relieve Contractor of responsibility for the feasibility of the project schedule or requirements for accomplishing milestones and completion within Contract Time. Acceptance of the project schedule, updates or revisions does not warrant or acknowledge the reasonableness of the schedule's logic, durations, labor estimates or equipment productivity.

1.02 SUBMITTALS

A. All schedules described below shall be submitted electronically in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26).

B. GENERAL – FORMAT:

1. Each of the types of submittal format shall conform to these requirements. All printed reports, tabular reports, bar charts and graphic plots shall be generated from and be consistent with the overall project schedule. The plot date, data date and projected project finish date shall be clearly shown. Unless noted otherwise, all print formats shall be 11 inches by 17 inches with a minimum font size of six points.

a. ACTIVITY BAR CHART REPORT: Shall include milestones and show relationships, activity ID numbers and activity descriptions grouped by WBS Item. Each activity shall indicate the appropriate Contractor or subcontractor responsibility and be sorted by start date. Activity Bar Chart Report shall be time-scaled and show continuous flow from left to right grouped by Work Item. The critical paths shall be readily identifiable through the use of red printing. Activity ID numbers and activity descriptions shall be listed in columns at the left of the sheet. Plots shall show early start and early finish dates and total float for each activity. The calendar being used should be identified.

b. CRITICAL PATH REPORT: Sorted by start date

c. MILESTONE REPORT: summarizing the planned and actual milestone dates compared against the approved baseline dates

d. The following information shall be furnished as a minimum for each activity:

1) Activity description and ID number.

2) Activity predecessors and successors

3) Original duration and remaining duration of each activity.

4) Early start date.

5) Early finish date.

6) Late start date.

7) Late finish date.

8) Total float.

9) Constrained dates.

10) Percentage of activity completed and actual number of working days remaining (for updates only).

11) An electronic copy of the native xer file along with a pdf copy shall be submitted for the Baseline and Monthly Update Schedules.

C. BASELINE SCHEDULE:

1. The sequence below describes the submittal and review process for the Baseline Schedule for all work:

   a. Within ten (10) calendar days after the Pre-Construction Scheduling Conference, and before work commences on any non-mobilization work activity, the Contractor shall submit a P6 (or MS Project) CPM schedule representing in detail, all planned submittal, procurement and on-site construction activities. A Narrative Report shall be included explaining the basis and assumptions of the planned sequence of work. A review meeting with the Contractor and appropriate subcontractors will be conducted within 10 days of the receipt of the CPM schedule. Comments will be provided within 7 days after the review meeting. This provision shall hold regardless of the commencement of counting of working days. This schedule shall be updated monthly with progress and will be used as the basis for payment. No payments beyond mobilization will be made until the Baseline Schedule is accepted.

   b. The Baseline Schedule shall be cost loaded as described in the Cost Loading Section of this specification.

   c. The District Representative shall be the judge of the acceptability of the proposed Baseline Schedule.

D. MONTHLY UPDATES:

1. Contractor’s monthly payment applications shall not be accepted and processed for payment by the District Representative without Master Baseline Schedule progress updates submitted in the time and manner required by this specification which accurately reflect the allowable costs due under the Contract Documents, and are accepted by the District Representative.

2. Following acceptance of the baseline schedule, on the last Friday of each month the Contractor shall submit a detailed Monthly Schedule of Values in pdf format from the Schedule Update generated in Oracle Primavera. This submittal is commonly known as a "pencil copy." The Data Date shall be set to the first Monday after the last Friday of the month. Two working days prior to the last Friday of the month, the Contractor will attend a Schedule Review Meeting with the District Representative to review the current schedule status, any changes or revised logic

and address any schedule issues. Contractor staff involved with the schedule are required to attend. Two working days after the last Friday of the month, the Contractor will meet and\or walk the project to finalize the schedule progress on the Monthly Schedule of Values. The Contractor will incorporate the District Representative's progress comments and resubmit the detailed Monthly Schedule Update and Schedule of Values for final acceptance by the Friday following the last Friday of the month. A narrative shall be provided describing the status of the project including major slippage or problems and if appropriate proposed corrective measures are needed.

3. The Schedule Update Submittal shall include:

   a. A detailed Gantt chart showing all activities organized by Preconstruction/Construction, Phase/Stage, Location/Area, then sorted by Actual Start then Early Start. The activity columns on the tabular data portion of the schedule shall include Activity ID, Activity Name, Original Duration, Remaining Duration in Full Work Days, Duration % Complete, Physical % Complete, Early Start, Early Finish, and Total Float. The critical path and relationship lines (logic) shall be clearly shown.

   b. A Critical Path Gantt chart showing critical activities organized by Preconstruction/Construction, Phase/Stage, Location/Area, then sorted by Early Start. The activity columns on the tabular data portion of the schedule shall include Activity ID, Activity Name, Original Duration, Remaining Duration in Full Work Days, Duration % Complete, Physical % Complete, Early Start, Early Finish, and Total Float. The critical path and relationship lines (logic) shall be clearly shown and based upon the critical and longest path

4. Revisions to durations, constraints, predecessors, successors or logic which have been accepted shall be included in the monthly update. Schedule revisions are not to be included in the monthly update until accepted by the District Representative.

E. SCHEDULE REVISIONS:

1. A Revised Schedule shall be prepared and submitted if any of the following conditions occur:

   a. A Revised Schedule shall be submitted within 10 days of the District Representative request when it is determined that the analysis and review of the schedule warrants a revision.

   b. A Revised Schedule shall be submitted within 10 days if requested by the District Representative when the completion of any milestone or Work Item is projected to be more than 10 working days later than the completion specified in the Contract plus approved time extensions.

2. If any of the above conditions occur, a revised P6 (or MS Project) schedule showing how the lost time will be recovered to complete the project or Work Item within the specified time of completion shall be submitted for acceptance. A narrative report shall be provided with each Revised Schedule and shall detail any special problems or assumptions in the schedule and shall itemize all proposed new activities, changed durations, and changed activity constraints.

3. Upon acceptance of the revised pure logic diagram, the Contractor shall incorporate the accepted changes in the next monthly update schedule.

F. PERIODIC SCHEDULES:

1. 4-WEEK ROLLING SCHEDULE: 4-week rolling schedules shall be provided weekly which provides an accurate representation of the work performed the previous week, work planned for the current week, and work planned for the subsequent two weeks.

2. The schedule shall be produced using the latest version of Primavera P6 (or MS Project) software and generated from the latest Monthly Schedule Update.

3. The schedule shall include activity ID number, activity description, and start and finish dates both scheduled and actual and the activity total float. Each activity shall be coded to note those activities on the critical path and which are behind schedule. The 4-week rolling schedule will be an agenda item at the Weekly Progress Meetings

4. FINAL AS-BUILT SCHEDULE: A final as-built schedule recording all activities and actual start and completion dates shall be submitted with the final progress pay estimate.

1.03 REQUIREMENTS

A. GENERAL REQUIREMENTS:

1. The following requirements shall hold for all schedule submittals and subsequent revisions.

a. SCHEDULE TYPE: The Contractor shall prepare a critical path method schedule (CPM) using either Primavera P6 version 8 or later (or MS Project).

b. LEVEL OF DETAIL: The schedule shall depict construction activities and sequence of work. In addition, mobilization, key submittals, key procurement, access requests, plant shutdowns, testing, demobilization, cleanup and punch list activities shall be included in the schedule. Milestone and Contract completion dates and other constraints or requirements described in the WORK RESTRICTIONS Section (01 14 00) and CONTRACT TIME Section (01 14 20) shall be shown.

c. The critical path shall be identified using both the Critical and Longest Path filters in P6 (or MS Project).

d. Every activity, except the project start and finish milestones, shall have a minimum of one predecessor and one successor. All paths through the project schedule shall proceed in the direction representing the progression of time. Activity lags shall not have a negative value. The use of lags shall be kept to a minimum and shall be subject to acceptance by the District Representative. Lags on the critical path are not permitted. Redundant ties to preceding activities in a sequential series of activities will not be permitted.

e. ACTIVITY CONSTRAINTS: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the District Representative. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report. The Contractor shall not use any manual date entries that override schedule driven dates based on duration and network logic.

f. The use of lags shall be kept to a minimum and shall be subject to acceptance by the District Representative. Lags on the critical path are not permitted. Redundant ties to preceding activities in a sequential series of activities will not be permitted.

g. Any calendar differing from the current District working day calendar and its holidays must be approved by the District Representative.

h. Any activity codes utilized must be global. The District will provide the required activity codes at the Pre-Construction Scheduling Conference along with the Activity ID prefix to be used and the file name structure being used by the District.

i. SOFTWARE SETTINGS: Schedule calculations and Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not Progress Override. All activity durations and float values will be shown in days. Activity progress will be shown using Remaining Duration. Default activity type set to "Task Dependent". User preference settings shall be set to hours with the show unit label box checked and zero decimal places. The “Durations Format” shall be set to days with the show durations label box checked, and zero decimal places

j. Activities unless otherwise approved will be “physical percent complete” type. Duration percent complete will only be used on District-related activities such as submittal reviews.

k. Duration Type shall be set to Fixed Duration and Units.

l. SUBNETS: The schedule shall be broken down into primary subnetworks equivalent to Work Items described in the WORK RESTRICTIONS Section (01 14 00).

m. ACTIVITY COST AND DURATION LIMITATION: No activity in the schedule shall have a duration greater than 10 working days. Construction activities with durations greater than 10 working days shall be subdivided.

1) Submittal, fabrication and delivery activities may have durations greater than 10 working days. Submittal review activities shall have, as a minimum, durations specified in the SUBMITTAL PROCEDURES Section (01 33 00) and requirements for acceptance of QC Plans as specified in the QUALITY CONTROL Section (01 45 00). Testing activities shall have, as a minimum, durations as specified in the COMMISSIONING Section (01 91 00). Submittal review and testing activity durations specified in calendar days shall be converted to working days before entry into the schedule.

n. Subcontractor and Vendor Involvement: The schedule shall show subcontractor work and vendor activities.

o. Non-working Days and Holidays: The schedule shall designate non-working days and holidays. Holidays are defined in the CONTRACT TIME Section (01 14 20).

B. DETAILED REQUIREMENTS:

1. All schedules shall show the sequence and inter-dependence of activities and shall indicate:

a. Milestone dates and the start and finish dates of all activity.

b. Activities for procurement, submittal review, delivery and installation of Major Equipment. Activities for products, equipment, materials and supplies which have a fabrication and delivery lead time greater than 20 working days.

c. Submission, review and approval of Access Requests involving coordination with plant operations and processes listed in the COORDINATION WITH OCCUPANTS Section (01 14 16).

d. Activities for testing described in the COMMISSIONING Section (01 91 00).

e. Days per week and shifts per day worked.

2. Every activity except the first and last activity shall have a predecessor and successor.

3. Out of sequence progress shall be resolved through retained logic not progress overrides.

C. COST LOADING:

1. The activities contained within the schedules shall be cost loaded using labor, non-labor and material resources, and they shall equal the Contract Total Price with Sub-Totals that match the Schedule of Values as described in the PROGRESS PAYMENT PROCEDURES Section (01 29 76). Contractor is required to cost load the construction schedule using price per unit. For example, the labor unit would be $ per hour; the material unit would be material cost per unit installed.
2. Procured items should be budgeted as part of separate procurement activities such that the installation activity is not statused as started when the procured material onsite and installation has begun. Refer to the PROGRESS PAYMENT PROCEDURES Section (01 29 76) for further details.

3. Overhead and profit shall be prorated evenly on all cost loaded activities.

4. Every construction activity that contains labor shall be cost loaded.

5. Fabricate and Deliver activities shall be cost loaded to cover the material costs. The Fabrication activities shall utilize a material resource.

6. Commissioning activities shall be cost loaded using a labor resource.

7. The cost loading and progress payments for any long lead procurement items will be discussed at the pre-construction scheduling conference.

8. At the Pre-Construction Scheduling Conference, the District Representative shall discuss the setup of monthly pay periods to correctly input the actual costs so they can be transferred correctly to the master schedule. This requirement has no impact on the actual 'last Friday of the month" pay period date used by the Contractor. It's a P6 (or MS Project) reporting criteria. For example, the Financial Period in P6 (or MS Project) for July must be stated as 01-Jul-14 to 31-Jul-14, regardless of the actual start and finish date of the July pay period.

9. Once the Schedule of Values is accepted with the Baseline Schedule, requests for changes to the Baseline Schedule of Values will not be approved unless approved in writing by the District Representative.

D. EVALUATION CRITERIA:

1. Schedules shall provide sufficient detail to assure adequate planning and execution of the work and to allow monitoring, inspection, evaluation and plant coordination of progress in the performance of the work. The Contractor is responsible for the

accuracy of the information contained in the schedules. The following criteria will be used to evaluate schedule submittals:

a. A schedule extending beyond the Contract Time or containing negative float will not be acceptable.

b. A schedule showing the work completed in less than the Contract Time may not be accepted.

c. A schedule which is inconsistent with the contract documents, or includes logic which is not practical or physically impossible, will not be accepted. A schedule with sequestered float will not be accepted.

d. Any schedule showing the Work completed in less time than the Contract Time or milestone durations shall be defined to have float.

1.04 ANTICIPATED WEATHER DAYS

A. "Inclement weather" is a lost workday, caused by inclement weather conditions, and is defined as a day in which the Contractor's planned workforce for a critical path activity cannot work 50 percent or more of the day on an activity on the critical path, thereby resulting in a delay to the critical path.

B. Time allowance for inclement weather:

1. Normal weather conditions shall be considered and included in the planning and scheduling of all-weather sensitive schedule activities.

2. Schedule activity duration(s) shall be formulated with allowance for normal weather conditions.

3. Any activity which could be impacted by normally anticipated inclement weather (precipitation, high or low temperature, wind, et.), or the effects thereof shall include an adjustment to include the anticipated weather impact from normal weather conditions.

4. The Contractor shall include an allowance for the average amount of inclement weather that would be expected to occur in the duration of their activities. The Contractor may use the table below as a minimum in developing the schedule.

Month	Allowance (Work Days)
January	5
February	5
March	5
April	3
May	3
June	1
July	0
August	0
September	0
October	3
November	3
December	4
Total:	32

1.05 WEATHER CALENDAR AND ACCOUNTING OF DAYS

A. The Contractor shall include a calendar for weather sensitive activities. This calendar shall be a working day calendar that includes the above stated Inclement Weather Allowance and all District holidays. The weather allowance for each month shall be shown as non-working days and spread throughout the corresponding month. The weather calendar shall be assigned to all weather sensitive activities in the schedule.

B. The accounting of weather days shall occur once monthly corresponding to the Monthly Schedule Update. The actual non-working days affecting the critical path attributable to weather shall be accounted for in the Weekly Statement of Contract Time, as prepared by the District, independent of the weather allowance. Actual weather days shall be added to the schedule monthly as a one work day schedule activities behind the data date with an actual date equal to the non-working day as reflected in the Weekly Statement of Contract Time. A monthly reconciliation will occur between the inclement weather allowance and actual weather impact, as reflected in the Weekly Statement of Contract Time. Should the Contractor meet all contract requirements for demonstrating unavoidable delay, the Contractor shall be granted a time extension for actual weather impact days, beyond the weather allowance days for the same time period, for activities on the critical path. Weather related delays shall not entitle Contractor to any additional compensation.

C. No contract time adjustment shall be made in the event that actual non-working days attributable to weather affecting the critical path DOES NOT exceed the allowance. Unused weather allowance shall become project float.

****END OF SECTION****

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 -- GENERAL

1.01 PRECONSTRUCTION PHOTOGRAPHS

A. Prior to the commencement of the work, the Contractor and the District Representative shall jointly survey the site, existing buildings and facilities, paving, and other items noting and photographing existing conditions and damage such as cracks, sags and other damage. All photographs shall be color, minimum 10 mega pixel, and taken with a camera which will automatically indicate on the front of each print the date, name of work, and the location where the photograph was taken. A minimum of 100 color photographs shall be taken by the Contractor prior to construction. Before construction may start, the photographs shall be delivered to the District's Representative in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26) and the SUBMITTAL PROCEDURES Section (01 33 00). The photographer shall be equipped to photograph either interior or exterior exposures. This record shall serve as a basis for determination of subsequent damage due to settlement, movement or due to the Contractor's operations.

1.02 CONSTRUCTION PHOTOGRAPHS

A. Starting at the date of the preconstruction photographs and continuing every month thereafter as long as the work is in progress, a minimum of 50 color photographs per month shall be taken of active work areas as directed by the District's Representative. The photographs shall be delivered within 10 days following the date taken in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1. All USA markings shall be captured in the monthly photos as soon as marked, or prior to work in the area, and progress photos shall be labeled with the project stationing where appropriate.

2. Photograph USA markings prior to excavation as directed by the District Representative.

B. Upon acceptance of the Work, 100 color photographs shall be made of the work where directed by the District Representative. The photographer shall be equipped to take either interior or exterior exposures,

C. The photographs shall be delivered to the District's Representative within 10 days following the date taken in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.03 MONTHLY AERIAL PHOTOGRAPHS (DELETED)

****END OF SECTION****

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Submittals include, but are not limited to, product data, shop drawings, test procedures, test results, annotated PLC program listings, AutoCAD® generated drawings, samples, requests for substitutions, descriptive data, certificates, methods, schedules, marked contract drawings and specifications, manufacturer's installation and other instructions, and miscellaneous work related items. Submittals also include all other information as may reasonably be required, in the opinion of the District Representative, to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents. Additional submittal requirements are specified in each individual section of the specifications. Items to be submitted are specified in these individual technical specification sections.

B. All submittals will be submitted via the Project Controls System (PCS) as described in the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Minimum size lettering height on all submittals shall be 12 point font for text documents, 1/16 inch height for 8-1/2 by 11 inch and 11 by 17 inch documents and 1/8-inch height for documents larger than 11 by 17.

C. The review of the Contractor's drawings or other descriptive material shall not relieve the Contractor of responsibility for any error or of any obligation for accuracy of dimensions and details, for agreement and conformity with the contract drawings and specifications, or responsibility to fulfill the contract as prescribed and required by the GENERAL CONDITIONS Section (00 72 00). If errors or omissions exist in the Contractor's submittals which are not noted by the District during the District's review, it shall be the Contractor's responsibility, at no additional cost to the District, to correct the errors and omissions, to correct field conditions, and to repair any damage inflicted to new or existing equipment and other improvements as a result of the errors or omissions.

D. All submittals shall include all applicable District-assigned Equipment ID/Tag numbers on the transmittal cover.

E. Where specified, the Contractor shall furnish submittals to the District Representative for information only. An electronic version shall be transmitted to the District Representative. Designation "For Information Only" does not preclude the District

Representative from reviewing or commenting on the submittal contents as specified in this section.

F. All other submittals shall be submitted by the Contractor to the District Representative for review, comment, and approval. An electronic version shall be transmitted to the District Representative.

G. All submittal data including shop drawings will become part of the and O&M data and project records furnished under the PROJECT RECORD DOCUMENTS Section (01 78 39) and the OPERATION AND MAINTENANCE DATA Section (01 78 23). All changes or modifications during construction to original equipment submittals must be recorded and become part of the project record and O&M process as outlined in their respective sections.

1.02 DEFINITIONS

A. GENERAL:

1. The definitions of types of drawings, diagrams and other forms of submittal documents shall include the terms used in the following paragraphs. Whenever the following terms for drawings or other forms of submittal documents are used in submittal requirements, the definitions in the following paragraphs shall apply. The following set of definitions is not comprehensive. They are included to help clarify the meanings of certain terms applicable to mechanical, electrical, instrumentation and control system documents.

B. SINGLE-LINE DIAGRAMS: (DELETED)

C. ELEMENTARY OR SCHEMATIC DIAGRAM: (DELETED)

D. LOOP DIAGRAM: (DELETED)

E. CONNECTION DIAGRAM: (DELETED)

F. INTERCONNECTION DIAGRAM: (DELETED)

G. PANEL FABRICATION DRAWINGS: (DELETED)

H. ELECTRONIC ASSEMBLY DRAWINGS: (DELETED)

I. INSTRUMENT INSTALLATION DRAWINGS:

1. Instrument installation drawings shall show the mounting and piping details of field mounted instruments and instrument racks.

J. BILL OF MATERIALS:

1. Materials identified on the drawing and listed by item number, a brief description, manufacturer, model number (and/or page number), serial number (if available), and quantity used. Associated equipment numbers must be shown. The items must match the field installation and the drawing.

1.03 STANDARD COMPLIANCE

A. When materials or equipment are required to conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL), documents showing or proving conformance shall be submitted.

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

1.04 SUBMITTAL REVIEW

A. When review and comment is required of any drawing or information regarding materials and equipment, the Contractor shall post the submittal information to the Project Control System in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26). Within a reasonable time as specified in this section after receipt of said submittal, the District Representative will return electronically one copy of the submittal documents indicating one of the following four actions by item number:

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

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

a. If the District Representative determines that follow-up documentation needs to be submitted to demonstrate that the corrections have been incorporated, the District Representative will indicate as such in the submittal comments. The Contractor may submit the additional documentation at a later date and not delay the work.

3. If review and comment indicates insufficient or incorrect data has been submitted, copies will be returned marked "AMEND AND RESUBMIT." The Contractor is not authorized to begin incorporating the material and equipment covered by this submittal document into the work until the submittal document is revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

4. If review and comment indicates the material and equipment submittal is unacceptable, copies will be returned marked "REJECTED - SEE REMARKS". The Contractor is not authorized to begin incorporating the material and equipment covered by this submittal into the work until a new submittal is made, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

B. When submittal documents are referred to in these specifications as "approved," "reviewed" or "accepted," this means that they are stamped as in case 1 or 2 above.

C. Designation of submittal documents "for information only," does not preclude the District's Representative from reviewing or commenting on the submittal contents. Information only submittals returned to the Contractor marked "AMEND AND RESUBMIT" or "REJECTED - SEE REMARKS" shall be revised and resubmitted by the Contractor.

PART 2 -- PRODUCTS

2.01 SHOP DRAWINGS

A. GENERAL:

1. Shop drawings shall include data of all forms which have been custom prepared for this project. This includes detail drawings for structural, architectural, mechanical, piping, HVAC, electrical, logic diagrams, software programs, electronic, instrumentation, control, and communication equipment, assemblies, and systems which are installed or fabricated as a part of this project. All shop drawings shall be drawn in CAD format, as specified in this section, at an approved drawing scale. Also included are drawings and data which show fabrication, layout, setting or erection details. This includes any data which is prepared by the Contractor, subcontractors, vendors, suppliers, manufacturers or their representatives, specifically for this project.

2. Shop drawings shall have drawing numbers, scale, revision date and number, Contractor name, subcontractor name, supplier name, name of detailer or engineer who prepared the document, relation to adjacent structures, materials, drawing cross references, standards references, Contractor's certification stamp, and registered engineer's stamp, if required, shown on them. Maximum sheet size shall be 22 inches by 34 inches. Minimum sheet size for drawings shall be 11 inches by 17 inches, except as allowed by the District Representative.

B. CAD DRAWINGS:

1. All drawings shall be prepared in a CAD format, using the 2018 AutoCAD® software by Autodesk, Inc. The following drawings are specifically required in CAD format:

   a. Shop drawings which are specifically prepared for this project.

2. All CAD drawings shall comply with the United States National CAD Standard® (NCS). All Contractor submissions requiring CAD shall be in accordance with NCS Version 5.0, or the latest release, and the U.S. National BIM Standard (NBIMS). Additional information or clarification can be obtained from the United States National CAD Standard® (NCS) website at www.nationalcadstandard.org/ncs5. The National Institute of Building Sciences owns the copyright to the work known as the United States National CAD Standard® (NCS) and reserves all rights to said work under United States and international law.

   a. Exceptions to the NCS are as follows:

      1) All annotation shall be capitalized.

      2) All annotation shall be a minimum 1/8-inch Arial for full size drawings and a minimum 1/16-inch Arial for half size drawings.

      3) All arrowheads shall match the font size (1/8-inch) of the annotation in the drawing.

3. The Contractor shall require that the CAD drawings prepared by all subcontractors or vendors meet the requirements of these standards.

4. The Contractor shall upload the submittal drawing files (in both native and pdf format) to the Program Controls System in accordance with the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26).

C. ELECTRICAL AND CONTROL DOCUMENT REQUIREMENTS:

1. GENERAL: (DELETED)

2. CUSTOM SOFTWARE DOCUMENTATION: (DELETED)

3. SINGLE-LINE DIAGRAMS: (DELETED)

4. ELEMENTARY DIAGRAMS: (DELETED)

5. LOOP DIAGRAMS: (DELETED)

6. CONNECTION DIAGRAMS: (DELETED)

7. INTERCONNECTION DIAGRAMS: (DELETED)

8. ELECTRONIC ASSEMBLY DIAGRAMS: (DELETED)

9. INSTRUMENT INSTALLATION DRAWINGS: Instrument installation drawings shall be drawn to an approved scale and shall show the mounting, piping, and wiring details for field and rack mounted instruments (if applicable). Mounting dimensions, piping slopes, complete bill of material and installation notes shall be shown. Mounting heights, sense of line routing and process line tap heights relative to the instrument shall be shown. Viewing, adjustment, operation, and service access shall be shown. Groupings of instruments shall be drawn to an approved scale. Instrument installation drawings shall be submitted for all field mounted instruments and instrument racks (if applicable). Installation drawings shall list all applicable equipment numbers.

10. PANEL FABRICATION AND LAYOUT DRAWINGS: (DELETED)

2.02 MANUFACTURER'S PRODUCT DATA

A. Product data shall include data of all forms which define design, performance and function of manufactured products or materials. This includes all preprinted literature, performance specifications, drawings, instruction manuals, and data which are available from the original equipment manufacturer and/or supplier. Product data shall also include all software and firmware encoded on programmable device readable media. Specific Asset Attribute data related to the product data shall be submitted separately and is specified in the DESIGN DATA Section (01 33 16). Product data shall be

submitted for all manufactured products and material as specified in this section and in the Technical Specifications, Divisions 03 through 50.

2.03 TEST PROCEDURES AND RESULTS

A. Refer to the individual technical specifications for the submittal requirements of test procedures and results.

2.04 SAMPLES (DELETED)

2.05 MISCELLANEOUS SUBMITTALS

A. These include, but are not limited to, stormwater BMP plans and descriptions, warranties, guarantees, certifications, maintenance agreements, quality testing reports and similar information, devices and materials (if applicable).

2.06 PROJECT RECORD DRAWINGS AND DATA

A. Refer to the PROJECT RECORD DOCUMENTS Section (01 78 39) for the submittal requirements of as-built drawings and data.

2.07 OPERATION AND MAINTENANCE INSTRUCTIONS (DELETED)

2.08 BURIED UTILITIES (DELETED)

2.09 SCHEDULE

A. Refer to the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16) for submittal requirements for Schedules.

PART 3 -- EXECUTION

3.01 SUBMITTAL REQUIREMENTS

A. GENERAL:

1. Submittals shall be reviewed and coordinated by the Contractor before transmittal to the District Representative. Submittals shall be complete and fully identified by the Contractor.

B. PREPARATION:

1. Each submittal shall contain documents which are related to only one material, product or system. Normally, a separate transmittal form shall be used for each specific item or class of material, equipment or system. Exceptions may be allowed only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates checking or review of the group or

"package" as a whole. The Contractor shall mark each submittal document with the submittal number, letter suffix and item number.

2. Prior to preparation of each "major submittal package," the Contractor shall arrange for an 8-hour pre-submittal meeting, to be attended by the Contractor, District's Representative, and vendor(s) of the major submittal package. The purposes of the pre-submittal meeting will be to discuss how the submittal package will be organized, content of the submittal package, anticipated schedule for submittal and review, major features of the equipment/materials and basic compliance with specified equipment/materials, and coordination needed with related equipment/material submittals.

C. TRANSMITTAL FORM:

1. The District Representative will define a submittal numbering scheme which the Contractor shall use. Items omitted, or incorrectly or ambiguously listed on the transmittal form will be deemed to be not included in the submittal. Where items listed in the transmittal by equipment number conflicts with other descriptions contained in the submittal, the listed equipment numbers shall be deemed to be the intended scope. The Contractor shall bear all costs and damages sustained to the District attributable to omitted, or incorrectly or ambiguously listed submitted items.

2. Submittals shall be transmitted by utilizing the District-furnished web based Project Controls System. Prior to the first submittal, the Contractor shall attend a submittal transmittal meeting to work out all compatibility requirements. Each transmittal shall contain the following information as a minimum:

   a. Date

   b. Submittal or re-submittal number

   c. Contract title and number

   d. Contractor's name and address

   e. List of documents being submitted, by preparer, number and version

   f. Contract documents references (including specific specification section and drawing numbers) for each submittal document

   g. EchoWater Facility system references for each submittal document

   h. Previous submittal number and item number for each submittal document

   i. Notification of deviation(s) from contract documents for each submittal document

j. Complete list of equipment numbers and auxiliaries included with each submittal document

k. Contractor's certification of having reviewed and coordinated the submittal

l. Description of intended use in this contract

D. DOCUMENT IDENTIFICATION:

1. If multiple items are included within a single submittal, each separate document within the submittal shall contain the following information:

a. Document (Item) number within this submittal

b. Identification of product or material

c. Manufacturer's name

d. Equipment number

E. RESUBMITTALS:

1. Revise returned submittal documents as indicated and as required. Resubmit using the same submittal procedure as for an initial submittal. All resubmittals shall use the previous submittal number with a letter suffix and shall refer to the previous item number.

2. Resubmittals shall address all comments from the District Representative. Partial re-submittals may be returned "REJECTED." The Contractor will be responsible for the District Representative's review costs for each re-submittal in excess of the first resubmittal. These costs will be back charged to the Contractor and will be deducted from progress payments.

3. Time extensions will not be granted for delays resulting from the necessity for the Contractor to provide resubmittals due to inaccurate, incomplete or rejected submittals.

F. COORDINATION AND SEQUENCING:

1. Review priority will be based on the schedule unless otherwise requested in writing by the Contractor. The Contractor in scheduling submittals shall submit no more than 10 per week. In the event the Contractor submits more than 10 per week, the District Representative's review time may exceed the review time outlined.

2. The Contractor shall coordinate submittals with the work so that work will not be delayed. Submittals shall be coordinated and scheduled into different categories, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The

Contractor shall not proceed with work related to a submittal until the submittal process is complete and the submittal document has been returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted."

3. All submittals, including shop drawings, shall be submitted in sufficient time to allow the District Representative not less than 30 days for review of such submittals.

4. These review periods do not include any time that the District Representative cannot proceed further with the review because of having to wait for further information of clarification from the Contractor.

5. Normally, initial submittals will be returned to the Contractor within 30 days, and resubmittals will be returned within 20 days, exclusive of any time awaiting clarification or further information, and exclusive of "major submittals" as described above. However, the time for return will necessarily vary and may exceed the time described above depending upon the complexity of the submittal, the number of submittals, and the express needs of the Contractor.

6. Submittals for material or equipment which are not specified by name, and which are being submitted as an "or equal" to that specified and submittals for material or equipment with arrangements or requirements that are different than that shown in the contract documents, will normally require 42 days for the review process.

G. CONTRACTOR'S RESPONSIBILITIES:

1. The Contractor shall review submittals before they are transmitted to the District Representative to ensure that there are no conflicts with other submittals. The Contractor shall coordinate submittals from subcontractors and suppliers to ensure that they are complete and that there are no conflicts.

2. The Contractor is responsible for errors and omissions in submittals even though the District’s Representative reviews the submittal.

3. The District Representative shall be notified in writing at the time the submittal is transmitted of deviations from the requirements of the contract documents. The Contractor is responsible for correcting deviations from the contract documents even though the District Representative has reviewed the submittal, unless the deviations are clearly described in writing in the submittal transmittal form.

4. The Contractor shall be responsible for distributing submittals which have been returned with the District’s Representative's action to subcontractors and suppliers. Installation shall not be started until the submittal data with the "No Exceptions Taken" or "Make Corrections Noted" stamp is in the possession of the installer.

5. No changes shall be made by the Contractor in any submittal after it has been approved. The equipment or materials provided shall not deviate from the submittal

documents which are stamped with the "No Exceptions Taken" or "Make Corrections Noted" stamp in any way except with written approval by the District Representative.

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

7. The Contractor may authorize a material or equipment supplier to deal directly with the District Representative with regard to such submittals; however, ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor.

H. REQUESTS FOR SUBSTITUTION:

1. The Contractor may offer to substitute material or equipment if permitted by the technical specifications. The District will consider offers for substitution only from the Contractor unless the substitution/or equal submission is made pre-bid as described in the GENERAL CONDITIONS Section (00 72 00). Post-bid the District will not acknowledge or consider such offers from suppliers, distributors, manufacturers, or subcontractors.

2. The Contractor's offers of substitution shall be made in writing to the District Representative in ample time to permit review without delaying the work. Until and unless such substitutions are approved by the District Representative, no deviations from the specifications shall be allowed. Time extensions will not be granted for requests for substitution which are subsequently denied by the District Representative. Time extensions will not be granted for substitutions which are not submitted in a timely manner. Any request for substitutions shall include sufficient data to enable the District Representative to assess the acceptability of the material or equipment for the particular application and requirements.

3. The Contractor shall submit a brief description of the proposed substitution prior to preparing a detailed submittal. The brief description shall be submitted on a Request for Substitution/Construction Incentive Change Proposal (CICP) form. Within 15 working days, the District Representative will review the proposal in concept and respond. If the District Representative accepts the concept of the substitution, the Contractor may prepare a detailed submittal conforming to the requirements of this section.

4. Any cost differential associated with a request for substitution must be negotiated with the District Representative. These costs or savings must be covered by a change order which modifies the contract documents.

I. DRAWINGS FOR MODIFIED PANELS AND OTHER CONTROL SYSTEM COMPONENTS: (DELETED)

3.02 PROPRIETARY INFORMATION

A. All of the information required herein shall be provided even though it may be considered to be proprietary. If any of the information required herein is considered to be proprietary, the District's standard proprietary agreement shall be executed between the District and the Contractor, prior to contract award, stipulating that all such information will be supplied by the Contractor and kept confidential by the District.

B. Not more than 90 percent of all work shall be paid for until all proprietary information has been submitted and approved. Proprietary information shall describe the final as-built work. No part of the work covered by the proprietary agreement shall be modified after proprietary submittal acceptance until after updated proprietary information has been submitted by the Contractor and accepted by the District. Updated proprietary information shall fully document all modifications to be implemented. All proprietary data shall be marked "PROPRIETARY" by the Contractor.

3.03 MANAGEMENT OF THE SUBMITTAL PROCESS

A. The Contractor shall develop with assistance of the District Representative and Design Engineer a comprehensive management plan for all submittals required for the project. The intent of the management plan shall be to provide an orderly and timely process for the submission and review of submittals. The submittal management plan shall be developed and implemented within 60 days following Notice to Proceed. The submittal management plan shall incorporate the following elements:

1. The Contractor shall submit a list of submittals which require review within the first 120 days of the project, within 10 days following the Notice to Proceed.

2. The Contractor shall develop a comprehensive Master Submittal List of all specified submittals. The list shall be serially numbered in accordance with the appropriate specification section. The list shall be developed and submitted to the District Representative for review within 21 days following the Notice to Proceed. The District Representative will conduct a meeting to review the Master Submittal List with the Contractor within 3 working days following receipt of the list.

3. The Contractor shall develop a schedule for the submission and review of all specified submittals for the project. The schedule shall be developed in accordance with the CONSTRUCTION PROGRESS SCHEDULE Section (01 32 16). The schedule shall include individual activities for submission and review (and fabrication and delivery for equipment and material) for each submittal. The submittal schedule shall be a separate subnet of the master CPM construction schedule with each submittal activity linked to the appropriate construction activity. Every projected submittal shall be listed and incorporated into the schedule.

4. The Contractor shall meet at least once per month with the District Representative to review the status of all submittals. In addition, the Contractor shall develop and transmit monthly, a written list of the submittals which require review within the following 90 days. The list of projected submittals shall include the estimated date of submission for each submittal and a reference Master Submittal List for each item to be included in the submittal.

B. This section shall not supersede or modify any specific requirements for submittals or the submittal process described elsewhere in these specifications, but shall be a supplement to the existing requirements.

****END OF SECTION****

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Contractor shall be responsible for providing and maintaining the required utilities for construction facilities, such as telephone, electric, and water service necessary for use at Contractor's expense except as noted in this section.

B. Contractor shall provide temporary utilities which will enable construction processes and will accommodate other necessary activities at the site. Providing adequate temporary utilities is Contractor's responsibility, and is not limited to the minimums established by the requirements hereof.

C. The types of temporary utilities required for the project include (but are not necessarily limited to) the following:

1. Electric power;

2. Potable water;

3. Telephones;

4. Internet and computer network communications;

5. Non-potable water for construction activities.

D. The District has designated a general contractor laydown area, as shown on Contract Drawing GC002.

E. Contractor shall not use existing EchoWater Facility utilities such as air supplies (UA and SA), steam system, telephone, public address system, radio frequency, etc.

F. The following tabulation shows details of District's intent for responsibility of providing utilities:

Facility	Contractor-Supplied Utilities
Resident Engineer Office	None
Contractor and subcontractor field offices	All
Contractor and subcontractor on site storage facilities	District will supply power at existing 480 volt receptacles; Contractor to provide all others.
Construction utilities	District will supply non-potable water sources from existing utility stations.
Contractor shop areas	All
Performance Testing	District will supply power and water and Contractor shall provide temporary spools, fittings, pressure gauges, and conveyance and all other utilities as needed except as specified in the USE OF SITE Section (01 14 19).
Operational and Reliability Testing	District will supply all connected utilities (i.e. cooling water, seal water, power); Contractor shall supply hydraulic fluids, lubricants, etc.

1.02 QUALITY ASSURANCE

A. REGULATIONS:

1. Comply with governing regulations for the installation and use of general service facilities, including health and safety regulations.

B. STANDARDS:

1. Comply with Subchapter 4, CAC Title 8, Construction Safety Orders, and Subchapter 7, General Industrial Safety Orders, as applicable.

C. RESPONSIBILITIES:

1. Except as otherwise indicated, the assignment of responsibilities for installing utilities and for complying with trade regulations and union jurisdictions associated therewith, is Contractor's obligation.

1.03 SUBMITTALS

A. Submit to the District Representative for information only copies of inspection reports, certificates, permits and similar documentation required in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.04 SCHEDULED USES

A. Provide temporary utilities at the time first needed at the site; and maintain, expand and modify the facilities as needed throughout the construction period.

1.05 CONDITIONS OF USE

A. Operate, maintain, control and protect temporary utilities in a manner which will prevent fire, discomfort to users, flooding, interference with the construction work, and similar deleterious effects.

PART 2 -- PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. GENERAL:

1. Unless otherwise specified, Contractor may provide either new or used materials and equipment for general service facilities, which are in substantially undamaged condition and without significant deterioration and which are recognized in the construction industry by compliance with appropriate standards, as being suitable for the intended use in each application.

B. NONPOTABLE WATER:

1. Contractor may use the existing well located near the northwest corner of Sims Road and Echo Road. Use of this well will be shared with other contractors and District staff. The approximate capacity of the well pump is 1,100 gpm.

2. Contractor may also use the existing well located north of ESB-D Road and west of Sims Road. Use of this well will be shared with other contractors. The approximate capacity of the well pump is 900 gpm. Contractor shall use care when using these wells and shall follow all District operating procedures. Contractor shall notify the District's Representative immediately if Contractor observes any issues with the wells.

PART 3 -- EXECUTION

3.01 INSTALLATION OF TEMPORARY UTILITIES

A. GENERAL:

1. Locate utilities where they will serve the total project construction work adequately, and result in minimum interference with performance of the work. Relocate, modify and extend utilities as required during the course of the work, to properly accommodate the entire work of the project. Provide a reasonably neat and uniform appearance in general service facilities, acceptable to the District Representative.

2. Except as otherwise indicated, do not plan to change over from use of temporary utilities to use of permanent facilities until time of substantial completion, or for longer periods of time as requested by District. However, it is recognized that certain utilities will need to be removed from the site at or near the time of field acceptance, and that Contractor's personnel remaining at the site beyond that time will be permitted to use certain permanent facilities, under restricted use conditions which are acceptable to the District Representative.

B. DRINKING WATER:

1. Supply drinking water for construction personnel by either water-system connected drinking fountains or by containerized tap-dispensers with paper cups, (or both), at Contractor's option.

2. A 4-inch potable water service connection will be provided by the District within the designated Contractor trailer area and will available for use by the Contractor. Contractor shall be responsible for all piping and fittings to connect to the service connection.

C. ELECTRICAL POWER

1. District will provide a 480 volt power transformer and manhole for construction purposes within the designated Contractor area. Contractor shall install a GFI breaker rated a maximum of 60 amps and install underground conduit from the manhole to each trailer provided by the Contractor.

D. SANITARY SEWER

1. District will provide a 30-inch sanitary drain and manhole for construction purposes within the designated Contractor area. Contractor shall be responsible for trenching and providing underground piping and fittings to connect to the manhole.

E. NETWORK AND TELEPHONE COMMUNICATIONS

1. Contractor will provide all necessary network and telephone communications. EchoWater Facility network or telephones shall not be used by Contractor or subcontractor personnel.

2. Post a listing of telephone numbers at each telephone location, including local police, fire department, doctor, ambulance service and similar emergency numbers as well as temporary and home offices of contractors, principal subcontractors, architects, engineers, representatives of District, and others involved with the performance of the work.

3.02 MAINTENANCE AND TERMINATIONS

A. MAINTENANCE:

1. Operate and maintain temporary utilities in good operating condition through the time of use, and until removal is authorized. Protect from damage by weather.

B. TERMINATION AND REMOVAL:

1. When the need has ended for each temporary utility, or at the time of substantial completion, promptly remove the utility unless requested by the District Representative to retain it. Complete or restore permanent work which may have been delayed or otherwise affected by the temporary utility. Replace work which cannot be satisfactorily restored.

****END OF SECTION****

SECTION 01 52 00

CONSTRUCTION FACILITIES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Contractor shall be responsible for providing and maintaining the necessary field offices, material storage and sanitary facilities necessary for use at Contractor's expense except as noted in this section. Temporary utilities for construction facilities are described in the TEMPORARY UTILITIES Section (01 51 00).

B. Contractor shall provide temporary facilities which will enable construction processes, and will accommodate other necessary activities at the site. Providing adequate general services is Contractor's responsibility, and is not limited to the minimums established by the requirements hereof. Except as otherwise indicated, the use of alternative general services equivalent to those specified is Contractor's option, subject to acceptance by the District Representative. Temporary general services exclude inspection and testing services, surveys, photographs, security provisions, protection, safety, final cleaning, start-up of systems, instructions to District personnel and other services which are recognized to be similar to the work of this section but are specified in other sections hereof, if required.

C. The types of temporary facilities and general services required for the project include (but are not necessarily limited to) the following:

1. Field offices for Contractor and subcontractor;

2. On-site storage facilities for Contractor and subcontractor;

3. Sanitary facilities;

4. Collection/disposal of waste materials; and

5. Miscellaneous general services.

D. Contractor shall not use existing EchoWater facilities such as restrooms, lunchrooms, etc.

1.02 QUALITY ASSURANCE

A. REGULATIONS:

1. Comply with governing regulations for the installation and use of general service facilities, including health and safety regulations.

B. STANDARDS:

1. Comply with Subchapter 4, CAC Title 8, Construction Safety Orders, and Subchapter 7, General Industrial Safety Orders, as applicable.

C. RESPONSIBILITIES:

1. Except as otherwise indicated, the assignment of responsibilities for installing facilities and performing general services, and for complying with trade regulations and union jurisdictions associated therewith, is Contractor's obligation.

1.03 SUBMITTALS

A. Submit to the District Representative for information only copies of inspection reports, certificates, permits and similar documentation required or issued in connection with general services in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.04 SCHEDULED USES

A. Provide temporary general services at the time first needed at the site; and maintain, expand and modify the facilities as needed throughout the construction period.

1.05 CONDITIONS OF USE

A. Operate, maintain, control and protect general service facilities in a manner which will prevent fire, hazardous exposures, health problems, unsanitary conditions, pollution, contamination, discomfort to users, flooding, interference with the construction work, public nuisances and similar deleterious effects.

PART 2 -- PRODUCTS

2.01 MATERIALS AND EQUIPMENT OF GENERAL SERVICES

A. GENERAL:

1. Unless otherwise specified, Contractor may provide either new or used materials and equipment for general service facilities, which are in substantially undamaged condition and without significant deterioration and which are recognized in the

construction industry by compliance with appropriate standards, as being suitable for the intended use in each application.

B. CONSTRUCTION MATERIALS:

1. For offices, fabrication shops, storage sheds and similar construction, provide standard-manufactured prefabricated or mobile home construction insulated and weather-tight where indicated to be heated or air conditioned, or provide equivalent job-built construction. Equip each unit with locked entrances, operable windows, roofing, adequate foundations for usual loading including wind loads, serviceable finishes of the types indicated, and mechanical/electrical equipment as needed to achieve the ambient conditions indicated.

C. SELF-CONTAINED TOILET UNITS:

1. Single-occupant, self-contained units of the chemical aerated recirculation type fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material, properly vented and maintained in operation.

PART 3 -- EXECUTION

3.01 INSTALLATION OF GENERAL SERVICE FACILITIES

A. GENERAL:

1. The District has designated Contractor trailer, material storage laydown, and parking areas to be shared by multiple contractors working concurrently at the EchoWater Facility as shown on Contract Drawing GC002. Parking on existing road shoulders, in District parking areas, or parking in any way that affects the District's ingress/egress shall not be acceptable. Any single Contractor trailer must not exceed 3,600 square feet.

2. Locate facilities within the designated Contractor area where they will serve the total project construction work adequately, and result in minimum interference with performance of the work. Relocate, modify and extend facilities as required within the designated area during the course of the work, to properly accommodate the entire work of the project. Provide a reasonably neat and uniform appearance in general service facilities, acceptable to the District Representative.

3. Except as otherwise indicated, do not plan to change over the use of permanent facilities of the project to replace the use of temporary general service facilities. However, it is recognized that certain general service facilities will need to be removed from the site at or near the time of field acceptance, and that Contractor's personnel remaining at the site beyond that time will be permitted to use certain permanent facilities, under restricted use conditions which are acceptable to the District Representative.

B. SANITARY FACILITIES:

1. GENERAL:

   a. Sanitary facilities include toilets, wash facilities, drinking water fixtures and food/beverage service facilities (if any). Comply with governing regulations including safety and health codes for the type, number, location, operation, and maintenance of fixtures and facilities, but provide not less than the specified requirements. Install sanitary facilities in available locations which will best serve the needs of personnel at the project site.

   b. Distribute toilets and drinking water fixtures as necessary. EchoWater Facility washroom, toilet, and drinking water facilities shall not be used by Contractor or subcontractor personnel.

   c. Supply and maintain toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each sanitary facility, and provide and empty waste paper containers for used materials.

2. TOILETS: Choice of either self-contained toilet units or water/sewer connected temporary toilet installations (or both) is Contractor's option to the extent permitted by governing regulations. The provision of water/sewer connections is Contractor's responsibility in accordance with the TEMPORARY UTILITIES Section (01 51 00).

3. DRINKING WATER FIXTURES: Supply drinking water for construction personnel by either containerized tap-dispensers with paper cups, or by water-system connected drinking fountains (or both), at Contractor's option. Refer to the TEMPORARY UTILITIES Section (01 51 00) for temporary potable water supply.

4. SHOWERS: Contractor may provide a shower facility for which Contractor would be responsible for providing potable water and sewer connection in accordance with the TEMPORARY UTILITIES Section (01 51 00). Location of shower facility shall be approved by the District Representative and may possibly be placed in the EchoWater Facility somewhat remote from the project site. Existing District showers may not be used by Contractor, except as approved by the District Representative for unusual situations.

C. COLLECTION AND DISPOSAL OF WASTES:

1. Establish and enforce a daily system for collecting and disposing of waste materials from construction areas and elsewhere at the project site. No waste material can be stored in tunnels or buildings, it must be disposed of daily. Do not hold collected materials at the site for periods of more than 7 days, nor for periods of more than 3 days during hot weather (when daily temperatures can be expected to rise above 80 degrees F). Handle hazardous, dangerous, unsanitary, contaminated, polluting and similar harmful wastes separately from inert materials. Store and dispose of hazardous wastes in a lawful and timely manner. Allowable mandated storage

retention times may be less than the 7-day limit stated for nonhazardous wastes. Dispose of each category of waste material in a lawful manner. Do not bury or burn waste materials on District property.

D. MISCELLANEOUS GENERAL SERVICES:

1. Include whatever general services may be required, or are found to be necessary, for the accommodation of the work. The items of general service which may be needed include, but are not necessarily limited to, the installation of postal delivery service, parking spaces at the temporary offices, walkways in and around the construction area and personal protection items for employees and visitors.

3.02 OPERATIONS AND TERMINATIONS

A. SUPERVISION:

1. Enforce strict discipline in the use of general services at the project site. Limit availability of facilities to essential and intended uses, so as to minimize wastes and the possibility of abuses and the resulting unsanitary and hazardous or dangerous conditions. Do not allow temporary offices and similar temporary or permanent spaces to be used as living quarters, or for other unintended occupancies or uses.

B. JANITORIAL SERVICES:

1. Provide daily janitorial services for temporary offices, toilets, wash facilities, and similar areas at the project site. Require users of other general services to maintain clean and orderly premises.

C. MAINTENANCE:

1. Operate and maintain general services in good operating condition through the time of use, and until removal is authorized. Protect from damage by weather.

D. TERMINATION AND REMOVAL:

1. When the need has ended for each temporary general service facility, or at the time of substantial completion, promptly remove the facility unless requested by the District Representative to retain it. Complete or restore permanent work which may have been delayed or otherwise affected by the temporary facility. Replace work which cannot be satisfactorily restored. Except as otherwise indicated, the materials and equipment of temporary general services remain the property of Contractor. District reserves the right to take possession of project identification signs.

****END OF SECTION****

SECTION 01 56 00

TEMPORARY BARRIERS AND ENCLOSURES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. This section specifies minimum requirements of temporary provisions for temporary barriers and enclosures not specified elsewhere.

B. The providing of adequate security and protection is Contractor's responsibility, and is not limited to minimums established by requirements hereof. Except as otherwise indicated, use of alternative security and protection methods of facilities equivalent to those specified is Contractor's option. The work of this section is not intended to include required insurance coverage, individual provisions for safe performance of specific work, first aid requirements, general supervision, quality control, damage surveys, prequalification of construction personnel, temporary enclosure of completed work and stored materials, inspection and tests of the work, instructions to District personnel and similar recognized protection/security provisions, which may be required.

C. The types of security and protection facilities required for the project include but are not necessarily limited to the following:

1. Barricades, warning signs, lights;

2. Enclosure fence for project site and construction areas; and

3. Security enclosure and lockup of work.

1.02 QUALITY ASSURANCE

A. REGULATIONS:

1. Comply with governing regulations for installation and operation of security and temporary barrier facilities.

B. RESPONSIBILITIES:

1. The assignment of responsibilities for security and temporary barriers such as installation, maintenance and operation, is Contractor's obligation.

C. DELIVERIES:

1. No deliveries will be accepted by the District. All deliveries shall be made to the Contractor.

1.03 JOB CONDITIONS

A. SCHEDULED USES:

1. Provide temporary barriers, security and protection at site. Maintain, expand and modify facilities as needed throughout construction period.

2. It is the contractor's responsibility to remove the grating for any work inside the pipe chases and to reinstall it at the end of each workday to prevent trip hazards during the night. Temporary fall protection barriers are required when working inside the pipe chases.

B. TEMPORARY USE OF PERMANENT FACILITIES:

1. The Contractor shall be required to assume responsibility for its operation, maintenance and protection prior to acceptance of the facility by the District Representative.

C. CONDITIONS OF USE:

1. Use temporary barriers, security and protection facilities and services in a safe, sanitary, lawful, and publicly acceptable manner, which will not interfere unduly with performance of the work nor result in other deleterious effect.

D. TEMPORARY FENCING: (DELETED)

PART 2 -- PRODUCTS

2.01 SECURITY AND PROTECTION FACILITIES

A. GENERAL:

1. Provide either new or used materials and equipment, which are in substantially undamaged and serviceable condition.

B. OPEN-MESH FENCING: (DELETED)

2.02 GIANT GARTER SNAKE (GGS) EXCLUSION BARRIER (NOT USED)

2.03 ENVIRONMENTALLY SENSITIVE AREA (ESA) FENCING (NOT USED)

PART 3 -- EXECUTION

3.01 INSTALLATION OF SECURITY/PROTECTION FACILITIES

A. GENERAL:

1. Locate facilities to serve total project construction work adequately, and to result in minimum interference with performance of the work. Relocate, modify and extend facilities as required during course of the work, to properly accommodate entire work of the project. Provide and maintain a reasonably neat and uniform appearance in security and protection facilities, acceptable to District.

2. Do not plan to change over from use of temporary security and protection facilities to use of permanent facilities until time of substantial completion, or for longer periods of time as requested by District.

B. BARRICADES, WARNING SIGNS AND LIGHTS:

1. Comply with recognized standards and code requirements for erection of substantial and structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at site, and the general public where exposure exists, of hazard being protected. Provide lighting where appropriate and needed for recognition of facility, including flashing red lights where appropriate.

2. Provide and maintain all barricades, warning lights, signs, fences and other work for the protection and safety of the public and workers as required by the District's Representative. Contractor shall at all times have at least 50 unused barricades on site whenever excavation of any type is taking place.

3. Construction areas within the existing buildings shall be adequately signed and partitioned off so that such areas can be secured, at all times, against unauthorized entry.

C. ENCLOSURE FENCING: (DELETED)

D. SECURITY ENCLOSURE AND LOCKUP:

1. The Contractor shall be responsible for the security of all equipment, materials and work until it is accepted by the District Representative.

3.02 INSTALLATION OF ENVIRONMENTALLY SENSITIVE AREA (ESA) FENCING (NOT USED)

3.03 TERMINATION AND REMOVAL

A. Maintain protection and security facilities and services in good operating condition through time of use and until completion and use of permanent work makes each temporary service unnecessary, or until District occupancy has replaced the need for service or until its discontinuation has been otherwise authorized. Remove each facility promptly after its use has been terminated. Complete or restore permanent work which may have been delayed or otherwise affected by temporary facility. Replace work which cannot be satisfactorily restored. Except as otherwise indicated, materials and equipment of temporary security and protection facilities remain the property of the Contractor.

****END OF SECTION****

SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Equipment, products and materials shall be shipped, handled, stored, maintained and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the District Representative.

B. Failure of Contractor to properly store and maintain equipment and materials will result in rejection of the equipment or material or a withholding from the progress payment.

C. Deliveries to the EchoWater Facility must include the contract number and name of the project on all delivery manifests.

1.02 MATERIALS

A. Materials shall be handled, stored, and installed as recommended by the manufacturer. Pipes with paint, tape coatings, linings or the like shall be stored to protect the coating or lining from physical damage or other deterioration. Plastic pipes including PVC conduit shall be stored with UV protection until placed or installed. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.

1.03 EQUIPMENT

A. PACKAGE AND MARKING:

1. All equipment shall be protected against damage from moisture, dust, handling, or other cause during transport from manufacturer's premises to site. Each item or package shall be marked with the number unique to the specification reference covering the item.

2. Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or subassembled units where possible.

B. IDENTIFICATION:

1. Each item of equipment and valve shall have permanently affixed to it a label or tag with its equipment or valve number designated in this contract. Label or tag shall be of stainless steel. Location of label will be easily visible.

C. SHIPPING:

1. Bearing housings, vents and other types of openings shall be wrapped or otherwise sealed to prevent contamination by grit, dirt and water vapor.

2. Damage shall be corrected to conform to the requirements of the contract before the assembly is incorporated into the work. Contractor shall bear the costs arising out of dismantling, inspection, repair and reassembly.

D. FACTORY APPLIED COATINGS:

1. Unless otherwise specified, each item of equipment shall be shipped to the site of the work with the manufacturer's shop applied prime coating which is compatible with the field applied coating as specified in the PAINTING AND COATING Section (09 90 00). The prime coating shall be applied over clean dry surfaces in accordance with the coating manufacturer's recommendations. The prime coating will serve as a base for field-applied finish coats. Electrical equipment and materials shall be painted by manufacturer as specified in the PAINTING AND COATING Section (09 90 00).

E. STORAGE:

1. During the interval between the delivery of equipment to the site and installation, all equipment, unless otherwise specified, shall be stored in an enclosed space affording protection from weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Manufacturer's recommendations shall be adhered to in addition to these requirements.

2. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Temporary power shall be provided to energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing the sealed enclosure.

F. PROTECTION OF EQUIPMENT AFTER INSTALLATION:

1. After installation, all equipment shall be protected from damage from, including but not limited to, dust, abrasive particles, debris and dirt generated by the placement, chipping, sandblasting, cutting, finishing and grinding of new or existing concrete, terrazzo and metal; and from the fumes, particulate matter, and splatter from welding,

brazing and painting of new or existing piping and equipment. As a minimum, vacuum cleaning, blowers with filters, protective shieldings, and other dust suppression methods will be required at all times to adequately protect all equipment. The protection of equipment shall also apply to disassembled equipment. During concreting, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all equipment nameplates, grease fittings, and similar openings shall be covered to prevent the entry of paint. Electrical switchgear, unit substation, and motor load centers shall not be installed until after all concrete work and sandblasting in those areas have been completed and accepted and the ventilation systems installed.

G. PREVENTIVE MAINTENANCE:

1. All equipment in storage and during and after installation shall be maintained by qualified Contractor personnel. Contractor shall set up a preventive maintenance program for all equipment. This program shall include as a minimum all manufacturer's recommendations and operation and maintenance manual requirements for the preventive maintenance of each piece of equipment including environmental, lubrication and rotation procedures. Record sheets of the preventive maintenance program shall be submitted to the District Representative monthly in accordance with the SUBMITTAL PROCEDURES Section (01 33 00).

1.04 SUBMITTALS

A. Prior to equipment delivery, Contractor shall submit pre and post installation preventive maintenance (PM) instructions recommended by the manufacturers for Major Equipment. Contractor shall conduct an ongoing monthly PM program during construction on all Major Equipment and any minor equipment requiring PM per the manufacturer's recommendations. The PM program shall be witnessed by the District Representative. Contractor shall monthly submit information in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) on the status of all equipment in the PM program. Failure of Contractor to properly maintain the equipment shall result in rejection of the equipment or a withholding from the progress payment.

****END OF SECTION****

SECTION 01 73 33

RESTORATION OF IMPROVEMENTS

PART 1 -- GENERAL

1.01 STRUCTURES

A. Contractor shall remove existing facilities, including curbs, gutters, pipelines and utilities, as may be necessary for the work and shall replace the structures as good a condition as found. Existing facilities which may be damaged as a result of the work shall be repaired and restored.

1.02 ROADS

A. Unless otherwise specified, roads in which the surface is removed, broken, or damaged, or in which the ground has caved or settled shall be restored to the original grade and section. Roads used by Contractor shall be cleaned and repaired. Before pavement is placed, edges of pavements shall be sawcut to provide clean, solid, vertical faces, and shall be free of loose material. Repair work shall conform to the paving specifications.

1.03 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS

A. Cultivated or planted areas and other improvements which are damaged by Contractor shall be restored as nearly as possible to their original condition.

B. Existing guard posts, barricades, fences, and signs shall be protected and replaced if damaged.

1.04 RAILROAD TRACKS (DELETED)

1.05 PROTECTION OF EXISTING INSTALLATIONS

A. Contractor shall immediately correct or replace existing equipment, controls or systems which are damaged.

1.06 REMOVAL OF EXISTING PIPING AND EQUIPMENT

A. Material designated as salvage shall be flushed and stored on pallets at the plant site as directed by the District Representative. All other piping, equipment, fixtures, conduit, wiring and other appurtenances not specified or indicated to be salvaged shall become the property of Contractor and shall be removed from the site and properly disposed of at the expense of Contractor.

1.07 MODIFICATION OF STRUCTURES

A. Contractor shall alter or rework existing concrete structures as shown and specified. Generally, when items of equipment and piping are removed, the areas and surfaces from which items were removed shall be left with a neat appearance and finish compatible with surrounding areas, colors and surfaces. Holes and pipe and conduit penetrations in walls and slabs shall be filled with grout. Contractor shall do all painting, sanding, grouting, sacking, resurfacing, and other work as necessary. Prior to structural modifications, all surfaces shall be inspected by the District Representative. Colors shall match existing.

B. Contractor shall take care when handling materials to prevent dropping them into an operating tank, channel, conduit, pipeline or the like. Contractor shall notify the District Representative immediately if anything is added to any tank, channel, conduit, or pipeline.

1.08 CONNECTIONS TO HYDRAULIC STRUCTURES

A. Connections to existing hydraulic structures, for the purpose of transferring flow to completed portions of the work, shall be as specified.

****END OF SECTION****

SECTION 01 74 23

FINAL CLEANING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. As a condition precedent to final acceptance or release of a structure, space or process unit for use by District, Contractor shall thoroughly clean all floors, ceilings, roofs, walls, woodwork, counters, sinks, fixtures and windows to leave same in first-class condition.

B. All pits and sumps shall be cleared of silt, sand, debris and construction materials. Ductwork, air intakes, and exhaust grilles shall be inspected and cleared of extraneous dust and material. All filters shall be replaced or cleaned to like new condition. All grounds shall be cleared of all debris and reseeded and restored to its original condition. Finish floors shall be thoroughly cleaned, sealed and given a final coat of wax. Blinds, all furniture and cabinets shall be dusted. Replace all burned out lamps.

C. Contractor shall not proceed with this work until authorized in writing by the District Representative.

****END OF SECTION****

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. Project record documents (commonly known as "as-builts") shall show the actual as-constructed conditions of installed or modified systems, equipment and material at the time of field acceptance of the related portions of work. The purpose of as-built documents is to provide accurate information for the future modification, expansion, operation and maintenance of the plant.

B. The project record documents are especially important for recording field conditions of embedded or concealed material and equipment. These embedded or concealed items shall include, but are not limited to, buried structures, thrust restraints, backfill material, piping, cables and raceways.

C. Work related to Field Instructions (FI), Contract Change Orders (CCO), Clarifications or other agreements between Contractor and the District Representative shall be considered part of the project record process. Contractor shall record conditions and/or changes relating to this work on the project record documents.

D. Project record documents shall clearly be shown as part of the CPM activity schedule.

E. Divisions 1 through 50 may contain additional project record document requirements which shall be met in accordance with the requirements of this section.

1.02 VALUES

A. Project record documents shall have a value of not less than one percent (1%) of the contract value. For additional work, the project record document value shall be determined by Field Instructions or Change Orders as outlined in the GENERAL CONDITIONS Section (00 72 00) of this contract. Project record documents for additional work shall meet all conditions of this section.

B. The value of project record documents as specified in the PROGRESS PAYMENT PROCEDURES Section (01 29 76) shall be distributed in the following categories with an associated drawing weight:

No.	Project Record Categories	Drawing Weight
1.	Process and Piping Schematic	3
2.	All other contract drawings.	1

C. The sum of the total number of approved drawings in each category multiplied by the assigned weight, divided by the sum of the total number of drawings in each category multiplied by the assigned weight will provide the weighted percent complete for as-built drawings. The weighted percent complete will be used to determine progress payments for project record drawings.

PART 2 -- PRODUCTS

2.01 DISTRICT-SUPPLIED DRAWINGS AND CONTRACT DOCUMENTS

A. The following District-supplied drawings, contract documents, and AutoCAD files are to be submitted in as-built condition for review by the District Representative:

1. Contract drawings and specification schedules.

2. Contract supplemental drawings, existing plant drawings, schedules affected by the work of this contract. These drawings and documents cover electrical distribution systems, electrical control panels, instrumentation panels, control panels, Area Control Centers (ACC), telephone systems, intercom systems, the sound powered telephone system, Process Control Centers (PCC), and terminal panels.

3. Drawings, agreements, tabulations, and schedules supplied by District as a result of Requests for Information (RFIs), Field Instructions (FIs), and Change Orders (COs).

2.02 CONTRACTOR-SUPPLIED DRAWINGS AND OTHER DOCUMENTS

A. The following Contractor supplied drawings, other contract documents, and AutoCAD files shall be submitted in project record condition for review by the District Representative:

1. Shop drawings generated by Contractor, sub-contractors, vendors or suppliers as defined in the SUBMITTAL PROCEDURES Section (01 33 00).

2. Programmable logic controllers (PLC) and analog controller program documentation with control and logic diagrams which have been submitted for construction.

3. Operation and maintenance manual documents, drawings, and schedules supplied by Contractor, subcontractors, vendors, or suppliers.

PART 3 -- EXECUTION

3.01 GENERAL

A. Contractor immediately upon setting up the job site field office shall set up a designated area for project record keeping. An accurate neatly marked complete set of full-size contract drawings, documents and shop drawings (including specifications and schedules) shall be designated as the as-built record set.

B. Contractor shall immediately start recording project record information upon doing any work.

C. Contractor shall keep those documents current with changes reflecting as-built status as construction proceeds.

D. Although some drawings are considered diagrammatic with respect to placement of conduit, piping, etc., Contractor must closely follow the routing shown. If there are deviations, Contractor must show the as-built conditions as work progresses and provide all changes to the project record documents with dimensions as outlined below:

1. Buried or embedded items within buildings, tunnels and other structures including but not limited to, piping, thrust restraints, electrical raceways, cables, duct banks, or other related appurtenances, in or under concrete, asphalt or soil, which are not placed as shown on the drawings, shall show as-built dimensions horizontally and vertically from a wall, formed footing, finish floor, ceiling or finish top of curb. Items placed in the center of concrete slabs do not need to have vertical dimensions.

2. All buried or embedded items as described above which are outside of buildings shall be tied to the plant survey grid system both horizontally and vertically with proper stationing, invert elevations and/or top of buried item. Survey data shall show all transition points (changes in direction, change in elevation, etc.). All items which are installed by horizontal or vertical curves shall show as-built curve data.

3.02 PROJECT RECORD KEEPING

A. All project record documents shall be marked-up copies, with erasable colored pencils using the following color coding:

1. Red - Additions including notes and dimensions.

2. Green - Deletions (By hash marks or appropriate lines through the deletion.)

3. Graphite - General comments and notes used by Contractor or District's Representative and not required on the as-built.

4. Yellow - Work completed as shown and used by District's Representative in field review of the as-built, during the submittal phase.

5. Blue - District's Representative's office verification and notes required to be added and noted by District's Representative in review of the as-built, during submittal phase.

B. All work shall be neatly organized and legible using the same standards and symbols as the original drawing.

3.03 MAINTAINING PROJECT RECORD DOCUMENTS

A. Contractor shall maintain a neatly marked full size set of project record documents. All District-supplied documents shall have shop drawing references clearly marked with clouds around the areas which are detailed on the shop drawing. Shop drawings referenced to other associated shop drawings shall have drawing references clearly marked with clouds around the area representing the shop drawing.

B. Abbreviation of the drawing Originator (Contractor, subcontractors, vendors or suppliers) referenced on the contract documents is unacceptable.

C. In areas where detail does not permit showing as-built conditions clearly on contract drawings but a shop drawing depicts actual as-built condition of the area, a cloud with shop drawing reference may be accepted at the District Representative's discretion. Otherwise all as-built conditions shall be shown on the contract drawings.

D. The project record documents and one copy of all approved shop drawings and one copy of the approved O&M instructions (per the OPERATION AND MAINTENANCE Data Section [01 78 23]) shall be kept in a central location on the job site providing access for all associated with the contract, for updating of as-built information and for review during normal business hours.

E. The project record documents shall be kept current using the mark-up procedures described herein. These documents shall be available for inspection by the District Representative at all times.

F. If project record documents are not kept current based upon weekly review by the District Representative, the current progress payment shall be limited as specified in the PROGRESS PAYMENT PROCEDURES Section (01 29 76).

3.04 PROJECT RECORD SUBMITTAL PROCESS

A. GENERAL:

1. All project record documents shall be submitted electronically in accordance with the SUBMITTAL PROCEDURES Section (01 33 00) and the ELECTRONIC COMMUNICATION PROTOCOLS Section (01 31 26).

2. Project record documents shall be submitted showing the as-built conditions within 30 working days after completion of Clean Water Commissioning of an area or subsystem. Project record documents shall be completed and submitted prior to Substantial completion of each area or subsystem. Contractor shall compare all as-built documents with the actual field conditions and show the actual field conditions on the as-built documents before submitting them for review.

3. Project record submittals shall be rejected without any part being reviewed for any of the following reasons:

    a. Work has not been completed, including work related to Field Instructions, Change Orders, clarifications, or other agreements pending.

    b. Not all components and equipment have been properly labeled on the drawings. All equipment numbers (device and equipment number labeling codes) shall be shown on all drawings depicting the equipment. Equipment numbers must be coordinated with the plans and drawings and shown on all District-supplied and all contractor supplied drawings that depict equipment. The Contractor shall request equipment numbers from the District for all new equipment installed.

    c. Actual field conditions are not substantially shown on the documents.

    d. Drawing cross references are incomplete. District supplied drawings must be cross referenced to Contractor-supplied drawings and Contractor-supplied drawings must be cross referenced back to the District-supplied drawings.

B. PROJECT RECORD GROUPS AND SYSTEMS:

1. All project record documents shall be submitted together in the following logical groups or systems:

    a. All site drawings including survey data and data related to an area.

    b. All mechanical and piping related to an area, or by piping system. Process and Piping Schematics shall be submitted with the mechanical and piping package.

    c. All structural and architectural data related to an area.

    d. All electrical and instrumentation data related to an area, including Interconnection and Instrument Loop Drawings, together with all associated shop drawings and connection drawings; all related drawings found in the O&M manuals; process and Instrumentation diagrams.

C. PRELIMINARY REVIEW PROCESS:

1. In order to minimize the number of re-submittals, the following procedure shall be used:

a. Upon assembly of a project record submittal, Contractor shall notify the District Representative that the submittal is ready for review. Prior to review, a list of project record documents with all drawing numbers, descriptions and originators listed shall be submitted to District's Representative for review. The District Representative will review the list of project record documents and meet with Contractor to review the submittal for completeness and accuracy. Contractor may be required to add or subtract some documents as directed by the District Representative to ensure a complete and reviewable package.

b. Some drawings may show work in several areas or systems. When this occurs, the list shall indicate this type of drawing. The area on this type of drawing which is to be reviewed as part of this submittal shall be clearly outlined by Contractor.

c. Documents that represent more than one area of work must be submitted for each area of work it represents and must receive approval for each area of work.

d. After the preliminary review, Contractor shall submit the as-built package with the necessary corrections for as-built review.

D. PROJECT RECORD SUBMITTALS FOR REVIEW AND COMMENTS

1. Contractor shall submit the original full size markups, one (1) set of full size copies of all District-supplied documents and two (2) sets of Contractor-supplied as-built record documents for each submittal or re-submittal as outlined in this section. One (1) set of Contractor supplied as-built documents shall be returned after each submittal review.

2. Contractor shall correct the original hard copy drawings and AutoCAD drawings once the District Representative has returned the marked up Contractor supplied documents "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED". Contractor shall then supply the mark-ups, and the AutoCAD drawing files electronically as part of the resubmittal package, along with a hard copy of the drawing files.

E. DOCUMENT IDENTIFICATION:

1. Each separately bound document within a submittal shall have the following information shown on it:

a. Submittal number.

b. Document item number within this submittal.

c. Identification of product or material.

d. Manufacturer's name.

F. COORDINATION AND SEQUENCE:

1. Contractor shall coordinate the submittals with the work as outlined in this section. No extension of time will be allowed because of failure to properly schedule as-built submittals as outlined in this section. The submittal will be returned to Contractor within forty (40) working days of receipt by the District Representative, exclusive of any time waiting for clarification or further information from Contractor. The time for return will vary and may exceed 40 days depending on the complexity of the submittal and the number of submittals.

G. PROJECT RECORD RE-SUBMITTALS:

1. Returned project record submittal documents shall be revised as indicated by the District Representative's comments as required. Re-submittal shall be done by using the same submittal number with an alpha suffix after the submittal number. Reference to the previous submittal number and item number is required when resubmitting. Re-submittals shall address all comments from the District Representative. Partial re-submittals will not be reviewed and will be returned in their entirety REJECTED. Contractor will be responsible for the District Representative's review cost for each re-submittal in excess of the first re-submittal. These costs will be back-charged to Contractor and will be deducted from the progress payment.

H. SUBMITTAL REVIEW:

1. GENERAL: The following are the four (4) possible Review Codes each document item can receive:

   a. "A" - NO EXCEPTIONS TAKEN: the as-built document is approved as is.

   b. "B" - MAKE CORRECTIONS NOTED: limited corrections are required. Copies will be returned with remarks as to corrections required.

   c. "C" - AMEND AND RESUBMIT: insufficient or incorrect data has been submitted or data is missing to complete the review. Copies will be returned with remarks requiring re-submittal with deficiencies corrected.

   d. "D" - REJECTED: Submittal is unacceptable and does not meet the requirements of these specifications, the document will be returned with remarks. A complete submittal may be REJECTED for excessive errors.

2. The Review Status and approval of District supplied drawings and documents shall be as follows:

   a. As-built drawings and documents which receive an "A" Review Status are approved as, as-built. District's Representative will stamp the document As-Built, sign and date it. The document will not be returned to Contractor unless

it is a partial or tied to a related document which has not received an "A" status in the submittal.

b. As-built drawings and documents which receive a "B," "C" or "D" Review Status will be returned with comments indicating corrections needed.

c. Submittals of as-built AutoCAD drawings shall be subject to the same submittal requirements as other as-built documents.

3. The Review Status and approval of Contractor supplied drawings and documents shall be as follows:

a. As-built drawings and documents receiving an "A" Review Status are approved as, as-built. District's Representative will stamp the document As-built, sign and date it. This document will be returned for AutoCAD update, as required.

b. As-built drawings and documents receiving an "B", "C", or "D" will be returned with comments directed at corrections needed.

c. Submittals of as-built AutoCAD drawings shall be subject to the same submittal requirements as other as-built documents.

3.05 PAYMENT

A. Payment shall be part of the progress payment schedule as outlined in the PROGRESS PAYMENT PROCEDURES Section (01 29 76).

B. No partial payments shall be made for project record documents.

C. Only after all the project record documents for a work activity area have been submitted, received, reviewed and approved, will a progress payment be made.

D. Project record documents that include more than one area of work activity will only receive payment upon submittal and approval at the final area of work they represent.

E. Progress payments for Contractor supplied project record documents (including shop drawings) shall only be made for approved original documents and plotted AutoCAD drawings together with the electronic copy of the documents.

F. Progress payments for District-supplied documents shall be given for approved submittal only.

****END OF SECTION****

SECTION 02 05 00

DEMOLITION AND MODIFICATIONS TO EXISTING PIPING

PART 1 GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK:

1. This section includes all material, labor, and services to provide demolition and modification to existing piping.
2. The Contractor shall furnish all labor, material, equipment, and incidentals required to demolish, modify, or alter, existing facilities as shown or specified and as required for the installation of new piping and pipe supports.

B. PERFORMANCE REQUIREMENTS:

1. EXISTING CONDITIONS: Contractor shall visit the site and inspect the nature and condition of all facilities to be demolished, partially demolished, modified, or altered in any way prior to submittal of his Bid. No increase in cost or extension of Contract time will be considered for failure to know the existing conditions of the site and structures.
2. SALVAGE: Any items specifically indicated to be salvaged for reinstallation as part of the contract or designated to be salvaged for the District's own purposes shall be carefully removed, cleaned, and be relocated to District-designated storage areas on the project site. Contractor shall protect salvaged equipment and materials from weather, staining, construction damage, theft, and vandalism. Contractor shall arrange storage to facilitate inspection by District.
3. DEMOLITION AND DISPOSAL: All other materials removed under the demolition Work, including dismantled materials, piping, fittings, valves, pipe supports, and other construction debris shall become the property of the Contractor and be removed from the site as trash. Trash and debris shall be disposed of legally, off the site, by the Contractor. Upon removal from site, the Contractor shall have the rights of salvage of materials.

1.02 QUALITY ASSURANCE

A. PROTECTION OF EXISTING FACILITIES:

1. The Contractor shall diligently protect existing structures and property of the District while proceeding with Work of this section and the entire Contract. All damage shall be repaired at once to the satisfaction of the District. All such repairs shall be at the expense of the Contractor and no claims for additional payment will be accepted.

B. PENETRATIONS AND HOLES:

1. Existing penetrations of floors, ceilings or walls or holes from removal of fasteners or other hardware which are no longer required because of removal of piping shall be sealed. Sealing and restoration of surfaces shall be in accordance with Part 2.

C. EXISTING EQUIPMENT:

1. Locations of all existing equipment, piping and appurtenances shall be field verified by the Contractor prior to initiating the modification work. All material and appurtenances removed shall be disposed of by the Contractor except for items specifically designated by the District for salvage or re-use.

D. ITEMS TO BE SALVAGED:

1. Refer to the drawings for items to be salvaged. In addition, the Contractor shall request the District to identify all items to be salvaged prior to the start of the Work.

PART 2 MATERIALS AND METHODS

2.01 REPAIR AND RESTORATION

A. GENERAL:

1. The Contractor shall not alter or rework existing structures except as shown and specified. Generally, when items of equipment and piping are removed, the areas and surfaces from which items were removed shall be left with a neat appearance and finish compatible with surrounding areas, colors, and surfaces. The Contractor shall do all painting, sanding, grouting, sacking, resurfacing, and other Work as necessary to comply with the above requirements. Prior to structural modifications, all surfaces shall be subject to inspection by the District. Colors shall match existing colors as closely as possible. For replacement, repair or restoration of Work removed, the Contractor's repairs shall comply with the specifications for the type of Work to be done.

B. PENETRATIONS (NOT USED)

C. MODIFICATIONS OF EXISTING STRUCTURES (NOT USED)

D. PIPING MODIFICATIONS:

1. Where necessary or required for the purpose of making piping connections, cut existing pipelines and provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work under this Contract. The remaining open ends of all piping, valves, fittings, and appurtenances that are removed shall be plugged with standard pipe plugs or closed with flanges so that there will be no leakage through the closure.

E. ASBESTOS TESTING AND ABATEMENT (NOT USED)

F. LEAD PAINT TESTING AND ABATEMENT

1. If lead paint or another lead hazard is discovered, remediation must occur with all

safety precautions, testing and reporting requirements prescribed by national state and local regulations. Refer to the LEAD CONTAINING PAINT ABATEMENT Section (02 83 19.15) for lead containing paint abatement requirements.

PART 3 EXECUTION

3.01 GENERAL

A. SHUTDOWN OF EXISTING OPERATIONS AND UTILITIES:

1. primary tanks are required to remain in operation during the entire construction period.
2. Total shutdown of the existing facilities to perform any new construction, to make the required piping replacements, will not be permitted. Partial shutdown of the various existing facilities shall be permitted as defined in Section 01 14 00.
3. Prior to making any piping modifications to existing facilities, obtain specified timing and schedule approval from the District.

B. CONTROL OF HAZARD AND NUISANCE CONDITIONS:

1. All demolition, salvage, and renovation Work shall be conducted in a manner which will protect the environment, promote public health and safety, and preclude nuisance conditions, in strict conformance with the requirements of Section 00 73 19 Health and Safety Requirements. In addition, the Contractor shall enforce the following safety requirements:
   a. No fires will be permitted on-site.
   b. Post “No Smoking” signs in all interior spaces and in hazardous or confined spaces where work is to be carried on. Strictly enforce “No Smoking” restrictions among all personnel employed on the Work. In addition, smoking is not allowed within 20 feet of any buildings or digesters.

C. DEMOLITION OF EXISTING EQUIPMENT AND SUPPORTS (NOT USED)

END OF SECTION

SECTION 02 83 19.15

LEAD-CONTAINING PAINT DISTURBANCE

PRIMARY DECK WRH PIPING REPLACEMENT PROJECT

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. These specifications are intended to minimize and control potential lead dust releases during the disturbance of lead-containing coatings in industrial settings. This specification applies to the disturbance of lead which may include, but is not limited to, manual demolition, abrasive blasting, water blasting, water jetting, chemical stripping, cutting into, drilling into, sanding, or removal of any structure or its components containing or covered with lead, or the demolition of any structure that contains lead either in or on its surfaces. Examples of surface coatings that may contain lead include paint, varnish, and stains.

2. The Contractor shall furnish all labor, materials, equipment and documentation needed to complete this project.

3. If applicable, all lead related work shall be supervised by persons experienced in lead related construction work. Contractor shall have at least one supervisory employee per work area who is currently certified by the California Department of Public Health (CDPH) as a Certified Lead Supervisor.

4. If applicable, all lead related work shall be performed by employees currently certified by CDPH as Certified Lead Workers.

5. These specifications represent the minimum performance standards with which the Contractor must comply.

6. Contractor is responsible for restoring the work area and auxiliary areas, used in the lead related construction work, to conditions equal or better than original.

7. Those coatings found to contain lead on this project include the white paint found on the 3 inch branch pipe associated with Tank #1. Results of testing indicate the white paint contains 908 parts per million (ppm) lead. Cal/OSHA 1532.1 lead regulations shall apply if any of these surfaces or materials will be disturbed during the project work.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
Title 8 CCR 1532.1	California Code of Regulations, California Occupational Safety and Health Standards Construction Safety Orders, Lead
Title 8, Division 1, Chapter 4	Division of Industrial Safety
Title 8 CCR 5194	Hazard Communication
Title 22	Hazardous Waste Handling
Title 8, Section 5144	Guide to Respiratory Protection
29 CFR 1910.1025	Occupational Safety and Health Standards General Industry Standards for Lead
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.132 through 1910. 138	Personal Protective Equipment
29 CFR 1910.134	Respiratory Protection Standard
29 CFR 1910.1000	Air Contaminants- Permissible Exposure Limits
29 CFR 1910.1020	Employee Access to Exposure and Medical Records
29 CFR 1926	Occupational Safety and Health Standards Construction Industry Standards
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Occupational Safety and Health and Lead Exposure in Construction Interim Final Rule
29 CFR 1910, Section 2	Access of Employee Exposure/Medical Records
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste

Reference	Title
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, & Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 745	Lead Based Paint Poisoning Prevention
49 CFR Parts 100-185	Transportation, Hazardous Materials Guide for Shippers, Handlers and Transporters
DHHS (NIOSH) Publication #85-115	U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
SSPC Guide 6	Society of Protective Coatings, Guide for Containing Surface Preparation Debris
SSPC Guide 7	Society of Protective Coatings, Guide to the Disposal of Lead-Contaminated Surface Preparation Debris
SSPC QP 2	Society of Protective Coatings, Certification of Field Removal of Hazardous Coatings
USEPA Standard Operating Safety Guides	United States Environmental Protection Agency, National Service Center for Environmental Publications, Standard Operating Safety Guides

1.03 SUBMITTALS

1. A site-specific lead work plan.

2. The proposed waste hauler.

3. The proposed disposal site.

4. Employee Training Certification meeting 40 CFR 745 (subpart L) for each employee and supervisor working on the project site, signed and dated by authorized training provider.

5. Copy of the Contractor's formal written OSHA respirator plan, including a complete description of each respirator type, a fit-testing procedure for passive air filtering type respirators. The respiratory protection program must conform to 29 CFR 1910.134

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

1.05 DELIVERY AND STORAGE (NOT USED)

1.06 SITE CONDITIONS (NOT USED)

1.07 IMPLEMENTATION OF HEALTH AND SAFETY PLAN

A. NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS AND POSTERS:

1. Post at the jobsite contact information regarding the local fire department, police department, ambulance companies, and hospitals describing the scope and duration of the project and including the name and phone number of persons to be contacted in case of emergency.

2. Secure any permits required for work. Deliver all permits to the Sacramento Area Sewer District for review and approval at least two (2) days prior to the preconstruction meeting.

3. Post OSHA-specified warning signs around the work area. The signs shall conform to OSHA requirements with the words "WARNING LEAD WORK AREA POISON NO SMOKING OR EATING". The warning signs shall be illuminated and easily noticeable. The size of the sign and its lettering shall be no less than OSHA requirements.

4. Label all waste containers in accordance with OSHA, DOT and NESHAPs regulations prior to removing contaminated material from the work areas for transport to the disposal landfill.

B. PERSONAL PROTECTIVE EQUIPMENT:

1. Determination of the appropriate level of personal protective equipment and procedures during this Project shall be made based on initial site survey, review of existing data, and a continued safety and health monitoring program performed by the Contractor's Site Health and Safety Officer for the Project.

2. Provide hard hats, safety shoes and eye protection and any other safety equipment as needed due to job conditions or as required by safety regulations.

1.08 SEQUENCING AND SCHEDULING (NOT USED)

1.09 AUTHORITY TO STOP WORK

A. The Sacramento Area Sewer District or its site representative(s) have the authority to stop work at any time he/she determines that conditions or procedures pose a threat to the health and safety of the district's safety representative(s) or contractors' employees.

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Deliver all materials and equipment to the site in the original containers bearing the name of the manufacturer, and details for proper storage and usage.

B. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that shall not interfere with the District's operations.

C. Damaged or deteriorated materials may not be used and must be promptly removed from the premises. Material that becomes contaminated with lead material shall be packaged as lead waste and legally transported and disposed of in an approved landfill.

D. For disposal of lead-contaminated waste, Contractor shall furnish DOT 17H/55- gallon, open-top, steel drums with polyethylene liners and locking ring lids.

E. Provide all materials, equipment, facilities, and permitting to comply with applicable federal, state, and local regulations for all work activities described herein.

2.02 MATERIALS, TOOLS, AND EQUIPMENT

A. All materials, tools, and equipment must comply, at minimum, with this specification, and relevant federal, state, and local codes.

B. WARNING SIGNS AND LABELS: Shall comply with 29 CFR 1926-62 and all other federal, state, or local codes and regulations.

C. WASTE CONTAINERS TRANSPORTATION: Shall be DOT-approved metal drums or other DOT-approved closed containers. The containers shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without rupture, or otherwise causing spillage or exposure to persons or emissions to the atmosphere.

D. RESPIRATORY PROTECTION DEVICES: Shall be NIOSH and MSHA-approved and shall comply with all provisions of 29 CFR 1926.62.

PART 3 -- EXECUTION

3.01 GENERAL

A. All removal activities involving piping coated with lead-containing paint, must be done utilizing engineering controls which minimize both the disturbance of the lead-containing paint and employees exposure to airborne lead particulates.

B. Please refer to Attachment A (Laboratory Results) of this specification for information regarding those paints that have been identified to contain lead.

3.02 INSTALLATION (NOT USED)

3.03 TESTING (NOT USED)

3.04 TRAINING (NOT USED)

3.05 PREPARATION (NOT USED)

3.06 CDPH CERTIFIED PROJECT MONITOR'S APPROVAL OF REMOVAL WORK (NOT USED)

3.07 CLEAN-UP AND DECONTAMINATION (NOT USED)

3.08 SITE SECURITY (NOT USED)

3.09 QUALITY ASSURANCE AND INSPECTION (NOT USED)

3.10 AIR MONITORING BY CONTRACTOR

A. The Contractor shall be responsible for personal air-monitoring as required by 8 CCR 1532.1.

3.11 RESTORATION AND REPAIRS

A. At the completion of the project, remove all equipment and materials to restore the worksite to a neat and orderly condition.

****END OF SECTION****

ATTACHMENT A (LABORATORY RESULTS)

MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

for office use only
Project ID
L39414-16

CLIENT INFORMATION

Company	County of Sacramento
Name	Cory Sanders
Address	4000 Bradshaw Road
	Sacramento, CA 95827
Phone	916-875-5008
Email	sandersco@saccounty.net

SAMPLE

Date	Wednesday, January 22, 2025
Time	10:30 AM

MicroTest Laboratories
Analytical Report

JOB SITE INFORMATION

Sampler	Cory Sanders
Project	WRH
Site	SASD
Address	8521 Laguna Station Road
	Elk Grove, CA
Job #	
PO #	

Lead in Paint/Bulk Analysis by Flame AA - EPA METHOD 7420/7000B

Client Sample ID	Laboratory Sample ID	Client Sample Description	Matrix	Results	Reporting Limits (RL)	Comments
01Pb-WRH-012225	L39414	White Paint/WRH, 6" to 4" Reducer with Blue Primer	Paint	<RL % Wt	0.01 %Wt	
				<RL PPM	100 PPM	
02Pb-WRH-012225	L39415	White Paint/WRH, Tank #1, 3" Branch Pipe	Paint	0.09 % Wt	0.01 %Wt	
				908.1 PPM	100 PPM	
03Pb-WRH-012225	L39416	Blue Paint/WRH, Tank #2, 4" Branch Pipe	Paint	<RL % Wt	0.01 %Wt	
				<RL PPM	100 PPM	

Date Received:	Thursday, January 23, 2025
Date Analyzed:	Monday, January 27, 2025
Date Reported:	Monday, January 27, 2025

Analyst: **Erich Bowman**

Authorized Signatory:
Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Mod.

Project ID: L39414-16
Client: County of Sac
Received Date: 01/23/25
Count: 3 **TAT:** 48H

MICROTEST
MT
LABORATORIES, INC.

MicroTest Laboratories, Inc.
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

CLIENT INFORMATION
Company County of Sacramento
Name Cory Sanders
Address 4000 Bradshaw Rd. Sacto, CA 95827
Phone
Email SandersCe@saccounty.gov

SAMPLE
Date 01/22/25
Time 10:30 Am

MicroTest Laboratories
Chain-Of-Custody

JOB SITE INFORMATION
Sampler Cory Sanders
Project WRH
Site SASD
Address 8521 Laguna Station Rd. Elk Grove, CA
Job #
PO #

TURNAROUND	LEAD FAA	METALS
___ Rush**	X Paint Chip	___ CAM 17
___ Same Day**	___ Wipe	___ Single Analyte(s)
___ 1-Day	___ Air	(6020) -Arsenic, (As) -Antimony, (Sb) -Barium, (Ba) -Beryllium, (Be) -Cadmium, (Cd) -Chromium, (Cr) -Cobalt, (Co) -Copper, (Cu) -Lead, (Pb) -Molybdenum, (Mo) -Nickel, (Ni) -Selenium, (Se) -Silver, (Ag) -Thallium, (Tl) -Vanadium, (V) -Zinc, (Zn) (7471) -Mercury, (Hg)
X 2-Day	___ Soil	___ STLC
___ 3-Day	___ TTLC*/STLC*	___ TCLP
___ 5-Day	___ TCLP*	___ pH
**See TAT Guidelines for Details		___ Other

Sample ID	Liters Per Minute On	Off	Aver	Total Min	Total Vol	Wipe Area	Sample Description
01 Pb-							White Paint / WRH, 6" to 4" Reducer
WRH-							w/ Blue Primer
012225							
02 Pb-							White Paint / WRH, Tank #1, 3" Branch Pipe
WRH-							
012225							
03 Pb-							Blue Paint / WRH, Tank #2, 4" Branch Pipe
WRH-							
012225							

Special Instructions:

Relinquished by (Client)	Date/Time
	01/23/25 09TC

Relinquished by (Lab)	Date/Time

Total Number of Samples 3

Received By (Lab)	Date/Time
RMC	1/23/25 950am

Received By (Client)	Date/Time

*TTLC** Total Threshold Limit Concentration | STLC* Soluble Threshold Limit Concentration | TCLP* *Toxicity Characteristic Leaching Procedure* | TAT* Turnaround Time

SECTION 09 06 90

SCHEDULES FOR PAINTING AND COATING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section lists the specific coating systems and colors for rooms, galleries, piping, equipment, and other items. Coating system requirements are specified in the PAINTING AND COATING Section (09 90 00).

1.02 REFERENCES (NOT USED)

1.03 SUBMITTALS (NOT USED)

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION (NOT USED)

3.03 TESTING (NOT USED)

3.04 TRAINING (NOT USED)

3.05 COATING SYSTEMS SCHEDULE

A. Refer to the PAINTING AND COATING Section (09 90 00) for coating system designations.

B. Specific coating systems and colors for rooms, galleries, piping, equipment, and other items are specified in the attached Coating System Schedule.

COATING SYSTEM SCHEDULE

Surface	Environment	Coating System	Color
1. Concrete & Masonry			
(a) Interior			
(b) Exterior			
(c) Buried			
(d) Submerged			
2. Structural Steel, including fasteners, anchors and supports (except stainless)			
(a) Interior			
(b) Exterior			
(c) Buried			
(d) Submerged			
3. Gypsum Board			
4. Doors and Door Frames			
5. Equipment, Equipment Supports, Metal Appurtenances, etc. (except stainless)			
(a) Interior			
(b) Exterior			
• Utility Stations	All	Hot dip galvanized	
(c) Buried			
(d) Submerged			
6. Piping and Appurtenant Hangers and Supports, (except stainless)			
(a) Interior			
(b) Exterior			
• Cast Iron and Steel	Moderate	E/U	Light Gray ANSI #70
• PVC/CPVC	Moderate	L2	Light Gray ANSI #70
• Ductile Iron			
• Pipe Supports	All	Hot dip galvanized	
(c) Buried			
(d) Submerged or in enclosed space			
• Cast Iron and Steel	Harsh	E-100	
• Ductile Iron			

COATING SYSTEM SCHEDULE			
Surface	**Environment**	**Coating System**	**Color**
7. Conduit, Outlet and Junction Boxes, Hangers and Supports, Panels, Lighting Transformers, etc. (except stainless)			
(a) Interior			
(b) Exterior			
(c) Buried			
(d) Submerged			
8. Other			
(a) Interior			
(b) Exterior			
(c) Buried			
(d) Submerged			

****END OF SECTION****

SECTION 09 90 00

PAINTING AND COATING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies coating systems, surface preparations, and application requirements.

B. RELATED WORK:

1. The following specifications sections are referenced herein:

a. Section	Title
1) Section 01300	SUBMITTALS

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ASTM D16	Standard Terminology for Paint, Related Coatings, Materials, and Applications
SMAQMD Rule 442	Sacramento Metropolitan Air Quality Management District - Architectural Coatings
SMAQMD Rule 451	Sacramento Metropolitan Air Quality Management District – Surface Coating of Miscellaneous Metal Parts and Products
SSPC Good Painting Practice	SSPC: The Society for Protective Coatings (formerly Steel Structures Painting Council) Specifications, Vol. 1 and 2, latest edition.
SSPC Guide 6	Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations

B. DEFINITIONS:

1. Specific coating terminology used in this section is in accordance with definitions contained below and in ASTM D16:

   a. DRY FILM THICKNESS (DFT): The thickness of one fully cured continuous application of coating.

   b. WET FILM THICKNESS (WFT): The thickness of one wet layer of coating taken shortly after application.

   c. FIELD COAT: The application of a coating after installation of the surface at the site of the work.

   d. SHOP COAT: One or more coats applied in a shop or plant prior to shipment to the site of erection or fabrication, where the field or finishing coat is applied.

   e. TIE COAT: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.

   f. VINYL ACID WASH COAT: A coating supplied as one or two component systems on clean light alloy or ferrous surfaces, and on many nonferrous surfaces, to provide adhesion with the substrates, and for the application of subsequent coats of paint.

   g. PHOTOCHEMICALLY REACTIVE ORGANIC MATERIAL: Any organic material that will react with oxygen, excited oxygen, ozone or other free radicals generated by the action of sunlight on components in the atmosphere giving rise to secondary contaminants and reaction intermediates in the atmosphere which can have detrimental effects.

   h. VOLATILE ORGANIC CONTENT: The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter or pounds per gallon.

   i. TOUCH UP PAINTING: The application of paint on small areas of painted surfaces to repair marks, scratches, and small areas where the coating has deteriorated to restore the coating film to an unbroken condition.

   j. STRIPE COAT: Coating with brush or spray gun to all edges, corners, bolts and welds, with coating material prior to application of full surface coat. Striping will extend at least one inch minimum from all edges, corners and welds.

   k. The terms "solvent cleaning", "hand tool cleaning", "wire brushing", and "blast cleaning", or similar words of equal intent in these Specifications or in paint manufacturer's specifications refer to the applicable SSPC Surface Preparation Standards.

l. SPREADING RAGE: The amount of product that is applied to a specified area of a surface to be coated. The spreading rate is specified in square feet per gallon (SFPG) or square feet per gallon per coat (SFPGPC).

m. FERROUS METAL: Iron, steel, and alloys containing iron as the principal element, except stainless steel.

n. INTERIOR: Inside of a building or structure, unless otherwise specified.

o. EXTERIOR: Outside of building or structures and exposed to weather elements.

p. BURIED: Surfaces that are underground and either in contact with soil or encased in concrete.

q. SUBMERGED: Surfaces that are underwater or are below the top elevation of structures or facilities that contain water, under normal operating conditions.

r. MILD ENVIRONMENT: Standard commercial facility conditions.

s. MODERATE ENVIRONMENT: Industrial facility conditions where surfaces may be occasionally exposed to light-moderately aggressive liquids or gases.

t. HARSH ENVIRONMENT: Industrial facility conditions where surfaces may be subject to aggressive liquids or gases, or normally exposed to light-moderately aggressive liquids or gases.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's standard product data and material safety data sheet for all field applied primer, tie coat, thinners, intermediate and finish coating, abrasives and all shop applied primers, intermediate and finish coating including those from equipment manufacturers and suppliers. Copies of these data shall be posted at the job site at each field application area.

3. List of materials proposed to be used under this section.

4. Manufacturer's literature and written instructions for surface preparation, mixing and application of each primer and finish coating.

5. Manufacturer's complete color selection chart.

6. Applicator's SSPC QP-1 certification and manufacturer's certification of installation contractor.

7. Containment system plan.

8. Shop and field inspection records.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

1.05 REGULATORY REQUIREMENTS

A. All applicable federal, state, and local regulatory agency requirements shall be complied with during the course of the work. The Contractor's attention is directed to the following list of agency requirements that generally apply to coatings work; the Contractor is responsible for identifying and complying with any other agencies or requirements not listed.

1. OSHA – Personnel protection during all phases of work, including exposure to airborne solvents, dust, and lead.

2. CAL/OSHA – Personnel protection; requirements may supersede OSHA regulations.

3. California Title 22 – Environmental requirements, including definition of abrasive blast materials and residue relative to hazardous waste disposal requirements. Abrasives shall not contain metals or other substances that would classify abrasive as a hazardous waste under California Title 22 requirements.

4. California Air Resources Board (CARB) and Sacramento Metropolitan Air Quality Management District (SMAQMD) – Environmental requirements for equipment and products. Also, environmental requirements for limiting emissions produced by paint removal and coating operations. Maximum VOC limits shall comply with SMAQMD Rule 442 and Rule 451.

1.06 QUALITY ASSURANCE

A. QUALIFICATIONS:

1. SSPC Painting Contractor Certification Program, QP-1 certification.

2. Coating manufacturer approved applicator when coating manufacturer has approved applicator program.

B. INSPECTION:

1. The District may retain the services of an independent third party NACE CIP Level III-Certified Inspector for partial or full-time inspection of the work.

2. The Contractor shall give the District Representative a minimum of 14 calendar days advanced notice of the start of all coating application work to allow scheduling for shop and field observation.

3. Provisions shall be made to allow the District Representative full access to facilities and appropriate documentation regarding coating materials, coating material storage, surface preparation and coating application. The Contractor shall provide access to the District Representative at all times during the contract period to observe the work.

4. Observation by the District Representative or the waiver of observation of any particular portion of the work shall not be construed to relieve the Contractor of his responsibility to perform the work in accordance with these Specifications.

5. Coating materials shall be subject to testing for conformance with this specification prior to or during incorporation into the work.

1.07 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the job site in their original, unopened containers. Each container shall bear the manufacturer's name, coating type, batch number, date of manufacture, and special directions. All materials delivered to the job site shall be accompanied by the manufacturer's latest product data sheets which indicate storage life.

B. All protective coating materials shall be used within the manufacturer’s recommended shelf life. Shelf life shall not be extended beyond the stated periods for any reason, including statements or certifications by the manufacturer.

C. Deliver and store abrasives in their original moisture-proof bags or airtight bulk containers.

D. Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site.

E. Where shop-primed or shop-finished items are to be shipped to the job site, protect coatings from damage by the use of battens, padded straps, and nonmetallic slings. Excessive shipping damage will be considered grounds for rejection of shop primers and shop finishes.

F. The Contractor shall keep and maintain records for all products delivered to the site. Information should include batch numbers, quantities, and dates used for all paints, solvents, and cleaners used. These records should be reported to the District Representative weekly.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Materials and supplies provided shall be the standard products of manufacturers. Materials in each coating system shall be the products of a single manufacturer.

B. The standard products of manufacturers other than those specified will be accepted when it is demonstrated to the District that they are equal in composition, durability, usefulness, and convenience for the purpose intended. Requests for substitutions, in accordance with the SUBMITTAL PROCEDURES Section (01 33 00), will be considered, provided the criteria specified in the SUBMITTAL PROCEDURES Section (01 33 00) are satisfied and the following minimum conditions are met:

1. The proposed coating system shall use an equal number of coats to achieve the required dry film thickness.

2. The proposed coating system shall use coatings of the same generic type as that specified.

3. Requests for substitution shall have directions for application and descriptive literature which includes generic type, percent solids by volume, volatile organic content (grams per liter), flammability, toxicity, and any other information required to determine if the substitution is equal to the specified coating system.

4. The Contractor shall provide a list of references where paint of the same generic type has been applied. The reference list shall give the project name, city, state, owner, phone number of owner, coating system reference and number, and year coating material was applied.

5. Any shop applied coating materials shall be compatible with the field applied coating materials specified.

6. Coatings shall contain ≤ 0.0000% lead.

7. Coatings shall contain ≤ 0.0000% zinc-chromate and ≤ 0.0000% strontium-chromate.

8. Coatings shall contain ≤ 0.0000% asbestos.

9. Coatings shall contain ≤ 0.0000% mercury and ≤ 0.0000% mercury compounds.

10. Coatings shall not contain any toxic chemicals in amounts greater than the amounts in the specified acceptable products.

11. Abrasives shall not contain metals or other substances that would classify abrasive as a hazardous waste under California Title 22 requirements.

12. Maximum VOC limits shall comply with Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 442 and Rule 451.

2.02 COATING SYSTEM SPECIFICATION SHEETS

A. Coating systems are specified on the following Coating System Specification sheets:

COATING SYSTEM SPECIFICATIONS		
Coating System:	Epoxy, 100% Solids	Symbol: E-100
	Description:	Acceptable Products:
Single Coat:	100% Solids, Thick Film, Premium Epoxy.	Carboline: Plasite 4500 S Tnemec: Perma-Glaze Series 435 Sherwin Williams: Duraplate 5900
Services:	Interior, Submerged Mild, Moderate, Harsh	
Surface:	Metal, Concrete, Masonry	
Surface Preparation:	SSPC-SP10 or SSPC-SP5, per manufacturer's recommendation. 3 to 5 mil sharp anchor profile.	
Application:	Single component spray application, in accordance with manufacturer's written instructions, plus the following: 1. Apply 30 mil DFT in a single coat.	

COATING SYSTEM SPECIFICATION		
Coating System:	Epoxy Mastic / Urethane	Symbol: E/U
	Generic Description:	Acceptable Products:
Prime Coat:	Multipurpose Epoxy Mastic	Carboline: Carboguard 890 VOC
		Rustoleum: V9100 System Low VOC DTM Epoxy Mastic with appropriate activator
		Sherwin Williams: Macropoxy 646
Finish Coat:	Aliphatic Acrylic Urethane	Carboline: Carbothane 134MC Polyurethane
		Rustoleum: 9700 System 250 VOC Acrylic Polyester Urethane
		Sherwin Williams: Hi Solids Polyurethane 250
Services:	Interior, Exterior Mild, Moderate	
Surfaces:	Metal	
Surface Preparation:	In accordance with manufacturer's written instructions.	
Application:	In accordance with manufacturer's written instructions, plus the following: 1. Apply 5 – 7 mil DFT prime coat. 2. Apply two 2 – 3 mil DFT finish coats to obtain a total system of 9 – 13 mils DFT.	

COATING SYSTEM IDENTIFICATION: L-2	
Coating Material:	100 percent Acrylic Latex.
Surface:	PVC and CPVC pipe.
Service Condition:	Interior and Exterior non-corrosive to mildly corrosive atmospheres suitable for direct sunlight exposure.
Surface Preparation:	Plastic pipe shall be cleaned with solvent compatible with the specified primer and sanded to roughen surfaces to achieve a uniform surface profile of 1.0 to 1.5 mils. Vacuum clean or wipe with a damp rag after sanding to remove all loose dust, plastic particles, and dirt.
Application:	Field
System Thickness:	3 mils dry film.
Coatings:	
Primer:	One coat at CSM's recommended DFT.
Finish:	Finish: One or more coats at CSM's recommended DFT per coat to the specified system thickness.

MATERIAL REQUIREMENTS FOR COATING SYSTEMS: ALL OF THE UNITED STATES INCLUDING CALIFORNIA EXCEPT SCAQMD			
Coating System:	CSM	First Coat(s)	Finish Coat(s)
Latex Acrylic			
L-2	Benjamin Moore	Series 110 Stix Primer	Corotech V331 DTM Acrylic
	Carboline	Sanitile 120	Carbocrylic 3359 MC
	PPG	Pitt-Tech Plus 4020 PF	Pitt-Tech Plus 4216
	Sherwin Williams	Pro-Cryl Primer	Sher-Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. SURFACE PREPARATION:

1. GENERAL:

   a. Surface preparations for each type of surface shall be in accordance with the specific manufacturer's requirements of each coating and its intended service, and the Coating System Specification sheets.

   b. All surfaces to be coated shall have a sharp angular surface profile of the minimum depth specified by the coating manufacturer.

   c. If existing lead-based coating is present, all Work shall comply with the LEAD-CONTAINING PAINT ABATEMENT Section (02 83 19.15).

2. ABRASIVE BLAST MEDIA:

   a. Blast media shall CARB-approved.

3. ABRASIVE BLAST CONTAINMENT SYSTEM:

   a. Provide a Class 3A Containment System in accordance with SSPC Technology Guide 6.

   b. Utilize Method G, Visual Assessment of Site Cleanliness, to monitor the amount of dust or debris that may escape the work area.

B. METAL SURFACE PREPARATION (UNGALVANIZED):

1. ABRASIVES:

   a. The type and size of abrasive shall be selected to produce a surface profile as specified and as recommended by the coating manufacturer for the particular coating and service conditions.

   b. Abrasive blasting nozzles shall be equipped with "deadman" emergency shut-off nozzles. Blast nozzle pressure shall be a minimum of 95 PSI and shall be verified by using an approved nozzle pressure gauge at each start-up period or as directed by the Engineer. The number of nozzles used during all blast cleaning operations must be sufficient to ensure timely completion of project.

   c. Interior blast cleaning shall be by dry method unless otherwise directed.

d. The Contractor shall keep the area of his work in a clean condition and shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the workers or the existing facilities. Spent abrasives and other debris shall be removed at the Contractor's expense, as directed by the District Representative.

e. Blast cleaned and coated interior surfaces shall be cleaned prior to application of specified coatings via a combination of blowing with clean dry air, brushing/brooming and/or vacuuming as necessary to achieve a clean surface condition.

f. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil and moisture separators which remove at least 95 percent of the contaminants. An oil and moisture separator shall be provided in the air line between the compressor and blast machine.

g. Do not abrasive blast when air temperature is less than 5 degrees above the dew point.

C. PROTECTION OF SURFACES NOT TO BE COATED:

1. Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.

2. All hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Dropcloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

3. Project is subject to intermittent shutdown if, in the opinion of the District Representative, any operations are creating a condition detrimental to the site personnel or adjacent property. In the event of emergency shutdown by the District Representative, Contractor shall immediately correct deficiencies. All additional costs created by shutdown shall be borne by Contractor.

D. APPLICATION:

1. GENERAL:

a. Coating products shall not be used until the District has inspected the materials.

b. All of the manufacturer's printed recommendations with respect to surface preparation, mixing instructions, thinning, application method, application equipment, pot life, drying times, and any other manufacturer's

recommendations deemed applicable by the District shall be strictly adhered to by the Contractor.

c. All steel coating application shall also comply with SSPC-PA 1.

d. Application of the first coat shall follow immediately after completion of final surface preparation, dust removal operations, and before any rusting or other deterioration of the surface occurs. Cleaning shall be limited to only those surfaces that can be prime-coated in the same working day.

e. All irregular surfaces shall receive a brush coat of the specified product prior to application of each coat. Irregular surfaces include edges, angles, weld seams, flanges, nuts and bolts, ends and flanges of structural members, crevices, surfaces with restricted access for spray application, and other places where insufficient film thicknesses are likely to be applied. During application to irregular surfaces, paint shall be brushed in multiple directions to ensure penetration and coverage. Care shall be exercised to ensure that the resulting dry film thicknesses do not exceed the maximum thicknesses allowed by the manufacturer for each product.

2. SHOP-APPLIED COATINGS:

a. Except as otherwise specified herein, coatings may be shop applied or field applied. All coatings, whether shop applied or field-applied shall comply with the specifications.

b. Shop-applied primers shall be compatible with the specified coating system and shall be applied at the dry film thickness recommended by the manufacturer. Product data sheets identifying the shop primer used shall be provided to the on-site finish coat applicator.

c. If the shop-applied prime coat meets the requirements of this section, the field coating may consist of touching up the shop prime coat with a compatible field prime coat and then applying compatible intermediate and/or finish coats to achieve the specified film thickness and continuity. Intermediate or finish coats shall not be applied beyond the primer recoat window. If the primer recoat window is exceeded, the item shall be re-blasted and re-primed in accordance with the manufacturer's recommendations.

d. Damaged, deteriorated and/or poorly applied shop coatings that do not meet the requirements of this section shall be removed and the surfaces recoated.

3. WORKMANSHIP:

a. Coated surfaces shall be free from runs, drops, ridges, waves, laps, and brush marks. Coats shall be applied so as to produce an even film of uniform thickness

completely coating corners and crevices. Painting shall be done in accordance with the requirements of SSPC Paint Application Specification No. 1.

b. Each coat of paint shall be applied evenly and sharply cut to line. Each coat shall give a uniform appearance throughout. Lap marks for multiple coats shall be staggered. Care shall be exercised to avoid overspraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, or other suitable measures.

c. Where two or more coats of epoxy mastic are required, the alternate coats shall be of contrasting colors.

d. Existing coating systems damaged by new construction shall be repaired and coated in accordance with the appropriate system specified for new work.

e. Items which have been newly coated shall not be handled, worked on, or otherwise disturbed, until the paint is completely dry and hard.

E. CLEANUP:

1. Upon completion of coating, the Contractor shall remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray or other paint related damage.

F. COATING SYSTEMS SCHEDULE:

1. Existing surfaces not damaged by work in this contract shall not be coated unless specifically shown on the drawings. Existing surfaces damaged by work in this contract shall be repaired to match existing coating and color.

2. Specific coating systems and colors for rooms, galleries, piping, equipment, and other items are specified in the SCHEDULES FOR PAINTING AND COATING Section (09 06 90).

3.03 TESTING

A. FIELD QUALITY CONTROL:

1. GENERAL:

a. The District shall have the right to inspect at all times any tools, instrument, materials, staging, or equipment used or to be used in the performance of the work accessible for these inspections. The District shall have the right to take samples of the coating material at any time during the coating operation.

b. The District shall have the right to observe all application procedures during the time the work is in progress, inspect and approve the surface preparation prior to the application of any coating, and to inspect and approve the condition of each coat prior to the application of the following one.

c. The Contractor shall provide the same access to the inspector as for his painters. If necessary for safe inspection, scaffolding shall be provided for use by the inspector.

d. The Contractor shall notify the District Representative 48 hours before work or part of the work commences.

e. Where applicable, inspection of substrate anchor patterns shall be done with a surface profile indicator, surface profile comparator or Testex Press O Film Replica Tape.

f. Abrasive blast samples shall be utilized for inspection purposes throughout the duration of blast cleaning operations.

g. District may inspect coatings during application with a wet mil gauge. After drying, the District may inspect coatings with an Elcometer, Positest, or equivalent DFT instrument.

h. Contractor shall furnish, until Final Acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of protective coatings.

i. Contractor shall provide the services of a trained operator for the holiday detection devices.

j. Holiday detection testing of coatings for submerged and severe service shall be performed in accordance with AWWA D.102-06 and NACE SPO 188.

    1) Testing shall be performed in the presence of the District Representative and shall be performed until the subject surfaces are 100% holiday-free.

    2) Contractor shall holiday test all coated ferrous surfaces. Areas which contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.

    3) COATINGS WITH THICKNESS EXCEEDING 20 MILS: For surfaces having a total dry film coating thickness exceeding 20 mils, a pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

4) COATINGS WITH THICKNESS OF 20 MILS OR LESS: For surfaces having a total dry film coating thickness of 20 mils or less, a Tinker & Rasor Model M1non-destructive type holiday detector, K-D Bird Dog, or equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.

k. District may perform destructive coating adhesion tests with an Elcometer, Positest, or equivalent pull-off adhesion tester. Contractor shall be responsible for repairing the coatings.

2. FILM THICKNESS TESTING:

a. On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC-PA2 using a magnetic-type dry film thickness testing device such as Mikrotest model FM, Elcometer model 111/1EZ, “Inspector” or “Positest” or equal. Each coat shall be tested for the correct thickness.

b. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

3. REJECTED WORK AND EQUIPMENT:

a. The District shall have the right to condemn any and all tools, instruments, materials, staging, equipment, or work which does not conform to the specifications and CAL/OSHA regulations. Condemned areas of coating applications shall be marked with a compatible paint of contrasting color.

b. Any condemned coating applications, defective preparatory work (i.e., blast cleaning, staging) or any defective work not conforming to this specification shall be rectified by the Contractor at no additional cost to the District. Any condemned tools, instruments, materials or equipment shall be replaced or rectified at no additional costs to the District.

4. APPROVAL:

a. Prior to acceptance of part of the work or the complete work, an inspection of the work will be conducted by the District.

B. WARRANTY:

1. ELEVENTH MONTH INSPECTION:

a. The District will conduct an inspection of coated surfaces prior to the end of the warranty period. The Contractor will be notified in advance of this inspection

and may attend at his option and at no additional cost to the District. A list of all coating defects and failures identified during the inspection will be prepared and transmitted to the Contractor. The list will serve as notice of repairs required under warranty, at no additional cost to the District.

2. REPAIRS:

   a. All defective coatings shall be repaired by Contractor using coating materials, equipment, and methods similar to those used in the original work. Materials shall be of fresh manufacture and within the manufacturer's stated shelf life, at the time of application.

   b. Contractor shall complete all required coating repairs within 90 calendar days of the eleventh month inspection.

3.04 TRAINING (NOT USED)

****END OF SECTION****

SECTION 40 05 03

COMMON WORK RESULTS FOR PIPING SYSTEMS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies systems of process piping and general requirements for piping systems in all project applications.

2. Detailed information for piping systems are contained in the Piping Specification Sheets (PIPESPEC) located at the end of this specification section.

3. Additional detailed specifications for the components listed on the Piping System Specification sheets are found in other project specification sections. This section shall be used in conjunction with those sections.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ANSI A13.1	Scheme for the Identification of Piping Systems
ASTM A36	Carbon Structural Steel
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A240	Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
ASTM A312	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
ASTM A536	Ductile Iron Castings
ASTM A778	Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products
ASTM B88	Standard Specification for Seamless Copper Water Tube

Reference	Title
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D1785	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2000	Standard Classification System for Rubber Products in Automotive Applications
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM F104	Standard Classification System for Nonmetallic Gasket Materials
AWWA C111	AWWA C111-12 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151	Ductile-Iron Pipe, Centrifugally Cast
AWWA C200	Steel Water Pipe 6 Inch (150 Mm) and Larger
AWWA C651	Disinfecting Water Mains
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution
AWWA C906	Polyethylene (PE) Pressure Pipe and Fittings 4 In. (100 mm) Through 63 In. (1,600 mm) for Water Distribution and Transmission
CISPI 301	Standard Specification for Hubless Cast Iron Soil Pipe and Fittings
CISPI 310	Specification for Coupling For Use in Connection With Hubless Cast Iron Soil Pipe and Fittings
CPC	California Plumbing Code
NSF-61	National Sanitation Foundation, Drinking Water System Components – Health Effects
UPC	Uniform Plumbing Code

B. DEFINITIONS:

1. PIPESPEC: Piping system detail information located at the end of this specification section.

2. Pressure terms used in these project specifications are defined as follows:

   a. MAXIMUM: The greatest continuous pressure at which the piping system operates.

   b. TEST: The hydrostatic pressure used to determine system acceptance.

3. Exposure location terms used in these specifications are defined as follows:

   a. INTERIOR: Inside of a building or structure.

   b. EXTERIOR: Outside of a building or structure and exposed to weather elements.

   c. BURIED: Below grade and in contact with backfill material or concrete encasement. Piping may or may not be insulated.

   d. SUBMERGED: Submerged or below the top elevation of structures or facilities containing liquids, such as: tanks, channels, digesters, manholes, sumps, basins, rivers, and other areas as indicated or shown on the drawings.

4. Exposure severity terms are defined as follows:

   a. MILD ENVIRONMENT: Standard commercial facility conditions.

   b. MODERATE ENVIRONMENT: Industrial facility conditions where surfaces may be occasionally exposed to light-moderately aggressive liquids, solids or gases.

   c. HARSH ENVIRONMENT: Industrial facility conditions where surfaces may be subject to aggressive liquids, solids or gases, or surfaces may be normally exposed to light-moderately aggressive liquids, solids or gases.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Information on piping materials as specified in individual specification sections for piping materials, flanges, fittings, gaskets, valves, supports and components. Include manufacturer's data, ASTM conformance, and catalog numbers.

3. Piping layout and support shop drawings for all piping systems including all pipes, drains, vents, valves, supports, seismic braces, and specific locations of all instrument taps. Drawings shall be original layouts by the Contractor photocopies of contract drawings are not acceptable.

4. Sample of the valve identification tag.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance (O&M) instructions in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23) by submitting a copy of the OPERATION AND MAINTENANCE DATA Section (01 78 23) with each paragraph check marked to show compliance. O&M instructions shall be submitted after all submittals specified above have been returned mark "No Exceptions Taken" or "Make Corrections Noted." O&M instructions shall reflect the approved materials and equipment.

PART 2 -- PRODUCTS

2.01 PIPING MATERIALS

A. GENERAL:

1. Piping materials including pipe, gaskets, fittings, connections, and joint assemblies, lining and coatings, shall be provided from those listed on the Piping System Specification sheets associated with this section and as shown on the drawings.

2. Piping materials shall conform to detailed specifications for each type of pipe and piping appurtenances specified in other project specification sections.

3. Pipe connection types shall also be provided as listed in the project specifications and where shown on the drawings.

4. To assure uniformity and compatibility of piping components, fittings and couplings for grooved end piping systems shall be furnished by the same manufacturer.

5. Coat all buried non-cathodically protected metallic appurtenances, specials, restraining rings/glands, tees, bends, and all other fittings with a wax tape coating system as specified in the CATHODIC PROCESS CORROSION PROTECTION Section (40 46 42). Wax tape shall be provided to both bare metallic surfaces and factory coated surfaces.

B. FLANGE GASKETS:

1. GENERAL:

   a. Flange gaskets shall be of the full-face type. Gasket thickness shall be as specified, unless otherwise shown on the drawings.

   b. For flanged connections on polyethylene pipe installations, full-face gaskets shall be installed, and shall be manufactured with an internal diameter equal to the pipe internal diameter and an outer diameter equal to the larger of the polyethylene flange adapters or the joining appurtenance flange.

2. COMPRESSED NON-ASBESTOS-NITRILE:

   a. ACCEPTABLE PRODUCTS: Garlock BLUE-GARD Style 3000, or equal.

   b. MATERIAL: ASTM F104 Compressed non-asbestos sheet gasket with Aramid fibers and nitrile binder. Continuous temperature limit = 400 °F (not for saturated steam). Pressure limit = 1,000 psi. Thickness = 0.062 inches.

3. EPDM:

   a. ACCEPTABLE PRODUCTS: Garlock Style 8314; Biltrite Style 475; or equal.

   b. MATERIAL: Premium-grade ASTM D2000 EPDM rubber sheet gasket. Durometer Shore A hardness = 60. Temperature limit = 300 °F. Pressure limit = 150 psi. Thickness = 0.125 inches.

4. EPDM RING:

   a. ACCEPTABLE PRODUCTS: ASAHI/America Style AV; Garlock Stress Saver 6800; Proco style 9013-EP, or equal.

   b. MATERIAL: Premium-grade ASTM D2000 EPDM rubber molded ring gasket. Durometer Shore A hardness = 60. Temperature range = -4 to +210 °F. Pressure limit = 150 psi

5. FILLED PTFE:

   a. ACCEPTABLE PRODUCTS: Garlock Blue GYLON Style 3504, or equal.

   b. MATERIAL: ASTM F104 filled PTFE gasket. Temperature range = -350 to +500 °F. Pressure limit = 800 psi. Thickness = 0.062 inches.

6. FILLED PTFE OXY:

a. ACCEPTABLE PRODUCTS: Durabla Durlon 9000; Garlock Fawn GYLON Style 3502 for oxygen service, or equal.

b. MATERIAL: ASTM F104 filled PTFE gasket for oxygen service. Temperature range = -350 to +500 °F. Pressure limit = 1200 psi. Thickness = 0.062 inches.

7. NEOPRENE:

a. ACCEPTABLE PRODUCTS: Garlock Style 7986, or equal.

b. MATERIAL: Premium-grade ASTM D2000 neoprene rubber sheet gasket. Durometer Shore A hardness = 70. Temperature limit = 250 °F.

8. NEOPRENE CI (CLOTH INSERT):

a. ACCEPTABLE PRODUCTS: Garlock Style 3205; Biltrite Cloth-Inserted Neoprene – Regular Polyester Ply; or equal.

b. MATERIAL: Reinforced rubber diaphragm gasket. Premium-grade ASTM D2000 neoprene rubber sheet gasket with polyester fabric insert. Durometer Shore A hardness = 70. Temperature limit = 200 °F. Thickness = 0.125 inches.

9. NITRILE:

a. ACCEPTABLE PRODUCTS: Garlock Style 9122; Biltrite Premium Nitrile; or equal.

b. MATERIAL: Premium-grade ASTM D2000 nitrile (Buna N) rubber sheet gasket. Durometer Shore A hardness = 70. Temperature limit = 250 °F. Pressure limit = 150 psi. Thickness = 0.125 inches.

10. PTFE BONDED:

a. ACCEPTABLE PRODUCTS: ASAHI/America Style AV; Garlock Style Stress Saver 370; Proco Style 9013-ET, or equal.

b. MATERIAL: PTFE envelope gasket with concentric, convex molded rings bonded to an EPDM core. EPDM Durometer Shore A hardness = 65. Temperature range = -4 to +210 °F.

11. PTFE ENVELOPE:

a. ACCEPTABLE PRODUCTS: Flexitallic, or equal.

b. MATERIAL: PTFE split type envelope gasket with neoprene cloth-insert gasket core. Temperature range = -350 to +480 °F. Core thickness = 0.125 inches.

C. COUPLING GASKETS:

1. GENERAL:

a. Gaskets for sleeve-type, plain end, and grooved end couplings shall be provided by the coupling manufacturer.

2. EPDM:

a. EPDM rubber.

b. Temperature range = -30 to +230 °F.

c. NSF-61 certified for potable water service.

3. NEOPRENE:

a. Neoprene rubber.

b. Temperature range = +30 to +180 °F.

4. NITRILE:

a. Nitrile (Buna N) rubber.

b. Temperature range = -20 to +180 °F.

5. Fluoroelastomer:

a. Fluoroelastomer (Viton).

b. Temperature range = +20 to 300 °F.

D. SLEEVE-TYPE COUPLINGS:

1. ACCEPTABLE PRODUCTS

a. ACCEPTABLE PRODUCTS: PowerSeal, Romac Industries, Smith-Blair, or equal, modified as required to meet the specifications in accordance with the tables below. Sleeve-type couplings shall only be used on pipe types that are compatible per manufacturer's requirements with the acceptable products in the tables below.

Acceptable Products for Ductile Iron Sleeve-Type Couplings			
Description	PowerSeal Allowable Sizes	Romac Industries Allowable Sizes	Smith-Blair Allowable Sizes
Standard	3501 2 to 48 inches	501 2 to 24 inches	441 2 to 16 inches
Extended Range	3506 2 to 16 inches	XR501 4 to 12 inches	461 1.5 to 12 inches
Reducing	3506R 4 to 12 inches	RC501 3 to 24 inches	R441 2 to 8 inches
Flanged adapter	3521 4 to 12 inches	FCA501 3 to 16 inches	912 3 to 12 inches
Insulating	N/A	IC501 4 to 14 inches	N/A

Acceptable Products for Steel Sleeve-Type Couplings			
Description	PowerSeal Allowable Sizes	Romac Industries Allowable Sizes	Smith-Blair Allowable Sizes
Standard	3538 14 to 72+ inches	400 14 to 96+ inches	411 standard weight design 14 to 200 inches
Extended Range	N/A	N/A	N/A
Reducing	3562R 14 to 48+ inches	RC400 26 to 96+ inches	413 or 415 26 to 48+ inches
Flanged adapter	3528 14 to 24+ inches	FC400 14 to 96+ inches	913 14 to 24 inches
Insulating	3539 14 to 24+ inches	IC400 16 to 48+ inches	416 16 to 24 inches

Acceptable Products for Stainless Steel Sleeve-Type Couplings			
Description	PowerSeal Allowable Sizes	Romac Industries Allowable Sizes	Smith-Blair Allowable Sizes
Standard	3506AS 2 to 12 inches 3538 12 inches and up	400 12 to 96+ inches	N/A
Extended Range	3506AS 2 to 12 inches	N/A	N/A
Reducing	3562 12 inches and up	RC400 26 to 96+ inches	N/A
Flanged adapter	N/A	N/A	N/A
Insulating	N/A	N/A	N/A

2. MATERIAL:

a. Materials for Ductile Iron, Steel and Stainless Steel sleeve-type couplings shall be in accordance with the following tables:

Materials for Ductile Iron Sleeve-Type Couplings				
	Acceptable Exposure Severity: Mild & Moderate			
	Exposure Locations			
	Interior	Exterior	Buried	Submerged
Center Body	ASTM A536 ductile iron	ASTM A536 ductile iron	ASTM A536 ductile iron	ASTM A536 ductile iron
End Glands	ASTM A536 ductile iron	ASTM A536 ductile iron	ASTM A536 ductile iron	ASTM A536 ductile iron
Gasket	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets
Bolts and Nuts	High strength, low alloy steel	High strength, low alloy steel	High strength, low alloy steel	Type 316 Stainless Steel
Finish	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy

Materials for Steel Sleeve-Type Couplings				
	Acceptable Exposure Severity: Mild & Moderate			
	Exposure Locations			
	Interior	Exterior	Buried	Submerged
Center Body	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
End Glands	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
Gasket	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets
Bolts and Nuts	High strength, low alloy steel	High strength, low alloy steel	High strength, low alloy steel	Type 316 Stainless Steel
Finish	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy	AWWA C213 Fusion Bonded Epoxy

Materials for Stainless Steel Sleeve-Type Couplings				
	Acceptable Exposure Severity: Mild & Moderate & Harsh			
	Exposure Locations			
	Interior	Exterior	Buried	Submerged
Center Body	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel
End Glands	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel	ASTM A240 Type 316 stainless steel
Gasket	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets	Per PIPESPEC sheets
Bolts and Nuts	Type 316 stainless steel	Type 316 stainless steel	Type 316 stainless steel	Type 316 stainless steel
Finish	N/A	N/A	N/A	N/A

3. RING STIFFNERS:

    a. Ring Stiffeners required for use of restrained sleeve couplings on HDPE pipe.

        1) ACCEPTABLE PRODUCTS: JCM 230 and 231 or equal.

        2) MATERIAL: ASTM 240 – TP 304 Stainless Steel or 316 Stainless Steel

E. LINK TYPE SEALS

1. Characteristics:

    a. Modular mechanical type, consisting of interlocking EPDM rubber links shaped to continuously fill the annular space between the pipe and wall opening.

    b. Assemble links solely with Type 316 stainless steel bolts and nuts to form a continuous rubber belt around the pipe.

    c. Provide a nylon polymer pressure plate with Type 316 stainless steel hardware. Isolate pressure plate from contact with wall sleeve.

    d. Provide centering blocks on the bottom 1/3 of the pipe opening to center the pipe in the pipe sleeve.

    e. Where axial slip inserts are indicated on the drawings, provide a sliding surface between the link type seal and the pipe to allow for unlimited axial movement of the pipe while maintaining a water tight seal.

2. Manufacturers: One of the following or equal:

    a. Calpico, Incorporated.

    b. Pipeline Seal and Insulator, Inc., Link-Seal.

    c. Metraflex, inc

2.02 PIPING IDENTIFICATION

A. PIPE LABELING:

1. ACCEPTABLE PRODUCTS:

    a. ADHESIVE LABELS: Brady B-681 polyester with overlaminate; Craftmark model Duramark HT polyester with overlaminate; or equal, modified as required to meet the specifications.

b. SELF-COILING LABELS: Brady model B-915 Snap-On & Strap-On; Craftmark model Specmark Snap-On; or equal, modified as required to meet the specifications.

2. Labels for identifying piping shall conform to ANSI A13.1.Piping labels shall include system, contents, and direction of flow. Labels shall be provided bearing the label lettering on the background colors specified in Table A. Color field shall be long enough to print the entire lettering

3. Size of legend letters and minimum length of color field:

Outside Diameter of Pipe or Covering (inches)	Minimum Length of Color Field (inches)	Letter Height (inches)
¾ to 1¼	8	½
1½ to 2	8	¾
2½ to 6	12	1¼
8 to 10	24	2½
Over 10	32	3½

4. LABEL construction:

a. Adhesive labels shall be weather, water, and grease-resistant, with 5 to 8 year average outdoor life. Labels shall be polyester with polyester overlaminate. Vinyl labels are not acceptable.

b. Self-coiling, around-pipe markers shall be weather, water, and grease-resistant, with 5 to 8 year average outdoor life.

c. In the event of a short piping run and none of the above methods will be practical, a metal tag fastened with stainless steel wire may be used to identify the piping system.

B. PIPE COLOR:

1. Piping shall be painted in accordance with the attached PIPESPECS and the PAINTING AND COATING Section (09 90 00). Stainless steel pipes are typically not painted. The following are general EchoWater Facility reserved piping paint colors:

a. BONE WHITE: All chemical piping other than chlorine and sulfur dioxide

b. RED: Fire suppression

c. LIGHT GRAY: All piping other than chemical and fire suppression

C. VALVE LABELS AND TAGS:

1. Labeling or tagging of valves and other fixtures shall use the method that is both durable and readily viewable.

2. Approved tagging media are as follows:

   a. METAL TAGS:

      1) 16-gauge aluminum or 0.025 inch Type 304 stainless steel construction

      2) Minimum 1-inch by 4-inch rectangular in size with rounded corners

      3) ½-inch high letters, deeply and legibly engraved or stamped

      4) Attached with 16-gauge 304 stainless steel wire

   b. MULTI-LAYER PLASTIC TAGS:

      1) UV stabilized

      2) At least 2-ply impact acrylic

      3) At least 1/16-inch thick

      4) Minimum 1-inch by 4-inch rectangular in size

      5) ½-inch high letters, deeply and legibly engraved

      6) Attached with 16-gauge 304 stainless steel wire

D. UNDERGROUND WARNING TAPE:

1. ACCEPTABLE PRODUCTS:

   a. T. Christy Enterprises, Inc., W.H. Brady Co., Seton Name Plate Corp., or equal.

2. MATERIAL:

   a. Underground warning tape shall be 6 inches wide and 3.5 mil thick polyethylene.

   b. Two messages shall be printed on the tape. The first message shall read "CAUTION CAUTION CAUTION". The second message shall state the type of buried utility line: Reclaimed Water, Gas, Water, Stormwater or Sewer.

E. UNDERGROUND TRACER WIRE:

1. Underground tracer wire shall be #10 AWG THWN solid copper wire, with yellow insulation.

2.03 PIPING APPURTENANCES

A. WATER STRAINERS:

1. ACCEPTABLE PRODUCTS:

a. Watts; Mueller Steam Specialty; or equal.

2. MATERIAL:

a. BODY: Bronze or cast iron. Y-pattern, unless otherwise specified.

b. SCREENS: 0.045-inch 304 stainless steel,

B. CAM LOCK PLUG (MALE) and CAM LOCK (FEMALE):

1. ACCEPTABLE PRODUCTS:

a. OPW; PT; or equal

2. MATERIAL

a. Material per PIPESPEC. Size shall be as indicated on the Drawings

PART 3 -- EXECUTION

3.01 GENERAL - NOT USED

3.02 INSTALLATION

A. LOCATION:

1. Piping shall be installed as shown on the drawings, except for adjustments to accommodate conflicts. A minimum vertical clearance of 8 feet shall be provided over walkways and throughways in all tunnels and galleries. Unless otherwise indicated on the drawings, minimum depth of cover for buried, non-plastic pipe shall be 42 inches over the top of the pipe. Unless otherwise indicated on the drawings, minimum depth of cover for buried, plastic pipe shall be 48 inches over the top of the pipe.

B. COATING:

1. All piping shall be coated and lined as specified in the individual piping sections and PIPESPEC sheets located at the end of this specification section.

2. Unless otherwise specified, finish coating shall conform to the SCHEDULES FOR PAINTING AND COATING Section (09 06 90) and the PAINTING AND COATING Section (09 90 00).

C. PIPE SUPPORT, ANCHORAGE AND SEISMIC BRACING:

1. Piping shall be supported, anchored, and seismically braced as shown on the drawings and as specified in the HANGERS AND SUPPORTS FOR PROCESS PIPING Section (40 05 07).

2. Where a specific type of support or anchorage is indicated on the layout drawings, then only that type shall be used there.

3. Supports shall be provided on each run at each change of direction.

4. (DELETED)

D. RESTRAINTS FOR PIPING:

1. All pipe-to-pipe joints, plugs, caps, tees, bends, and valves shall be restrained for all exposed and buried piping unless otherwise specified. Restrained pipe-to-pipe joints, shall be flanged or grooved end for exposed service and restrained push-on for buried service or as specified in the individual piping sections.

2. Concrete thrust blocks shall be as shown on the drawings.

E. BEDDING AND BACKFILL:

1. Bedding and backfill for buried piping shall be as specified in the EARTH MOVING Section (31 20 00) and as shown on the drawings.

F. NOT-BURIED TO BURIED PIPING MATERIAL TRANSITIONS:

1. Unless otherwise shown on the drawings, all piping shall transition on the not-buried side of the ground penetration.

G. PROCESS INSTRUMENTATION CONNECTIONS:

1. Process instrumentation taps shall be as shown on the detail drawings. Taps shall be located, sized and orientation coordinated with the requirements of the INSTRUMENTATION OF PROCESS SYSTEMS Section (40 70 00) and the

SCHEDULE FOR INSTRUMENTATION OF PROCESS SYSTEMS Section (40 06 70).)

2. Direct drill and tap of a pipe wall is not acceptable.

H. DRAINS AND VENTS:

1. Provide manual air vents in the following locations:

   a. Where indicated on plans

   b. At all high points of piping, including high points created at all piping offsets

   c. On horizontal piping in excess of twenty feet from any offset or riser

   d. On horizontal piping shall be installed at a maximum interval of 100 foot

2. AIR VENTS:

   a. Air vents shall be piped to the floor with a valve within 4 feet of the floor

   b. For solid-containing fluids, manual air vents shall include 1-inch valve and a cam and groove quick disconnect fitting

   c. All other manual air vents shall be a ¾-inch valve

3. Provide drains in the following locations:

   a. Where indicated on plans

   b. At all low points of piping, including piping offsets and drops

   c. On horizontal piping in excess of twenty feet from any offset or drop

   d. On horizontal piping at a maximum of one hundred foot intervals

4. DRAINS:

   a. Drains shall be piped to a floor drain, sump or gutter with a valve within 4 feet of the floor

b. Drains for solid-containing fluids shall include a 2-inch valve and a cam and groove quick disconnect fitting

c. All other drains shall incorporate a 1-inch valve

5. When air vents and drains cannot be piped to the locations listed above the Contractor shall notify the District Representative who will determine an acceptable alternate method or location.

3.03 PIPING IDENTIFICATION

A. PIPE LABELS:

1. After application of the specified coating and insulation systems, non-buried piping shall be identified with labels. Labels shall be neat, readable and uniform in appearance. Labels shall be readily visible from normal working locations and must not impede normal operations.

2. Labels shall not be located where they will be damaged by normal use or tools.

3. Each exposed pipe will be identified:

a. At intervals of 40 feet on straight pipe runs greater than 120 feet, otherwise

b. At intervals of 30 feet

c. At least one time in each room

d. Within 2 feet of all turns, ells, valves, and on the upstream side of all distribution fittings, branches and headers

e. On both sides of wall or floor penetrations

f. Within 3 feet of penetrating the ground

B. VALVE TAGS:

1. If the association between label or tag and valve or fixture is definitive, then valves and fixtures may use any of the methods identified; otherwise attach a metal tag to the valve or fixture.

2. Attach valve tags to the valve stem.

3. Buried valves shall be identified by a metal tag attached to the collar of the valve box or riser. Do not attach metal tags to lids because they are often swapped from box to box.

C. UNDERGROUND WARNING TAPE:

1. A single line of tape shall be provided 2.5 feet above the top of all buried piping systems.

2. For pipelines buried 8 feet or greater below finished grade, Contractor shall provide a second line of tape 12 inches below finished grade, above and parallel to each buried pipe. Tape shall be spread flat with message side up before backfilling.

D. UNDERGROUND TRACER WIRE:

1. Underground tracer wire shall be tie-wrapped to the top centerline of the pipe on buried nonferrous, plastic, reinforced thermosetting resin, and non-electrically continuous ferrous pipelines. For large diameter piping, taping may be used in sizes where tie-wrap is not available. Tie-wrapping shall be done at 5-foot intervals and at every tee, bend, cross or valve.

2. Tracer wire shall be electrically continuous. Splices shall be western union type, soldered, and sealed with heat shrink tubing, or they shall be wire nut type, designed specifically for underground connections.

3. Wiring shall be brought up to valve boxes, cleanout boxes, aboveground penetrations, etc. with 5 feet of extra wire coiled neatly and accessibly.

3.04 CLEANING AND FLUSHING

A. GENERAL:

1. Clean piping systems following completion of testing and prior to connection to operating, control, regulating or instrumentation equipment.

B. TYPE 1:

1. Clean piping with a swab or cleaning ball. Flush, disinfect, and test for residual chlorine in accordance with AWWA C651, modified as follows:

a. Use liquid chlorine.

b. Use the continuous feed method.

c. Fill piping with chlorine solution and expel air. Retain solution in piping for 24 hours.

d. Test for minimum chlorine residual of 10 ppm at end of 24 hour period. Take at least one sample every 500 feet of piping, in addition to the samples specified in AWWA C651.

e. Dispose of chlorinated water as directed by District.

2. The District will perform bacterial testing in accordance with AWWA C651.

C. TYPE 2:

1. Clean piping with a swab or cleaning ball. Flush with clean water.

D. TYPE 3:

1. Clean piping with a swab or cleaning ball. Flush with airstream. Purge sludge gas and natural gas systems with nitrogen and maintain a nitrogen pad of 10 psi until put in service.

E. TYPE 4:

1. Five basic steps are necessary to ensure that "items are cleaned for oxygen service." These steps are:

a. Select a Suitable Cleaning Agent.

Recommended Cleaning Agents for Various Materials		
Material	Recommended Cleaning Agent	Remarks
Aluminum	Diversey 909, or Chlorothene	Rinse off water-soluble agents with generous quantities of hot water. Dry off solvents with oil-free compressed dry air or nitrogen, or allow to air dry.
Copper and Copper Alloys	Metso Beads 2048	Rinse off water-soluble agents with generous quantities of hot water.
Stainless Steel	Metso Beads 2048, or Chlorothene	Rinse off water-soluble agents with generous quantities of hot water. Dry off solvents with oil-free compressed dry air or nitrogen, or allow to air dry.
Iron and Steel	Metso Beads 2048, or Chlorothene	Rinse off water-soluble agents with generous quantities of hot water. Dry off solvents with oil-free compressed dry air or nitrogen, or allow to air dry.
Packing and Gasketing Material Specifications	--	Purchase suitable for oxygen service.

Valves or Equipment	--	Purchase pre-cleaned for oxygen service by the manufacturer.

b. Remove contaminants. Contaminants include oil, grease, threading compounds, flux, weld metal, chips, filings, and other foreign material. Contaminants may cause ignition by impact or from friction of metallic or non-metallic parts (which are normally safe in oxygen service). Typical cleaning methods include:

1) IMMERSION: In this method, immerse the item in a container of cleaning agent.

2) SWABBING: In this method, clean the item with a swab soaked in cleaning agent.

3) SPRAYING: In this method, clean the item with a high velocity nozzle and cleaning agent.

4) FLUSHING: In this method, clean the item by circulating a cleaning agent solution through the item.

5) SANDBLASTING: In this method, clean the item by sandblasting with steel shot or garnet. For steel pipe only.

c. Remove all cleaning agent residue.

1) Remove water-soluble cleaning agents by flushing with large quantities of hot (170°F) clean water. Dry the item by purging with hot (200°F), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving are warm to the touch. Purge rates should be at an absolute minimum, allowing adequate time for the purge gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

2) Remove solvent cleaning agents by evaporation. Dry the item by purging with hot (200°F), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving are warm to the touch. Purge rates should be at an absolute minimum, allowing adequate time for the purge gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

3) Remove sandblast residue by vacuum, swab, etc. Dry the item by purging with hot (200°F for steel), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving have a -40°F dew point. Purge rates should be at an absolute minimum, allowing adequate time for the purge

gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

d. Inspect item for cleanliness.

1) If any evidence of contamination is noted, clean the item again.

2) Inspect items visually for gross contamination.

3) After the initial inspection, examine items using an ultraviolet light. A UV light will cause cutting oil and grease to fluoresce. Where direct visual examination is not possible, swab the item, then check the swab with a UV light for contamination.

4) Small, cleaned items to be checked may be placed in a closed box with a UV light and peephole. This shields the specimen from visible light. Special boxes for this purpose are commercially available. Samples also may be inspected under a UV light in a closet or any other dark location. However, it is emphasized that this type of test is not sensitive to all types of carbonaceous contamination, such as animal and vegetable fat, but will detect most cutting oils and machinery lubricants. A UV lamp with a wavelength of approximately 3660A, at a minimum output of 620 microwatts/cm^2 is particularly suited to test for carbonaceous contaminants.

e. Protect cleaned items from contamination.

1) Use only clean, grease-free gloves, tools, and slings for handling cleaned items.

2) Seal manholes, inspection ports, nozzles, and other openings. Use blank flanges bolted in place, plastic protectors, hard board covers, polyethylene bags, polyethylene sheeting, or at least two layers of clean Kraft paper. Label packages whose contents are not visible to identify the contents without breaking the seals.

3) Store and assemble cleaned items in areas free from oil mist, lubricants dropping from cranes, and similar contaminating conditions. Wrap or cover items temporarily stored on floor areas with clean paper.

F. TYPE 5: (CHLORINE LIQUID & GAS, NOT VACUUM OR SOLUTION)

1. Five basic steps are necessary to ensure that “items are cleaned for chlorine service.” These steps are:

a. Select a Suitable Cleaning Agent.

Recommended Cleaning Agents for Various Materials		
Material	Recommended Cleaning Agent	Remarks
PVC	Metso Beads 2048	Rinse off water-soluble agents with generous quantities of hot water. Dry with oil-free compressed dry air or nitrogen, or allow to air dry.
Steel	Metso Beads 2048, or Chlorothene	Rinse off water-soluble agents with generous quantities of hot water. Dry off solvents with oil-free compressed dry air or nitrogen, or allow to air dry.
Packing and Gasketing Material Specifications		Purchase suitable for chlorine service.
Valves or Equipment		Purchase pre-cleaned for chlorine service by the manufacturer.

b. Remove contaminants.

1) Chlorine may react violently with contaminants. Contaminants include oil, grease, threading compounds, flux, weld metal, chips, filings, and other foreign material. Typical cleaning methods include:

2) IMMERSION: In this method, immerse the item in a container of cleaning agent.

3) SWABBING: In this method, clean the item with a swab soaked in cleaning agent.

4) SPRAYING: In this method, clean the item with a high velocity nozzle and cleaning agent.

5) FLUSHING: In this method, clean the item by circulating a cleaning agent solution through the item.

6) SANDBLASTING: In this method, clean the item by sandblasting with steel shot or garnet. For steel pipe only.

c. Remove all cleaning agent residue.

1) Remove water-soluble cleaning agents by flushing with large quantities of hot (170°F) clean water. Dry the item by purging with hot/warm (200°F for steel; 100°F for PVC), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving have a -40°F dew point. Purge rates should be at an absolute minimum, allowing adequate time for the purge gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

2) Remove solvent cleaning agents by evaporation. Dry the item by purging with hot (200°F for steel), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving have a -40°F dew point. Purge rates should be at an absolute minimum, allowing adequate time for the purge gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

3) Remove sandblast residue by vacuum, swab, etc. Dry the item by purging with hot (200°F for steel), oil-free dry (-60°F dew point maximum) air or nitrogen until all vent gas streams leaving have a -40°F dew point. Purge rates should be at an absolute minimum, allowing adequate time for the purge gas to reach equilibrium when the dew point is taken. Visually inspect the item to be sure that all cleaning agent has been removed.

d. Inspect item for cleanliness.

1) If any evidence of contamination is noted, clean the item again.

2) Inspect items visually for gross contamination.

3) After the initial inspection, examine items using an ultraviolet light. A UV light will cause cutting oil and grease to fluoresce. Where direct visual examination is not possible, swab the item, then check the swab with a UV light for contamination.

4) Small, cleaned items to be checked may be placed in a closed box with a UV light and peephole. This shields the specimen from visible light. Special boxes for this purpose are commercially available. Samples also may be inspected under a UV light in a closet or any other dark location. However, it is emphasized that this type of test is not sensitive to all types of carbonaceous contamination, such as animal and vegetable fat, but will detect most cutting oils and machinery lubricants. A UV lamp with a wavelength of approximately 3660A, at a minimum output of 620 microwatts/cm^2 is particularly suited to test for carbonaceous contaminants.

e. Protect cleaned items from contamination.

1) Use only clean, grease-free gloves, tools, and slings for handling cleaned items.

2) Seal manholes, inspection ports, nozzles, and other openings. Use blank flanges bolted in place, plastic protectors, hard board covers, polyethylene bags, polyethylene sheeting, or at least two layers of clean Kraft paper. Label packages whose contents are not visible to identify the contents without breaking the seals.

3) Store and assemble cleaned items in areas free from oil mist, lubricants dropping from cranes, and similar contaminating conditions. Wrap or cover items temporarily stored on floor areas with clean paper.

3.05 TESTING

A. GENERAL:

1. Upon completion of piping, but prior to application of insulation on non-buried piping, the Contractor shall test the piping systems.

2. Buried piping systems shall be tested upon completion of piping, but prior to backfill.

3. Testing shall be in accordance with this section and the attached test forms.

4. Pressures, media and test durations shall be as specified in the PIPESPEC sheets located at the end of this specification section.

5. Equipment which may be damaged by the specified test conditions shall be isolated.

6. Testing shall be performed using certified, calibrated test gauges.

   a. Required pressure tests of 10 psig or less shall be performed with gauges of 1/10 psig increments or less.

   b. Required pressure tests exceeding 10 psig but less than 100 psig shall be performed with gauges of 1 psig increments or less.

   c. Required pressure tests exceeding 100 psig shall be performed with gauges incremented for 2% or less of the required test pressure.

   d. Test gauges shall have a pressure range not greater than twice the test pressure.

7. Testing shall be performed using certified, calibrated volumetric measuring equipment to determine leakage rates.

8. Testing, as specified herein, shall include existing piping systems that connect with new pipe systems. Existing pipe shall be tested to the nearest existing valve. Any piping which fails the test shall be repaired. Repair of existing piping will be considered and paid for as extra work.

B. TYPE 1:

1. Leakage shall be zero at the specified test pressure throughout the specified duration unless specifically allowed in the individual PIPESPEC sheets located at the end of this specification section.

C. TYPE 2:

1. Piping systems shall first be pressure tested at the specified test pressure. Leakage shall be zero.

2. Piping systems shall next be vacuum tested at the specified test vacuum. Leakage shall be zero. Vacuum test shall be performed by an independent test company experienced in vacuum testing.

D. TYPE 3:

1. Systems shall be tested in accordance with the UPC.

3.06 TRAINING (NOT USED)

3.07 PIPING SYSTEM SPECIFICATION SHEETS

A. Piping and valves are specified on individual Piping System Specification (PIPESPEC) sheets located at the end of this specification section. Piping services specified in the PIPESPEC sheets and shown on the drawings are alphabetically arranged by designated service abbreviations as shown in Table A. Table A also indicates the pipe label legend, background color, and lettering color of each service. Existing pipe systems may vary from the PIPESPEC. The Contractor shall field verify the pipe type, location and arrangement required for each connection to existing pipe systems.

Table A, Piping Services

Symbol	Pipe Legend	Pipe Paint Color	Pipe Label Background Color	Pipe Label Lettering Color
SRW	SCUM REMOVAL WATER	Light Gray	Green	White
WN	NON-POTABLE WATER	Light Gray	Purple	White
WRH	RECLAIMED WATER HIGH PRESSURE	Light Gray	Green	White

Table B. Piping Service Test Schedule

Pipe Symbol	Service	Test Form	Test Description	Test Date	Submittal Number	Item No.	Accepted Date
SBIS	Sodium Bisulfite	40 05 03 C1	Pre-Operational				
SBIS	Sodium Bisulfite	40 05 03 C2	Pre-Operational				
SRW	Scum Removal Water	40 05 03 C1	Pre-Operational				
SRW	Scum Removal Water	40 05 03 C2	Pre-Operational				
WN	Non-Potable Water	40 05 03 C1	Pre-Operational				
WN	Non-Potable Water	40 05 03 C2	Pre-Operational				
WRH	High Pressure Reclaimed Water	40 05 03 C1	Pre-Operational				
WRH	High Pressure Reclaimed Water	40 05 03 C2	Pre-Operational				

****END OF SECTION****

PIPING SYSTEM SPECIFICATION					
SERVICE: High Pressure Reclaimed Water				SYMBOL: WRH	
FLUID: Reclaimed Water					
PRESSURE – PSIG				TEMPERATURE - °F	
MAX: 140	TEST: 150	TEST TYPE: 1		NORMAL: 70	MAX: 85
TEST MEDIUM: Water	TEST DURATION: 120 minutes			CLEANING TYPE: 2	

PIPE AND FITTING SPECIFICATION			
SIZE	EXPOSURE	PIPE	FITTINGS AND JOINTS
≤ 2”	Interior or Exterior	Steel, ASTM A53 Grade B, Schedule 40, Type S galvanized.	Malleable iron, ASTM A197, ANSI B16.3, Class 150, galvanized, with threaded, flanged, or grooved end coupling connections.
3” – 6”	Interior or Exterior	Steel, ASTM A53 Grade B, Schedule 40, Type E, black with epoxy lining.	Grooved end couplings, with flanged adapters for valves. Grooved end fittings, ASTM A47 malleable iron, ASTM A536 ductile iron, ASTM A234 steel with epoxy lining.
All	All	Flange Gaskets: Nitrile	
		Push-on/Mech. Couplings: Nitrile	

GENERAL VALVE SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED IN VALVE SCHEDULE				
SIZE	EXPOSURE	DUTY	SPECIFICATION	OPERATOR
≤ 2”	All	Isolation	Ball valve, Type BR-2P, per BALL VALVES Section (40 05 63)	MLQ
≥2.5”	Interior or Exterior	Isolation	Butterfly valve, Type AW-150.BUTTERFLY VALVES Section (40 05 64).	MGQ

REMARKS: All pipe-to-pipe joints, plugs, caps, tees bends, all other fittings, and valves shall be restrained.

PIPING SYSTEM SPECIFICATION					
SERVICE: Scum Removal Water				SYMBOL: SRW	
FLUID: Reclaimed Water					
PRESSURE – PSIG				TEMPERATURE - °F	
MAX: 140	TEST: 150	TEST TYPE: 1		NORMAL: 70	MAX: 85
TEST MEDIUM: Water	TEST DURATION: 120 minutes			CLEANING TYPE: 2	

PIPE AND FITTING SPECIFICATION			
SIZE	EXPOSURE	PIPE	FITTINGS AND JOINTS
≤ 2”	Interior or Exterior	CPVC; ASTM D1784, Class 23447 (Type IV Gr. I) ASTM F441 Sch 80	CPVC, ASTM D1784 Class 23447, ASTM F439 for socket, ASTM F437 for threaded, Plain end connections. Solvent weld with threaded or flanged connections for valves and strainers
	Buried		
		Flange Gaskets:	
		Push-on/Mech. Couplings:	

GENERAL VALVE SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED IN VALVE SCHEDULE				
SIZE	EXPOSURE	DUTY	SPECIFICATION	OPERATOR

REMARKS:

PIPING SYSTEM SPECIFICATION					
SERVICE: Sodium Bisulfite				SYMBOL: SBIS	
FLUID: 25% Sodium Bisulfite					
PRESSURE – PSIG				TEMPERATURE - °F	
MAX: 100	TEST: 150	TEST TYPE: 1		NORMAL: 70	MAX: 120
TEST MEDIUM: Water	TEST DURATION: 120 minutes			CLEANING TYPE: 2	

PIPE AND FITTING SPECIFICATION			
SIZE	EXPOSURE	PIPE	FITTINGS AND JOINTS
1/2"	All	ASTM A312, Type 316L, Schedule 40S seamless.	Type 316L, ASTM A182, Class 150 stainless steel threaded fittings meeting ANSI/MSS SP-114 & ASTM A351 Joints: Threaded

GENERAL VALVE SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED IN VALVE SCHEDULE				
SIZE	EXPOSURE	DUTY	SPECIFICATION	OPERATOR
½"	All	Isolation	Ball valve, Type SS-2P	MLQ

REMARKS:

PIPING SYSTEM SPECIFICATION					
SERVICE: Non-Potable Water				SYMBOL: WN	
FLUID: Water					
PRESSURE – PSIG				TEMPERATURE - °F	
MAX: 130	TEST: 150	TEST TYPE: 1		NORMAL: 60	MAX: 120
TEST MEDIUM: Water	TEST DURATION: 120 minutes			CLEANING TYPE: 2	

PIPE AND FITTING SPECIFICATION			
SIZE	EXPOSURE	PIPE	FITTINGS AND JOINTS
≤ 2”	Interior or Exterior	Steel, ASTM A53 Grade B, Schedule 40, Type S galvanized.	Malleable iron, ASTM A197, ANSI B16.3, Class 150, galvanized steel, with threaded, flanged, or grooved end coupling connections.
3” – 6”	Interior or Exterior	Steel, ASTM A53 Grade B, Schedule 40, Type E, black with epoxy lining.	Grooved end couplings, with flanged adapters for valves. Grooved end fittings, ASTM A47 malleable iron, ASTM A536 ductile iron, ASTM A234 steel with epoxy lining.
All	All	Flange Gaskets: Nitrile	
		Push-on/Mech. Couplings: Nitrile	

GENERAL VALVE SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED IN VALVE SCHEDULE				
SIZE	EXPOSURE	DUTY	SPECIFICATION	OPERATOR
≤ 2”	All	Isolation	Ball valve, Type BR-2P, per BALL VALVES Section (40 05 63)	MLQ
≥2.5”	Interior or Exterior	Isolation	Butterfly valve, Type AW-150.BUTTERFLY VALVES Section (40 05 64).	MGQ

REMARKS: All pipe-to-pipe joints, plugs, caps, tees bends, all other fittings, and valves shall be restrained.

CONTRACT #:

FORM #: 40 05 13 C1 - PIPING SYSTEM PRESSURE & LEAKAGE TEST (LIQUID)

PIPE SYSTEM #:_____ REF. DRAWING #(S):_____

PIPE MATERIAL:_____ PIPE LINER:_____

SPECIFICATION SECTION(S):_____

ENTER INFORMATION FROM SPECIFICATION 40 05 13 FOR APPROPRIATE SYSTEM:

Test Requirements:

Medium:_____Pressure:_____

Duration:_____

FROM SPECIFICATION **40 05 13**:

Leakage shall be zero at the specified test pressure throughout the specified duration for the following systems: exposed piping, or insulated piping, through all valves when in the close position, and buried or exposed piping carrying liquid chemicals. Unless otherwise specified, leakage from other buried liquid pipe systems shall be less than 0.02 gallons per hour per inch diameter per 100 feet of buried piping.

Attach drawing with line marking tested piping and equipment. List any equipment not shown on the drawing. Show temporary connections

TEST EQUIPMENT NEEDED

See specification section xx xx xx for additional testing equipment specifications.

1. Pressure gauge, & equipment to measure makeup medium flow rate.
2. Equipment to provide medium at required pressure in the pipe.
3. All appropriate temporary fittings.

TEST EQUIPMENT CALIBRATION INFORMATION		
Equipment Type	Serial Number	Calibration Expiration Date
1. Pressure gauge		

ALLOWABLE LEAKAGE CALCULATIONS
1. Allowable leakage, calculated at required test pressure:_____gal/hr
2. Allowable leakage, calculated at recorded test pressure:_____gal/hr

TESTING PROCEDURES

Note: Test any buried valves before backfilling.

1. Remove all installed equipment which may be damaged by the specified high pressure test conditions.
2. Ensure that all pipeline to be tested is clean.
3. Isolate section to be tested by closing all appropriate valves.
4. Perform 24-hour visible leak test under a pressure of 5 psi.
5. Add water to the specified pressure and record total leakage (makeup water necessary to maintain specified pressure) for the specified period of time.
6. Check for zero leakage for the same specified time period through all valves 8 inches in diameter or larger in the closed position beginning with the valve farthest from the pressure guage and working backward, one by one, except pressure modifying valves. Test with each valve closed for the same specified time period as the leakage test.
7. Repeat test a maximum of two more times if leakage exceeds allowable level.
8. Visually check piping for any alignment, grade, or other defects.

TEST MEASUREMENTS

Trial No.	Measured Pressure (psig)	Measured Leakage		Leakage ≤ Allowable	
		Total (gal)	Rate (gal/hr)	CONTR. INITIALS	ENGR'S WITNESS
1					
2					
3					

ZERO LEAKAGE CHECK THROUGH ALL CLOSED VALVES

VALVE NO.	VALVE DESCRIPTION	CONTR. INITIALS	ENGR'S WITNESS

OTHER CHECKS	CONTR. INITIALS	ENGR'S WITNESS
Seismic bracing installed.		
Pipe free of alignment, grade, or any other defects.		

WITNESS BLOCK

Engineer's Representative:_____Date:_____

Contractor's Representative:_____Date:_____

CONTRACT #:

FORM #: 40 05 13 C2 - PIPING SYSTEM CLEANING & FLUSHING (LIQUID)

PIPE SYSTEM #:_____ REF. DRAWING #(S):_____

PIPE MATERIAL:_____ PIPE LINER:_____

SPECIFICATION SECTION(S):_____

Piping systems shall be cleaned prior to pressure and leakage testing and prior to connection to operating, control, regulating or instrumentation equipment. See Specification 40 05 13for cleaning instructions.

EQUIPMENT ITEMS CLEANED AND FLUSHED
Attach drawing with line marking cleaned piping sections.

TEMPORAY SCREENS INSTALLED	CONTR. INITIALS	ENGR'S WITNESS
Number of temporary screens installed in this section:_____ Indicate on the attached drawing the locations of the temporary screens installed.		

CLEANING AND FLUSHING COMPLETE	CONTR. INITIALS	ENGR'S WITNESS
1. Piping flushed using:_____(Clean water or testing liquid specified) For:_____Minutes (minimum = 15 minutes)		

WITNESS BLOCK
Engineer's Representative:_____Date:_____
Contractor's Representative:_____Date:_____

SECTION 40 05 07

HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies requirements for design, selection, installation and inspection of hangers, supports, and seismic restraints for all piping systems specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), except for fire sprinkler systems. The Drawings specify hangers, supports, and seismic restraints for piping larger than 12-inch nominal diameter that is outside the Contractor's design professional responsibility. All process piping supports and seismic restraints designed by the Contractor's design professional and all supports and seismic restraints specified in the Drawings shall be provided by the Contractor.

B. SEISMIC CRITERIA:

1. The design criteria for the seismic restraints for all piping systems shall be in accordance with the California Building Code and the seismic parameters shown on the Drawings. The component importance factor I_P shall be 1.50. The seismic restraint system shall be designed by a professional Engineer registered in the State of California.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent that they are referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
AISC Manual	Manual of Steel Construction - 13th Edition
ASTM A193 / A193M	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A575	Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades

Reference	Title
ASTM A576	Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality
ASTM A1011	Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM D635	Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials
CBC	California Building Code
FEDSPEC WW-H-171e	Hangers and Supports, Pipe
MSS SP-58	Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	Pipe Hangers and Supports - Selection and Application
OSHPD	California Office of Statewide Health Planning and Development
SAE J429	Mechanical and Material Requirements for Externally Threaded Fasteners

B. DEFINITIONS:

1. Longitudinal direction: direction parallel to the pipe axis.

2. Lateral/Transverse direction: direction perpendicular to the pipe axis.

3. Essential Facilities: buildings and other structures that are intended to remain operational in the event of extreme environmental loading from flood, wind, snow or earthquakes.

4. Exposure location terms used in these specifications are defined as follows:

Interior: Inside of a building or structure.
Exterior: Outside of a building or structure and exposed to weather elements.
Buried: Below grade and in contact with backfill material or concrete encasement. Piping may or may not be insulated.
Submerged: Submerged or below the top elevation of structures or facilities containing liquids, such as: tanks, channels, digesters, manholes, sumps, basins, rivers, and other areas as indicated or shown on the drawings.

5. Exposure severity terms are defined as follows:

Mild Environment: Standard commercial facility conditions.

Moderate Environment: Industrial facility conditions where surfaces may be occasionally exposed to light-moderately aggressive liquids, solids or gases.

Harsh Environment: Industrial facility conditions where surfaces may be subject to aggressive liquids, solids or gases, or surfaces may be normally exposed to light-moderately aggressive liquids, solids or gases.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the product.

3. Hanger and support locations and hanger components, including elbow thrust restraints as required by the piping system, shall be indicated on the piping layout drawings required by the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03). Pipe hanger spacing shall not exceed the maximum spans shown on the Drawings. Contractor shall provide a legend that includes support identification number, support type, pipe size and service, and support weight. Failure to include this information with pipe layout drawing submittal shall be cause for rejection of the layout drawings.

4. Pipe hanger, thrust restraints and seismic restraint calculations prepared and stamped by a professional structural or civil engineer registered in the State of California.

5. Seismic restraint locations and components shall be indicated on the piping layout drawings required by the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

PART 2 -- PRODUCTS

2.01 MATERIALS

A. GENERAL:

1. All hangers, supports, hardware and components shall be of the material and finish per the following table, unless specifically shown otherwise on the drawings:

	Locations			
	Interior	Exterior	Buried	Submerged
Mild Environment	HDGAF	HDGAF	N/A	N/A
Moderate Environment	HDGAF	HDGAF	304 SS	N/A
Harsh Environment (not Hypochlorite)	316 SS	316 SS	316 SS	316 SS
Harsh Environment (Hypochlorite)	FRP	FRP	FRP	FRP

HDGAF = Steel, Hot Dip Galvanized After Fabrication
SS = Stainless Steel
FRP = Fiberglass Reinforced Plastic

1. All exposed pipe trenches are Moderate Environment
2. Enclosed space is considered Harsh Environment

2.02 CHANNEL STRUT

A. ACCEPTABLE PRODUCTS:

1. Single channel: B-Line B22; Unistrut P1000; B-Line BFV22SH; or equal.

2. Double channel: B-Line B22A; Unistrut P1001; B-Line BFV22A; or equal.

3. Double deep channel: B-Line B12A; Unistrut P5501; or equal.

B. MATERIALS:

1. ASTM A1011 Grade 33 steel channel shall be 1-5/8 inches square, roll formed, 12-gage material. Channel shall have a continuous slot along one side with in-turned clamping ridges.

2. ASTM A240 stainless steel channel shall be 1-5/8 inches square, roll formed, 12-gage material. Channel shall have a continuous slot along one side with in-turned clamping ridges.

3. Fiberglass channel shall be 1-5/8 inches square, pultruded, ¼-inch thick material with vinyl ester resin. Channel shall meet ASTM E84 Class 1 Flame Rating, and self-extinguishing requirements of ASTM D635. Channel shall have a continuous slot along one side with in-turned clamping ridges. Channel profile shall match steel channel profile.

2.03 PIPE HANGERS AND SUPPORTS

A. TYPE 1 - CLEVIS PIPE HANGER:

1. ACCEPTABLE PRODUCTS: B-Line B3100; Anvil Fig. 260; B-Line BFV3104; or equal.

2. MATERIALS:

Steel and stainless steel clevis hangers shall comply with MSS and FEDSPEC Type 1.
FRP hangers shall be glass reinforced polyurethane or glass reinforced vinyl ester.

B. TYPE 4 - ADJUSTABLE ROLLER HANGER:

1. ACCEPTABLE PRODUCTS: B-Line B3110; Anvil Fig. 181; or equal.

2. MATERIALS: Rollers shall be cast iron, and shall comply with MSS Type 43 and FEDSPEC Type 44.

C. TYPE 5 - SINGLE PIPE ROLLER:

1. ACCEPTABLE PRODUCTS: B-Line B3114; Anvil Fig. 171; or equal.

2. MATERIALS: Rollers and sockets shall be cast iron, and shall comply with MSS Type 41 and FEDSPEC Type 42.

D. TYPE 6 - FRAMING CHANNEL ONE-BOLT PIPE CLAMP:

1. ACCEPTABLE PRODUCTS: B-Line B2000 series; Unistrut P 1109 series; B-Line BFV2000; or equal.

2. MATERIALS:

Gage of steel and stainless steel one-bolt clamps shall be as follows:

1) Pipe sizes 3/8 inch and 1/2 inch shall be 16 gage.

2) Pipe sizes 3/4 inch through 1 1/4 inches shall be 14 gage.

3) Pipe sizes 1 1/2 inches through 3 inches shall be 12 gage.

4) Pipe sizes 3 1/2 inches through 5 inches shall be 11 gage.

5) Pipe sizes 6 and 8 inches shall be 10 gage.

FRP clamps shall be glass reinforced polyester or vinyl ester.

E. TYPE 7 - U-BOLT:

1. ACCEPTABLE PRODUCTS: B-Line B3188; Anvil Fig. 137; B-Line BFV501 series; or equal.

2. MATERIALS:

Steel and stainless steel U-bolts shall comply with MSS and FEDSPEC Type 24.

FRP U-bolts shall be glass reinforced polyurethane or glass reinforced polyester or vinyl ester.

F. TYPE 8 - ADJUSTABLE PIPE ROLLER SUPPORT:

1. ACCEPTABLE PRODUCTS: B-Line B3122; Anvil Fig. 177; or equal.

2. MATERIALS: Rollers and sockets shall be cast iron.

G. TYPE 9 - WELDED PIPE STANCHION:

1. MATERIALS: Minimum material thickness shall be standard schedule pipe, cut to match contour of the pipe elbow. Use of this support shall be limited to ambient systems only.

H. TYPE 10 - PIPE STANCHION SADDLE:

1. ACCEPTABLE PRODUCTS: B-Line B3090; Carpenter & Patterson Fig. 125; or equal.

2. MATERIALS: Saddles and yokes shall be steel or stainless steel, and shall comply with MSS type 37 and FEDSPEC Type 38. Include matching base stand.

I. TYPE 11 - OFFSET PIPE CLAMP:

1. ACCEPTABLE PRODUCTS: B-Line B3148; Anvil Fig. 103; or equal.

2. MATERIALS:

Pipe clamp shall be carbon or stainless steel.
Vertical pipe support applications shall be as specified above except that insulation shields shall not be used for insulated pipe. Clamp support directly to pipe and insulate supports same as the pipe.

J. TYPE 12 - RISER CLAMP:

1. ACCEPTABLE PRODUCTS: B-Line B3373; Anvil Fig. 261; B-Line B3373 CT; Anvil Figure 261C; or equal.

2. MATERIALS: Riser clamps shall comply with MSS and FEDSPEC Type 8.

K. TYPE 13 - CHANNEL STRUT SINGLE PIECE PIPE STRAP:

1. ACCEPTABLE PRODUCTS: B-Line 2400 series; Unistrut P2558 series; B-Line BFP2400 series; or equal.

2. MATERIALS:

Steel and Stainless Steel: Pipe straps shall comply with MSS Type 26.
FRP: Glass reinforced polyurethane or glass reinforced polyester or vinyl ester.

2.04 RACK AND TRAPEZE SUPPORTS:

A. GENERAL:

1. Trapeze and pipe rack components shall have a maximum deflection 1/240 of the span.

B. TYPE 20 - TRAPEZE PIPE SUPPORT:

1. MATERIALS: Trapeze pipe support cross members shall be channel strut with flat plate fittings square washer.

TYPE 21 - PIPE SUPPORT RACK:

2. MATERIALS:

Post and cross members shall be channel strut. Channel fittings shall be manufactured by the channel strut manufacturer.
90-degree fittings shall have gussets. B-Line B844W; Unistrut P2484W; or equal.
Channel strut post base fittings shall be as specified.

C. CANTILEVER PIPE SUPPORT RACK:

1. ACCEPTABLE PRODUCTS: Interlake Mecalux model Structural Cantilever; Bluff Manufacturing model Cantilever Rack; or equal, modified as required to meet the specifications.

2. MATERIALS:

Cantilever rack components shall be fabricated from structural steel shapes. Roll formed cantilever rack components shall not be acceptable. Columns shall be fabricated from wide flange beams. Bases shall be fabricated from wide flange beams, and shall be welded to the columns. Arms shall be fabricated from structural steel shapes, and shall be bolted to the columns. Rack components shall be powder coated. See Standard Detail Drawing M82 for additional information.

2.05 STRUCTURAL ATTACHMENTS

A. TYPE A - MALLEABLE IRON CONCRETE INSERT:

1. ACCEPTABLE PRODUCTS: B-Line B3014; Anvil Figure 282; or equal.

2. MATERIALS: Concrete inserts shall be malleable iron and shall comply with MSS and FEDSPEC Type 18.

B. TYPE B – CONTINUOUS CHANNEL STRUT CONCRETE INSERT:

1. ACCEPTABLE PRODUCTS: B-Line B22-I series; Unistrut P3270 series; or equal.

2. MATERIALS: Concrete inserts shall include strut, Styrofoam filler, closure strips and end caps. Design capacity shall be 2000 lbs/ft with a safety factor = 3.

C. TYPE C - MALLEABLE IRON BEAM CLAMP WITH EXTENSION PIECE:

1. ACCEPTABLE PRODUCTS: B-Line B3054; Anvil Figure 218 with Figure 157 extension piece; or equal.

2. MATERIALS: Clamp and extension piece shall be malleable iron, and shall comply with MSS and FEDSPEC Type 30.

D. TYPE D – HEAVY DUTY STEEL BEAM CLAMP WITH EYE NUT:

1. ACCEPTABLE PRODUCTS: B-Line B3291 series; Anvil Figure 292; or equal.

2. MATERIALS: Beam clamp and eye nut shall be forged steel, and shall comply with MSS and FEDSPEC Type 28.

E. TYPE F - WELDED BEAM ATTACHMENT:

1. ACCEPTABLE PRODUCTS: B-Line B3083; Anvil Figure 66; or equal.

2. MATERIALS: Beam attachment shall comply with MSS and FEDSPEC Type 22.

F. TYPE G - ADJUSTABLE ROD BEAM ATTACHMENT:

1. ACCEPTABLE PRODUCTS: B-Line B3082; or equal.

2. MATERIALS: Steel or stainless steel.

G. TYPE H - DOUBLE CHANNEL BRACKET:

1. ACCEPTABLE PRODUCTS: B-Line B297 series; Unistrut P2542 series; or equal.

2. MATERIALS: Wall channel shall be single channel strut. Cantilever bracket shall be double-channel assembly.

H. TYPE J - SINGLE CHANNEL BRACKET:

1. ACCEPTABLE PRODUCTS: B-Line B409 series; Unistrut P2513 series; or equal.

2. MATERIALS: Wall channel shall be single channel strut. Cantilever bracket shall be single-channel assembly.

I. TYPE L - PIPE STANCHION BASE STAND:

1. ACCEPTABLE PRODUCTS: B-Line B3088S; or equal.

2. MATERIALS:

Steel or Stainless Steel: Baseplate shall be rated for seismic applications. Anchor bolt holes shall be 1/16 inch larger than the anchor bolt diameter. The space between the baseplate and the floor shall be filled with nonshrink grout.

J. TYPE M - WELDED STEEL BRACKET:

1. ACCEPTABLE PRODUCTS: B-Line B3066 or B3067; Anvil Figure 195 or 199; or equal.

2. MATERIALS: Brackets shall comply with MSS Type 32 and FEDSPEC Type 33 for medium welded bracket. Heavy welded bracket shall comply with MSS type 33 and FEDSPEC Type 34. Bracket type as required for load.

K. TYPE P - CHANNEL STRUT POST BASE:

1. ACCEPTABLE PRODUCTS:

Single channel: B-Line B280; Unistrut P2072A SQ; B-Line BFV280SQ; or equal.
Double channel: B-Line B281; Unistrut P2073A SQ; B-Line BFV281SQ; or equal.

2. MATERIALS:

Steel or Stainless Steel: Post base shall be manufactured by the channel strut manufacturer.
FRP: Glass reinforced polyurethane or polyester or vinyl ester.

L. TYPE Q - SIDE BEAM BRACKET:

1. ACCEPTABLE PRODUCTS: B-Line B3060; Anvil Figure 206; or equal.

2. MATERIALS: Steel or stainless steel.

2.06 ACCESSORIES

A. HANGER RODS:

1. MATERIALS:

Rods shall be threaded on both ends or continuously threaded and sized as specified.
Steel: ASTM A575 & A576; SAE J429 Grade 2; or equal.
Stainless Steel: ASTM A193 B8 Class 1 or 2, Type 304 stainless steel, and ASTM A193 B8M Class 1 or 2, Type 316 stainless steel.
FRP: Glass reinforced vinyl ester.

B. WELDLESS EYE NUT:

1. ACCEPTABLE PRODUCTS: B-Line B3200; Anvil Figure 290; or equal.

2. MATERIALS: Eye nut shall be forged steel and shall comply with MSS and FEDSPEC Type 17.

C. WELDED EYE ROD:

1. ACCEPTABLE PRODUCTS: B-Line B3211; Anvil Figure 278; or equal.

2. MATERIALS: Eye rod shall be welded closed. Inside diameter of eye shall accommodate a bolt diameter 1/8 inch larger than the rod diameter.

D. TURNBUCKLE:

1. ACCEPTABLE PRODUCTS: B-Line B3202; Grinnell Figure 230; or equal.

2. MATERIALS: Turnbuckle shall be forged steel and shall comply with MSS SP-58.

2.07 THERMAL PIPE HANGER SHIELD

A. HOT PIPE SHIELDS:

1. ACCEPTABLE PRODUCTS: B-Line B3380-B3387; or equal.

2. MATERIALS: Asbestos-free, hydrous calcium silicate insert, treated for water resistance, and encased in a 360° galvanized steel jacket. The jacket thickness shall be as recommended by the manufacturer. Shield shall have butt connection to pipe insulation. Jacket and insulation shall be flush with end. Provide stainless steel band clamps to prevent slippage between the pipe wall and the thermal shield. Temperature range: 20° to 500° F.

B. COLD PIPE SHIELDS:

1. ACCEPTABLE PRODUCTS: B-Line B3380-3387; or equal.

2. MATERIALS: Asbestos-free, hydrous calcium silicate insert, treated for water resistance, and encased in a 360° galvanized steel jacket. The jacket thickness shall be as recommended by the manufacturer. Shield shall have butt connection to pipe insulation. Insulation shall extend 1 inch each side of steel jacket for vapor tight connection to pipe insulation vapor barrier. Provide stainless steel band clamps to prevent slippage between the pipe wall and the thermal shield. Temperature range: 20° to 500° F.

2.08 SEISMIC RESTRAINTS

A. GENERAL:

1. Seismic restraint system shall be OSHPD approved for piping in essential facilities, and shall comply with the CBC.

2. Acceptable manufacturers include: Mason Industries Incorporated; Cooper B-Line/TOLCO; or equal.

3. Cable-type seismic bracing will not be acceptable for this project.

PART 3 -- EXECUTION

3.01 GENERAL

A. HANGER AND SUPPORT SELECTION

1. Select pipe hangers and supports as shown on the drawings and as specified here.

2. Hangers and supports shall withstand all static and specified dynamic conditions of loading to which the piping and associated equipment may be subjected. As a minimum, consider the following conditions:

Weights of pipe, valves, fittings, insulating materials, suspended hanger components and normal fluid contents.
Weight of hydrostatic test fluid or cleaning fluid if operating fluid contents are lighter. The type of fluids and testing pressure requirements are specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).
Reaction forces due to the operation of safety or relief valves.
Reaction forces at bens and elbows due to internal pressures if the piping system is not fully restrained.
Thermal expansion and contraction due to temperature changes in the fluids conveyed by the piping systems.
Wind, snow or ice loading on outdoor piping.

3. Where there is horizontal movement at a suspended type hanger location, hanger components shall be selected to allow for swing. The vertical angle of the hanger rod shall not, at any time, exceed 4 degrees.

4. Provide thermal shields at hanger, support and guide locations on pipe requiring insulation. The thermal shield shall be the same thickness as the piping system insulation specified in Process Piping and Equipment Insulation Specification Section.

5. There shall be no contact between a pipe and hanger or support component of dissimilar metals. Prevent contact between dissimilar metals by wrapping the pipe with three layers of UPC-listed 20-mil PVC pipe wrap or 1/8-inch-thick 40 durometer neoprene padding as necessary to ensure the isolation material covers the entire contact surface between the pipe and any metallic portion of the support or hanger. Isolation material must be compatible with the environment.

3.02 INSTALLATION

A. HANGER AND SUPPORTS

1. Locate hangers and supports as near as possible to concentrated loads such as valves, flanges, etc. Locate hangers, supports and accessories within the maximum span lengths specified to support continuous pipeline runs unaffected by concentrated loads.

2. Do not use existing pipes and supports to support new piping.

3. Do not attach pipe support components to pressure vessels.

4. Provide at least one hanger or support within 2 feet from a pipe change in direction.

5. Locate hangers and supports to ensure that connections to equipment, tanks, etc., are substantially free from loads transmitted by the piping.

6. Pipe shall not have pockets formed in the span due to sagging of the pipe between supports caused by the weight of the pipe, medium in the pipe, insulation, valves and fittings.

7. Welded and bolted attachments to the building structural steel shall be in accordance with the requirements of AISC Manual of Steel Construction. Do not drill or burn holes in the building structural steel without written authorization of the structural engineer of record.

8. Do not use hanger components for rigging or erection purposes.

9. Install thermal pipe hanger shields in accordance with the manufacturer's recommendations.

10. Remove burrs and sharp edges from hanger and support components.

11. Rollers shall roll freely without binding. Verify smooth operation prior to placing load on support.

12. Finished floor beneath floor mounted structural attachments and framing channel post bases shall be roughed prior to grouting. Grout between base plate and floor shall be free of voids and foreign material.

13. Provide manufacturer's plastic or rubber end caps at the exposed ends of all framing channels that are located within 7 feet of the floor or ground. Outside caps shall be UV and weather resistant.

14. Adjust hangers and supports to obtain required pipe slope and elevation. Shims made of material that is compatible with the piping material may be used. Adjust stanchions prior to grouting their baseplates.

15. Seal cut ends of hot dip galvanized after fabrication channel and components with ZRC Galvilite Galvanizing Repair Compound, or equal. Grind all sharp edges off. Solvent clean the surface to remove grease and oils. Apply two coats in accordance with the manufacturer's instructions.

16. Seal cut ends of FRP channel and components with UV-resistant sealant coating provided by the FRP channel manufacturer. Apply sealant coating in accordance with the manufacturer's instructions.

B. SEISMIC RESTRAINT SELECTION AND INSTALLATION:

1. Unless otherwise specified, the Contractor's design professional shall design, select, and locate seismic restraints for piping to be furnished in accordance with the contract documents.

2. Provide and install seismic restraints in accordance with the Mason Industries Seismic Restraint Guidelines for Suspended Piping, Ductwork and Electrical Systems and the CBC.

3. Piping systems shall not be braced to dissimilar parts of a building or to dissimilar building systems that may respond in a different mode during an earthquake. Examples: wall and a roof; solid concrete wall and a metal deck with lightweight concrete fill.

4. Restraints shall be sized to fit the outside diameter of the pipe, tubing, or, where specified, the outside diameter of insulation.

5. There shall be no contact between a pipe, duct or raceway and restraint component of dissimilar metals.

6. Branch lines shall not be used to brace main lines.

7. Seismic bracing shall not limit the expansion and contraction of the piping system.

3.03 TESTING (NOT USED)

3.04 TRAINING (NOT USED)

****END OF SECTION****

SECTION 40 05 24

STEEL PROCESS PIPE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies steel pipe, fittings, flanges, connections, linings, and coatings.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ASME B1.1	Unified Inch Screw Threads
ASME B1.20.1	Pipe Threads, General Purpose
ASME B16.1	Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.3	Malleable Iron Threaded Fittings
ASME B16.4	Gray Iron Threaded Fittings
ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B16.9	Factory-Made Wrought Steel Buttwelding Fittings
ASME B16.11	Forged Fittings, Socket-Welding and Threaded
ASME B16.12	Cast Iron Threaded Drainage Fittings
ASME B16.14	Ferrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads
ASME B16.39	Malleable Iron Threaded Pipe Unions Classes 150, 250 and 300
ASME B16.42	Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300
ASME B31.1	Power Piping
ASME B31.3	Chemical Plant and Petroleum Refinery Piping

Reference	Title
ASME Section IX	Certification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A105	Forgings, Carbon Steel, for Piping Components
ASTM A106	Seamless Carbon Steel Pipe for High- Temperature Service
ASTM A126	Gray Iron Castings for Valves, Fittings, and Pipe Fittings
ASTM A193	Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A197	Cupola Malleable Iron
ASTM A234	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
ASTM A395	Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A536	Ductile Iron Castings
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
AWWA C200	Steel Water Pipe--6 Inches (150 mm) and Larger
AWWA C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe 4-In. and Larger, Shop Applied
AWWA C207	Steel Pipe Flanges for Waterworks Services Sizes 4-In. Through 144-In.
AWWA C208	Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C213	Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
AWWA M11	Steel Pipe A Guide for Design and Installation
NSF 61	National Sanitation Foundation, Drinking Water System Components – Health Effects
SAE J429	Mechanical and Material Requirements for Externally Threaded Fasteners, Standard
SSPC-SP 10	Near-White Blast Cleaning

B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the item.

3. (DELETED)

4. Contractor's shop drawings including fabrication and layout drawings.

5. (DELETED)

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

PART 2 -- PRODUCTS

2.01 GENERAL (NOT USED)

2.02 PIPE MATERIAL

A. ASTM A53:

1. SIZE RANGE: 1/8 to 26 inches. Unless otherwise specified, ASTM A53 pipe shall be Grade B, Type E, electric resistance welded or Type S, seamless pipe. The minimum wall thickness for ASTM A53 pipe shall be Schedule 40 for pipe 10 inch diameter and less and 3/8 inch for pipe 12 inch through 26 inch diameter. Increased shell thickness shall be provided where specified.

B. ASTM A106:

1. SIZE RANGE: 1/8 to 48 inches. Unless otherwise specified, ASTM A106 pipe shall be Grade B, Schedule 40 for pipe 10 inch diameter and less and 3/8 inch wall thickness for pipe 12 inch through 48 inch diameter. Increased wall thickness shall be provided where specified.

C. AWWA C200:

1. SIZE RANGE: 6 inches and larger. AWWA C200 pipe shall be straight or spiral seam. The minimum wall thickness shall be 7 gage for pipe 6 inch through 24 inch diameter and 1/4 inch for pipe 26 inch diameter and larger. Increased shell thickness shall be provided where specified. Yield strength ≥ 35,000 psi. Tensile strength ≥ 60,000 psi.

2.03 FITTING MATERIAL

A. ASTM A105:

1. Class 3000 forged steel fittings shall conform to ASTM A105 and ASME B16.11. Fittings shall be threaded or socket weld.

B. ASTM A126:

1. Class 125 cast iron fittings shall conform to ASTM A126 Class B; and ASME B16.1, ASME B16.4, ASME B16.12, or ASME B16.14. Tensile strength ≥ 31,000 psi. Fittings shall be threaded or flanged.

C. ASTM A197:

1. Class 150 malleable iron fittings shall conform to ASTM A197; and ASME B16.3 or B16.39. Yield strength ≥ 30,000 psi. Tensile strength ≥ 40,000 psi. Fittings shall be threaded.

D. ASTM A234:

1. Wrought steel butt weld fittings shall conform to ASTM A234 Grade WPB or WPB-W; and ASME B16.9. Fitting wall thickness shall match pipe wall thickness.

2. Wrought steel grooved fittings shall conform to ASTM A234 Grade WPB. Fitting wall thickness shall match pipe wall thickness.

E. ASTM A395:

1. Class 150 ductile iron fittings shall conform to ASTM A395 and ASME B16.1. Fittings shall be flanged.

F. ASTM A536:

1. Ductile iron fittings shall conform to ASTM A536. Fittings shall be threaded, grooved or flanged.

G. AWWA C208:

1. Fabricated steel fittings shall conform to AWWA C208.

2.04 FLANGE MATERIAL

A. ASTM A126:

1. Class 125 cast iron flanges shall conform to ASTM A126 class B and ASME B16.1. Tensile strength ≥ 31,000 psi. Flanges shall be threaded with flat face.

B. ASTM A234:

1. Class 150 forged steel flanges shall conform to ASTM A235; and ASME B16.5.

2. Class 300 forged steel flanges shall conform to ASTM A235; and ASME B16.5.

3. Flanges shall be threaded, weld neck, slip-on, or socket weld.

4. Flanges shall be raised face with continuous spiral groove.

C. ASTM A395:

1. Class 150 ductile iron flanges shall conform to ASTM A395 and ASME B16.5. Flanges shall be threaded with flat face.

D. AWWA C207:

1. Class B (86 psi); Class D (150 psi); and Class E (275 psi) steel flange thickness shall conform to AWWA C207.

2. Class B bolt-circle diameter shall conform to AWWA C207.

3. Class D and Class E bolt-circle diameter shall conform to ASME B16.1 Class 125.

4. Flanges shall be slip-on with flat face.

2.05 CONNECTION MATERIAL

A. THREADED CONNECTIONS:

1. Pipe thread dimensions and size limits shall conform to ASME B1.20.1.

B. FLANGED CONNECTIONS:

1. Gaskets shall be as designated in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

C. FASTENERS:

1. Fasteners for buried, submerged, or gas exposures subject to temperatures less than 200°F shall be ASTM F593 Type 316 stainless steel cap screws with matching washers and nuts, coarse thread.

2. Fasteners for other exposure subject to temperatures less than 200°F shall be SAE J429 Grade 5 hex head zinc-plated carbon steel cap screws with matching washers and nuts, coarse thread.

3. Fasteners for all exposures subject to temperatures greater than or equal to 200°F shall be ASTM A193 Grade B7, with matching washers and nuts.

D. INSULATING FLANGE SET:

1. Unless otherwise specified, insulating flange sets shall be as specified in CATHODIC PROCESS CORROSION PROTECTION Section (40 46 42).

2. Flange insulation sets shall be suitable for 225°F continuous operating temperature.

3. Insulating gaskets shall be plain phenolic, Type "E" full flange diameter type. Sealing gaskets shall be 1/16" thick, type as specified in the COMMON WORK RESULTS FOR PROCESS PIPING Section (40 05 03).

4. Insulating sleeves and washers shall be either one-piece or two-piece type. Sleeves and washers shall be phenolic or spiral-wound Mylar.

5. Metallic flat washer shall be steel or stainless steel to match the cap screw material.

6. Flange insulation sets shall be manufactured by PSI, or equal.

E. SLEEVE-TYPE COUPLINGS:

1. Sleeve-type couplings shall be constructed of ductile iron or steel per the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

F. PLAIN END COUPLINGS:

1. ACCEPTABLE PRODUCTS: Gruvlok 7005; Victaulic Style 99; or equal.

2. Plain end couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 1½ to 14".

3. Bolts, washers and nuts for buried and submerged exposure locations, or severe exposure severity shall be Type 316 stainless steel regardless of any other protective coatings.

4. Gaskets shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

G. GROOVED END COUPLINGS:

1. FLEXIBLE-TYPE COUPLINGS:

a. ACCEPTABLE PRODUCTS: Gruvlok 7001; Victaulic Style 177N; or equal.

b. Flexible-type couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: ¾ to 24".

2. RIGID-TYPE COUPLINGS:

    a. ACCEPTABLE PRODUCTS: Gruvlok 7004HPR; Victaulic Style HP-70; or equal.

    b. Rigid-type couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: ¾ to 24".

3. FLANGED COUPLING ADAPTERS:

    a. ACCEPTABLE PRODUCTS: Gruvlok 7012; SPF model F-3; or equal.

    b. Flanged coupling adapters shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 2 to 24".

4. STEEL TO DUCTILE IRON TRANSITION COUPLING:

    a. ACCEPTABLE PRODUCTS: Victaulic Style 307, or equal.

    b. Grooved steel to grooved ductile iron pipe transition couplings shall be ASTM A536 Grade 65-45-12 ductile iron. Size range: 3 to 12".

5. Bolts, washers and nuts for buried, submerged, and gas exposures shall be Type 316 stainless steel regardless of any other protective coatings.

6. Gaskets shall be as specified in COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

H. PUSH-ON JOINTS:

1. Gaskets shall be as specified in COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

I. RESTRAINT DEVICES:

1. Restraint devices shall be welded steel harness assemblies. Unless restrained joints on the drawings are excluded, joints using sleeve-type couplings shall be provided with tie bolts and harness lugs. The harnessing system shall be in accordance with Chapter 13 of the AWWA Manual M11 and shall be designed for the test pressure specified in COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

2.06 LINING MATERIAL

A. EPOXY LINING:

1. Where specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), pipe (including butt ends) and fittings shall be epoxy lined with

at least 10 mils of epoxy. Surfaces shall be prepared in accordance with SSPC-SP 10 Near White Blast Cleaning, and the lining applied as recommended by the manufacturer.

2. Epoxy lining for all piping systems, except WP system, shall be Carboline 891, Ameron Amerlock 400, or equal.

3. Epoxy lining for WP system shall be Carboline 891, Ameron Amerlock 400, or equal. Primers and paint shall conform to the requirements of NSF-61.

B. FUSION EPOXY LINING:

1. ACCEPTABLE PRODUCTS: 3M Scotchkote 206N, or equal.

2. Where specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), pipe (including butt ends) and fittings shall be fusion epoxy lined in accordance with AWWA C213. Surface preparation shall be in accordance with SSPC-SP 10 Near White Blast Cleaning. Application shall be by the fluidized bed method and shall attain a dry film thickness of at least 12 mils.

3. Fusion epoxy lining shall conform to the requirements of NSF-61.

C. CEMENT MORTAR LINING:

1. Where specified in COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), pipe (including butt ends) and fittings shall be lined with cement mortar as specified in AWWA C205. Fittings and specials larger than 24 inches, not fabricated from centrifugally lined straight sections, shall require 2-inch by 4-inch by 13-gage self-furring wire mesh reinforcement for hand-applied lining.

D. GLASS LINING:

1. ACCEPTABLE PRODUCTS: US Pipe Fabrication Ferrock MEH-32; Vitco SG-14; or equal.

2. Where specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), pipe and fittings shall be glass lined with a vitreous material to a minimum thickness of 10 mils. Thickness to be measured in using a magnetic-type film thickness gage such as Mikrotest Model FM, Elcometer Model 211/1E, or equal. Glass lining shall provide continuous coverage as tested by a Tinker and Rasor Model M1 nondestructive type holiday detector, K-D Bird Dog, or equal low voltage holiday detector. The unit shall operate at less than 75 volts. Voids shall be cause for rejection. Glass-lined pipe shall be prefabricated. Field cut pieces will only be allowed if no damage occurs to the glass lining. Ends shall be coated.

3. Pipe shall be bored, machined, or grit blasted to remove any voids, protrusions or surface irregularities to obtain a smooth continuous surface for glass lining. Fittings

shall be ground or grit blasted to remove any voids, protrusions or surface irregularities.

2.07 COATING MATERIAL

A. EPOXY COATING:

1. Refer to the PAINTING AND COATING Section (09 90 00) for epoxy coating of pipes.

B. FUSION EPOXY COATING:

1. ACCEPTABLE PRODUCTS: 3M Scotchkote 206N, or equal.

2. Where specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), pipe and fittings shall be fusion epoxy coated in accordance with AWWA C213. Surface preparation shall be in accordance with SSPC-SP 10 Near White Blast Cleaning. The application method shall be by the fluidized bed method and shall attain a dry film thickness of at least 12 mils. For buried pipe the minimum dry film thickness shall be 20 mils.

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. PIPE INSTALLATION:

1. Install pipe in accordance with the drawings, the manufacturer’s instructions and recommendations and AWWA M11, Chapter 16. Pipe shall be installed in accordance with AWWA M11, Chapter 16.

B. FITTING INSTALLATION:

1. Install fittings in accordance with the manufacturer's instructions and recommendations.

C. CONNECTION INSTALLATION:

1. THREADED CONNECTIONS:

a. Cut, thread and join in accordance with the fitting manufacturer's instructions and recommendations, and ASME B31.1.

2. FLANGED CONNECTIONS:

a. Cut, thread and join in accordance with the fitting manufacturer's instructions and recommendations, and ASME B31.1.

3. MECHANICAL COUPLING CONNECTIONS:

a. Install in accordance with the coupling manufacturer's instructions and recommendations.

4. PUSH-ON CONNECTIONS:

a. Install in accordance with the fitting manufacturer's instructions and recommendations.

5. WELDED CONNECTIONS:

a. Weld in accordance with ASME Section IX, ASME B31.1, or ASME B31.3. Welders shall be ASME-certified.

6. TAKEDOWN COUPLINGS:

a. Install screwed unions, flanged or grooved end mechanical coupling type joints where indicated on the drawings. Use flanged or grooved end joints on pipelines 2-1/2 inches in diameter and larger.

7. RESTRAINT DEVICES:

a. Install in accordance with the manufacturer’s instructions and recommendations to prevent joint separation.

8. DIELECTRIC CONNECTIONS:

a. Provide dielectric connections for dissimilar metal pipe connections.

D. LINING INSTALLATION:

1. Linings shall be applied and patched in accordance with the manufacturer’s recommendations and instructions.

E. COATING INSTALLATION:

1. Coatings shall be applied and patched in accordance with the manufacturer’s instructions and as specified in the PAINTING AND COATING Section (09 90 00).

F. PIPE ANCHORAGE:

1. Anchorage shall be provided as specified in the HANGERS AND SUPPORTS FOR PROCESS PIPING Section (40 05 07) and shown in the drawings.

G. CLEANING AND FLUSHING:

1. The cleaning, disinfection, and flushing of steel pipe shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.03 TESTING

A. FACTORY TESTING:

1. Factory testing shall conform to the requirements of ASTM A53, ASTM A106, or AWWA C200 as applicable.

B. PRE- OPERATIONAL TESTING:

1. Testing pipe shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.04 TRAINING - (NOT USED)

****END OF SECTION****

SECTION 40 05 31.13

POLYVINYL CHLORIDE PROCESS PIPE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies polyvinylchloride (PVC) and chlorinated polyvinylchloride (CPVC) pipe and fittings.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ASTM D1784	Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2466	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D2665	Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D2855	Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride)(PVC) Pipe and Fittings
ASTM D3034	Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3139	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

Reference	Title
ASTM F437	Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F439	Socket-type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F441	Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F493	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings
ASTM F645	Standard Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems
ASTM F656	Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
ASTM F679	Poly(Vinyl Chloride) (PVC) Large – Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F891	Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core
AWWA C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C111	Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings
AWWA C153	Ductile Iron Compact Fittings, 3 Inches Through 24 Inches, For Water and Other Liquids
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in. for Water Distribution.
AWWA C905	Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 in. Through 36 in.
NSF-61	National Sanitation Foundation, Drinking Water System Components – Health Effects

B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the item.

3. SHOP DRAWINGS:

   a. Describe materials, pipe, fittings, gaskets, and solvent cement.

   b. Installation instructions.

4. Manufacturer's Certificate of Source Testing. Include as applicable:

   a. Date of manufacture of tubing for each lot delivered.

   b. Solvent cement manufacturer's report and certification.

5. Manufacturer's Certificate of Installation and Functionality Compliance.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (NOT USED)

1.05 QUALITY ASSURANCE

A. Pipe in potable water applications: Provide pipe bearing NSF 61 seal.

B. Mark pipe and fittings in accordance with ASTM 1785.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect from sunlight, scoring and distortion.

B. Do not allow surface temperatures to exceed 120 degrees Fahrenheit.

C. Store and handle as recommended by manufacturer in published instructions.

PART 2 -- PRODUCTS

2.01 PIPE

A. PVC PIPE:

1. SCHEDULE 40: (DELETED)

2. SCHEDULE 80:

   a. MATERIAL:

      1) ASTM D1785. Type 1, Grade 1 PVC, ASTM D1784, Class 12454-B. Gray color, with UV inhibitor. NSF-61 compliant.

3. AWWA C900 PIPE: (DELETED)

B. AWWA C905 PIPE: (DELETED)

C. RECLAIMED WATER PIPE (WRF): (DELETED)

D. DRAIN, WASTE, AND VENT PIPE (DWV): (DELETED)

E. SEWER PIPE: (DELETED)

F. CPVC PIPE:

1. MATERIAL:

a. Schedule 80, ASTM F441. Type 1, Grade 1 CPVC, ASTM D1784, Class 23447-B. Light gray color, with UV inhibitor. NSF-61 compliant.

2.02 FITTINGS

A. PVC:

1. SCHEDULE 40: (DELETED)

2. SCHEDULE 80:

a. ACCEPTABLE PRODUCTS: Nibco; Chemtrol Spears; or equal.

b. MATERIAL:

1) ASTM D2467. Type 1, Grade 1 PVC, ASTM D1784, Class 12454-B. Gray color, with UV inhibitor. NSF-61 compliant.

B. AWWA C900 AND C905: (DELETED)

C. DRAIN, WASTE, AND VENT (DWV): (DELETED)

D. SEWER: (DELETED)

E. CPVC:

1. ACCEPTABLE PRODUCTS: Nibco; Chemtrol; Spears; or equal.

2. MATERIAL:

a. Schedule 80. ASTM F437 and F439. Type 1, Grade 1, PVC, ASTM D1784, Class 23477-B. Light gray, with UV inhibitor. NSF-61.

2.03 FLANGES

A. ACCEPTABLE PRODUCTS: Nibco; Spears; or equal.

B. MATERIAL:

1. PVC:

a. ASTM D2467. Type 1, Grade 1 PVC, ASTM D1784, Class 12454-B. Color: Gray, with UV inhibitor. NSF-61. Flanges shall be Van Stone style, socket flange (socket female connection by flange connection).

2. CPVC:

a. ASTM D2467. Type 1, Grade 1 PVC, ASTM D1784, Class 23447-B. Color: Gray, with UV inhibitor. NSF-61. Flanges shall be Van Stone style, socket flange (socket female connection by flange connection).

2.04 CONNECTIONS

A. SOLVENT WELD CONNECTIONS:

1. PRIMER:

a. ACCEPTABLE PRODUCTS: IPS Corporation Weld-On P-70 Purple Primer; or equal.

b. MATERIAL:

1) Purple-tinted aggressive cleaner and primer. Exceeds ASTM F656. NSF 61 and Uniform Plumbing Code listed.

2. PVC CEMENT (All fittings ≤ 12-inches):

a. ACCEPTABLE PRODUCTS: IPS Corporation Weld-On 711 Gray; or equal.

b. MATERIAL:

1) Heavy-bodied, medium setting, gray colored cement for all schedules and classes of PVC pipe and fittings up to 12 inch diameter. Exceeds ASTM D2564. NSF-61 complaint, and Uniform Plumbing Code listed.

3. PVC CEMENT (All fittings ≤ 30-inches):

a. ACCEPTABLE PRODUCTS: IPS Corporation Weld-On 719 Gray; or equal.

b. MATERIAL:

1) Extra-heavy-bodied, slow setting, gray colored cement for all schedules and classes of PVC pipe and fittings up to 30 inch diameter. Exceeds ASTM D2564. NSF-61 compliant, and Uniform Plumbing Code listed.

4. CPVC & PVC CEMENT:

a. ACCEPTABLE PRODUCTS: IPS Corporation Weld-On 724 Gray; or equal.

b. MATERIAL:

1) Chemical-resistant, heavy-bodied, medium setting, gray colored cement for all schedules and classes of CPVC & PVC pipe and fittings up to 12 inch diameter. Exceeds ASTM F-493.

B. THREADED CONNECTIONS:

1. Pipe thread dimensions and size limits shall conform to ANSI B1.20.1.

C. FLANGED COUPLING ADAPTERS (FCA): (DELETED)

D. SLEEVE-TYPE COUPLINGS: (DELETED)

E. PUSH-ON JOINTS: (DELETED)

F. RESTRAINT DEVICES: (DELETED)

G. VALVES:

1. Required valves for PVC pipelines are as indicated on the drawings and as specified in the applicable Division 40 section for each valve type.

2. Valves connected to PVC pipe shall be flanged.

3. CORROSION PROTECTION: Install a wax tape coating system as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03) and the CATHODIC PROCESS CORROSION PROTECTION Section (40 46 42).

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 PIPE INSTALLATION

A. Install pipe in accordance with the manufacturer's instructions and recommendations unless otherwise specified.

B. PUSH-ON JOINTS WITH RESTRAINED RIEBER GASKET INSTALLATION: (DELETED)

C. FITTING INSTALLATION:

1. Install fittings in accordance with the manufacturer's instructions and recommendations.

D. CONNECTION INSTALLATION:

1. Install connections in accordance with the manufacturer's instructions and recommendations.

E. LINING INSTALLATION: (DELETED)

F. COATING INSTALLATION: (DELETED)

3.03 DISINFECTION

A. Disinfection shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.04 TESTING

A. Testing shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.05 TRAINING (NOT USED)

****END OF SECTION****

SECTION 40 05 57

ACTUATORS FOR PROCESS VALVES AND GATES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies manual operators and powered actuators for valves and gates, and appurtenances.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ASTM A276	Stainless Steel Bars and Shapes
AWWA C542	Electric Motor Actuators for Valves and Slide Gates
AWWA C561	Fabricated Stainless Steel Slide Gates
NEMA ICS2	Industrial Control Devices, Controllers and Assemblies

B. DEFINITIONS:

1. As used in the control valve schedule in the POWER ACTUATED VALVE AND GATE SCHEDULE Section (40 06 60.13) and for manual valves specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), operator and actuator types are identified by a 3 to 6 digit code. For actuators with digital bus, use the specification for the first 5 digits and include the digital bus field unit specifications in this section.

OPERATOR & ACTUATOR CODES					
X	X	X	X	X	X
Power Source M – Manual E – Electric P – Pneumatic H – Hydraulic	Transmission C – Cylinder D – Diaphragm G – Gear L – Lever M – Motor S – Acme Stem	Stroke L – Linear M – Multiturn Q – Quarter turn	(Optional) A – AWWA F – Floor box O – Open/close T – Throttling M – Modulating	(Optional) S – Small M -- Medium L – Large	(Optional) D – Digital fieldbus

2. ANTIFRICTION BEARING: The term “antifriction bearing” shall mean rolling element type bearing.

3. OPEN/CLOSE: To move to the fully open or fully closed position.

4. THROTTLING: To move to the fully open or fully closed position, or to move to and maintain an intermediate position between fully open and fully closed in response to a manually initiated control.

5. MODULATING: To move to the fully open or fully closed position, or to move to intermediate positions in response to a variable control signal.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the product.

3. A copy of the contract document control diagrams and process and instrumentation diagrams that apply to the equipment in this section marked to show specific changes necessary for the supplied equipment. If no changes are required, the drawings shall be marked "No Changes Required."

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance (O&M) instructions in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23) by submitting a copy of the OPERATION AND MAINTENANCE DATA Section (01 78 23) with each paragraph check marked to show compliance. O&M instructions shall be submitted after all submittals specified above have been returned mark “No Exceptions Taken” or “Make Corrections Noted.” O&M instructions shall reflect the approved materials and equipment.

PART 2 -- PRODUCTS

2.01 TYPE MLQ OPERATORS

A. MATERIALS/EQUIPMENT:

1. GENERAL:

a. Type MLQ operators shall be manual lever quarter turn operators.

2. BALL VALVES:

    a. Provide locking lever type with vinyl plastic cover.

3. BUTTERFLY VALVES:

    a. Provide latch type lever capable of being locked in at least ten intermediate positions between fully open and fully closed.

4. ECCENTRIC PLUG VALVE:

    a. Provide removable lever handle.

2.02 TYPE MGQ OPERATORS

A. ACCEPTABLE PRODUCTS:

1. Bray series 04;

2. DynaTorque Inc. series DT;

3. Rotork series AB;

4. Or equal, modified as required to meet the specifications.

B. MATERIALS/EQUIPMENT:

1. GENERAL:

    a. Type MGQ operators shall be manual gear quarter turn operators. Torque range: 2000 to 24000 in-lbs, or 160 to 2000 ft-lbs.

2. HOUSING:

    a. Cast or ductile iron, gasketed for weatherproof service. Aluminum housings are not acceptable.

3. GEARING:

    a. Worm and worm gear type reduction gearing.

4. INPUT SHAFT:

    a. Stainless steel shaft with antifriction bearings.

5. ROTATION:

a. Nominal 90 degrees, with externally adjustable travel stops. Provide visual position indicators, with permanent labels to show the open and closed positions on aboveground and overhead applications. Clockwise input shaft rotation equals clockwise output. Counterclockwise to open.

6. SIZE:

a. Size operator for the full pressure rating of the valve.

7. OPERATOR:

a. Handwheel, 12 inch diameter maximum unless otherwise indicated.

2.03 TYPE MGQA OPERATORS: (DELETED)

2.04 TYPE MSMA OPERATORS: (DELETED)

2.05 TYPE EMQOS(D) ACTUATORS: (DELETED)

2.06 TYPE EMQMS(D) ACTUATORS: (DELETED)

2.07 TYPE EMQTM(D) ACTUATORS: (DELETED)

2.08 TYPE EMQMM(D) ACTUATORS: (DELETED)

2.09 TYPE EMMTL ACTUATORS: (DELETED)

2.10 TYPE EMMML ACTUATORS: (DELETED)

2.11 TYPE EMQTL ACTUATORS: (DELETED)

2.12 TYPE PCQOS ACTUATORS: (DELETED)

2.13 TYPE PCQMS ACTUATORS: (DELETED)

2.14 DIGITAL BUS SYSTEM: (DELETED)

2.15 MOUNTING ADAPTERS: (DELETED)

2.16 APPURTENANCES: (DELETED)

2.17 NAMEPLATES

A. Nameplates shall be provided on each item of equipment. Equipment nameplates shall be 16-gauge aluminum bearing the equipment name and equipment number legibly engraved in ¾ inch high letters. Nameplates shall be attached to the equipment in an accessible location with stainless steel screws.

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. Equipment specified in this section shall be installed in accordance with the manufacturer's instructions.

B. MANUAL OPERATORS:

1. ACCESSIBILITY:

a. Position operators so that they can readily be operated.

b. Provide specified handle for operators with centerlines up to 7 feet 6 inches above the operating level. Where these operators are not readily accessible, provide either rigid shaft extensions with universal joints, or flexible shaft extensions so that the handles can be remotely mounted in an accessible location.

c. Unless otherwise shown on the plans, replace specified handwheels with chain wheels for operators with centerlines more than 7 feet 6 inches above the operating level. Where these chain wheels are not accessible, provide either rigid shaft extensions with universal joints, or flexible shaft extensions so that the chain wheels can be remotely mounted in an accessible location.

2. AWWA NUTS: Provide 2 inch AWWA nuts on buried valves and on valves operated through floor boxes. Extend nut if necessary so nut will be within 6 inches of the valve box cover.

3. CHAIN WHEELS: (DELETED)

C. POWERED ACTUATORS: (DELETED)

D. APPURTENANCES: (DELETED)

3.03 TESTING

A. Valves shall be tested with the piping system test per the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.04 TRAINING (DELETED)

****END OF SECTION****

SECTION 40 05 63

BALL VALVES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies ball valves.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed references, the requirements of this section shall prevail.

Reference	Title
ASTM A216	Steel casting, carbon, suitable for fusion welding for high temperature service
ASME B16.1	Cast iron pipe flanges and flanged fittings class 25, 125, and 250
ASME B16.5	Pipe Flanges and Flanged Fittings
ASTM A276	Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A351	Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts
ASTM B584	Copper Alloys and Castings
ASTM D1784	Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

B. DEFINITIONS:

Valve Type	Description
PVC	General Purpose PVC Ball Valve.
BR-2P	Bronze, 2-Piece General-Purpose Ball Valve.
SS-2P	Stainless Steel, 2-Piece Ball Valve.
SS-3P	Stainless Steel, 3-Piece Ball Valve.

Valve Type	Description
SS-F	Stainless Steel, Flanged Ball Valve.
FL	Fully Lined Ball Valve.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the product.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance (O&M) instructions in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23) by submitting a copy of the OPERATION AND MAINTENANCE DATA Section (01 78 23) with each paragraph check marked to show compliance. O&M instructions shall be submitted after all submittals specified above have been returned mark “No Exceptions Taken” or “Make Corrections Noted.” O&M instructions shall reflect the approved materials and equipment.

1.05 UNIT RESPONSIBILITY

A. Equipment systems made up of two or more components shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the specification for the equipment system, including equipment specified elsewhere but referenced in the specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified in the particular equipment specification, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives or other entities who are not a direct component of the manufacturing corporation shall not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the Contractor of his responsibility for performance of all systems as provided in the GENERAL CONDITIONS Section (00 72 00).

B. The Contractor shall ensure that all equipment systems provided for the project are products for which unit responsibility has been accepted by the responsible

manufacturer. Certificates shall be signed by an officer of the manufacturer's corporation.

PART 2 -- PRODUCTS

2.01 GENERAL (NOT USED)

2.02 TYPE PVC VALVES (DELETED)

2.03 TYPE BR-2P VALVES

A. GENERAL:

1. Type BR-2P valves are bronze or brass two-piece general-purpose ball valves, rated 600 psig WOG for bi-directional bubbletight shutoff. Size Range: ¼ inch to 2 inch.

B. ACCEPTABLE PRODUCTS:

1. Apollo Series 70-100 and 70-200; Flow-Tek series S51; Flo-Tite model T51BZ; Sharpe series 10; NIBCO Series T-580-70 and S-580-70; or equal, modified as required to meet the specifications.

C. MATERIALS:

1. BODY: The body shall be two-piece bronze or brass construction. End connections shall be NPT or solder.

2. BALL: The ball shall be constructed of chrome-plated bronze or brass conforming to ASTM B16 or B584.

3. SEAT: The seats shall be reinforced PTFE, rated for 600 psig at 100 degrees F WOG and for 150 psig saturated steam.

4. STEM: The stem shall be constructed of bronze or brass.

5. STEM SEAL: The stem seal shall be TFE or reinforced PTFE.

6. DIRECTION: Counterclockwise to open.

7. FLOW WAY: The valves shall be standard or full port design.

2.04 TYPE SS-2P VALVES

A. GENERAL:

1. Type SS-2P valves are stainless steel two-piece ball valves, rated 1000 psig WOG for bi-directional bubbletight shutoff. Size Range: ¼ inch to 2 inch.

B. ACCEPTABLE PRODUCTS:

1. Apollo Series 76-100; Flow-Tek series S70; Flo-Tite T80SS; Sharpe series 5457 and 50M76; NIBCO Series T-580-S6-R-66-LL; or equal, modified as required to meet the specifications.

C. MATERIALS:

1. BODY: The body shall be two-piece, ASTM A351 Grade CF8M stainless steel or ASTM A743 Grade CF8M stainless steel construction, with actuator pad. End connections shall be NPT.

2. BALL: The ball shall be constructed from ASTM A276 Type 316 stainless steel or ASTM A351 Grade CF8M stainless steel.

3. SEAT: The seats shall be reinforced PTFE, rated for 1500 psig WOG and for 150 psig saturated steam.

4. STEM: The stem shall be constructed from ASTM A276 Type 316 stainless steel.

5. STEM SEAL: The stem seal shall be reinforced PTFE.

6. BEARINGS: The bearings shall be Teflon.

7. FLOW WAY: The valves shall be standard or full port design.

2.05 TYPE SS-3P VALVES

A. GENERAL:

1. Type SS-3P valves are stainless steel three-piece ball valves, rated 1000 psig WOG for bi-directional bubbletight shutoff. Size Range: ¼ inch to 2 inch.

B. ACCEPTABLE PRODUCTS:

1. Apollo Series 86A-100-76; Flow-Tek series 7000; Flo-Tite series 300; Sharpe series 13; or equal, modified as required to meet the specifications.

C. MATERIALS:

1. BODY: The body shall be three-piece, ASTM A351 Grade CF8M stainless steel construction, with ISO 5211 actuator pad. End connections shall be NPT.

2. BALL: The ball shall be constructed from ASTM A351 Grade CF8M stainless steel or ASTM A276 Type 316 stainless steel.

3. SEAT: The seats shall be multi-seal, reinforced PTFE, rated for 1000 psig WOG and for 150 psig saturated steam.

4. STEM: The stem shall be constructed from ASTM A276 Type 316 stainless steel.

5. STEM SEAL: The stem seal shall be reinforced PTFE, live-loaded with stainless Belleville spring washers.

6. FLOW WAY: The valves shall be full port design.

2.06 TYPE SS-F VALVES (DELETED)

2.07 TYPE FL VALVES (DELETED)

2.08 VALVE OPERATORS

A. Manual valve operators shall be as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

B. Power valve operators shall be as specified in the POWER-ACTUATED VALVE AND GATE SCHEDULES Section (40 06 60.13).

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. Valves and operators shall be installed in accordance with the manufacturer's recommendations.

B. Manual operators shall be positioned so that they can readily be operated.

C. Powered operators shall be installed so that the position indicator can be easily read from floor level.

3.03 TESTING

A. Testing for the valves and associated operators shall be in accordance with the ACTUATORS FOR PROCESS VALVES AND GATES Section (40 05 57). The installed gate and operator assemblies shall be tested for proper alignment, balancing, and smooth operation.

B. Valves shall be tested with the piping system test as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.04 TRAINING (NOT USED)

3.05 BALL VALVE SCHEDULE

Valve Number	Service	Valve Size, in.	Valve Type	Operator	Drawing
31WRH28	WRH	1"	BR-2P	MLQ	31DP902
31WRH29	WRH	0.5"	SS-3P	MLQ	31DP902
31WRH30	WRH	0.5"	SS-3P	MLQ	31DP902
31WRH31	WRH	0.5"	SS-3P	MLQ	31DP902
31WRH01	WRH	2"	BR-2P	MLQ	31DP902
31SRW03	SRW	2"	BR-2P	MLQ	31DP902
31SRW04	SRW	1.25"	BR-2P	MLQ	31DP902
31SBIS10	SBIS	0.5"	SS-2P	MLQ	31DP902
31SRW10	SRW	2"	BR-2P	MLQ	31DP903
31SRW11	SRW	2"	BR-2P	MLQ	31DP903
31SRW12	SRW	2"	BR-2P	MLQ	31DP903
31SRW13	SRW	2"	BR-2P	MLQ	31DP903
31SRW14	SRW	2"	BR-2P	MLQ	31DP903
31SRW15	SRW	2"	BR-2P	MLQ	31DP903
31SRW16	SRW	2"	BR-2P	MLQ	31DP903
31SRW17	SRW	2"	BR-2P	MLQ	31DP903
31SRW18	SRW	2"	BR-2P	MLQ	31DP903
31SRW19	SRW	2"	BR-2P	MLQ	31DP903
31SRW20	SRW	2"	BR-2P	MLQ	31DP903
31SRW21	SRW	2"	BR-2P	MLQ	31DP902
31SRW39	SRW	2"	BR-2P	MLQ	31DP902
31SRW22	SRW	1.25"	BR-2P	MLQ	31DP902
31SRW40	SRW	1.25"	BR-2P	MLQ	31DP902
31SBIS11	SBIS	0.5"	SS-2P	MLQ	31DP902
31SRW28	SRW	2"	BR-2P	MLQ	31DP903
31SRW46	SRW	2"	BR-2P	MLQ	31DP903
31SRW29	SRW	2"	BR-2P	MLQ	31DP903
31SRW47	SRW	2"	BR-2P	MLQ	31DP903
31SRW30	SRW	2"	BR-2P	MLQ	31DP903
31SRW48	SRW	2"	BR-2P	MLQ	31DP903
31SRW31	SRW	2"	BR-2P	MLQ	31DP903
31SRW49	SRW	2"	BR-2P	MLQ	31DP903
31SRW32	SRW	2"	BR-2P	MLQ	31DP903
31SRW50	SRW	2"	BR-2P	MLQ	31DP903
31SRW33	SRW	2"	BR-2P	MLQ	31DP903
31SRW51	SRW	2"	BR-2P	MLQ	31DP903
31SRW34	SRW	2"	BR-2P	MLQ	31DP903
31SRW52	SRW	2"	BR-2P	MLQ	31DP903
31SRW35	SRW	2"	BR-2P	MLQ	31DP903
31SRW53	SRW	2"	BR-2P	MLQ	31DP903
31SRW36	SRW	2"	BR-2P	MLQ	31DP903
31SRW54	SRW	2"	BR-2P	MLQ	31DP903
31SRW37	SRW	2"	BR-2P	MLQ	31DP903

31SRW55	SRW	2"	BR-2P	MLQ	31DP903
31SRW38	SRW	2"	BR-2P	MLQ	31DP903
31SRW56	SRW	2"	BR-2P	MLQ	31DP903
32SRW02	SRW	2"	BR-2P	MLQ	32DP902
32SRW20	SRW	2"	BR-2P	MLQ	32DP902
32SRW03	SRW	1.25"	BR-2P	MLQ	32DP902
32SRW21	SRW	1.25"	BR-2P	MLQ	32DP902
32SBIS10	SBIS	0.5"	SS-2P	MLQ	32DP902
32SRW09	SRW	2"	BR-2P	MLQ	32DP903
32SRW27	SRW	2"	BR-2P	MLQ	32DP903
32SRW10	SRW	2"	BR-2P	MLQ	32DP903
32SRW28	SRW	2"	BR-2P	MLQ	32DP903
32SRW11	SRW	2"	BR-2P	MLQ	32DP903
32SRW29	SRW	2"	BR-2P	MLQ	32DP903
32SRW12	SRW	2"	BR-2P	MLQ	32DP903
32SRW30	SRW	2"	BR-2P	MLQ	32DP903
32SRW13	SRW	2"	BR-2P	MLQ	32DP903
32SRW31	SRW	2"	BR-2P	MLQ	32DP903
32SRW14	SRW	2"	BR-2P	MLQ	32DP903
32SRW32	SRW	2"	BR-2P	MLQ	32DP903
32SRW15	SRW	2"	BR-2P	MLQ	32DP903
32SRW33	SRW	2"	BR-2P	MLQ	32DP903
32SRW16	SRW	2"	BR-2P	MLQ	32DP903
32SRW34	SRW	2"	BR-2P	MLQ	32DP903
32SRW17	SRW	2"	BR-2P	MLQ	32DP903
32SRW35	SRW	2"	BR-2P	MLQ	32DP903
32SRW18	SRW	2"	BR-2P	MLQ	32DP903
32SRW36	SRW	2"	BR-2P	MLQ	32DP903
32SRW19	SRW	2"	BR-2P	MLQ	32DP903
32SRW37	SRW	2"	BR-2P	MLQ	32DP903
32SRW38	SRW	2"	BR-2P	MLQ	32DP902
33SRW03	SRW	2"	BR-2P	MLQ	32DP902
32SRW39	SRW	1.25"	BR-2P	MLQ	32DP902
33SRW04	SRW	1.25"	BR-2P	MLQ	32DP902
32SBIS11	SBIS	0.5"	SS-2P	MLQ	32DP902
32SRW45	SRW	2"	BR-2P	MLQ	32DP903
33SRW10	SRW	2"	BR-2P	MLQ	32DP903
32SRW46	SRW	2"	BR-2P	MLQ	32DP903
33SRW11	SRW	2"	BR-2P	MLQ	32DP903
32SRW47	SRW	2"	BR-2P	MLQ	32DP903
33SRW12	SRW	2"	BR-2P	MLQ	32DP903
32SRW48	SRW	2"	BR-2P	MLQ	32DP903
33SRW13	SRW	2"	BR-2P	MLQ	32DP903
32SRW49	SRW	2"	BR-2P	MLQ	32DP903
33SRW14	SRW	2"	BR-2P	MLQ	32DP903

32SRW50	SRW	2"	BR-2P	MLQ	32DP903
33SRW15	SRW	2"	BR-2P	MLQ	32DP903
32SRW51	SRW	2"	BR-2P	MLQ	32DP903
33SRW16	SRW	2"	BR-2P	MLQ	32DP903
32SRW52	SRW	2"	BR-2P	MLQ	32DP903
33SRW17	SRW	2"	BR-2P	MLQ	32DP903
32SRW53	SRW	2"	BR-2P	MLQ	32DP903
33SRW18	SRW	2"	BR-2P	MLQ	32DP903
32SRW54	SRW	2"	BR-2P	MLQ	32DP903
33SRW19	SRW	2"	BR-2P	MLQ	32DP903
32SRW55	SRW	2"	BR-2P	MLQ	32DP903
33SRW20	SRW	2"	BR-2P	MLQ	32DP903
33SRW21	SRW	2"	BR-2P	MLQ	33DP902
33SRW39	SRW	2"	BR-2P	MLQ	33DP902
33SRW22	SRW	1.25"	BR-2P	MLQ	33DP902
33SRW40	SRW	1.25"	BR-2P	MLQ	33DP902
33SBIS10	SBIS	0.5"	SS-2P	MLQ	33DP902
33SRW28	SRW	2"	BR-2P	MLQ	33DP903
33SRW46	SRW	2"	BR-2P	MLQ	33DP903
33SRW29	SRW	2"	BR-2P	MLQ	33DP903
33SRW47	SRW	2"	BR-2P	MLQ	33DP903
33SRW30	SRW	2"	BR-2P	MLQ	33DP903
33SRW48	SRW	2"	BR-2P	MLQ	33DP903
33SRW31	SRW	2"	BR-2P	MLQ	33DP903
33SRW49	SRW	2"	BR-2P	MLQ	33DP903
33SRW32	SRW	2"	BR-2P	MLQ	33DP903
33SRW50	SRW	2"	BR-2P	MLQ	33DP903
33SRW33	SRW	2"	BR-2P	MLQ	33DP903
33SRW51	SRW	2"	BR-2P	MLQ	33DP903
33SRW34	SRW	2"	BR-2P	MLQ	33DP903
33SRW52	SRW	2"	BR-2P	MLQ	33DP903
33SRW35	SRW	2"	BR-2P	MLQ	33DP903
33SRW53	SRW	2"	BR-2P	MLQ	33DP903
33SRW36	SRW	2"	BR-2P	MLQ	33DP903
33SRW54	SRW	2"	BR-2P	MLQ	33DP903
33SRW37	SRW	2"	BR-2P	MLQ	33DP903
33SRW55	SRW	2"	BR-2P	MLQ	33DP903
33SRW38	SRW	2"	BR-2P	MLQ	33DP903
33SRW56	SRW	2"	BR-2P	MLQ	33DP903
34SRW03	SRW	2"	BR-2P	MLQ	34DP902
34SRW21	SRW	2"	BR-2P	MLQ	34DP902
34SRW04	SRW	2"	BR-2P	MLQ	34DP902
34SRW22	SRW	2"	BR-2P	MLQ	34DP902
34SBIS10	SBIS	0.5"	SS-2P	MLQ	34DP902
34SRW10	SRW	2"	BR-2P	MLQ	34DP903

34SRW28	SRW	2"	BR-2P	MLQ	34DP903
34SRW11	SRW	2"	BR-2P	MLQ	34DP903
34SRW29	SRW	2"	BR-2P	MLQ	34DP903
34SRW12	SRW	2"	BR-2P	MLQ	34DP903
34SRW30	SRW	2"	BR-2P	MLQ	34DP903
34SRW13	SRW	2"	BR-2P	MLQ	34DP903
34SRW31	SRW	2"	BR-2P	MLQ	34DP903
34SRW14	SRW	2"	BR-2P	MLQ	34DP903
34SRW32	SRW	2"	BR-2P	MLQ	34DP903
34SRW15	SRW	2"	BR-2P	MLQ	34DP903
34SRW33	SRW	2"	BR-2P	MLQ	34DP903
34SRW16	SRW	2"	BR-2P	MLQ	34DP903
34SRW34	SRW	2"	BR-2P	MLQ	34DP903
34SRW17	SRW	2"	BR-2P	MLQ	34DP903
34SRW35	SRW	2"	BR-2P	MLQ	34DP903
34SRW18	SRW	2"	BR-2P	MLQ	34DP903
34SRW36	SRW	2"	BR-2P	MLQ	34DP903
34SRW19	SRW	2"	BR-2P	MLQ	34DP903
34SRW37	SRW	2"	BR-2P	MLQ	34DP903
34SRW20	SRW	2"	BR-2P	MLQ	34DP903
34SRW38	SRW	2"	BR-2P	MLQ	34DP903
34WRH02	WRH	2"	BR-2P	MLQ	34DP902
34SRW39	SRW	2"	BR-2P	MLQ	34DP902
34SRW40	SRW	2"	BR-2P	MLQ	34DP902
34SBIS11	SBIS	0.5"	SS-2P	MLQ	34DP902
34SRW46	SRW	2"	BR-2P	MLQ	34DP903
34SRW47	SRW	2"	BR-2P	MLQ	34DP903
34SRW48	SRW	2"	BR-2P	MLQ	34DP903
34SRW49	SRW	2"	BR-2P	MLQ	34DP903
34SRW50	SRW	2"	BR-2P	MLQ	34DP903
34SRW51	SRW	2"	BR-2P	MLQ	34DP903
34SRW52	SRW	2"	BR-2P	MLQ	34DP903
34SRW53	SRW	2"	BR-2P	MLQ	34DP903
34SRW54	SRW	2"	BR-2P	MLQ	34DP903
34SRW55	SRW	2"	BR-2P	MLQ	34DP903
34SRW56	SRW	2"	BR-2P	MLQ	34DP903

****END OF SECTION****

SECTION 40 05 64

BUTTERFLY VALVES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies butterfly valves.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed publications, the requirements of this section shall prevail.

Reference	Title
ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A167	Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
ASTM A240/A240M	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A351/A351M	Standard Specification for Castings, Austenitic, for Pressure-Containing Parts
ASTM A395/A395M	Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A439	Standard Specifications for Austenitic Ductile Iron Castings
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A564/A564M	Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes

Reference	Title
ASTM A582/A582M	Standard Specification for Free-Machining Stainless Steel Bars
ASTM A743/A743M	Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Applications
AWWA C504	Rubber-Seated Butterfly Valves, 3 in. (75mm) Through 72 in. (1,800 mm)
AWWA C516	Large-Diameter Rubber-Seated Butterfly Valves, Sizes 78 inches and Larger

B. DEFINITIONS:

Type	Description
GP-XXX-XXXX	General purpose butterfly valve.
AW25	Eccentric disc AWWA C504 25 psig butterfly valve.
AW75	Eccentric disc AWWA C504 or C516 75 psig butterfly valve.
AW150	Eccentric disc AWWA C504 or C516 150 psig butterfly valve.
AW250	Eccentric disc AWWA C504 or C516 250 psig butterfly valve.
HPDO	High performance double offset butterfly valve.
HPDO-FS	High performance double offset fire safe butterfly valve.
HPTO	High performance triple offset butterfly valve.
TF	PTFE-lined butterfly valve.

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

2. Manufacturer's information and catalog data showing compliance with this specification and a full description of the product. Manufacturer's records of tests performed in accordance with AWWA C504 and C516 requirements for AWWA style valves.

3. Certified shop drawings for AWWA valves 30 to 120 inches.

4. Installation instructions.

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance (O&M) instructions in accordance with the OPERATION AND MAINTENANCE DATA Section (01 78 23) by submitting a copy of the OPERATION AND MAINTENANCE DATA Section (01 78 23) with each paragraph check marked to show compliance. O&M instructions shall be submitted after all submittals specified above have been returned mark "No Exceptions Taken" or "Make Corrections Noted." O&M instructions shall reflect the approved materials and equipment.

1.05 UNIT RESPONSIBILITY

A. Equipment systems made up of two or more components shall be manufactured and assembled as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the specification for the equipment system, including equipment specified elsewhere but referenced in the specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified in the particular equipment specification, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives or other entities who are not a direct component of the manufacturing corporation shall not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the Contractor of his responsibility for performance of all systems as provided in the GENERAL CONDITIONS Section (00 72 00).

B. The Contractor shall ensure that all equipment systems provided for the project are products for which unit responsibility has been accepted by the responsible manufacturer. Certificates shall be signed by an officer of the manufacturer's corporation.

PART 2 -- PRODUCTS

2.01 GENERAL

A. For underground installation, install a wax tape coating system as specified in the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03) and the CATHODIC PROCESS CORROSION PROTECTION Section (40 46 42). Wax tape coating not required on valve bodies that are epoxy coated, but shall be applied to flanges and fasteners.

2.02 TYPE GP-XXX-XXXX

A. GENERAL:

1. Type GP valves shall be general-purpose butterfly valves, ANSI Class 150, rated for 150 psig minimum bi-directional bubbletight shutoff and for bubbletight dead-end service with one flange removed as shown in the following table. Type GP valves shall be identified by a 3-section code as follows:

General Purpose Butterfly Valve Codes				
Type		**Dead End Pressure (psig)**		**Seat**
xx	—	xxx	—	xxxx
GP		050		Buna
		150		EPDM
				FKM

B. ACCEPTABLE PRODUCTS:

1. GP-050-Buna & GP-050-EPDM & GP-050-FKM:

   a. Bray Series 31 (2 inches to 20 inches) with bonded seat and Series 36 (22 inches to 120 inches) with bonded seat;

   b. Valtorc Resilient Seated Lugged Butterfly Valves (2 inches to 24 inches) and Resilient Seated Flanged Butterfly Valves (26 inches to 40 inches);

   c. or equal, modified as required to meet the specifications.

2. GP-150-Buna & GP-150-EPDM:

   a. Bray Series 31 (2 inches to 20 inches) with bonded seat and Series 36 (22 inches to 120 inches) with bonded seat;

   b. Valtorc Resilient Seated Lugged Butterfly Valves (2 inches to 24 inches) and Resilient Seated Flanged Butterfly Valves (26 inches to 40 inches);

   c. or equal, modified as required to meet the specifications.

3. GP-150-FKM:

    a. Valtorc Resilient Seated Lugged Butterfly Valves (2 inches to 24 inches) and Resilient Seated Flanged Butterfly Valves (26 inches to 40 inches); or equal, modified as required to meet the specifications.

C. MATERIALS:

1. BODY:

    a. Valves shall be full lugged or flanged body. The body shall be constructed of ASTM A126, Class B cast iron, or ASTM A536, ductile iron.

2. DISC:

    a. The inline disc shall be constructed of ASTM A351/A351M or A743/A743M, CF8M Type 316 stainless steel, spherically machined and polished.

3. SEAT:

    a. The seat shall provide complete isolation of the media from the valve body. The seat shall also incorporate integral flange seals to eliminate the requirement for flange gaskets or O-rings. Typical seat is Buna-N for sewage service, EPDM for air and water services, and FKM (Viton) for gas and chemical service. Cartridge style seats are not acceptable.

4. SHAFT:

    a. The shaft shall be constructed of ASTM A182 or A276 Type 316 stainless steel.

    b. Shaft-to-disc connection shall be an internal double-D or spline connection. External screws, bolts, taper pins, etc. are not acceptable.

    c. Shafts retained from blowout using pins or similar devices in the neck or body are not acceptable.

5. BEARINGS:

    a. Upper shaft bearing shall be heavy duty acetal.

6. DIRECTION:

    a. Counterclockwise to open.

7. COATINGS:

    a. The interior and exterior body surfaces shall be coated with the manufacturer's standard epoxy finish.

2.03 TYPES AW25, AW75, AW150, AND AW250 VALVES

A. GENERAL:

1. SIZE RANGE: 3 inches to 72 inches

    a. Type AW25 valves shall be AWWA C504 butterfly valves, Class 25B. Type AW75 valves shall be AWWA C504 butterfly valves, Class 75B. Type AW150 valves shall be AWWA C504 butterfly valves, Class 150B. Type AW250 valves shall be AWWA C504 butterfly valves, Class 250B. Valves shall provide full bi-directional bubbletight shutoff capability, and shall also provide full bubbletight dead-end service with one flange removed.

2. SIZE RANGE: 78 inches to 120 inches

    a. Type AW75 valves shall be AWWA C516 butterfly valves, Class 75B. Type AW150 valves shall be AWWA C516 butterfly valves, Class 150B. Valves shall provide full bi-directional bubbletight shutoff capability, and shall also provide full bubbletight dead-end service with one flange removed.

B. ACCEPTABLE PRODUCTS:

1. SIZE RANGE: 3 inches to 24 inches

    a. GA Industries series 800;

    b. Duzurik;

    c. Val-Matic American-BVF;

    d. or equal, modified as required to meet the specifications.

2. SIZE RANGE: 30 inches to 120 inches

    a. Mosser Series 830 (24 inches to 120 inches);

    b. Val-Matic American-BFV (24 inches to 108 inches);

    c. or equal, modified as required to meet the specifications.

C. MATERIALS:

1. BODY:

   a. Valves shall be of the short body flanged type, and shall have an inside port diameter not less than the inside diameter of the connecting pipe minus one inch. The actual lengths of the valves shall be within 0.0625 inches of the manufacturer's specified length. The body shall be constructed of ASTM A536 ductile iron.

2. DISC:

   a. SIZE RANGE: 3 inches to 24 inches

      1) Valves shall utilize the in-line or eccentric disc design. The disc shall be constructed of ductile iron, ASTM A536 Grade 65-45-12.

   b. SIZE RANGE: 30 inches to 120 inches

      1) Valves shall utilize the eccentric disc design. The disc shall be constructed of ductile iron, ASTM A536 Grade 65-45-12.

3. RESILIENT SEATS:

   a. SIZE RANGE: 3 inches to 24 inches

      1) The interior of the body shall be fully lined with a Buna-N resilient seat, molded and vulcanized to the body.

      2) Or, the seat shall be a 360 degree uninterrupted seal and shall be retained on the disc by means of an ASTM A167 or A240/A240M Type 304 stainless steel ring and ASTM A276 or A240/A240M Type 304 stainless steel cap screws. Seats retained in the body are not acceptable. The seat design shall allow for replacement and field adjustment the full 360-degree circumference without dismantling the operator, disc, or shaft and without removing the valve from the pipeline. Seats that are bonded or vulcanized to the body or disc, or are held in place by epoxy are not acceptable. The resilient seat shall be constructed from Buna N.

   a. SIZE RANGE: 30 inches to 120 inches

      1) The seat shall be a 360 degree uninterrupted seal and shall be retained on the disc by means of an ASTM A167 or A240/A240M Type 304 stainless steel ring and ASTM A276 or A240/A240M Type 304 stainless steel cap screws. Seats retained in the body are not acceptable. The seat design shall allow for replacement and field adjustment the full 360-degree circumference without dismantling the operator, disc, or shaft and without removing the valve from the pipeline. Seats that are bonded or vulcanized

to the body or disc, or are held in place by epoxy are not acceptable. The resilient seat shall be constructed from Buna N.

4. SEAT MATING SURFACE:

    a. SIZE RANGE: 3 inches to 24 inches

        1) The seat-mating surface shall be constructed of ASTM A276 or A240/A240M Type 304 or 316 stainless steel, and shall be welded to the valve body or disc edge. Sprayed seat mating surfaces are not acceptable.

    b. SIZE RANGE: 30 inches to 120 inches

        1) The seat-mating surface shall be constructed of ASTM A276 or A240/A240M Type 304 or 316 stainless steel, and shall be welded to the valve body. Sprayed seat mating surfaces are not acceptable.

5. SHAFT:

    a. SIZE RANGE: 3 inches to 24 inches

        1) The one-piece shaft shall be constructed of ASTM A276 or A240/A240M Type 304 or 316 stainless steel, or ASTM A564 Type 17-4 PH stainless steel, and shall be turned, ground, and polished.

        2) Or, the stub shafts shall be constructed of ASTM A276 or A240/A240M Type 304 or 316 stainless steel, or ASTM A564 Type 17-4 PH stainless steel, and shall be turned, ground, and polished.

    b. SIZE RANGE: 30 to 120 inches

        1) The stub shafts shall be constructed of ASTM A276 or A240/A240M Type 304 or 316 stainless steel, or ASTM A564 Type 17-4 PH stainless steel, and shall be turned, ground, and polished. The shaft shall be provided with a machined groove in the top end of the shaft, indicating the precise disc position on the shaft.

6. SHAFT SEAL:

    a. Shaft seals shall be self-adjusting Buna-N chevron type, or adjustable Teflon impregnated packing type.

7. BEARINGS:

    a. Upper and lower bearings shall be self-lubricating sleeve bearings.

8. FASTENERS:

    a. All fasteners shall be stainless steel.

9. DIRECTION:

    a. Counterclockwise to open.

10. COATINGS:

    a. The interior and exterior ductile iron or steel surfaces of the valves shall be coated with Carboline Carboguard 891 epoxy coating or Amerlock Series 400 epoxy coating applied to a minimum 10 mils DFT in not less than two coats. Surface preparation shall be in accordance with the coating manufacturer's recommendations.

11. TESTING:

    a. Each valve shall be tested at the factory in accordance with AWWA C504. District representatives shall witness tests at the factory.

2.04 TYPE HPDO VALVES (DELETED)

2.05 TYPE HPDO-FS VALVES (DELETED)

2.06 TYPE HPTO VALVES (DELETED)

2.07 TYPE TF VALVES (DELETED)

2.08 OPERATORS

A. Manual operators and powered actuators shall be as specified in this specification section, the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03), and the ACTUATORS FOR PROCESS VALVES AND GATES Section (40 05 57).

B. Powered operators shall be as specified in the POWER ACTIVATED VALVE AND GATE SCHEDULES Section (40 06 60.13) and the ACTUATORS FOR PROCESS VALVES AND GATES Section (40 05 57).

PART 3 -- EXECUTION

3.01 GENERAL (NOT USED)

3.02 INSTALLATION

A. Install valves with valve shafts horizontal, unless a vertical shaft is required to suit a particular installation, and unless a vertical shaft is indicated on the Drawings.

B. Install pipe spools or valve spacers in locations where butterfly valve disc travel may be impaired by adjacent pipe lining, pipe fittings, valves, or other equipment. Field shaving is not permitted.

C. Valves and operators shall be installed in accordance with the manufacturer's recommendations.

3.03 TESTING

A. Valves shall be tested with the piping system test per the COMMON WORK RESULTS FOR PIPING SYSTEMS Section (40 05 03).

3.04 TRAINING (DELETED)

3.05 BUTTERFLY VALVE SCHEDULE

Valve Number	Service	Valve Size, in.	Valve Type	Operator	Drawing
31WRH22	WRH	6"	AW150	MGQ	31DP902
31WRH19	WRH	4"	AW150	MGQ	31DP902
31WRH03	WRH	3"	AW150	MGQ	31DP902
31WN10	WN	3"	AW150	MGQ	31DP903
31WRH02	WRH	3"	AW150	MGQ	31DP902
31WRH04	WRH	4"	AW150	MGQ	31DP902
31WN11	WN	4"	AW150	MGQ	31DP903
32WRH25	WRH	4"	AW150	MGQ	32DP902
32WRH01	WRH	3"	AW150	MGQ	32DP902
32WRH04	WRH	4"	AW150	MGQ	32DP902
32WN17	WN	4"	AW150	MGQ	32DP903
32WRH02	WRH	3"	AW150	MGQ	32DP902
32WRH05	WRH	4"	AW150	MGQ	32DP902
32WN18	WN	4"	AW150	MGQ	32DP903
33WRH21	WRH	4"	AW150	MGQ	33DP902
33WRH01	WRH	3"	AW150	MGQ	33DP902
33WRH03	WRH	4"	AW150	MGQ	33DP902
33WN10	WN	4"	AW150	MGQ	33DP903
34WRH20	WRH	4"	AW150	MGQ	34DP902

34WRH01	WRH	3"	AW150	MGQ	34DP902
34WRH04	WRH	4"	AW150	MGQ	34DP902
34WN16	WN	4"	AW150	MGQ	34DP903
34WRH21	WRH	4"	AW150	MGQ	34DP902
34WRH05	WRH	3"	AW150	MGQ	34DP902
34WN17	WN	3"	AW150	MGQ	34DP903

****END OF SECTION****

SECTION 40 70 00

INSTRUMENTATION OF PROCESS SYSTEMS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

A. SCOPE:

1. This section specifies requirements for process instruments. Specific application dependent requirements are delineated in the SCHEDULES OF INSTRUMENTATION FOR PROCESS SYSTEMS Section (40 06 70) and on the drawings.

1.02 REFERENCES

A. REFERENCE STANDARDS: The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of a conflict between the requirements of this section and those of the listed standards, the requirements of this section shall prevail.

Reference	Title
ISA S51.1	Process Instrumentation Terminology
ANSI B16.5	Steel Pipe Flanges and Flanges Fittings
ANSI B40.1	Gauges-Pressure Indicating Dial Type-Elastic Segment: Special Notice
IEEE C62.41.1	Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits
ANSI C96.1	Temperature Measurement Thermocouples
API 670	Machine Protection Systems Noncontacting Vibration and Axial Position Monitoring System
API 678	Accelerometer - Based Vibration Monitoring System
ASTM A105	Specifications for Carbon Steel Forging for Piping Components
ASTM E230	Temperature Electromotive Force (EMF) Tables for

Reference	Title
	Standardized Thermocouples
ASTM A269	Seamless and Welded Austinitic Stainless Steel Tubing for General Service
ASTM B68	Seamless Copper Tube, Bright Annealed
ASTM D883	Standard Terminology Relating to Plastics
IPTS-68	International Practical Temperature Scale of 1968
JIC P-1	Pneumatic Standards for Industrial Equipment
NEMA 250	Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 6	Industrial Control and Systems: Enclosures
UL 1002	Electrically Operated Valves for use in Hazardous (Classified) Locations
UL 1012	Power Units Other Than Class 2
UL 1449	Transient Voltage Surge Suppressors
UL 1778	Uninterruptible Power Supply Equipment
MIL STD 461-A	Electromagnetic Interference Characteristics Requirements for Equipment
SAMA RC 17-10	Bushings and Wells for Temperature Sensing

B. DEFINITIONS: (Not Used)

1.03 SUBMITTALS

A. The following information shall be submitted for review in accordance with the SUBMITTAL PROCEDURES Section (01 33 00):

1. A copy of this specification section, with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviation.

2. Manufacturer's specifications, installation recommendations, and catalog literature for each type of instrument specified herein Part 2 which clearly and unambiguously shows that the instrument meets all the requirements specified herein.

3. Instrument data sheet for each instrument or a group of instruments with similar loop application.

4. Instrument manufacturer's factory calibration certification.

5. (DELETED).

6. Contractor's instrument installation details.

7. (DELETED).

8. (DELETED).

9. Contractor's instrument calibration test results in accordance with the test forms

10. (DELETED).

11. (DELETED).

1.04 OPERATION AND MAINTENANCE INSTRUCTIONS (DELETED)

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS (DELETED)

2.02 LEVEL COMPONENTS (DELETED)

2.03 PRESSURE COMPONENTS

A. PRESSURE GAGES:

1. ACCEPTABLE PRODUCTS:

a. HIGH RANGE GAGES: Ashcroft Duragauge Figure 1279, Ametek 1981L, or equal.

b. LOW RANGE GAGE: Ashcroft type 1188, or equal.

c. DIFFERENTIAL PRESSURE GAGE: (DELETED)

2. MATERIALS/EQUIPMENT:

a. HIGH RANGE PRESSURE GAGES (> 10 PSI):

1) Pressure gage scales shall be selected so that the normal operating pressure falls between 50 and 75 percent of full scale. All gages shall be 4-1/2 inches, 270-degree movement, and suitable for bottom stem mounting unless otherwise shown on the drawings. Accuracy shall be plus or minus 0.5 percent of span. Gages shall have a phenolic case, high temperature

acrylic window, and a 1/2-inch NPT bottom connection. Pressure gages shall be premium grade, heavy-duty, 316 stainless steel bourdon tube units (bellows type for low pressure of vacuum) with 316 stainless steel movement.

2) Gages on liquid service shall be as noted above except they shall be provided with an internal pulsation dampening system consisting of a silicone or halocarbon fluid fill. Gages used for oxygen service shall be provided with factory options for oxygen service cleaning. Snubbers or orifices shall not be utilized. Chemical seals shall be provided as noted in the MISCELLANEOUS INSTRUMENTS, CALIBRATION EQUIPMENT, INSTRUMENTATION VALVES, AND FITTINGS Section (40 79 00). Sanitary/chemical seals shall be one piece construction with diaphragms fastened directly to the instrument top flange. Seals shall be 2 inches with ¼-inch NPT instrument connection and a bleed screw. Seals shall be provided with quick disconnect clamp with wing nut. Diaphragm and clamp shall be designed to mate with a sanitary seal male adapter. Seal body and clamp shall be 316 stainless steel. Diaphragm material shall be 316L stainless steel, except for chlorine service where the material shall be Hastelloy-C. Diaphragm fill fluid shall be silicone, except for oxygen and chlorine service where the fluid shall be halocarbon. Seals and gauges shall be factory filled and assembled. Seals shall be Ametrek CST series, with #24-90001 clamp, or equal.

b. LOW RANGE PRESSURE GAGES (< 10 PSI):

1) Gage shall be 4-1/2-inch phenolic turret case construction with acrylic window, 270 degree movement, 1/2-inch NPT process connection. Unless otherwise specified, element shall be a 316 stainless steel bellows. Gage shall be provided with a throttle screw as standard. Accuracy shall be Grade A, in conformance with ANSI B40.1. Unit shall be designed for outdoor installation in sunlight and rain.

c. DIFFERENTIAL PRESSURE GAGE: (DELETED)

B. DIAPHRAGM SEALS:

1. ACCEPTABLE PRODUCTS:

a. Diaphragm seal shall be Ashcroft Type 101 for NPT connection or Type 103 for flange connection, ITT Conoflow Model 100AC for NPT connection or Model 100B for flange connection, or equal.

2. MATERIALS/EQUIPMENT:

a. DIAPHRAGM TYPE:

1) Seal shall be diaphragm type with a 1/4-inch flushing connection, type 316 stainless steel body, type 316 stainless steel diaphragm and a 1-inch NPT sludge process connection for gages and a 3-inch flanged sludge process connection for transmitters and switches. All other process connections shall be ½-inch NPT unless otherwise specified or required by the application. Fill fluid shall be Silicone DC200, except that Fluorolube FS-5 shall be used for oxygen or chlorine service.

2.04 FLOW COMPONENTS (DELETED)

2.05 ANALYTICAL COMPONENTS (DELETED)

2.06 TEMPERATURE COMPONENTS (DELETED)

2.07 MACHINERY PROTECTION COMPONENTS (DELETED)

2.08 MISCELLANEOUS MONITORING COMPONENTS (DELETED)

2.09 CONTROL DEVICES (DELETED)

PART 3 -- EXECUTION

3.01 GENERAL

A. Submit and obtain approval of instrument data sheets, instrument installation details and instrument calibration sheets prior to installing any instrument.

3.02 INSTALLATION

A. Instruments shall be installed in accordance with the instrument installation detail drawings, manufacturer's installation requirements, and as specified herein. Installation of process taps are specified in Division 40.

B. The mechanical drawings shall be coordinated with process drawings. The locations of the process taps need to be shown on the mechanical drawings. Process taps shall be specified in the COMMON WORK RESULTS FOR PROCESS PIPING Section (40 05 03).

C. Pressure Transmitters and Switches shall be installed as follows: (DELETED)

D. Magnetic Flow Meters shall be installed as follows: (DELETED)

E. Clamp-On Flow Meters shall be installed as follows: (DELETED)

F. COMPUTER INTERFACE TERMINAL BOARDS: (DELETED)

G. ISOLATION MODULES: (DELETED)

3.03 TESTING

A. All instruments shall be job site calibrated prior to installation. Test forms for pressure gauges are attached.

3.04 TRAINING (DELETED)

3.05 INSTRUMENTATION SCHEDULE

TAG NO	DESCRIPTION	SPEC	TYPE	VOLT	CALIBRATION			SIZE	DRAWINGS		
					RANGE	SET POINT	UNITS		P&ID	DETAIL	PLAN
PI310006 A	WRH PRESSURE GAUGE PI310006 A	40 70 00	PRESSURE GAUGE	-	0-140	-	PSIG	-	31X-601	P15 31DP502	31DP902
PI310006 B	WRH PRESSURE GAUGE PI310006 B	40 70 00	PRESSURE GAUGE	-	0-140	-	PSIG	-	31X-601	P15 31DP502	31DP902

****END OF SECTION****

CONTRACT #:
FORM #: 40 61 21 C7 – PRESSURE GAUGE TEST DATA

PRESSURE GAUGE EQUIP #:_____ GAUGE MFG:_____

GAUGE RANGE:_____ MODEL #:_____

SPECIFICATION SECTION(S):_____ SUBMITTAL #:_____

PROCEDURE:

1. Use a separate form for each type of gauge range being tested.
2. Compare gauge to be installed to calibrated gauge or to dead weight pressure gauge calibration system.
3. For vacuum & combination gauges, use both pressure + vacuum calibration tables.

PRESSURE CALIBRATION				
Pressure Gauge Equip. #	% Full scale difference at 25% full scale	% Full scale difference at 50% full scale	% Full scale difference at 75% full scale	Returns to zero after test Y/N

VACUUM CALIBRATION (For Vacuum & Combination Gauges)				
Pressure Gauge Equip. #	% Vacuum scale difference at 25% full scale	% Vacuum scale difference at 50% full scale	% Vacuum scale difference at 75% full scale	Returns to zero after test Y/N

WITNESS BLOCK

Engineer's Representative:_____Date:_____

Contractor's Representative:_____Date:_____