MARINA COAST WATER DISTRICT

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

CIP NO. OW-0206

March 2018

CONTRACT DOCUMENTS FOR
INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

CIP NO. OW-0206

Marina Coast Water District
11 Reservation Road
Marina, California 93933

Board of Directors

Thomas P. Moore, President
Jan Shriner, Vice-President
Herbert Cortez
Howard Gustafson
William Y. Lee

Submitted _____
Andrew J. Racz, P.E.

Approved_____
Mike Wegley, P.E. – District Engineer

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INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT
CIP # OW-0206

LIST OF TECHNICAL SPECIFICATIONS

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15042	Hydrostatic Testing of Pressure Pipelines
15050	Hot Tap Connections
15056	Ductile-Iron Pipe and Fittings
15057	Copper, Brass and Bronze Pipe, Fittings and Appurtenances
15058	Polyethylene Pipe
15064	PVC Pressure Distribution Pipe
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15112	Backflow Preventers
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END OF DOCUMENT

INVITATION TO BIDDERS

FOR THE ATTACHED CONSTRUCTION PROJECT ENTITLED: **INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT**

Site Inspection and Questions

A pre-bid conference and site walk for this project is scheduled for Thursday, April 12, 2018 at 10am. Additional questions may be directed to MCWD on an individual basis. The deadline for questions is Thursday, April 26, 2018.

Bid Opening

Bids will be received by the Marina Coast Water District (herein after referred to as "MCWD") at **11 Reservation Road, Marina CA 93933**, at **2 pm on Thursday, May 3, 2018,** for the performance of the work described in the Bid and Contract Documents on file. **Bid Opening location is: 11 Reservation Road, Marina, CA 93933.**

All Bid and Contract Documents, including the bid forms, shall be obtained from MCWD.

The plans and specifications for this project are available from:

Marina Coast Water District
Attn: Stephenie Verduzco
2840 4th Avenue
Marina, CA 93933
831-883-5929
831-384-0197

The plans and specifications are also available for download at www.mcwd.org

Description of Work

The work as indicated in the project documents consist of all materials, labor, tools, equipment, apparatus, facilities, transportation and incidentals necessary to construct, furnish, deliver and install the following in general:

This Capital Improvement project consists of installing approximately 3,500 linear feet of new 18-inch ductile iron pipe (DIP) water main in Inter-Garrison Road, from approximately 200' east of the Sherman Road intersection to approximately 500' west of the intersection with Sherman Blvd. in East Garrison. The new main will connect to existing 12" water mains at both its eastern and western ends. This work includes all associated fittings, valves, appurtenances, pavement removal and restoration, reconnecting existing mains and services along these pipes, and abandonment grouting of existing water mains within the right-of-way.

Payment will be made as described in the Instructions to Bidders, Section 2.01.

BONDS:

A Bid Bond is required.

A Payment Bond and a Performance Bond are required after the Notice of Award at the time of the delivery of executed counterparts of the Agreement to the Owner.

The right is reserved, as the interest of MCWD may require, to reject any or all bids, to waive any informality in bids, and to accept or reject any items of the bid. If the Contractor's bid is accepted, the Purchasing Agent will execute the Contract for and on behalf of the, as governed by Public Contract Code 22030 through 22045.

The bidder and any of his subcontractors must be licensed as a General Engineering Contractor with the Contractors State License Board of the State of California Department of Consumer Affairs. Bids will not be considered from contractors not licensed as a General Engineering Contractor unless they hold a specialty license for the specific classification(s) to be performed.

Public Works projects exceeding $1,000.00 require the payment of the general prevailing rate of per diem wages, copies of which are on file at the State of California, Department of Consumer Affairs Office. (Labor Code 1770, et seq.).

The MCWD contact person assigned to this project is: Andrew Racz, P.E., Associate Engineer (831) 883-5933. All inquiries regarding the project shall be directed to the Engineer, Andrew Hunter, P.E., at (831) 649-5225, (831) 373-5065 (fax), ahunter@whitsonengineers.com (e-mail). Requests for information will be received in writing or fax until 12 p.m. on April 26, 2018.

END OF DOCUMENT

BID FORM

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

TABLE OF ARTICLES and BID BOND

Form of Proposal

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Marina Coast Water District
11 Reservation Road
Marina, CA 93933
Attention: District Engineer

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied, where available, all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the

Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

All specified cash allowances are included in the price(s) set forth above and have been computed in accordance with Paragraph 11.02 of the General Conditions.

Item No.	Description	Unit	Quantity	Unit Price	Total Item Price
1	Mobilization/demobilization	LS	1		
2	Trench safety: Temporary sheeting, shoring and bracing	LS	1		
3	18-Inch Ductile Iron Pipe, incl. all valves, fittings and restraints, and slurry seal of trenched roadway	LF	3500		
4	Connection to existing 12" water main east of Schoonover Road, incl. tapping sleeve and all valves/fittings	LS	1		
5	Connection to existing 12" water main west of Sherman Blvd. in East Garrison, incl. all pipe, valves and fittings	LS	1		
6	Install 20' segments of capped 18" HDPE storm drain pipe (for future connection with Eastside Parkway construction), centered beneath water crossing, 1' clearance minimum	LS	7		

Total bid schedule including ADDS/DEDUCTS:

Number: $_____

Words: _____

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

If the District awards this contract, selection shall be based on the lowest total Bid Price and qualified contractor.

ARTICLE 6 – TIME OF COMPLETION

6.01 The Work will be substantially complete as indicated in Article 9 of the Instruction to Bidders after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions as indicated in Article 9 of the Instruction to Bidders after the date of Substantial Completion.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 Reference 00435 – Bid Submittal Checklist for all items required for bid submittal.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest: _____
(Signature of Corporate Secretary)

Date of Qualification to do business in _____ *[State Where Project is Located]* is ____________.

A Joint Venture

Name of Joint Venturer: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business address: _____
_____

Phone: _____ Facsimile:_____

Submitted on _____, 20_____.

State Contractor License No. _____. (If applicable)

END OF DOCUMENT

DESIGNATION OF SUBCONTRACTORS

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

In compliance with the provisions of Section 4100-4113 of the Public Contract Code of the State of California, and any amendments thereof, and, if applicable, with the requirements of County relating to projects for the construction, improvement or repair of Public Works, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work, and each subcontractor who, under subcontract, will specially fabricate and install a portion of the work or improvement according to detailed drawings contained in the plans and specifications, for such work to be performed under the Contract Documents to which the attached bid is responsive, and the portion of the work which will be done by each subcontractor and for each subcontract in excess of one half of one percent of the undersigned's total aggregate bid. Traffic signal equipment suppliers shall be listed at time of bidding on this form.

NAME OF SUBCONTRACTOR	LOCATION (address, city, zip, phone)	DIVISION OF WORK

COMPANY NAME: _____

By: _____
Bidder's Signature

Date:_____

END OF DOCUMENT

LIST OF SUPPLIERS

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

	Supplier	Product
1		
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END OF DOCUMENT

DESIGNATION OF INSURANCE AGENT OR BROKER

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

It is proposed that the following insurance agent/broker and insurance company will provide policies of insurance or insurance certificates as required by the bid documents.

Insurance Agent or Broker: _____

Street: _____

City, State and Zip: _____

Telephone: _____

Name of Insurance Company
Providing Coverage _____

Best's Key Rating Guide of at least A VII? Yes _____ No _____

It is proposed that the following bonding agent or surety will provide payment and performance bonds as required by the bid documents.

Bonding Agent or Broker: _____

Street: _____

City, State and Zip: _____

Telephone: _____

Name of Surety Company
Providing Bonds: _____

1. Admitted in California? Yes _____ NO _____

OR

Current Treasury Listed Surety (Federal Register)? Yes _____NO _____

AND

Current A.M. Best B or better rating? Yes _____NO _____

OR

Current Standard and Poors Rating of BB or better? Yes _____NO _____

2. (in lieu of 1)

An admitted surety insurer which complies with the provisions of the code of Civil Procedure, Section 995.660*.

California Code of Civil Procedure Section 995.660 in summary, states that an admitted surety must provide 1) the original, or a certified copy of instrument authorizing the person who executed the bond to do so; 2) a certified copy of the Certificate of Authority issued by the Insurance Commissioner, 3) a certificate from county Clerk of Monterey County that Certificate of Authority has not been surrendered, revoked, canceled, annulled or suspended; 4) a financial statement showing the assets and liabilities of the insurer at the end of the quarter calendar year, prior to 30 days next preceding the date of the execution of the bond.

OR

3. In lieu of 1 and 2, a company of equal financial size and stability that is approved by the MCWD Insurance/Risk Manager.

By signing below, the bidder certifies that:

The above comply with the MCWD standards for liability insurers and sureties pursuant to Section II, Part A, paragraph 14 of these bid documents: Yes _____ NO _____. If "No", your bid is subject to rejection.

COMPANY NAME: _____

BY: _____
(Bidder's signature)

DATE: _____

END OF DOCUMENT

LIST OF PROJECT REFERENCES

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

The Bidder shall provide three projects that they have successfully completed in the last ten years of like nature and equaling $250,000 or more in total value. The Bidder shall provide the project name, owner representative and phone number. The projects listed shall be of similar scope and type as the project identified in this document.

	Project Name	Owner Representative	Owner Phone #	Contract Amount
1				
2				
3				

END OF DOCUMENT

STOP NOTICE INFORMATION

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

PROJECT NAME: INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE

CONTRACTOR'S NAME AND ADDRESS: _____

_____

_____

Reference: California Civil Code, Division 3, Part 4, Title 15, Chapter 4

The following is provided for the information of contractors, subcontractors and suppliers of labor, materials, equipment, and services under MCWD contracts, and is not intended as legal advice. Advice of legal counsel should be obtained to ensure compliance with legal requirements relating to public works stop notices.

WHERE TO FILE: All original stop notices and preliminary-20 day notices (if required by California Civil Code 53098) must be filed with the Marina Coast Water District, 11 Reservation Road, Marina, CA 93933.

STOP NOTICE CONTENTS: See California Civil Code 3103. written notice, signed and verified by the claimant and including information such as the kind of labor, equipment, materials or service furnished or agreed to be furnished by the claimant; the name of the person/entity to or for whom the same was done or furnished; the amount in value of that already done or furnished and/or agreed to be done or furnished. Blank stop Notice forms are commercially available.

WHO MAY SERVE STOP NOTICE: See California Code 53181. All persons furnishing labor, materials, equipment or services to the job (except the original contractor) and persons furnishing provisions, provender or other supplies.

HOW THE STOP NOTICE IS SERVED: See California Code S3103. Served by personal service, registered mail, or certified mail.

TIME FOR SERVICE: See California Civil Code 3184. Stop notices must be served before the expiration of 30 days after the recording of a Notice of Completion (sometimes referred to as a Notice of Acceptance) or Notice of Cessation, if such notice is recorded or if no Notice of Completion or Notice of Cessation is recorded, 90 days after actual completion or cessation.

NOTICE OF PUBLIC ENTITY (OWNER): See California Civil Code 3185. Provided that a stop notice claimant has paid to the Clerk of the Board of Supervisors the sum of $2.00 at the time of filing a stop notice, the Clerk shall provide each stop notice claimant with notice of filing of a Notice of Completion or after the cessation of labor has been deemed a completion of a public work or after the acceptance of

completion, whichever is later, to each stop notice claimant, by personal service or registered or certified mail.

RELEASE OF STOP NOTICE: See California Civil Code 3196 and following. A stop notice can be released if the original contractor files a corporate surety bond with the Clerk of the Board of Supervisors, in the amount of 125% of the stop notice claim. Alternatively, the original contractor may file an affidavit pursuant to California Civil Code S3198, stating objections to the validity of the stop notice. A counter affidavit may be filed by the claimant pursuant to 53200 and a summary legal proceeding may be held pursuant to 3201 and following, to determine the validity of the stop notice. If no counter affidavit is filed, the stop notice funds shall be released. Alternatively, the Stop Notice claimant may file a Release in a form which substantially complies with California Civil Code 3262.

STOP NOTICE LAWSUIT: See California Civil Code 53210 through 3214. These sections provide that a stop notice is perfected only by the filing of a lawsuit. A lawsuit must be filed no sooner than 10 days after service of a stop notice and no later than 90 days after the expiration of the time for filing stop notices. Notice of suit must be given to the Clerk of the Board within 5 days after commencement. The Court has the discretionary right to dismiss the lawsuit if it is not brought to trail within two years.

I HEREBY ACKNOWLEDGE THAT I RECEIVED AND READ THE ABOVE STOP NOTICE INFORMATION AND IF I AM AWARDED THIS CONTRACT, I AGREE TO INCLUDE A COPY OF THIS PAGE IN ALL SUBCONTRACTS AND CONTRACTS FOR LABOR, MATERIALS, EQUIPMENT, AND SERVICES THAT I ENTER INTO FOR THIS PROJECT:

Bidder's Signature: _____ Date: _____

Bidder's Name and Title (Print): _____

END OF DOCUMENT

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

I, _____, am the
(name)

_____ of _____,
(Position Title) (Company)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid; and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

I declare under penalty of perjury under the laws of the
State of California that the foregoing is true and correct:

_____ _____

Signature **Date**

END OF DOCUMENT

PREVAILING WAGE STATEMENT

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

If awarded the contract, we and our subcontractors shall pay all the workers we assign to the project not less than the prevailing wage as determined by the state of California, Director of industrial Relations in compliance with Section IV, paragraph W of this Invitation to Bid. We are aware that the contractor shall be penalized for non-compliance by either the contractor or his subcontractor(s).

In addition, we are informed of the following:

Copies of the prevailing wage rates are on file at:

Marina Coast Water District
11 Reservation Road
Marina, CA 93933

or
State of California Department of Industrial Relations
Division of Labor Statistics and Research
455 Golden Gate Avenue, 5th Floor, Room 5184
San Francisco, CA 94104
(415) 703-4281

The successful bidder shall be required to post the prevailing wage determinations at each job site.

Each contractor and subcontractor shall keep accurate payroll records showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per them wages paid to each journeyman, apprentice, worker or other employee employed by him or her in connection the public work.

Certified copies of such payroll records must be furnished to the State or Marina Coast Water District upon request.

By signing below, the bidder certifies that he shall comply with the prevailing wage laws.

Company Name: _____

Contractor's Signature: _____

Date: _____

END OF DOCUMENT

LOCAL HIRING FOR PUBLIC WORKS

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

SUBMIT WITH BID

This contract is for a Marina Coast Water District public works project. All Contractors and Subcontractors are required to comply with all of the provisions of Ordinance 53 Local Hiring (Chapter 2.10 of the MCWD Code). Failure to comply with the local hiring ordinance may subject the Contractor herein with disqualification from any future Marina Coast Water District public works contracts.

The Bidder hereby certifies that (initial as applicable):

_____ Bidder has read Ordinance 53, Local Hiring for District Public Works, and

_____ Bidder can meet the local hiring requirements of Ordinance 53, or

_____ Bidder has made a good faith effort to meet the requirements of Ordinance 53 as documented on the attached pages, and anticipates a total of _____ percent of the workforce will be residents of the Monterey Bay Area, or

_____ Bidder requires an exception because a suitable pool of persons does not exist locally for the specialized skills listed below. These workers will constitute ____ percent of the workforce.

Specialized Skill	**No. of Workers**	**County of Residence**

Company Name: _____

Contractor's Signature: _____

Date: _____

Efforts to Hire Employees (submit only if needed)

Classification	Agency Contacted	Date	Results

Efforts to Hire Subcontractors (submit only if needed)

Work Item	Company Contacted	Date	Results*

* Standard codes: DNR-did not respond, NA-not available for job, NB-not bidding, USED-included in bid, HIGH-selected lower cost bid

END OF DOCUMENT

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

BID

Bid Due Date: **May 3, 2018**

This Capital Improvement project consists of installing approximately 3,500 linear feet of new 18-inch ductile iron pipe (DIP) water main in Inter-Garrison Road, from approximately 200' east of the Sherman Road intersection to approximately 500' west of the intersection with Sherman Blvd. in East Garrison. The new main will connect to existing 12" water mains at both its eastern and western ends. This work includes all associated fittings, valves, appurtenances, pavement removal and restoration, reconnecting existing mains and services along these pipes, and abandonment grouting of existing water mains within the right-of-way.

BOND

Bond Number:

Date (Not later than Bid due date):

Penal Sum: _____ _____

10% (ten percent) of the Total Bid Value in Words (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder who submitted a responsive Bid as determined by Owner for the work required by the Contract Documents, provided that:

1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the penal sum set forth on the face of this Bond, and

1.2. In no event shall Bidder's and Surety's obligation hereunder exceed the penal sum set forth on the face of this Bond.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

END OF DOCUMENT

BID SUBMITTAL CHECKLIST

All information required by the terms of the Bid Documents must be furnished. Important items to be submitted are including, but not limited to, those listed below;

ARTICLE 1 - SUBMIT WITH BID

	Form Number	Form Name
☐	00410	Bid Form
☐	00412	Designation of Subcontractors
☐	00414	List of Suppliers
☐	00416	Designation of Insurance Agent or Broker
☐	00418	List of Project References
☐	00420	Stop Notice Information
☐	00422	Non-Collusion Statement
☐	00424	Prevailing Wage Statement
☐	00426	Local Hire for Public Works
☐	00430	Bid Bond (Bid Security)
☐	No form included	Certificate of Contractor's License

ARTICLE 2 – SUBMIT PRIOR TO OWNER'S EXECUTION OF CONTRACT (After Notice of Award)

☐	00520	Agreement
☐	00610	Performance Bond
☐	00615	Payment Bond

END OF DOCUMENT

Notice of Award

Dated _____

Project: **Inter-Garrison Road Water Distribution Pipeline**	Owner: **Marina Coast Water District**	Owner's Contract No.:
Contract:		Engineer's Project No.:
Bidder:		
Bidder's Address: (send Certified Mail, Return Receipt Requested)		

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

_____

_____

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is _____

_____ Dollars ($_____).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.

2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]

3. Other conditions precedent:

_____

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

_____
Owner

By:_____
Authorized Signature

_____
Title

END OF DOCUMENT

AGREEMENT

INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE PROJECT

TABLE OF ARTICLES

AGREEMENT
BETWEEN MARINA COAST WATER DISTRICT
AND [CONTRACTOR] FOR
INTER-GARRISON ROAD WATER DISTRICTION PIPELINE PROJECT

CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Marina Coast Water District (MCWD or Owner)

and _____(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

This Capital Improvement project consists of installing approximately 3,500 linear feet of new 18-inch ductile iron pipe (DIP) water main in Inter-Garrison Road, from approximately 200' east of the Sherman Road intersection to approximately 500' west of the intersection with Sherman Blvd. in East Garrison. The new main will connect to existing 12" water mains at both its eastern and western ends. This work includes all associated fittings, valves, appurtenances, pavement removal and restoration, reconnecting existing mains and services along these pipes, and abandonment grouting of existing water mains within the right-of-way.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: **INTER-GARRISON ROAD WATER DISTRIBUTION PIPELINE**

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Andrew P. Hunter, P.E. – Whitson Engineers, 6 Harris Court, Monterey, CA 93940.

ARTICLE 4 – CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within 90 calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 120 calendar days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $500 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Construction Management as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. 80 percent of Work installed but not accepted (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

b. 50 percent of cost of materials and equipment not incorporated in the Work that is on site. (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in

accordance with Paragraph 14.02.B.5 of the General Conditions and less 50 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Construction Management as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 5 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement

2. Performance Bond (pages 1 to 4, inclusive).

3. Payment Bond (pages 1 to 4, inclusive).

4. General Conditions (EJCDC C-700 Standard General Conditions of the Construction Contract)

5. Supplementary Conditions (Document 00800).

6. Technical Specifications titled "Inter-Garrison Road Water Distribution Pipeline Project, CIP No. OW-0206"

7. Drawings consisting of 8 sheets numbered 1 through 8, inclusive, with each sheet bearing the general title "Inter-Garrison Road Water Distribution Pipeline Project"

8. Addenda (Numbers 1 to _, inclusive)

9. BID FORM Exhibits to this Agreement (enumerated as follows):

   a. Contractor's Bid

   b. Documentation submitted by Contractor prior to Notice of Award

10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

   a. Notice to Proceed.

   b. Work Change Directives.

   c. Change Order(s).

11. The Standard Plans and Specifications of the Marina Coast Water District, dated November 2007, are incorporated by reference.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Other Provisions – Not Used

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, 2018 (which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR:
Marina Coast Water District	
By:	By:
Title:	Title:
	[CORPORATE SEAL]
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
	License No.: (Where applicable)

END OF DOCUMENT

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): Marina Coast Water District, 11 Reservation Road, Marina, CA 93933

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefore to Owner; or

2. Deny liability in whole or in part and notify Owner citing reasons therefore.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF DOCUMENT

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER: Marina Coast Water District, 11 Reservation Road, Marina, CA 93933

CONTRACT
Date:
Amount:
Description (Name and Location):
BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

SURETY

(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone **Surety Agency or Broker:**

PRECEDENCE

In event of conflict between various provisions of the plans and specifications, the provisions more restrictive of the Contractor shall apply. In event of conflict that cannot be resolved by restrictiveness, the document highest in precedence shall control. The precedence shall be:

1. Federal and State requirements (where applicable)
2. Permits from Agencies having jurisdiction
3. Agreement
4. Bidding Documents
5. Special Requirements
6. Basic Specifications
7. Plans (Drawings)
8. Standard Drawings
9. Reference Specifications

END OF DOCUMENT

SUPPLEMENTARY CONDITIONS
TABLE OF CONTENTS

SUPPLEMENTARY CONDITIONS

I. General

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. C-700, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

II. Specific Items

SC-1.01.A.29 Add the following sentence at the end of Paragraph 1.01.A.29: The terms "Owner," "District" and "MCWD" shall be used interchangably and shall all have the same meaning.

SC 2.02 Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor up to 5 printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional copies will be furnished upon request at the cost of reproduction.

SC-4.02 Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

A. No reports of explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

A. No reports on drawings related to Hazardous Environmental Conditions are known to Owner or Engineer.

B. Not Used.

SC-5.02 Add the following new paragraphs immediately after Paragraph 5.02.A:

B. All of the insurance shall be provided through companies acceptable to Owner.

C. All insurance shall be provided on policy forms acceptable to the owner (Accord Form 25-S or equivalent), signed by the insurer's representative. Such evidence shall include an original copy of the additional insured endorsement signed by the insurer's representative.

D. Insurance is to be placed with insurers having a current AM Best rating of no less than A- or equivalent, unless otherwise agreed to by the parties in writing.

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

SC-5.04 Add the following new paragraph immediately after Paragraph 5.04.B:

C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

a. State: Statutory

b. Applicable Federal (e.g.,Longshoreman's): Statutory

c. Employer's Liability: $ 1,000,000

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a. General Aggregate $ 10,000,000

b. Products - Completed Operations Aggregate $ 5,000,000

c. Personal and Advertising Injury $ 5,000,000

d. Each Occurrence (Bodily Injury and Property Damage) $ 5,000,000

e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.

f. Excess or Umbrella Liability

1) General Aggregate $ 10,000,000

2) Each Occurrence $ 5,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:
Each Person $ 1,000,000
Each Accident $ 1,000,000

b. Property Damage:
Each Accident $ 1,000,000

c. Combined Single Limit of $ 1,000,000

4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:
Each Accident $ 2,000,000
Annual Aggregate $ 1,000,000

b. Property Damage:
Each Accident $ 1,000,000
Annual Aggregate $ 1,000,000

5. Contractors Pollution Liability, which shall include pollution coverage for contractual liability, clean-up costs, abatement, transport and non-owned disposal sites, bodily injury liability, property damage liability and environmental damage arising from pollution conditions caused in performance of operations. Include Asbestos and Lead if part of operations.

a. General Aggregate $ 10,000,000

b. Each Occurrence $ 5,000,000

6. In addition to the individuals and entities specified, include as additional insureds, the following:

a. Owner's inspector (TBD)
b. County of Monterey, CA

SC-5.06.A. Delete Paragraph 5.06.A in its entirety and insert the following in its place:

A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.

1. This insurance shall:

a. include the interests of Owner, Contractor, Subcontractors, Engineer and any other individuals or entities identified herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

b. in addition to the individuals and entities specified, include as additional insureds, the following:

1) County of Monterey, CA

c. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for

physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

d. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

e. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

f. allow for partial utilization of the Work by Owner;

g. include testing and startup; and

h. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

2. Contractor shall be responsible for any deductible or self-insured retention.

3. The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-5.06.A shall comply with the requirements of paragraph 5.06.C of the General Conditions.

SC-5.06.B. Delete Paragraph 5.06.B in its entirety and insert the following in its place:

B. Owner maintains property insurance upon the existing District Property at the Site. This insurance protects the interests of the Owner and its officers, directors, partners, employees, agents and authorized volunteers. Contractor is not a named additional insured and said policy is not subject to the requirements of GC-5.06.C.

SC-5.06.E. Delete Paragraph 5.06.E in its entirety.

SC-5.08 Delete paragraphs 5.08.A and 5.08.B and insert the following in their place:

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and Owner. Owner, Contractor and other parties of interest shall agree in writing as to the distribution of payments, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. If the Owner, Contractor and other parties of interest cannot reach an agreement within 30-days from the time of commencing negotiations, the settlement shall be handled as a Claim per the Dispute Resolution procedures in SC-16.01.

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

H. Owner or Engineer may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

SC-6.08 Add the following new paragraph immediately after Paragraph 6.08.A:

B The Owner shall provide the following permits:

1. CEQA Categorical Exemption

SC-6.09 Add the following new paragraphs immediately after Paragraph 6.09.D:

6.09.E. Public Contract Provisions

1. The Contractor is responsible for his own compliance, and is responsible for all Subcontractors' compliance, with all applicable sections of the California Labor Code regarding the payment of wages, the employment of apprentices,

and hours of work, all as set forth in Section 1170 through Section 1815 of that Code. Those requirements are set forth below.

2. Payment of Prevailing Wages

a. Pursuant to Sections 1774 and 1775 of the Labor Code, unless the contract price is under $1,000.00, the Contractor and any subcontractor under him, shall pay not less than the general prevailing rate of per diem wages, including holiday and overtime pay, to all workmen employed in the execution of this Contract. Failure to so comply will result in a fine of $25.00 per day per violation, and the obligation to compensate each such employee the difference between the wage actually paid and the prevailing wage applicable to that employee's craft.

b. Pursuant to Section 1773.2 of the California Labor Code, the District has on file at its principal office, copies of the prevailing rate of per diem wages for each craft, and classification or type of workman needed to execute the contract, and a copy shall be available to any interested party upon request.

c. The Contractor shall obtain and post copies of the prevailing per diem wage rates at the job site during the term of this project.

d. Pursuant to Labor Code Section 1776, the Contractor and each 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, the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor or subcontractor in connection with the project, and such other information as required by law, and such payroll records shall be certified and made available for inspection and release all in accordance with Labor Code Section 1776 and 8 California Code of Regulations Section 16000 et seq. **All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).** The Contractor shall file with the District certified copies of its and all its subcontractors' payroll records within thirty (30) calendar days after completion of each payroll period at no cost to the District.

e. Pursuant to Section 1773.8 of the Labor Code, travel and subsistence payments shall also be paid to each workman needed to execute such work if such travel and subsistence payments are set forth in the applicable collective bargaining agreements and filed with the Department of Industrial Relations thirty (30) days prior to the call for bids.

f. Unless the Contract amount is under $30,000 or will be completed in less than twenty (20) days (or if this Contract involves a specialty contractor under $2,000 or less than 5 days) the Contractor shall comply with Section 1777.5 regarding the employment of registered apprentices upon public works by hiring, and by requiring that all subcontractors hire apprentices at the wage rate and ratio required, if at all, and by requiring the contribution of funds to appreciable crafts or trades as applicable under Section 1777.5.

g. The Contractor shall, as a penalty to the District, forfeit not more than two hundred dollars ($200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of the Department of Industrial Relations for such work or craft in which such worker is employed for any public work done under this contract by the Contractor or by any subcontractor under the Contractor. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor. Labor Code Section 1775.

h. Required California Department of Industrial Relations provisions:

- No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
- No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

- This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

i. The Contractor certifies that the Contractor and all subcontractors for this public works project have been registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

j. The District shall not recognize any claim for additional compensation from the Contractor because of the payment by the Contractor of any wage rate in excess of the prevailing rate of per diem wages. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its bid and will not, under any circumstances, be considered as the basis of a claim against the District under this contract.

3. Hours of Labor

a. Pursuant to Sections 1810 through 1815 of the Labor Code, eight hours of labor constitutes a legal day's work, and work performed by employees of the Contractor or any subcontractor in excess of eight hours per day, and forty hours in any one week, shall be compensated at not less than one and one-half times their basic rate of pay. Violation of this condition shall result in a penalty of $25.00 per day per workman so underpaid.

4. Unidentified Utilities – Costs (Government Code 4215)

a. The District shall be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the construction site, if such utilities are not identified in the plans and specifications for the work. The Contractor shall be compensated for his actual costs of locating, repairing damage not due to his failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy and for equipment on the project necessarily idled during such work. If the Contractor discovers utility facilities not identified in the contract plans or specifications, he shall immediately notify the District and the utility in writing. The Contractor shall not be assessed liquidated damages for delay if caused by the failure of the District or the owner of the utility to provide for removal or relocation of such utility facilities. The District shall provide a layout of all main lines and existing service laterals. The Contractor shall exercise due care in verifying the locations provided by the District and shall notify the District of site conditions that differ from those indicated.

5. Dispute Resolution Procedures for Claims of Less Than $375,000

a. Sections 20104 - 20104.6 of the Public Contract Code set forth required procedures for the parties to resolve claim disputes involving less than $375,000, including the presentation of written claims with substantiating documents on or before the date of final payment, requests for additional documentation, time limits for responding to written claims, and requiring a conference to meet and confer; and also relating to filing a claim before suit, and required arbitration provisions in the event of a civil action filed to resolve the claim. All of such procedures, time limits and requirements shall be complied with if such Code sections are applicable to disputed claim.

6. Assignment of Antitrust/Unfair Business Practice Claims

a. Pursuant to Public Contract Code Section 7103, Contractor and any subcontractors supplying goods, services or materials under this contract agree to assign District all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C Sec. 15) or under the Cartwright Act (Chapter 2 commencing with Section 16700 of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to this contract or the subcontract.

7. Substitution of Securities for Retention. Pursuant to Public Contract Code Section 22300 and upon Contractor's request, the District will make payments into escrow of funds which would otherwise be retained from progress payments under the payments to contractor provisions in the Agreement and the Supplementary and General Conditions if the Contractor deposits into that escrow securities eligible for investment under Public Contract Code Section 22300 (hereafter collectively referred to as "securities"), upon the following terms and conditions:

a. The escrow agent shall be either the District Treasurer or a state or federal chartered bank acceptable to the District.

b. The Contractor shall bear all expenses of the District and of the escrow agent in connection with the escrow.

c. The fair market value of the securities shall be at least equal to 100 percent of the cash amount withheld as retention under the contract and the amount of the required securities shall be adjusted from time to time based upon changes in the fair market value of the securities on deposit with the escrow agent. Such securities shall be valued by the District Treasurer whose decision on valuation of the securities shall be final.

d. The Contractor shall enter into an escrow agreement substantially similar in form to that prescribed in Public Contract Code Section 22300.

e. The Contractor shall obtain the written consent to the escrow agreement of the surety or sureties furnishing Contractor with its performance and payment bonds.

SC-6.13 Add the following new paragraphs after paragraph 6.13.D:

E. In carrying out his/her work, the Contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including California Department of Industrial Relations (Cal/OSHA) regulations; and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act (as applicable). Safety precautions as applicable shall include, but shall not be limited to, adequate life protection, and life saving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks; confined space procedures; trenching and shoring; fall protection; and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents, injuries, or illnesses; and adequate facilities for the proper inspection and maintenance of all safety measures.

F. The Contractor shall be responsible for the safeguarding of all utilities. At least two working days before beginning work, the Contractor shall call the Underground Service Alert (USA) in order to determine the location of sub-structures. The Contractor shall immediately notify the District and the utility owner if he/she disturbs, disconnects, or damages any utility.

G. In accordance with Section 6705 of the California Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground during excavations of trenches of five feet or more in depth. The excavation/trench safety plan shall be submitted to and accepted by the District prior to starting excavation. The trench safety plan shall have details showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such a plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations (Cal/OSHA), the plan shall be prepared by a California registered civil or structural engineer. As part of the plan, a note shall be included stating that the registered civil or structural engineer certifies that the plan complies with the Cal/OSHA Construction Safety Orders, or that the registered civil or structural engineer certifies that the plan is not less effective than the shoring, bracing, sloping or other provisions of the Safety Orders. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders. Submission of this plan in no way relieves the Contractor of the requirement to maintain safety in all areas. If excavations or trench work requiring a Cal/OSHA permit are to be undertaken, the Contractor shall submit his/her permit with the excavation/trench work safety plan to the District before work begins.

H. Trench Excavation: Approval of Plan for Protection from Caving

1. If the contract involves an estimated expenditure of more than $25,000, for the excavation of any trench or trenches five feet or more in depth, the Contractor shall submit, for acceptance and approval by the District or its designated engineer, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provision to be made for worker protection from the hazard of caving ground

during such excavation, all in accordance with Labor Code Section 6705.

I. Excavations Deeper than Four Feet Involving Hazardous Wastes or Materially Different Site Conditions

1. If the contract involves digging trenches or other excavations that extend deeper than four feet below the surface:

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

(1) Material that the Contractor believes may be material that is 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.

b. The District shall promptly investigate the conditions, and if it finds that the conditions do materially so 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, it shall issue a change order under the procedures described in the Agreement.

c. 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 any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Agreement, but shall proceed with all work to be performed under the Agreement. The Contractor shall retain any and all rights provided either by contract or by law, which pertains to the resolution of disputes and protests between the contracting parties.

SC-6.17 Add the following new paragraph immediately after paragraph 6.17.E.1

F *Specified Submittals*

1. Contractor is responsible for making all submittals as specified in the Contract Documents. Where the Contract Documents specifically require the submittal of shop drawings, samples, product information, materials information or other items, failure of the Contractor to make such submittal, and/or failure of the Engineer or Owner to request such submittal, shall not imply approval of the Contractor's proposed item.

SC-6.20 Delete paragraph 6.20.A in its entirety and insert the following in its place:

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work or the failure, neglect or refusal of the Contractor to perform the Work and all obligations under the Contract, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

SC-7.01 Add the following new paragraph immediately after paragraph 7.01.C.

D. Related Work at Site None.

SC-9.03 Project Representative: Not Used.

SC-11.03.D Delete Paragraph 11.03.D in its entirety and insert the following in its place:

C. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the Bid price of a particular item of Unit Price Work amounts to 10 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 10 percent from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

SC-16 Dispute Resolution

SC-16.01 Delete Paragraph 16.01.A in its entirety and insert the following in its place:

A. Either Owner or Contractor may request mediation of any Claim submitted to the Engineer for a decision under Paragraph 10.05 before such a decision becomes final and binding. The mediation will be governed by the Construction industry mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement, except that the American Arbitration Association shall not administer the mediation. The mediation shall be initiated by one party sending a written demand of mediation to the other party. The parties shall agree on an arbitrator and if they are unable to so agree, the then-presiding judge of Monterey County, California Superior Court shall appoint an arbitrator.

SC-16.01 Delete Paragraph 16.01.C in its entirety and insert the following in its place:

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to demand arbitration of the Claim, pursuant to Paragraph SC-16.02, or

2. agrees with the other party to submit the Claim to another dispute resolution process.

SC-16.02 Add the following new paragraph immediately after Paragraph 16.01.

SC-16.02 Arbitration

A. All Claims or counterclaims, disputes, or other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for Claims which have been waived by the making or acceptance of final payment as provided by Paragraph 14.09) including but not limited to those not resolved under the provisions of Paragraphs SC-16.01A and 16.01.B will be decided before a single neutral arbitrator in accordance with the Commercial Arbitration Rules of the American Arbitration Association, except that the American Arbitration Association shall not administer the arbitration. The parties shall agree on an arbitrator and if they are unable to so agree, the then-presiding judge of Monterey County, California Superior Court shall appoint an arbitrator. The arbitration shall be subject to the conditions and limitations of this Paragraph SC-16.02. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the 30 day period specified in Paragraph SC-16.01.C, and in all other cases within a reasonable time after the Claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such Claim or other dispute or matter in question would be barred by the applicable statue of limitations.

C. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include: (i) a concise breakdown of the award; (ii) a written explanation of the award specifically citing the Contract Document provisions deemed applicable and relied on in making the award.

E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Controlling Law relating to vacating or modifying an arbitral award.

F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

SC-17.05 Delete paragraph 17.05.A in its entirety and replace it with the following:

A. This Contract shall be construed and enforced according to the laws of the State of California, and the parties hereby agree that the County of Monterey shall be the proper venue for any dispute arising hereunder.

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description of Work
B. CONTRACTOR Use of Site
C. OWNER Use of Facilities
D. Standard Specifications
E. Project Meetings

1.02 DESCRIPTION OF WORK

This Capital Improvement project consists of installing approximately 3,500 linear feet of new 18-inch ductile iron pipe (DIP) water main in Inter-Garrison Road, from approximately 200' east of the Sherman Road intersection to approximately 500' west of the intersection with Sherman Blvd. in East Garrison. The new main will connect to existing 12" water mains at both its eastern and western ends. This work includes all associated fittings, valves, appurtenances, pavement removal and restoration, reconnecting existing mains and services along these pipes, and abandonment grouting of existing water mains within the right-of-way.

1.03 CONTRACTOR USE OF SITE

A. The Work is within a public right of way and subject to the conditions of the City of Seaside Encroachment Permit. The encroachment permit application is at Appendix B of the Project Manual.

B. CONTRACTOR shall coordinate staging and storage per Section 01550.

1.04 OWNER USE OF FACILITIES

A. Existing water main and other utilities will remain active throughout the Work. Coordinate all work affecting the utilities with Marina Coast Water District (MCWD or the District) and the City. See additional requirements in Section 01045.

1.05 STANDARD SPECIFICATIONS

A. References in the Contract Documents to "Standard Specifications" shall mean the Design Standards and Standard Specifications of the Marina Coast Water District.

1.06 PROJECT MEETINGS

A. Preconstruction Conference:

1. Prior to the commencement of WORK at the site, one preconstruction conference will be held at a mutually agreed time and place which shall be attended by the

CONTRACTOR'S Project Manager, its Superintendent, and its Subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

a. DISTRICT ENGINEER.
b. Representatives of OWNER.
c. Governmental representatives as appropriate.
d. Others as requested by DISTRICT ENGINEER, CONTRACTOR, or OWNER.

2. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss all of the items listed below.
   a. Status of CONTRACTOR's insurance and bonds.
   b. CONTRACTOR's tentative schedules.
   c. Processing applications for payment.
   d. Maintaining record documents.
   e. Critical work sequencing.
   f. Field decisions and Change Orders.
   g. Use of project site, office and storage areas, security, housekeeping, and OWNER's needs.
   h. Major equipment deliveries and priorities.
   i. CONTRACTOR's assignments for safety and first aid.
3. The DISTRICT ENGINEER will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.
4. The CONTRACTOR and its Subcontractors should plan on the conference taking 2 hours.

B. **Progress Meetings**:

1. The CONTRACTOR shall attend regular on-site progress meetings at least weekly - and at other times as requested by DISTRICT ENGINEER or as required by progress of the WORK. The CONTRACTOR, DISTRICT ENGINEER, and all Subcontractors active on the site must attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.
2. The DISTRICT ENGINEER shall preside at the meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR is required to present any issues which may impact his work, with a view to resolve these issues expeditiously.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.01 SECTION INCLUDES

A. Methods of Measurement

B. Description of Bid Items

1.02 METHODS OF MEASUREMENT

A. Materials and items of work which are to be paid for on the basis of measurement shall be measured in accordance with the method stipulated in the particular sections involved. In determining quantities, all measurements shall be made in a horizontal plane unless otherwise specified.

B. Measurements shall be in accordance with U.S. Standard Measures. A pound is an avoirdupois pound. A ton is 2,000 pounds avoirdupois. The unit of liquid measure is the U.S. gallon. The unit of length is feet. The unit of volume is cubic yards.

C. Material not used from a transporting vehicle shall be determined by the ENGINEER and deducted from the certified tag.

D. When material is to be measured and paid for on a volume basis and it would be impractical to determine the volume, or when requested by the CONTRACTOR in writing and approved by the ENGINEER in writing, the material will be weighed and converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the ENGINEER and shall be agreed to by the CONTRACTOR before such method of measurement of pay quantities will be adopted.

E. Full compensation for all expense involved in conforming to the above requirements for measuring and weighing materials shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional allowances will be made therefore.

F. Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the CONTRACTOR to conform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or material placed outside the lines indicated on the plans or given by the ENGINEER; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will not be included in the final total quantities. No compensation will be allowed for hauling rejected material.

G. Bid items include all work necessary to complete the specific item described and not otherwise included in other bid items. The CONTRACTOR shall include in each bid item ***all*** costs required to construct the work in accordance with the Contract Documents and as identified below.

1.03 DESCRIPTION OF BID ITEMS

Bid Item 1: Mobilization/Demobilization:

The ***lump sum*** bid price for this item shall constitute full compensation for mobilization and demobilization including but not limited to equipment shipping and delivery, equipment set up, materials shipping and delivery, utility coordination, permitting including the City of Seaside Encroachment Permit, removal of equipment, and project closeout. The Mobilization/Demobilization bid item shall not be in excess of ten percent (10%) of the total bid schedule. Twenty-five percent (25%) of the total Mobilization / Demobilization bid price shall be considered the cost of Demobilization and will not be paid until completion of the work.

Bid Item 2: Trench Safety:

The ***lump sum*** bid price for temporary sheeting, shoring, and bracing or equivalent method will be based upon the completion of all planning, design, engineering, furnishing, and construction and the removal and disposal of all such temporary sheeting, shoring, and bracing for new construction as well as for protection of, support of, and bracing of existing utilities, complete, as required under the provisions of any permits, and in accordance with the requirements of OSHA and the Construction Safety Orders of the State of California, pursuant to the provisions of Section 6707 and Section 6705 of the California Labor Code.

Bid Item 3: 18 Inch Ductile Iron Pipe:

This ***unit*** bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide 18 inch pipeline in Inter-Garrison Road, as shown on the plans.

The price shall include furnishing and installing all pipe, fittings, valves, restraints and appurtenances as described on the plans, and hydrostatically testing and disinfecting these structures according to the specifications, and making final connections to the existing system. The price shall also include the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.

The price shall also include costs for restoring the streets and all other properties, back to initial condition, including a Type II slurry seal covering the ***full width*** of the street in which trenching occurs (approx. 3500 linear feet) and restriping.

Bid Item 4: Connection at Western Limit of Work:

This ***lump sum*** bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to connect the new 18 inch water line (Bid Item 3) to the existing 12 inch mains to the east of Schoonover Drive (western limit of work) as shown on the plans.

The price shall include furnishing and installing all pipe, fittings, valves and appurtenances as described on the plans, and hydrostatically testing and disinfecting these structures according to the specifications, and making final connections to the existing system. The price shall also include the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.

The price shall also include costs for restoring the streets and all other properties, back to initial condition.

Bid Items 5: Connection at Eastern Limit of Work:

This ***lump sum*** bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to connect the new 18 inch water line (Bid Item 3) to the existing 12 inch main to the west of Sherman Blvd (eastern limit of work), as shown on the plans.

The price shall include furnishing and installing all pipe, fittings, valves and appurtenances as described on the plans, and hydrostatically testing and disinfecting these structures according to the specifications, and making final connections to the existing system. The price shall also include the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.

The price shall also include costs for restoring the streets and all other properties, back to initial condition.

Bid Items 6: 18" HDPE Storm Drain Pipe Segments:

This ***lump sum*** bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to install seven (7) the new segments of 18 inch HDPE storm drain line beneath the new 18 inch water line (Bid Item 3), at locations shown on the plans. Segments, each 20 feet in length with no joints, shall be capped on both ends and centered beneath the new 18 inch water line, at a depth which allows at least 1 foot of vertical clearance between the storm drain and water lines.

The price shall include furnishing and installing all pipe, fittings, valves and appurtenances as described on the plans, and hydrostatically testing and disinfecting these structures according to the specifications, and making final connections to the existing system. The price shall also include the abandonment of the existing water line south of the point of connection, and the removal and disposal of excess excavation.

The price shall also include costs for restoring the streets and all other properties, back to initial condition.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

-END OF SECTION -

SECTION 01070 - ABBREVIATIONS OF INSTITUTIONS

PART 1 -- GENERAL

1.1 GENERAL

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meanings indicated herein.

1.2 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANS-	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturer's Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturer's Association

CGA	Compressed Gas Association
CLPCA	California Lathing and Plastering Contractors Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DCDMA	Diamond Core Drill Manufacturer's Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
FM	Factory Mutual System
FPL	Forest Products Laboratory
HI	Hydronics Institute
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastics Pipe Institute
RCRA	Resource Conservation and Recovery Act
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry, Inc.

SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WEF	Water Environment Federation
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

– END OF SECTION –

SECTION 01090 - REFERENCE STANDARDS

PART 1 -- GENERAL

1.1 GENERAL

A. **Titles of Sections and Paragraphs:** Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. **Applicable Publications:** Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. **Specialists, Assignments:** In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.

B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO). Similarly, references to "Mechanical Code' or "Uniform Mechanical Code," "Plumbing Code' or "Uniform Plumbing Code," 'Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or

providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.

D. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.

1. **Applicable Standard Specifications:** References in the Contract Documents to "Standard Specifications" shall mean the Standard Plans and Specifications for Construction of Domestic Water, Sewer and Recycled Water Facilities of the Marina Coast Water District, September 2003 Edition.

2. **State of California Department of Transportation Standard Specifications and Standard Plans:** References in the Contract Documents to "CALTRANS Standard Specifications" shall mean the State of California Department of Transportation Standard Specifications and Standard Plans, edition as required by the City of Marina. The CONTRACTOR should be prepared to distinguish between these two references.

3. References herein to "OSHA Regulations for Construction" shall mean **Title 29, Part 1926, Construction Safety and Health Regulations**, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

4. -References herein to "OSHA Standards" shall mean **Title 29, Part 1910, Occupational Safety and Health Standards**, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

5. **Applicable Safety Standards:** References herein to "Cal-OSHA" shall **mean State of California Department of Industrial Relations, Construction Safety Orders**, as amended to date, and all changes and amendments thereto.

6. Accessibility requirements shall conform to Title 24 of the California Administration Code and ADA Guidelines.

1.3 REGULATIONS RELATED TO CONSTRUCTION ACTIVITIES.

A. The CONTRACTOR is responsible that all WORK included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing construction activities, as referenced in Section 00700, "General Conditions."

1.4 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. The CONTRACTOR is responsible that all WORK included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

B. Where no specific regulations exist, all chemical, hazardous, and petroleum product piping and storage in underground locations must be installed with double containment piping and tanks, or in separate concrete trenches and vaults, or with an approved lining which cannot be penetrated by the chemicals, unless waived in writing by the OWNER.

PART 2 - PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01300 – CONTRACTOR SUBMITTALS

PART 1 -- GENERAL

1.1 GENERAL

A. Wherever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the ENGINEER.

B. Within 14 days after the date of commencement as stated in the Notice to Proceed or at Preconstruction Conference, which may occur within 10 days of the date of commencement, the CONTRACTOR shall submit the following items to the ENGINEER for review:

1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitutes ("Or-Equal") submittals listed in the Bid.

2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.

1.2 PRECONSTRUCTION CONFERENCE SUBMITTALS

A. At the preconstruction conference referred to in Section 01010, “Summary of Work,” the CONTRACTOR shall submit the following items to the ENGINEER for review:

1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitute ("Or-Equal") submittals listed in the Bid.

2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.

4. Construction schedule for entire project.

1.3 SHOP DRAWINGS

A. Wherever called for in the Contract Documents, or where required by the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER for review, 8 copies of each shop drawing submittal. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, list, graphs, catalog sheets, data sheets, and similar items. Whenever the CONTRACTOR is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an ENGINEER registered in the appropriate engineering branch and in the State of California, unless otherwise directed.

B. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be

collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the ENGINEER.

C. Except as may otherwise be indicated herein, the ENGINEER will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 14 working days following their receipt by the ENGINEER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER by the second submission of a submittal item. The OWNER reserves the right to withhold monies due to the CONTRACTOR to cover additional costs of the ENGINEER's review beyond the second submittal. The ENGINEER'S maximum review period for each submittal, including all resubmittals, will be 7 working days per submittal. In other words, for a submittal that requires two resubmittals before it is complete, the maximum review period for that submittal could be 14 working days. No extension of Contract Time will be granted for delays due to resubmittals that are reviewed within the number of days specified.

D. If 3 copies of a submittal are returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.

E. If 3 copies of a submittal are returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED," formal revision and resubmission of said submittal will not be required.

F. If a submittal is returned to the CONTRACTOR marked "REVISE AND RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

G. If a submittal is returned to the CONTRACTOR marked "REJECTED-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

H. Fabrication of an item shall be commenced only after the ENGINEER has reviewed the pertinent submittals and returned copies to the CONTRACTOR marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.” Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements.

I. All CONTRACTOR shop drawings submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR, prior to submittal to the ENGINEER. Each submittal shall be dated, signed, and certified by the CONTRACTOR, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the ENGINEER of any CONTRACTOR submittals will be made for any items which have not been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

J. The ENGINEER's review of CONTRACTOR shop drawings submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any

errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

1.4 CONTRACTOR'S SCHEDULE

A. Prepare construction schedule showing sequence of activities and proposed shutdowns.
B. Preliminary construction schedule submitted five days prior to Pre Construction Meeting.
C. Update construction schedule on monthly basis and submit with request for Progress Payment.

1.5 RECORD DRAWINGS

A. The CONTRACTOR shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the WORK.

Copies of the modified record drawings shall be submitted on completion of WORK.

B. Record drawings shall be accessible to the ENGINEER at all times during the construction period. ENGINEER may hold a progress payment amount of $5,000 until Contract Record Drawings are up-to-date.

C. Final payment will not be acted upon until the CONTRACTOR prepared record drawings have been prepared and delivered to the ENGINEER. Said up-to date record drawings shall be in the form of a set of Contract Documents prints with any changes from the original Contract Documents carefully plotted on the prints in red ink.

D. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the ENGINEER for transmittal to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected drawings showing the reported location of the WORK. The information submitted by the CONTRACTOR and incorporated by the ENGINEER into the Record Drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the Record Drawings as a result.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01530 - PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.01 GENERAL

A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

B. The CONTRACTOR shall verify the exact locations and depths of existing utilities shown that will be affected by the work. CONTRACTOR shall make exploratory excavations as necessary to confirm locations shown. The depths shown for existing underground utilities are based on record drawings, limited potholing, and survey information, and are approximate only (± 1 foot vertical and ± 5 feet horizontal). Where the depths are not shown, no such information was obtained during design. When such exploratory excavations show the utility location as shown to be in error, the CONTRACTOR shall immediately notify the ENGINEER when existing utilities are not as shown on the drawings.

C. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the CONTRACTOR shall notify the respective authorities representing the owners or agencies responsible for such facilities. The CONTRACTOR shall also notify Underground Service Alert-North at 1-800-227-2600 at least 2 days, but no more than 14 days, prior to such excavation.

D. CONTRACTOR shall photograph and document all project sites before and after construction. CONTRACTOR shall provide the ENGINEER with site pictures before work begins. CONTRACTOR shall provide the ENGINEER with photographs of completed work before requesting final payment.

1.02 PROTECTION OF STREET OR ROADWAY MARKERS AND MONUMENTS

A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey markers or points disturbed by the CONTRACTOR shall be restored accurately after all street or roadway resurfacing has been completed.

1.03 RESTORATION OF PAVEMENT

A. **General:** All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of at least equal thickness to match the existing adjacent undisturbed areas. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

B. **Temporary Resurfacing:** Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements. Temporary surfacing shall be replaced with permanent pavement within no more than 5 days after completion of work in an area. At no time shall the CONTRACTOR have more than 2,000 feet of trench with temporary surfacing.

C. **Restoration of Sidewalks or Private Driveways:** Wherever sidewalks or private roads have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

1.04 EXISTING UTILITIES AND IMPROVEMENTS

A. **General:** The CONTRACTOR shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary. The following clearances shall be met for gas mains and electric lines encountered:

1. Five feet from power pole to edge of straight trench.
2. Three feet from edge of slope for sloped trench.
3. Five feet from anchor blocks.
4. Three feet from edge of gas main to edge of pipeline.
5. One foot minimum crossing of gas main with pipeline.
6. A minimum of ten radial feet from the conductors on overhead power lines.

Clearances to be met for telephone are the following:

1. Five feet for anchor blocks and telephone poles.
2. Three feet for sloped trench.

B. **Utilities to be Moved:** In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the OWNER to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

C. Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the CONTRACTOR shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the

owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal. The CONTRACTOR shall arrange with the utility for utility poles to be moved whenever any of the clearances described above cannot be maintained. CONTRACTOR shall pay for such utility pole relocation. No extra compensation shall be paid to the CONTRACTOR for movement of utility poles.

D. **OWNER's Right of Access:** The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.

E. **Underground Utilities Indicated:** Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.

F. **Underground Utilities Not Indicated:** In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the ENGINEER. In such an event the CONTRACTOR's attention is directed to the provisions of Document 00800, Item 6.13.

G. **Approval of Repairs:** All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.

H. **Maintaining in Service:** All oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the ENGINEER are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01550 - SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.01 HAUL ROADWAYS

A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

B. Provide traffic control as specified in Section 01570.

1.03 CONTRACTOR'S WORK AND STORAGE AREA

A. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK.

B. OWNER will provide area for temporary staging, storage, and field offices at the location shown on the Drawings. Should the CONTRACTOR find it necessary to use any additional land for its field offices or for other purposes during the construction of the WORK, it shall provide for the use of such lands at its own expense.

C. CONTRACTOR shall be responsible for the security of its equipment, materials, and facilities stored in the OWNER provided temporary staging and storage area.

D. CONTRACTOR shall not use the OWNER provided temporary staging and storage area for maintenance of vehicles and equipment used in constructing the WORK.

E. The OWNER provided temporary staging and storage area is owned by Monterey Peninsula College. Do not damage or block access to the College modular buildings and construction trailers. Any damage to the site must be restored to the Owner’s satisfaction.

1.04 PARKING

A. The CONTRACTOR shall direct its employees to park in areas that do not interfere with traffic.

B. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

C. Parking is not allowed at the Monterey Peninsula College lots on 12th Street east of 3rd Avenue.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.1 EXPLOSIVES AND BLASTING

A. The use of explosives on the WORK will not be permitted.

1.2 DUST AND MUD ABATEMENT

A. The CONTRACTOR shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust and/or mud in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The CONTRACTOR shall be responsible for any damage resulting from any dust and/or mud originating from its operations. The dust or mud abatement measures shall be continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER.

1.3 RUBBISH CONTROL

A. During the progress of the WORK, the CONTRACTOR shall keep the site of the WORK and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the WORK site, and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.4 SANITATION

A. **Toilet Facilities:** Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. **Sanitary and Other Organic Wastes:** The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.

1.5 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or

the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

B. All chemicals used during the project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, fertilizer, disinfectants, polymers, reactants, fuel, oil, hydraulic fluid, detergent, paint, solvent, glue, or any other classification, shall be stored within a containment area that minimizes contact of the chemicals and the storage containers with surface waters. The CONTRACTOR shall notify the ENGINEER to determine if the surface water has been contaminated or may be allowed to be discharged to the storm drains or stream channels. If the surface water flows have become contaminated due to contact with the chemicals or the storage containers, the CONTRACTOR shall provide for removal and/or treatment of the surface water flows at no additional costs to the OWNER. If spills occur in the containment area, the CONTRACTOR shall immediately notify the ENGINEER and contain and cleanup the spill to prevent spilled material from entering storm drains, stream channels, or groundwater or from being absorbed by the underlying pavement or soil.

1.6 TRENCH SPOILS DISPOSAL

A. All trench spoils shall be hauled in trucks fitted with tarps and tailgates.

B. All trench spoils shall be disposed of at suitable sites retained by the CONTRACTOR and in compliance with fill and grading permits, copies of which shall be provided to the ENGINEER.

C. If disposing of trench spoils on private property, CONTRACTOR shall provide a release of liability from property owner upon construction completion.

1.7 RUNOFF AND EROSION CONTROL

A. CONTRACTOR shall prepare, submit and implement a Stormwater Pollution Prevention Plan (SWPPP) per the requirements of the State General Construction Stormwater Permit, SWRCB Order No. 2009-0009-DWQ, NPDES No. CAS000002.

B. CONTRACTOR shall file all notices as required in Order No. 2009-0009-DWQ.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01570 - TRAFFIC REGULATION

PART 1 -- GENERAL

1.01 TRAFFIC CONTROL REQUIREMENTS

A. Traffic control plans shall comply with the City of Marina Standard Specifications and Standard Plans, dated 2006.

B. CONTRACTOR shall supply and install all traffic control devices (including all warning, regulatory and guide signs) as required in Section 7-1.08, “Public Convenience,” 7-1.09, “Public Safety,” and 12, “Construction area Traffic Control Devices,” of the CALTRANS Standard Specifications. The City of Marina will not furnish any signs or other traffic control devices for this project.

C. CONTRACTOR shall furnish traffic control plans for approval by City of Marina Traffic Engineer a minimum of two (2) full working days prior to the preconstruction meeting. The traffic control plans must be approved by the City prior to any installation of traffic control devices.

The traffic control plans shall be to scale and complete for each significant portion of the work requiring lane closures, traffic detours and/or restriction of traffic movements. The traffic control plans shall indicate the work area, all proposed signs, the spacing and location of all traffic control devices (arrow boards, flagmen, barricades, cones, pylon construction markers, etc.) the limits of proposed parking prohibitions, and the width and location of any rerouted traffic lanes.

C. Traffic control plans shall include clearly marked detours facilitating access to the Monterey Peninsula College campus on 12th Street.

D. All open trenches must be adequately delineated by use of acceptable warning signs and devices during non-construction hours. The CONTRACTOR shall devise a typical plan indicating the type and spacing of barricades, signs, arrow boards, warning lights, pylon construction markers, construction tape, etc. to be used during non-construction hours. This plan must be submitted to the Engineer at the preconstruction meeting for review and approval.

E. It is imperative that field traffic control be handled in such a manner as to adequately and safely direct all traffic movements in the project area. The CONTRACTOR shall not be allowed to proceed with construction at any time that, in the opinion of the ENGINEER, traffic control is inadequate to meet the field conditions. Traffic control measures, in addition to those indicated on the approved traffic control plans may be required as field conditions dictate.

F. On-street parking, as appropriate, shall be provided on at least one side of the street in the project area at all times except during actual construction hours. Areas to be posted with "no parking" signs must be verified as correct by City Police Department a minimum of two (2) full working days prior to posting of the signs. Signs must be posted a minimum of forty eight (48) hours prior to the start of construction in each area requiring parking restrictions.

1.02 TEMPORARY CROSSINGS

A. General: Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 500 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

B. **Temporary Bridges:** Wherever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required. If CONTRACTOR does not consider temporary bridge or steel plates necessary. CONTRACTOR shall secure written approval to omit the steel plates from the ENGINEER prior to excavation

1.03 STREET USE

A. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the WORK shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

1.04 MEASUREMENT AND PAYMENT

No separate compensation shall be made for TRAFFIC REGULATION. Costs shall be incorporated into other items of work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

– END OF SECTION –

SECTION 01600 – PRODUCTS, MATERIALS, EQUIPMENT AND SUBSTITUTIONS

PART 1 -- GENERAL

1.1 DEFINITIONS

A. The word "Products," as used herein, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the WORK.

1.2 QUALITY ASSURANCE

A. **Source Limitations:** To the greatest extent possible for each unit of work, the CONTRACTOR shall provide products, materials, and equipment of a singular generic kind from a single source.

B. **Compatibility of Options:** Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 PRODUCT DELIVERY AND STORAGE

A. The CONTRACTOR shall deliver and store the WORK in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

B. The CONTRACTOR shall provide a certificate of compliance for all materials to be incorporated in the Work.

1.4 TRANSPORTATION AND HANDLING

A. Products shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturers unopened containers and packaging.

B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment, including those provided by OWNER, by methods to prevent soiling and damage.

C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.5 STORAGE AND PROTECTION

A. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's recommendations.

B. For exterior storage of fabricated products including pipe, products shall be placed on sloped supports above ground. Products subject to deterioration, including all ferrous metals, shall be covered with impervious sheet covering and heat and ventilation shall be provided to avoid condensation. PVC pipe shall be stored to avoid prolonged exposure to sunlight.

C. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

D. Storage shall be arranged to provide access for inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions.

E. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

F. The CONTRACTOR shall comply with manufacturer's product storage requirements and recommendations.

G. The CONTRACTOR shall maintain manufacturer-required environmental conditions continually.

H. The CONTRACTOR shall ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.

I. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.

J. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the OWNER in accordance with the Contract Documents.

1.7 PROPOSED SUBSTITUTES OR "OR-EQUAL" ITEM

A. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or equal" indicating that a substitution is permitted, materials or equipment of other suppliers may

be accepted if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:

1. The burden of proof as to the type, function, and quality of any such substitute product, material or equipment shall be upon the CONTRACTOR.

2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute and the ENGINEER'S decision shall be final.

3. The ENGINEER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense additional data about the proposed substitute.

4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.

5. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute.

6. The CONTRACTOR shall be responsible for resultant changes including design and construction changes and all additional costs resulting from the changes which the accepted substitution requires in the CONTRACTOR'S WORK, the WORK of its subcontractors and of other contractors, and shall effect such changes without cost to the OWNER.

B. The procedure for review by the ENGINEER will include the following:

1. If the CONTRACTOR wishes to provide a substitute item, the CONTRACTOR shall make written application to the ENGINEER on a ***"Substitution Request Form."***

2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the ***"Substitution Request Form(s)***" shall be submitted within the 14 days after award of the Contract.

3. Wherever a proposed substitute item has not been requested as specified herein, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide the material or equipment indicated in the Contract Documents.

4. The CONTRACTOR shall certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.

5. The ENGINEER will evaluate each proposed substitute within a reasonable period of time.

6. As applicable, no shop drawing submittals shall be made for a substitute item nor shall any substitute item be ordered, installed, or utilized without the ENGINEER'S prior written acceptance of the CONTRACTOR'S "Substitution Request Form."

7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes by the

CONTRACTOR in the Contract Documents occasioned thereby. Whether or not the ENGINEER accepts a proposed substitute, the CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitute.

C. The CONTRACTOR's "Substitution Request Forms" shall contain the following statements and information which shall be considered by the ENGINEER in evaluating the proposed substitution:

1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of substantial completion on time.

2. Whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitute.

3. Whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty.

4. All variations of the proposed substitute from the items originally specified will be identified.

5. Available maintenance, repair, and replacement service will be indicated. The manufacturer shall have a local service agency (within 50 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.

6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01700 – PROJECT CLOSEOUT

PART 1 -- GENERAL

1.1 FINAL CLEANUP

A. The CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.2 CLOSEOUT TIMETABLE

A. The CONTRACTOR shall establish a date for acceptance of work. The date shall be established not less than one week prior to beginning any of the foregoing items, to allow the OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

1.3 FINAL SUBMITTALS

A. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the ENGINEER for transmittal to the OWNER:

1. Written guarantees, where required.

2. Operating manuals and instructions.

3. Maintenance stock items; spare parts; special tools.

4. Completed record drawings.

5. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

6. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.4 MAINTENANCE AND GUARANTEE

A. The CONTRACTOR shall comply with the warranty requirements contained in the Construction Contract.

B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.

C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

STANDARD SPECIFICATIONS

SECTION 02200

STRUCTURE EARTHWORK

PART 1 - GENERAL

A. Description

This section includes excavation, backfilling, materials, testing, and shoring for structures.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1. Trenching, Backfilling, and Compacting: 02223

2. Concrete: 03300

C. Testing for Compaction

Testing for compaction shall conform to Section 02223.

D. Definition of Zones

1. Pavement and street zones shall be as specified in Section 02223.

2. Backfill zone is the backfill from the bottom of the structure excavation to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.

E. Permits

All work shall conform to the specifications and requirements of the State of California Department of Transportation, the city having jurisdiction, or any other affected agencies involved. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

F. Submittal

For any shoring or sheeting systems to be used for excavation, the contractor shall submit shoring plans and calculations designed and sealed by a registered structural engineer in the State of California.

PART 2 - MATERIALS

Native earth backfill, imported backfill material, granular material, imported sand, and crushed rock shall conform to the requirements of Section 02223.

PART 3 - EXECUTION

A. Compaction Requirements

1.	Backfill in Street Zone:	95% relative compaction
2.	Structural Backfill:	95% relative compaction
3.	Gravel Base:	95% relative compaction or as approved by the engineer
4.	Adjacent to existing structures:	95% relative compaction

B. Sidewalk, Pavement, and Curb Removal

1. Saw cut bituminous or concrete pavements regardless of their thickness, and curbs and sidewalks prior to excavation for the structure in accordance with the requirements of the city, or agency having jurisdiction. Curbs and sidewalks, that are damaged in the course of construction, are to be cut and removed from joint to joint.

2. Haul removed pavement and concrete materials from the site, to a proper disposal facility. These materials are not permitted for use as backfill. If the material to be removed exceeds 50 cubic yards, the contractor shall obtain a haul route permit from the city(s) having jurisdiction.

C. De-watering

1. Provide and maintain means and devices to continuously remove and dispose of all water entering the excavation during construction of the structure and all backfill operations.

2. Dispose of the water in a manner to prevent damage to adjacent property and pipe trenches.

3. Do not allow water to rise in the excavation until backfilling around and above the structure is completed.

4. Reporting shall conform to the requirements of the District's NPDES permit. A copy of the District’s permit is available from the District.

5. In no event shall the sewer system be used as a drain for de-watering.

D. Structure Excavation

1. Structure excavation shall include the removal of all material of whatever nature necessary for the construction of structures and foundations in accordance with the plans and these specifications.

2. The sides of excavations for structures shall be sufficient to leave at least a 2-foot clearance, as measured from the extreme outside of form work or the structure, as the case may be.

3. Surplus material shall be disposed of by the contractor in accordance with Section 02223.

E. Correction of Over Excavation

1. Where excavation is inadvertently carried below design depths, suitable provision shall be made by the contractor to adjust construction, as directed by the District representative, to meet requirements incurred by the deeper excavation.

2. No earth backfill will be permitted to correct over excavation beneath structures.

3. Over excavation shall be corrected by backfilling with crushed rock or concrete, as directed by the District representative.

F. Bracing

1. The contractor's design and installation of bracing and sheeting shall take the necessary precautions to be consistent with the rules, orders, and regulations of the State of California Construction Safety Orders.

2. Excavations shall be so braced, sheeted, and supported that they will be safe, such that the walls of the excavation will not slide or settle and all existing improvements of any kind, either on public or private property, will be fully protected from damage.

3. The sheeting, shoring, and bracing shall be arranged so as not to place any stress on portions of the completed work.

4. Carefully remove sheeting, shoring, bracing, and timbering to prevent the caving or collapse of the excavation faces being supported.

G. Backfill

1. After structures and foundations are in place, backfill shall be placed to the original ground line or to the limits designated on the plans.

2. No material shall be deposited against concrete structures until the concrete has reached a compressive strength of at least 3,000 pounds per square inch as tested per Section 03300.

3. Imported sand or granular material shall be placed in horizontal layers not exceeding 12 inches in depth.

4. Each layer of backfill material shall be moistened and thoroughly tamped, rolled, or otherwise compacted to the specified relative density.

5. Carefully operate compaction equipment near structures to prevent their displacement or damage. Structural fill is to be placed and compacted in uniform layers around all sides of the structure.

6. One-sack cement slurry may be used as structural backfill material.

H. Pavement Replacement

Pavement replacement shall be in accordance with the requirements of the city or the agency having jurisdiction.

I. Permits

An Encroachment Permit from the city or agency having jurisdiction is required prior to any work within public right-of-way. All traffic control and pavement replacement work shall be in accordance with the requirements of the permit and the agency Inspector.

A permit from OSHA is required of any excavation exceeding 5 feet.

Follow all restrictions of the required permits from other agencies.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 02222

ABANDONMENT OF PIPELINES

PART 1 - GENERAL

A. Description

This section includes abandonment in place of existing pipelines and manholes, when indicated on the Drawings for abandonment.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1. Trenching, Backfilling, and Compacting: 02223

2. Concrete: 03300

C. Reference Standards

1. ASTM C150 – Standard Specification for Portland Cement.

2. ASTM C494 – Standard Specification for Chemical Admixture for Concrete.

3. ASTM C618 – Standard Specification for Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.

4. ASTM C940 – Standard test Method for Expansion and Bleeding of Freshly Mixed grout for Replaced Aggregate Concrete in the Laboratory.

5. ASTM C1017 – Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.

6. ASTM C1107 – Standard Specification for Packaged Dry, Hydrailic-Cemeent Grout (Non-Shrink).

D. Definitions

1. Abandonment. Pipeline abandonment consists of filling or plugging portions of existing pipelines with flowable fill or grout plugs, as indicated on the Drawings. Manhole abandonment consists of removing cylinders, rings and lids above the depth indicated on the Drawings, and filling the remainder with flowable fill.

2. Flowable Fill. Flowable fill shall be controlled low-strength material consisting of fluid mixture of cement, fly ash, aggregate, water and with admixtures as necessary to provide workable properties. Placement of flowable fill may be by grouting techniques in pipelines or other restricted areas, or as mass placement by chutes or tremie methods in unrestricted locations with open access. Long-term hardened strength shall be within specified range.

3. Backgrouting. Secondary stage pressure grouting to ensure that voids have been filled within abandoned pipes. Backgrouting will only be required at critical locations indicated on the Drawings or if there is evidence of incomplete flowable fill placements.

E. Submittals

1. Submit flowable fill mix design report.

a. Flowable fill type and production method. Describe if fill will be mixed to final proportions and consistency in batch plant or if constituents will be added in transit mixer at placement location.

b. Aggregate gradation of fill. Aggregate gradation of mix shall be used as pilot curve for quality control during production.

c. Fill mix constituents and proportions including materials by weight and volume, and air content. Give types and amounts of admixtures including air entrainment or air generating compounds.

d. Fill densities and viscosities, including wet density at point of placement.

e. initial time of set.

f. Bleeding and shrinkage.

g. Compressive strength.

2. Submit technical information for equipment and operational procedures including projected injection rate, grout pressure, method for controlling grout pressure, bulkhead and vent design and number of stages for grout application.

PART 2 - MATERIALS

A. Flowable Fill

1. Design Mix Criteria. Provide design of one or more mixes to meet design criteria and conditions for placement. Present information required by Part 1, Paragraph E.1 in mix design, to include the following:

a. Cement: ASTM C150 Type I or II. Volume and weight per cubic yard of fill. Provide minimum cement content of 50 pounds per cubic yard.

b. Fly ash: ASTM C618, Class C or F. Volume and weight per cubic yard of fill. Provide minimum fly ash content of 200 pounds per cubic yard.

c. Potable water: Volume and weight per cubic yard of fill. Amount of water determined by mix design testing.

d. Aggregate gradation: 100 percent passing 3/8-inch sieve and not more than 10 percent passing No. 200 sieve. Mix design report shall define pilot gradation based on following sieve sizes: 3/8 inch, No. 4, 8, 16, 30, 50 100 and 200. Do not deviate from pilot gradation by more than plus or minus 10 percentage points for any sieve for production material.

e. Aggregate source material: Screened or crushed aggregate, pit or bank run fine gravels or sand, or crushed concrete. If crushed concrete is used, add at least 30 percent natural aggregate to provide workability.

f. Admixtures: use admixtures meeting ASTM C494 and ASTM C1017 as needed to improve pumpability, to control time of set and to reduce bleeding.

g. Fluidifier: Use fluidifier meeting ASTM C937 as necessary to hold solid constituents in suspension. Add shrinkage compensator if necessary.

h. Performance additive: Use flowable fill performance additive, if needed, to control fill properties.

2. Flowable Fill Requirements:

a. Unconfined compressive strength: minimum 75 psi and maximum 150 psi at 56 days as determined based on an average of three tests for same placement. Present at least three acceptable strength tests for proposed mix design in mix design report.

b. Placement characteristics: self-leveling.

c. Shrinkage characteristics: non-shrink.

d. Water bleeding for fill to be placed by grouting method in pipes: not to exceed 2 percent according to ASTM C940.

e. Minimum wet density: 90 pounds per cubic foot.

3. Grout Plugs

a. Cement-based dry-pack grout conforming to ASTM C1107, Grade B or C.

PART 3 - EXECUTION

A. Requirements by Pipe Location, Size and Depth

1. General areas, up to 5-feet of cover from finished grade. Abandonment not allowed except within specific listed areas. Pipes with less than 60-inches cover shall be removed and properly disposed.

2. General areas, pipes greater than 8-inch diameter, greater than 5-feet of cover from finished grade. Pipes indicated on the Drawings to be abandoned in place shall be completely filled with flowable fill.

3. General areas, pipes equal or less than 8-inch diameter, greater than 5-feet of cover from finished grade. Pipes indicated on the Drawings to be abandoned in place shall be cut and a grout plug set at each end.

4. Pipes under structures, waterways, roads, railroads tracks, rail right-of-ways or similar surface obstructions, and depth or diameter. Pipes indicated on the Drawings to be abandoned in place shall be completely filled with flowable fill.

B. Preparation

1. Notify inspector at least 24-hours in advance of grouting with flowable fill.

2. Select fill placement equipment and follow procedures with sufficient safety and care to avoid damage to existing underground utilities and structures. Operate equipment at pressure that will not distort or imperil portions of the work, new or existing.

3. Cut and cap portions of the piping system to remain, as shown on the Drawings. Drain water mains to be abandoned.

4. Clean sewer lines and video to identify connections and locate obstructions. Locate previously unidentified connections which have not been redirected or reconnected as part of the work and report them to the Project Manager. During placement of fill, compensate for irregularities in sewer pipe, such as obstructions or open joints, to ensure no voids remain unfilled.

4. Perform demolition work prior to starting fill placement. Clean placement areas for pipes and manholes of debris that may hinder fill placement. Remove excessive amounts of sludge and other substances that may degrade performance of the fill. Do not leave sludge or other debris in place if filling more than 2 percent of placement volume. Dispose of waste material in accordance with applicable codes and regulations.

5. Remove free water prior to fill placement.

C. Equipment

1. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design.

2. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

D. Demolition of Sewer Manholes Prior to Abandonment

1. Remove manhole frames and covers and castings and dispose or recycled as applicable. Obtain District approval before reusing frames and covers within the work.

2. Demolish and remove precast concrete rings to the depth indicated on the plans. Minimum depth of removal shall be 4-feet below finished grade, or 12-inches below any crossing utility, whichever is greater.

E. Installation of Flowable Fill

1. Abandon pipelines, as required in Part 3, Paragraph A, by completely filling with flowable fill. Abandon manholes by filling the portion not removed with flowable fill.

2. Place flowable fill equal to volume of pipe being filled. Continuously place flowable fill from manhole to manhole with no intermediate pour points, but not exceeding 500 linear feet of pipe per fill segment.

3. Perform operation with experienced crews with equipment to monitor density of flowable fill and to control pressure.

4. Temporarily plug or cap pipe segments which are to remain in operation during filling to keep lines free of flowable fill.

5. Pump flowable fill through bulkheads or use other suitable construction methods to contain flowable fill in lines to be abandoned.

6. Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction. Fill sewers from the downstream end to vent at upstream end.

7. Backfill excavations per Section 02223, Trenching, Backfilling and Compacting.

8. Collect and dispose of excess flowable fill material and debris.

F. Installation of Grout Plugs

1. Abandon pipelines of diameter 8-inches and below, as required in Part 3, Paragraph A, by cutting and placing grout plugs.

2. Clean inside surface of pipe at least 12-inches from ends, achieving firm bond and seal grout plug to pipe surface. Similarly clean and prepare exterior surface if manufactured cap is to be used.

3. Place temporary plug or bulkhead approximately 12-inches inside pipe. Fill pipe end completely with dry-pack grout mixture.

4. Backfill excavations per Section 02223, Trenching, Backfilling and Compacting.

5. Collect and dispose of excess grout material and debris.

G. Quality Control

1. Provide batch plant tickets for each truck delivery of flowable fill. Note on tickets addition of admixtures at site.

2. Check flow characteristics and workability of fill as placement proceeds.

3. Obtain at least threes test cylinders fro each placement area for determination of 56-day compressive strength and bleeding. Acceptance of placement will be based on average strength of three tests.

4. Record volume of flowable fill placement to demonstrate that voids have been filled. If voids exceed 10% of pipeline volume, injection grouting may be required at the direction of the Project Manager.

H. Protection of Persons and Property.

1. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

2. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to the work.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 02223

TRENCHING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

A. Description

This section includes materials, testing, and installation for trench excavation, backfilling, and compacting.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

C. Testing for Compaction

1. Determine the density of soil in place by the use of a sand cone, drive tube, or nuclear tester.

2. Determine laboratory moisture-density relations of existing soils by ASTM D 1557.

3. Determine the relative density of cohesionless soils by ASTM D 2049.

4. Sample backfill materials by ASTM D 75.

5. Express "relative compaction" as the ratio, expressed as a percentage of the in place dry density to the laboratory maximum dry density.

6. Compaction shall be deemed to comply with the specifications when no test falls below the specified relative compaction.

7. The developer will secure the services of a soils tester and pay the costs of all compaction testing. On capital projects, the District will secure the service of a soils tester and pay the cost of initial testing. The contractor will be responsible for the cost of all retests in failed areas. Test results will be furnished by the District representative.

D. Pavement Zone

The pavement zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill.

E. Street Zone

The street zone is the top 18 inches of the trench or depth determined by the jurisdictional agency immediately below the pavement zone in paved areas.

F. Trench Zone

The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.

G. Pipe Zone

The pipe zone shall include the full width of trench from the bottom of the pipe or conduit to a horizontal level 12 inches above the top of the pipe. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipes to a horizontal level 12 inches above the top of the highest or topmost pipe.

H. Pipe Bedding

The pipe bedding shall be defined as a layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width in which the pipe is bedded. Thickness of pipe bedding shall be as shown on the drawings or as described in these specifications for the particular type of pipe installed.

I. Excess Excavated Material

1. The contractor shall make the necessary arrangements for and shall remove and dispose of all excess excavated material unless indicated differently in the special provisions for any job.

2. It is the intent of these specifications that all surplus material not required for backfill or fill shall be properly disposed of by the contractor at his expense at a proper disposal site.

3. No excavated material shall be deposited on private property unless written permission from the owner thereof is secured by the contractor. Before the District will accept the work, the contractor shall file a written release signed by all property owners with whom he has entered into agreements for disposing excess excavated material, absolving the District from any liability connected therewith.

4. The contractor shall obtain a haul route permit from the city or agency having jurisdiction.

J. Safety

1. All excavations shall be performed, protected, and supported as required for safety and in the manner set forth in the operation rules, orders, and regulations prescribed by the Division of Industrial Safety of the State of California.

2. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrians and vehicular traffic of such excavations. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until such excavation is entirely refilled.

3. No trench or excavation shall remain open during non-working hours. The trench or excavation shall be covered with steel plates, spiked in place, or secured with temporary A.C. pavement around the edges, or backfilled. A security fence shall be installed around the work area during non-working hours.

4. The contractor shall notify the District of all work-related accidents which may occur to persons or property at or near the project site, and shall provide the District with a copy of all accident reports. All accident reports shall be signed by the contractor or its authorized representative and submitted to the District's authorized representative within twenty-four (24) hours of the accident's occurrence.

K. Access

Unobstructed access must be provided to all driveways, water valves, hydrants, or other property or facilities that require routine use.

L. Permits

All work shall conform to the specifications and requirements of the State of California Department of Transportation, the city having jurisdiction, or and other agencies involved. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

M. Slope Protection

Slope protection shall be installed where shown on the plans in accordance with MCWD Standard Plan S-10, wherever the profile of the ground surface above the water or sewer main exceeds 20%, and where no pavement of other surfacing is to be laid over the facility. The installation of the slope protection shall be considered a part of the work, and the contractor shall include the expense in his cost.

PART 2 - MATERIALS

A. Native Earth Backfill

1. Native earth, segregated from topsoil, shall be used for trench backfill.

2. Clean native sand, free from roots, debris and rocks over 2-inch, may be used in the pipe zone.

B. Imported Backfill Material

1. Whenever the excavated material is not suitable for backfill, the contractor shall arrange for and furnish suitable imported backfill material that is capable of attaining the required relative density.

2. The contractor shall dispose of the excess trench excavation as specified in the preceding section. Backfilling with imported material shall be done in accordance with the methods described herein.

C. Granular Material

Granular material shall be defined as soil having a minimum sand equivalent of 30 as determined in accordance with State of California, Division of Highways, Test "California 217," with not more than 20% passing a 200-mesh sieve.

D. Imported Sand

Imported sand shall have a minimum sand equivalent of 30 per State of California, Division of Highways, Test "California 217" with 100% passing a 3/8-inch sieve and not more than 20% passing a 200-mesh sieve. Certification that the sand meets this requirement shall be provided.

E. Crushed Rock and Gravel

1. Crushed rock shall be the product of crushing rock or gravel. Fifty percent of the particles retained on a 3/8-inch sieve shall have their entire surface area composed of faces resulting from fracture due to mechanical crushing. Not over 5% shall be particles that show no faces resulting from crushing. Less than 10% of the particles that pass the 3/8-inch sieve and are retained on the No. 4 sieve shall be weatherworn particles. Gravel shall not be added to crushed rock.

2. Gravel shall be defined as particles that show no evidence of mechanical crushing, are fully weatherworn, and are rounded. For pipe bedding, where gravel is specified, crushed rock may be substituted or added.

3. Where crushed rock or gravel is specified in the bedding details on the plans, the material shall have the following gradations:

Sieve Size	1-1/2 Inch Max Gravel % Passing	1-inch Max Gravel % Passing	¾ Inch Max Crushed Rock % Passing
2”	100		
1-1/2”	90 – 100	100	
1”	20 – 55	90 – 100	100
¾”	0 – 15	60 – 80	90-100
½”	-	-	30 – 60
3/8”	0 –5	0 – 15	0 – 20
No. 4	-	0 – 5	0 – 5
No. 8	-	-	-

F. Sand-Cement Slurry

Sand-cement slurry shall consist of one sack (94 pounds) of Portland cement per cubic yard of sand and sufficient moisture for workability.

PART 3 - EXECUTION

A. Compaction Requirements

1. The developer will engage the services of a qualified soils engineering firm to determine the relative compaction of the trench backfill. On capital projects, the District will engage the services of a qualified soils engineering firm to determine the relative compaction of the trench backfill.

2. If the backfill fails to meet the specified relative compaction requirements, the contractor shall rework the backfill until the requirements are met. The contractor shall make all necessary excavations for density tests as directed by the District representative. The compaction requirements of the city having jurisdiction or Caltrans shall prevail in all public roads. The developer or contractor will be responsible for the cost of all additional compaction tests in the reworked areas.

3. Compaction tests shall be performed at random depths and at 200-foot intervals and as directed by the District representative.

4. Unless otherwise shown on the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as described below:

   a. Pipe zone and pipe base: 95% relative compaction

   b. Trench zone not beneath paving: 95% relative compaction

   c. Trench zone to street zone in paved areas: 95% relative compaction

   d. Street zone in paved areas: per agency requirements or 95% relative compaction. The most stringent agency requirements shall prevail

   e. Rock refill material for foundation stabilization: 90% relative density

   f. Rock refill for over excavation: 90% relative density

B. Material Replacement

Removal and replacement of any trench and backfill material which does not meet the specifications shall be the contractor's responsibility.

C. Clearing and Grubbing

1. Areas where work is to be performed shall be cleared of all trees, shrubs, rubbish, and other objectionable material of any kind which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.

2. Organic material from clearing and grubbing operations will not be incorporated in the trench backfill.

3. Organic material from clearing and grubbing operations will be disposed of at a proper waste disposal facility.

D. Sidewalk, Pavement, and Curb Removal

1. Saw cut bituminous or concrete pavements regardless of their thickness, and curbs and sidewalks prior to excavation for the structure in accordance with the requirements of the city, or agency having jurisdiction. Curbs and sidewalks, that are damaged in the course of construction, are to be cut and removed from joint to joint.

2. Haul removed pavement and concrete materials from the site, to a proper disposal facility. These materials are not permitted for use as trench backfill. If the material to be removed exceeds 50 cubic yards, the contractor shall obtain a haul route permit from the city(s) having jurisdiction.

E. Trenching and Tunneling

1. Excavation for pipe, fittings, and appurtenances shall be open trench to the depth and in the direction necessary for the proper installation of the facilities as shown on the plans.

2. Trench banks shall be kept as near to vertical as possible and shall be properly braced and sheeted.

3. Tunneling will not be permitted.

4. The use of a jack and bore or hydraulic ram may be employed.

F. Bracing

1. The contractor's design and installation of bracing and shoring shall be consistent with the rules, orders, and regulations of the State of California Construction Safety Orders.

2. Excavations shall be so braced, sheeted, and supported that they will be safe such that the walls of the excavation will not slide or settle and all existing improvements of any kind, either on public or private property, will be fully protected from damage.

3. The sheeting, shoring, and bracing shall be arranged so as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength.

4. Care shall be exercised in the drawing or removal of sheeting, shoring, bracing, and timbering to prevent the caving or collapse of the excavation faces being supported.

G. Trench Widths

1. Excavation and trenching shall be true to line so that a clear space of not more than 8 inches or less than 6 inches in width is provided on each side of the largest outside diameter of the pipe in place measured at a point 12 inches above the top of the pipe. For the purpose of this article, the largest outside diameter shall be the outside diameter of the bell on bell and spigot pipe or the pipe collar.

2. Where the sewer trench width, measured at a point 12 inches above the top of the bell of the pipe, is wider than the maximum set forth above, the trench area around the pipe shall be backfilled with crushed rock, Class B concrete, or slurry to form a cradle for the pipe at the discretion of the District representative.

H. Length of Open Trench

The maximum allowable length of open trench shall be 600 feet, or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is less. Within developed areas, the length of open trench may be restricted as determined by the encroachment permit from the city or the agency having jurisdiction.

I. Grade

1. Excavate the trench to the lines and grades shown on the drawings with allowance for pipe thickness and for pipe base or special bedding.

2. The trench bottom shall be graded to provide a smooth, firm, and stable foundation that is free from rocks and other obstructions and shall be at a reasonably uniform grade.

J. Correction of Over Excavation

1. Where excavation is inadvertently carried below the design trench depth, suitable provision shall be made by the contractor to adjust the excavation, as directed by the District representative, to meet requirements incurred by the deeper excavation.

2. Over excavations shall be corrected by backfilling with approved bedding material, graded crushed rock or gravel and shall be compacted to provide a firm and unyielding subgrade or foundation, as directed by the District representative.

K. De-watering

1. The contractor shall provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. De-watering shall be done by methods that will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. De-watering methods may include well points, sump points, suitable rock or gravel placed below the required bedding for drainage and pumping, temporary pipelines, and other means, all subject to the approval of the District representative. Water shall be discharged in accordance with the requirements of the project's NPDES permit.

2. In no event shall the sewer system be used as drains for de-watering the construction trenches.

3. De-watering shall commence when groundwater is first encountered and shall be continuous until such times as water can be allowed to rise. No concrete shall be poured in water, nor shall water be allowed to rise around the concrete or mortar until it has set at least eight hours.

L. Foundation Stabilization

1. Whenever the trench bottom does not afford a sufficiently solid and stable base to support the pipe or appurtenances, the contractor shall excavate to a depth below the design trench bottom, as directed by the District representative, and the trench bottom shall be backfilled with 3/4-inch rock and compacted to provide uniform support and a firm foundation.

2. Where rock is encountered, it shall be removed to a depth at least 6 inches below grade and the trench shall be backfilled with 3/4-inch crushed rock to provide a compacted foundation cushion.

3. If excessively wet, soft, spongy, unstable, or similarly unsuitable material is encountered at the surface upon which the bedding material is to be placed, the unsuitable material shall removed to a depth as determined in the field by the District representative and replaced by crushed rock.

M. Excavated Material

1. All excavated material shall not be stockpiled in a manner that will create an unsafe work area or obstruct sidewalks or driveways. Gutters shall be kept clear or other satisfactory measures shall be taken to maintain street or other drainage.

2. In confined work areas, the contractor may be required to stockpile the excavated material off-site, as determined by the project permits.

N. Placing Pipe Bedding

1. Place the thickness of pipe bedding material over the full width of trench necessary to produce the required bedding thickness when the material is compacted to the specified relative density. Grade the top of the pipe bedding ahead of the pipe to provide firm, uniform support along the full length of pipe.

2. Excavate bell holes at each joint to permit assembly and inspection of the entire joint.

O. Placing Mounds to Support Pipe (DIP Only)

1. As an alternate to placing continuous imported sand pipe bedding material, the ductile iron pipe may be supported on mounds of imported sand.

2. The mounds shall be of imported sand and extend the full trench width. The mounds shall provide a minimum of 6 inches of contact with the pipe.

3. The pipe shall be supported to maintain its design line and grade.

4. The mounds shall be located 2½ feet from the bell/spigot of the pipe.

P. Backfilling within Pipe Zone

1. Backfill per the detailed piping specification for the particular type of pipe and per the following.

2. After pipe has been installed in the trench, place pipe zone material simultaneously on both sides of the pipe, keeping the level of backfill the same on each side. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.

3. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.

Q. Backfill within Trench Zone

1. Compact per the detailed piping specification for the particular type of pipe and per the following.

2. Push the backfill material carefully onto the backfill previously placed in the pipe zone. Do not permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe.

3. The remaining portion of the trench to the street zone or ground surface, as the case may be, shall be backfilled, compacted and/or consolidated by approved methods to obtain the specified relative compaction.

   a. Compaction using vibratory equipment, tamping rollers, pneumatic tire rollers, or other mechanical tampers shall be done with the type and size of equipment necessary to accomplish the work. The backfill shall be placed in horizontal layers of such depths as are considered proper for the type of compacting equipment being used in relation to the backfill material being placed. Each layer shall be evenly spread, properly moistened, and compacted to the specified relative density. The contractor shall repair or replace any pipe, fittings, manholes, or structures as directed by the District representative damaged by the contractor's operations.

   b. Consolidation of backfill performed by flooding, poling, or jetting shall obtain a relative compaction of the backfill material at least equal to that specified. When flooding, poling, or jetting methods are used, material for use as backfill shall be placed and consolidated in layers not exceeding 3-feet thick. Flooding, poling, or jetting methods shall be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required relative compaction. Care shall be taken in all consolidating operations to prevent the movement or floating of the pipe. Consolidation methods shall not be used where the backfill material is not sufficiently granular to be self-draining during and after consolidation, or where foundation materials may be softened or otherwise damaged by the quantities of water applied. The contractor shall rectify any misalignment of the pipe because of consolidation operations as directed by the District representative.

R. Backfill within Street Zone

1. The street zone within roadbed areas shall be compacted using approved hand, pneumatic, or mechanical type tampers to obtain the required relative compaction.

2. All work shall be done in accordance with the requirements and to the satisfaction of the city or the agency having jurisdiction.

3. Flooding and jetting will not be permitted in this Zone.

S. Sidewalk, Pavement, and Curb Replacement

Replace bituminous and concrete pavement, curbs, and sidewalks damaged or removed during construction in accordance with the requirements of the city or the agency having jurisdiction.

T. Slope Protection

1. Where cutoff walls or concrete anchors are required, they shall be in accordance with MCWD Standard Plan S-10, with a minimum thickness of 12 inches. The wall shall extend at least 12 inches to undisturbed material on each side of the trench as excavated. Cemented rubble and concrete surface slope protection shall be a minimum of 4-inches thick.

2. Wall or anchors shall be placed with a minimum horizontal spacing of:

   a. Not over 36 feet center to center on grades 25% to 35%

   b. Not over 24 feet center to center on grades 35% to 50%

   c. Not over 16 feet center to center on grades 50% and over

3. Material used for construction of cutoff walls or concrete anchors shall consist of cast-in-place reinforced concrete or reinforced hollow unit masonry. When reinforced hollow unit masonry is used, all cells in the block shall be filled solidly with grout. A No. 4 reinforcing bar shall be placed in vertically in each row of cells and No. 9-gage wall mesh shall be placed in each horizontal joint. In addition, a bond beam shall be placed at the top with two No. 4 bars.

   Where cutoff walls or concrete anchors are constructed of reinforced concrete, they shall have No. 4 reinforcing bars placed at 6-inches on center each way in the center of the wall. The bars shall extend full length and height of the wall.

END OF SECTION

SECTION 02460 – ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes Asphalt Concrete Pavement patching.

B. Related Sections:
1. Trenching, Backfilling and Compacting – Section 02223

1.02 REFERENCES

A. California Department of Transportation (Caltrans) Standard Specifications

1.03 SUBMITTALS

A. Submit in accordance with Conditions of Contract and Division 1 Specifications.

B. Material Certifications signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

1.04 QUALITY ASSURANCE

A. Asphalt mixing plant, hauling equipment, asphalt pavers, and rollers shall meet the requirements of Section 39 of the Caltrans Standard Specifications.

PART 2 – MATERIALS

2.01 ASPHALT CONCRETE PAVEMENT

A. Asphalt Concrete: Asphalt and aggregates shall be proportioned and mixed according to the asphalt and gradation requirements of Section 39 of the Caltrans Standard Specifications for Class B.

PART 3 - EXECUTION

3.01 GENERAL

A. CONTRACTOR shall saw cut back and trim the edge to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. Saw cut shall be minimum of 4 inches from edge of excavation.

B. The placing and compaction of pipe backfill shall be in accordance with the requirements of Section 02223 prior to placement of asphalt concrete pavement patch.

C. Tack edges and joints of asphalt concrete pavement with Asphalt Sealer SS 1 or equal prior to placing pavement patch.

D. Place and compact asphalt cement pavement in accordance with Section 39 of the Caltrans Standard Specifications.

E. After patch is placed, seal all joints with hot asphalt cement, AR 4000 Grade.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 03300

CONCRETE

PART 1 - GENERAL

A. Description

This section describes concrete materials, mixing, placement, form work, reinforcement and curing.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

Structure Excavation: 02200

C. Submittals

1. Shop drawings shall be submitted in accordance with the General Provisions, ACI 318, and the following.

2. Mix design with proof of design by laboratory 7-day and 28-day compressive testes, or test reports of 7-day and 28-day compressive tests of the mix where the same mix was used on two previous projects, shall be submitted in writing for review by the district at least 15 days before placing of any concrete.

3. Certificate that cement used in the concrete complies with ASTM C 150 and these specifications shall be submitted.

4. Aggregates: Certificate of compliance with ASTM C 33 shall be provided. Weathering region limits of coarse aggregates: sever, moderate, or negligible shall be stated. Basis of determining that potential reactivity is negligible shall be stated.

5. Ready Mix Concrete: Delivery tickets or weighmasters certificate per ASTM C 94, including weights of cement and each size aggregate, volume of water in the aggregate, and volume of water added at the plant shall aggregate, and volume of water added at the plant shall be provided. The volume of water added on the job shall be written on the ticket or certificate.

6. Concrete admixtures: Manufacturer’s certificate of compliance with there specification shall be provided.

7. Epoxy Bonding Compound: Manufacturer’s specific instructions for use shall be provided.

8. Nonshrink Grout: Manufacturer's certificate of compliance with these specifications and specific instruction for use shall be provided.

PART 2 - MATERIALS

A. Concrete

1. All Portland cement concrete shall conform to the provisions of Section 201 of the SS PWC except as herein modified.

2. Portland cement concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, and water proportioned and mixed to produce a smooth dense workable mixture. It can be of the ready-mix variety as produced by any reliable ready-mix concrete firm.

3. Portland cement, including Portland cement used in precast products, shall be Type V conforming to ASTM C 150.

4. Concrete mix design shall conform with ASTM C 94. Use classes of concrete as described in the following table.

Class	Type of Work	28-Day Compressive Strength (in psi)	Minimum Cement Content (in lbs. Per C.Y.)
A (560-C-3250) *	Concrete for all reinforced structures, piers, vaults, manhole bases, thrust blocks, encasements, slope protection	3,000	564 (6 sack)
B (450-C-2000) *	Concrete for anchors, cutoff walls, cradles and miscellaneous unreinforced concrete	2,000	470 (5 sack)

*concrete class per SS PWC

B. Reinforcing Steel

1. Reinforcement shall conform to ASTM A 615, Grade 40.

2. Fabricate reinforcing steel in accordance with the current edition of the Manual of Standard Practice, published by the Concrete Reinforcing Steel Institute. Bend reinforcing steel cold.

3. Deliver reinforcing steel to the site bundled and tagged with identifying tags.

C. Welded Wire Fabric

Welded wire fabric shall conform to ASTM 185.

D. Tie Wire

Tie wire shall be 16-gage minimum, black, soft annealed.

E. Bar Supports

Bar supports in beams and slabs exposed to view after form stripping shall be galvanized or plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

F. Forms

1. Forms shall be accurately constructed of clean lumber and shall be of sufficient strength and rigidity to hold the concrete and to withstand the necessary pressure and tamping without deflection from the prescribed lines.

2. The surface of forms against which concrete is placed shall be smooth and free from irregularities, dents, sags, or holes. The surface shall leave uniform form marks conforming to the general lines of the structure.

PART 3 - EXECUTION

A. Excavation

Excavation for structures shall be in accordance with Section 02200.

B. Form Work

1. The contractor shall notify the District representative a minimum of one working day before the placement of concrete to enable the District representative to check the form lines, grades, and other required items for approval before placement of concrete.

2. Unless otherwise indicated on the plans, all exposed sharp edges shall be chamfered with at least 3/4 - by 3/4-inch triangular fillets.

3. Before placing concrete, the form surface shall be clean and coated with form oil of high penetrating qualities.

C. Reinforcement

1. Place reinforcing steel in accordance with the current edition of "Recommended Practice for Placing Reinforcing Bars," published by the Concrete Reinforcing Steel Institute.

2. All reinforcing steel shall be of the required sizes and shapes and placed where shown on the drawings or prescribed by the District representative.

3. Do not straighten or rebend reinforcing steel in a manner that will injure the material. Do not use bars with bends not shown on the drawings.

4. All bars shall be free from rust, scale, oil, or any other coating which would reduce or destroy the bond between concrete and steel.

5. Position reinforcement steel in accordance with the drawings and secure by using annealed wire ties or clips at intersections and support by concrete or metal supports, spacers, or metal hangers. Do not place metal clips or supports in contact with the forms. Bend tie

wires away from the forms in order to provide the specified concrete coverage. Bars additional to those shown on the drawings, which may be found necessary or desirable by the contractor for the purpose of securing reinforcement in position, shall be provided and paid for by the contractor.

6. Place reinforcement a minimum of 2 inches clear of any metal pipe or fittings.

7. The reinforcement shall be so secured in position that it will not be displaced during the placement of concrete.

8. All reinforcing steel and wire mesh shall be completely encased in concrete.

9. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

10. Minimum lap for all reinforcement shall be 20 bar diameters.

11. Place additional reinforcement around the pipe or opening as indicated in the drawings.

12. Wire mesh reinforcement is to be rolled flat before being placed in the form. Support and tie wire mesh to prevent movement during concrete placement.

13. Extend welded wire fabric to within 2 inches of the edges of the slab. Lap splices at least 1-1/2 courses of the fabric and a minimum of 6 inches. Tie laps and splices securely at ends and at least every 24 inches with 16-gage black annealed steel wire. Pull the fabric into position as the concrete is placed by means of hooks, and work concrete under the steel to ensure that it is at the proper distance above the bottom of the slab.

D. Embedded Items

All embedded bolts, dowels, anchors, and other embedded items shall be held correctly in place in the forms before concrete is placed.

E. Mixing and Placing Concrete

1. Concrete, either commercial of on-site ready mix or batch mixed, shall be placed in the forms before taking its initial set.

2. No concrete shall be placed in water except with permission of the District representative.

3. As the concrete is placed in the forms, or in excavations to be filled with concrete, it shall be thoroughly settled and compacted throughout the entire layer by internal vibration and tamping bars.

4. All concrete surfaces upon which or against which the concrete is to be placed, and to which new concrete is to adhere, shall be roughened, thoroughly cleaned, wet, and grouted before the concrete is deposited.

F. Concrete Finishing

1. Immediately upon the removal of forms, all voids shall be neatly filled with cement mortar.

2. The surfaces of concrete to be permanently exposed to view must be smooth, free from projections, and thoroughly filled with mortar.

3. Exposed surfaces of concrete not finished against forms, such as horizontal or sloping surfaces, shall be screened to a uniform surface and worked with suitable tools to a smooth mortar finish.

G. Protection and Curing of Concrete

The contractor shall protect all concrete against damage. Exposed surfaces of new concrete shall be protected from the direct rays of the sun and from frost by being kept damp for at least two weeks after the concrete has been placed, or by using the "Hunt White Coverage" process or approved equal.

H. Backfill

Backfill around structures shall be in accordance with Section 02200.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 03462

PRECAST CONCRETE VAULTS

PART 1 - GENERAL

A. Description

This section includes the materials, manufacture, and installation of precast concrete vaults, vault frames and covers.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1. Structure Earthwork: 02200

2. Concrete: 03300

C. Approved Manufacturers

1. Precast Vaults
   - Utility Vault
   - J & R Products
   - Jensen Precast

2. Meter Boxes
   - Christy
   - Armorcast
   - BES

3. Joint Sealing Compound
   - Conseal

4. Waterproofing
   - Grace Dehydratine 4

5. Frames and Covers
   - Bilco

D. Frames and Covers

All precast sections shall be provided with fabricated aluminum or steel frames and covers as specified or shown on the drawings and shall be built up so that the cover is flush with the surrounding surface unless otherwise specified on the drawings or by the District representative in the field.

E. Meter Boxes

1. Precast concrete meter boxes for copper setters, 2-inch and smaller shall be purchased and installed by the contractor unless noted otherwise. Meter box lid shall be polymer type.

2. Sizes shall be as specified on the standard drawings for the various sizes and types of services.

F. Purchase of Vaults

The contractor shall purchase precast concrete vaults for meter installations 3-inch and larger and other applications.

PART 2 - MATERIALS

A. Precast Concrete Vault

1. Precast concrete vaults and covers shall be manufactured in a plant especially designed for that purpose and shall conform to the shapes and dimensions indicated on the plans.

2. Design loads shall consist of dead load, live load, impact, and in addition, loads due to water table and any other loads which may be imposed upon the structure. Live loads shall be for H-20 per AASHTO standard specifications for highway bridges. Design wheel load shall be 16 kips. The live load shall be that which produces the maximum shears and bending moments in the structure.

3. Concrete shall be Class A conforming to Section 03300.

4. Vault floor shall be treated such that a non-skid surface is provided.

5. Vault floor shall contain grooved channels to convey drainage to a sump area.

B. Meter Box Covers

1. All meter box covers shall be furnished with rectangular reading lids.

2. Concrete meter box covers shall be installed in all locations.

C. Vault Frames and Covers

1. Vault frames and covers shall be fabricated aluminum with stainless steel hardware.

2. Covers shall be fabricated with supports to resist deflection.

3. All covers shall be hinged providing access to the entire vault. Covers shall have spring hydraulic assists.

4. All covers shall be equipped with a hold-open mechanism with safety chains.

5. All covers shall be equipped with a flush, locking device with locking eyes up.

6. All frames and covers shall be equipped with a "ladder up" to provide access assistance.

7. All covers must be H20 traffic rated for equipment or vehicle loading, unless specified otherwise by the District Engineer.

D. Joint Sealing Compound

The joint sealing compound shall be a permanently flexible plastic material complying in every detail to Federal Specification SS S-00210 (GSA-FSS) dated July 26, 1965. "Quickseal", or approved equal.

E. Waterproofing

Waterproofing shall be formulated to comply with Federal Specification SS-A-701.

PART 3 - EXECUTION

A. Earthwork

1. Excavation and backfill for precast concrete vaults shall be in accordance with Section 02200 and the requirements herein.

2. The contractor shall prepare an excavation large enough to accommodate the structure and permit grouting of openings and backfilling operations.

3. The bottom of the structure shall be placed on 6- inches of compacted, crushed rock sub-base, graded level and to the proper elevation as shown on the plans, unless otherwise indicated by the District Engineer.

B. Installation

1. Openings or "knockouts" in precast concrete vaults shall be located as shown on the drawings and shall be sized sufficiently to permit passage of the largest dimension of pipe and/or coupling flange. Upon completion of installation, all voids or openings in the vault walls around pipes shall be filled with 3,000-psi concrete or mortar, using an approved epoxy for bonding concrete surfaces.

2. After the structure and all appurtenances are in place and approved, backfill shall be placed such that finished grade is sloped away from vault (in unpaved areas) or such that vault is flush with finished grade (in paved areas) to the original ground line or to the limits designated on the plans, unless otherwise indicated by the District Engineer.

3. All joints between precast concrete vault sections shall be made watertight using preformed mastic material. The sealing compound shall be installed according to the manufacturer's recommendations to provide a watertight joint which remains impermeable throughout the design life of the structure. All joints shall be filled with dry-pack non-shrink grout.

4. Frames and covers shall be built up so that the cover is flush with the surrounding surface unless otherwise specified on the drawings or by the District representative in the field. The contractor is responsible for placing the cover at the proper elevation where paving is to be installed and shall make all necessary adjustments so that the cover meets these requirements.

5. Waterproofing shall be applied to the exterior walls of all buried vaults in accordance with the manufacturer's instructions. Protection shall be placed over the waterproofing to prevent damage.

C. Meter Boxes

1. Boxes shall be set true to line and to the grade of the top of the curb, sidewalk, or surrounding graded area.

2. Meter boxes are not to be set until fine grading for landscape grading has been completed by the developer.

3. Retaining walls may be required around meter boxes installed on slopes as determined by the District representative.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 09900

PAINTING AND COATING

PART 1 - GENERAL

A. Description

This section includes the materials and application of painting and coating systems for buried and exposed surfaces.

All articles to be painted or coated will be painted or coated in the place of manufacture, unless field painting and coating is absolutely necessary. The District representative will make the determination. In the event that the paint or coating is damaged in the field, it will be touched up in the same manner as the original paint or coating applied in the place of manufacture.

B. Related Work Described Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Ductile-Iron Pipe and Fittings:	15056
2.	Manual Valves:	15100
3.	Fire Hydrants:	15139
4.	Underground Facilities Identification:	15151
5.	Precast Reinforced Concrete Manholes and Manhole Bases	03461

C. Submittals

Submit a Paint Plan for all proposed surfaces. The plan shall identify all materials and procedures, including proposed paint systems, names and experience of personnel to perform the work, proposed surface preparation specifications, required physical and environmental conditions to perform the work and proposed test methods and reporting for both factory and field applications. The plan shall also include proposed maintenance requirements for all surfaces. Samples of field applied paint and coating finishes, colors, and covering shall also be provided. The paint plan and all samples shall be provided at least 60 days prior to start of such finishing operations.

D. Approved Manufacturers

All materials shall be as manufactured by the companies listed herein or approved equal.

Tnemec, Carboline, Dunn-Edwards, International Protective Coatings, Rust-Oleum Corporation, 3M Minnesota Mining and Manufacturer

E. Coatings

All specified materials must meet and comply with National Sanitation Foundation (NSF) and California current air quality regulations governing architectural and industrial coatings.

1. Organic Zinc Primer
   Tnemec 90-97
   Carboline 621
   Rust-Oleum 7400 System Zinc Chromate PrimerDevoe CC 302V
   International Protective Coatings – Interzinc 52

2. Epoxy Coating

   a. Field Applied
      Tnemec Series N69 Epoxoline II
      Carboline 187
      Rust-Olem 9100 High Performance Epoxy Devoe BR235H
      International Protective Coatings – Interguard 475HS

   b. Field or Factory Applied
      Tnemec Series 140 NSF 61
      International Protective Coatings – Interline 850 or 925
      Devoe BR235H

   c. Factory Applied
      3M Scotchkote 206N Fusion Bonded Epoxy

   d. Manholes and Lift Stations, Field Applied
      Raven 405
      Hydro-Pox GL 212

3. Polyurethane
   Tnemec Series 1075
   Carboline 134 HS VOC
   Devoe 379H

4. Bituminous Mastic Epoxy
   Carboline 300M
   Tnemec Series 46H413
   Rust-OleumDevoe Devtar SA

5. Acrylic Primer
   International Intercryl 520
   Tnemec Series 26 TyCRYL
   Rust-Oleum Devoe Devflex 4020

6. Acrylic Polymer
   Tnemec Series 1029

F. Paint Schedule

Aboveground or exposed facilities shall be color-coded per APWA Uniform Color Code for domestic water, recycled water facilities, or wastewater facilities.

1. Domestic Water System

   a. Piping and Equipment: Safety Blue

   b. Public Fire Hydrants: Safety Yellow, unless different color is required by local fire jurisdiction. Comply with fire jurisdiction.

   c. Private Fire System: Safety Red

2. Sewer System

   Lift Station Piping and Equipment: Safety Green

3. Recycled Water Facilities: Safety Purple

G. Permits

All work shall conform to the specifications and requirements of the State of California Department of Transportation, the County, the city having jurisdiction, or and other agencies involved. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

PART 2 – MATERIALS

A. Zinc Primer

1. All primer shall contain not less than 79.60% zinc in dry film.

B. Bituminous Mastic

1. Bituminous mastic shall be coal-tar pitch based.

2. Bituminous mastic shall have a minimum of 68% solids by volume.

C. Epoxy Coating for Water System

1. Epoxy shall meet current local air quality standards and shall not be less than 65% solids.

2. All coatings and pigments to be used on domestic water services shall have NSF approval for use with domestic water.

D. Epoxy Coating for Wastewater System

1. Epoxy shall meet current local air quality standards and shall be 100% solids.

2. All coatings and pigments to be used on wastewater services shall be designed for prolonged exposure to hydrogen sulfides.

PART 3 – EXECUTION

A. Surface Preparation

1. Do not sandblast or prepare more surface area than can be coated in one day. Remove all sharp edges, burrs, and weld spatter. Do not sandblast epoxy-coated pipe that has already been factory coated.

2. Surface preparation shall conform with the SSPC specifications as described below:

Solvent Cleaning	SP-1
Hand Tool Cleaning	SP-2
Power Tool Cleaning	SP-3
White Metal Blast Cleaning	SP-5
Commercial Blast Cleaning	SP-6
Brush-Off Blast Cleaning	SP-7
Pickling	SP-8
Near-White Blast Cleaning	SP-10

3. Wherever the words "solvent cleaning," "hand tool cleaning," "wire brushing," or "blast cleaning" or similar words are used in these specifications or in paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC (Steel Structure Painting Council, Surface Preparation Specifications, ANSI A159.1) specifications listed above.

B. Painting Systems

1. All materials of a specified painting system, including primer, intermediate, and finish coats, shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer for the particular coating system.

2. Deliver all paints to the job site in the original, unopened containers.

C. Surfaces Not To Be Coated

The following surfaces shall not be painted and shall be protected during the painting of adjacent areas:

- Mortar-coated pipe and fittings
- Stainless steel
- Metal letters
- Nameplates
- Grease fittings
- Brass and copper, submerged

- Buried pipe, unless specifically required in the piping specifications
- Bronze meters and strainers

D. Protection of Surfaces Not To Be Painted

Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent paint and other materials from entering the motors.

E. Field Touch Up of Manufacturer-Applied Prime Coats

Surfaces that are primed at the place of manufacture shall receive a field touch-up of organic zinc primer to cover all scratches or abraded areas.

F. Bituminous Mastic

1. Buried metal (flanges, non-stainless steel nuts and bolts, flexible couplings, exposed reinforcing steel, etc.) shall be coated with a minimum of 20 mils of bituminous mastic.

2. All surfaces coated with bituminous mastic shall be covered with 8 mil polyethylene wrap per Section 15056, after applying the bitumastic.

G. Epoxy Coating of Metal

1. Only those metal surfaces specifically called out shall be epoxy coated.

2. Epoxy lining and coating of valves shall be per AWWA C550 and Section 15100 Manual Valves. All valves shall be lined and coated by manufacturer.

3. Surfaces to be epoxy coated shall follow the surface preparation requirements as recommended by the manufacturer.

4. Surfaces shall be coated with organic zinc primer to a dry film thickness of 3 mils.

5. Apply two coats of epoxy paint (4 mils each) to the primed surface. The manufacturer's recommended drying time between coats shall be followed.

6. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

H. Epoxy Coating of Concrete

1. Only those metal surfaces specifically called out shall be epoxy coated.

2. Surfaces to be epoxy coated shall follow the surface preparation requirements as recommended by the manufacturer.

3. Apply one or more coats of epoxy paint as needed to achieve a uniform coating thickness of 70 mils, minimum. The manufacturer's recommended drying time between coats shall be followed.

4. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

I. Dry-Film Thickness Testing

1. Measure coating thickness specified for metal surfaces with a majestic-type dry-film thickness gage. Test the finish coat (except zinc primer and galvanizing) for holidays and discontinuities with an electrical holiday detector, low-voltage, wet-sponge type. Measuring equipment shall be provided by the contractor. Provide detector as manufactured by Tinker and Rasor or K-D Bird Dog. Provide dry-film thickness gage as manufactured by Mikrotest or Elcometer. Check each coat for the correct dry-film thickness. Do not measure within eight hours after application of the coating.

2. If the item has an improper finish color or insufficient film thickness, the surface shall be cleaned and topcoated with the specified paint material to obtain the specified color and coverage. Visible areas of chipped, peeled, or abraded paint shall then be primed and finish coated in accordance with the specifications. Work shall be free of runs, bridges, shiners, laps, or other imperfections.

J. Warranty Inspection

Warranty inspections shall be conducted during the eleventh (11^{th}) month following completion of all coating work. Personnel present during the pre-construction meeting shall be present at this inspection. All defective work shall be repaired per the approved work plan as submitted by the contractor.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 13110

CORROSION PROTECTION AND JOINT BONDING

PART 1 - GENERAL

A. Description

This section describes the materials, installation and testing requirements for corrosion protection and monitoring facilities for buried piping and appurtenances. The facilities addressed below include: corrosion test stations; reference cells; insulating flange kits, casing insulators and seals; bonding for pipe and mechanical joints; alumino-thermic welds and sacrificial anodes for new water services and air/vacuum assemblies. Pipeline cathodic protection requirements are not included unless otherwise specified on plans.

Corrosion protection shall be provided according to corrosion study recommendations as specified in the Procedures Guidelines and Design Requirements manual.

B. Related Documents

1.	Trenching, Backfilling, and Compacting:	02223
2.	Concrete:	03300
3.	Painting and Coating:	09900

C. Specifications and Standards

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designations only.

ANSI/ASME B16.21 (Rev 1992)	Nonmetallic Flat Gaskets for Pipe Flanges
ASTM B3-90	Soft of Annealed Copper Wire
ASTM B8-86	Concentric-Lay-Stranded Copper Conductors
ASTM B 418	Standard Specification for Cast and Wrought Galvanic Zinc Anodes
ASTM D 1248-84 (Rev 89)	Polyethylene Plastics Molding and Extrusion Materials
AWWA C-217	Wax Coating Systems for Underground Piping Systems
MIL-C-18480B	Coating Compound, Bituminous, Solvent, Coal Tar Base

NACE RP0169-96	Recommended Practice, Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0286-97	Electrical Isolation of Cathodically Protected Pipelines
NEMA LI 1 –1989 (Rev 1995)	Industrial Laminated Thermosetting Products
UL 83-80	Thermoplastic-Insulated Wires

D. Submittals

1. Manufacturer's catalog cuts including:

   a. Post-mounted test enclosure
   b. Enclosure components
   c. Redwood post
   d. Conduit
   e. At-grade test boxes
   f. Brass tags
   g. Insulating flange kits
   h. Wax tape wrap system
   i. Wire and cable
   j. Plastic warning tape
   k. Casing seals
   l. Casing insulators
   m. Zinc water service anodes

2. As-built Drawings: The contractor shall maintain as-built drawings showing the exact locations of all corrosion monitoring test stations, insulators, and wire trenching runs. Location changes from the design drawings shall be legibly indicated in red on a blue line copy of the design drawings. These drawings shall be submitted to the District's representative before the work is considered complete.

3. Test Results: The following test results shall be submitted to the District representative.

   a. Continuity test report
   b. Insulator test results
   c. Initial pipe-to-soil potential survey

4. Notification for Testing: The contractor shall notify the District representative at least five days in advance of installation of anodes and completion of wrapping of buried flanges and couplings. The contractor shall also notify the District representative when test leads, continuity bonding and test boxes are installed and ready for inspection.

PART 2 - MATERIALS

A. Test Stations

1. Post Mounted Test Boxes:

a. Enclosure: The enclosure for a post mounted shunt box shall be approximately 7.5 inches x 6 inches x 5.28 inches and suitable for mounting on a post. Enclosure shall be constructed of one piece molded fiberglass and conform to NEMA 3R. The enclosure shall be constructed of fiberglass-reinforced resins that are chemically resistant to a wide range of corrosive atmospheres. The enclosure shall have non-metallic hinges and lockable quick release latches. Enclosure shall be Hoffman, Catalogue No. A-865JFGQRR or approved equal.

b. Panel: The mounting panel shall be fiberglass, micarta, or laminated phenolic sheet cross-laminated for resistance to warpage and weathering. Minimum panel thickness shall be 3/16-inch. Panel shall be mounted off of the back of the enclosure to allow sufficient space for terminal connectors.

c. Components: All terminal lugs and fasteners shall be solid brass. Provide a properly sized terminal lug for all wires. See District Standard Drawings for wiring configuration and wire labels

d. Post: Post shall be seasoned, construction heart garden grade redwood, 4 inches by 4 inches, and surfaced on four sides. Cut a ¾-inch chamfer in all 4 top edges. Posts shall be 66-inches in length.

e. Conduit: Conduit for the post mounted test boxes shall be 2-inch diameter galvanized steel approximately 4-feet long.

f. Panel Labels. All wire terminations on test station panel shall be identified by permanent marking. A self-adhesive aluminum tape permanently embossed with the required identification shall be fixed to the terminal board. Identify leads using an identification device by Dymo Products Company of Augusta, Georgia or approved equal.

2. At-Grade Test Box:

a. Test Box: At-grade test boxes shall be round, pre-cast concrete with dimensions of 13-1/2-inch O.D. by 8-inch I.D. by 12-inches high, similar to Christy G5 Utility Box with a cast iron supporting ring and lid, and shall have sufficient strength to support occasional vehicular traffic. The lid shall be 11 inches O.D. and cast with the legend "CP Test" using letters not less than 1-1/2-inches high.

b. Concrete Pad: Test boxes mounted in unpaved areas shall be mounted in a reinforced 26-inch square by 4-inches thick concrete pad (Class B concrete per Section 03300). Rebar shall be No. 4. A concrete pad is not required where the test box is placed in pavement.

c. Brass Identification Tags: Wire identification tags shall be 1-1/2-inch diameter brass discs with a 3/16-inch diameter hole and die stamped with 1/4-inch characters. Tags shall be attached to test wires with un-insulated AWG No. 14 solid copper wire.

B. Insulating Flange Kits

Insulating flange kits shall contain full-face gaskets, full-length sleeves and double washers (steel and phenolic) on each end. Flange insulation kits shall consist of:

1. Insulating Gaskets: Gaskets for flanges 16-inches or greater shall be Type E fullfaced Phenolic with Rectangular Nitrile or Viton O-Ring Seal (PSI Linebacker or equal). For flanges less than 16-inches, gaskets shall be Type E fullfaced neoprene faced phenolic.

2. Insulating Stud Sleeves for Bolts: Insulating sleeves shall be 1/32-inch thick, G10 laminated glass tube. For installation on threaded studs use full-length sleeves. For installation on threaded bolts, i.e., at butterfly valve flange bonnets and bases, the sleeves shall be half-length.

3. Insulating Washers for Bolts: Insulating washers shall be 1/8-inch G10 laminated glass.

4. Steel Washers Over Insulating Washer: 1/8-inch thick cadmium plated steel to be placed between the nut and the insulating washer.

C. Wax Tape External Coating

1. Wax Tape Coating: All buried non-mortar coated fittings and appurtenances such as valves, flanges, insulating flanges, couplings, etc. shall be coated with a wax tape primer and wrap per AWWA C217 and the District Standard Drawings.

2. Primer: All exposed non-mortar coated surfaces including flanges, bolts and nuts shall be prime coated with a blend of petrolatum, plasticizer, inert fillers, and corrosion inhibitor having a paste-like consistency.

3. Wax Tape: Wrap primed surfaces with a synthetic felt tape saturated with a blend of petrolatum, plasticizers, and corrosion inhibitors that is easily formable over irregular surfaces. A compatible petrolatum filler should be used to smooth over irregular surfaces.

4. Outer Covering: The primed and wax-tape wrapped flange shall be wrapped with a plastic tape covering consisting of three (3) layers of 1.5 mil, polyvinylidene chloride or PVC, high cling membranes wound together as a single sheet.

5. Protective Overwrap: The edges of flanges 18-inches in diameter and larger shall be wrapped with 10-mil pipe tape (two layers, 50% overlap) to protect wax tape during backfilling process.

D. Wire and Cable

1. General: All DC wires shall be stranded copper with high molecular weight polyethylene (HMWPE) or thermal plastic (THWN) insulation suitable for direct burial in corrosive soil and water, conforming to UL 83 and ASTM Standards B3 or B8. HMWPE insulation and shall conform to the requirements of ASTM D1248 Type 1, Class C. THWN insulation shall conform to the requirements of ASTM D-2220

2. Test Leads: Test wires shall be sized as shown in the District Standard Drawings. Each test lead shall be of sufficient length to extend from the attachment to the pipe or casing to the test box without a splice. Wires with cut or damaged insulation will not be accepted and replacement of the entire lead will be required at the contractor's expense.

3. Bond Wires: Bond wires shall be AWG No. 2, No. 4, or No. 6 HMWPE depending on the pipe diameter and as described in the District Standard Drawing W-31. Bond wires shall have minimal slack wire at each weld but otherwise be as short as possible.

E. Alumino-Thermic Welds

1. Weld Process: Cable-to-metal connections shall be made by the alumino-thermic welding process. Weld charge size, alloy and mold size shall be as specified by the manufacturer of the weld kit for use on steel or ductile iron pipe.

2. Weld Cap Primer: Weld cap primer shall be an elastomer-resin based corrosion resistant primer for underground services such as Royston Roybond Primer 747 or approved equal.

3. Weld Caps: Alumino-thermic welds shall be sealed with a pre-fabricated plastic cap filled with formable mastic compound on a base of elastomeric tape. Weld caps shall be Royston Handy Cap 2 or approved equal.

4. Weld Coating: All buried alumino-thermic welds and weld caps shall be coated with a cold-applied fast-drying mastic consisting of bituminous resin and solvents per Mil. Spec MIL-C-18480B such as Carboline 300M, Tnemec 40-H-413, Tape-coat TC Mastic or 3M Scotch Clad 244. The minimum coating thickness shall be 25 mils (0.025 inch).

F. Plastic Warning Tape

The plastic warning tape shall be 3 inches wide and shall have a printed warning - "Caution - Cathodic Protection Cable Buried Below" or similar.

G. Mortar

Mortar used to repair concrete coated pipe after attachment of bond or pipe test lead wires shall be the fast drying, non-shrinkable type.

H. Casing Seals

Casing seals used to prevent moisture intrusion into the casing annular space shall be either a rubber link or pull-on sleeve type.

1. "Rubber link" casing seals are made of molded, solid, synthetic rubber and are connected together by corrosion resistant bolts and nuts. After the links are placed in the casing opening, the bolts are turned to create an airtight and watertight seal. These types of casing seals shall be "Link Seals" brand, or approved equal.

2. "Sleeve" casing seals are made of 1/8-inch thick, synthetic rubber. The sleeve is fastened to the exterior of the casing and carrier pipe using stainless steel strapping. These types of casing seals shall be PSI Model "C" - Custom Pull-On seals, or approved equal.

I. Casing Insulators

Casing insulators used to prevent contact between the casing and carrier pipe shall be comprised of a fusion coated, 8-inch wide steel band with 2-inch wide glass reinforced plastic runners. These types of casing insulators shall be PSI Spacer Model C8G-2, or approved equal.

J. Zinc Anodes for New Services and Air-Vacs

1. Zinc Anode: Anode shall conform to ASTM B 418, Type II and shall be a prepackaged zinc alloy ingot having a chemical composition not exceeding the following limits:

Aluminum	0.005% Max.
Cadmium	0.0000% Max.
Iron	0.0014% Max.
Zinc	Remainder

2. Anode Weight and Dimensions: Ingot weight shall be 12 pounds. Ingot dimensions shall be 1.4-inches x 1.4 inches x 24 inches.

3. Anode Backfill: Each zinc anode shall be prepackaged in a permeable cloth bag with a backfill of the following composition or installed bare and backfilled with material having the following composition.

Gypsum	75%
Powdered Bentonite	20%
Anhydrous Sodium Sulfate	5%

Backfill grains shall be capable of 100% passing through a 100 mesh screen. The backfill shall be firmly packed around the anode by mechanical vibration to density which will maintain the zinc ingot in the center of the cloth bag and surrounded by at least 1-inch of backfill.

4. Steel Core: Anode shall be cast full length with an electrogalvanized 1/4-inch diameter steel core which shall be exposed at one end for connection of the anode lead wire.

5. Anode Lead Wire: Anode lead wire shall be AWG No. 12 stranded copper wire with THWN insulation suitable for direct burial use. Wire shall be attached to the steel core with silver solder by the manufacturer. The connection shall be encapsulated in a heat-shrinkable sleeve. Anode lead wire shall be of sufficient length of extend from the anode to the designated termination point without a splice. Wires with cut or damaged insulation will not be accepted and replacement of the entire lead will be required at the contractor's expense.

PART 3 - EXECUTION

A. General

Corrosion protection and monitoring installation shall conform to NACE Publication RP-0169 (Latest Revision) - Recommended Practice, Control of External Corrosion on Underground and Submerged Metallic Piping Systems.

B. Post Mounted Test Boxes:

1. Location: Locate redwood post directly above the pipeline, if possible, but not in a roadway or in a location that is particularly susceptible to damage. The District representative shall approve test station locations.

2. Test Box and Conduit: Connect 2-inch galvanized conduit to the anode test box with a threaded screw connection. Attach conduit to the post with two galvanized pipe straps and threaded fasteners. Insert all test leads in the galvanized conduit and run into test box prior to setting the post in concrete.

3. Post: Post shall be 5-feet in length with a chamfered top. Excavate a 16-inch diameter by 20-inch deep hole. Center the post and test box in the hole and fill the hole with concrete. The concrete shall be Class B per Section 03300.

4. Wire Identification: The self-adherent identification tape shall be attached to the micarta panel at the termination point of each wire. The tape shall identify the owner-size-service of the pipe to which the test leads are attached. For example: MCWD 18" RW. For wires attached to insulating flanges, an additional "N", "S", "E", or "W" for North, South, East or West shall be included on the identification tape to indicate on which side of the insulating flange the wires are attached.

C. At-Grade Test Boxes

1. Location: The at-grade test boxes shall be installed adjacent to paved roadways behind the curb; in the sidewalk, beyond the edge of the sidewalk, or in a planter as shown in the District Standard Plan CP-8. If no curb exists, locate the test box just off the paved surface. In unpaved areas or parking lots, locate the test box directly over pipe (but not in parking spaces). The District representative shall approve all test box locations.

2. Installation: All wire shall be properly identified, with approximately 18 inches of slack wire above finish grade and coiled inside the test box. Keep the inside of the test box clear of all debris and other foreign material. Top of box shall be flush with finish grade.

3. Wire Identification: Brass identification tags shall be securely attached to each of the wires in the test box with un-insulated AWG No. 14 solid copper wire. Tags shall be stamped with the owner-size-service of the pipe to which the test leads are attached. For example: MCWD 18" RW. Brass tags on wires in insulating flange test boxes shall be stamped with the additional identification of "N", "S", "E", or "W" for North, South, East or West to indicate on which side of the insulating flange the wires are attached.

D. Test and Bond Wire

1. Test Wires: Test wires shall be attached to the pipe and terminate in a test box without a splice as shown in the District Standard Drawings. A minimum of 18 inches of slack wire shall be coiled at each pipe connection and in each test box for each wire.

2. Bond Wires: Two or three bond wires shall be installed on steel pipe across each buried, unwelded pipe joint or mechanical joint including valves, couplings, special fittings and flanges except insulating flanges, as shown on District Standard Plan CP-10. Bond wires shall not be attached to valve bodies, but instead to the flange of the valve.

3. Connection to Pipe: Connections of copper wire to the pipeline shall be made with alumino-thermic weld charges or by brazing. Welding charges shall be the product of a manufacturer regularly engaged in the manufacture of the material. Manufacturer's recommend cartridge size and type shall be used. Only one wire shall be connected with each weld. Welds shall be no closer than 3-inches. Each completed weld shall be coated as described below.

   a. Preparation of Wire: Use a cutter to prevent deforming wire ends. Remove only enough insulation from the wire to allow the weld connection to be made. Do not use a hacksaw for cutting.

   b. Preparation of Metal: Remove all coating, dirt, grime and grease from the metal pipe at weld location by wire brushing and/or use of suitable safe solvents. Clean the pipe to a bright, shiny surface free of all serious pits and flaws by use of mechanical grinder or a file. The area of the pipe where the attachment is to be made must be absolutely dry. Failure to provide a dry surface for welding will result in a poor quality weld and could result in serious injury to the workman.

   c. Attachment of Wire to Pipe: The attachment of copper wire shall be made using an alumino-thermic weld as shown on the District Standard Plans. The wire is to be held at 30° to 45° angles to the surface when welding. One wire only shall be attached with each weld.

   d. Testing of All Completed Welds: As soon as the weld has cooled, the weldment shall be tested for strength by striking a sharp blow with a two-pound hammer while pulling firmly on the wire. All unsound welds are to be re-welded and re-tested. All weld slag shall be removed from the weldment.

   e. Coating of All Completed Welds: Thoroughly clean by wire brushing the area to be coated. The area must be completely dry. Apply the weld cap primer and the weld cap. Overcoat the weld cap with a bituminous mastic coating material in accordance with the manufacturer's recommendations. Completely coat the weld, all bare pipe surfaces around the weld and any exposed copper wire. For non-mortar coated pipe, extend coating 3 inches beyond weld cap. For mortar-coated pipe, apply coating up to but not over mortar. Allow sufficient time to dry prior to repair of the mortar coating on steel pipe.

f. Mortar Repair: On mortar-coated pipe, the mortar coating shall be repaired after the bituminous weld coating has dried, using fast-setting, non-shrinkable mortar to restore the original outside diameter of the pipe at each weld location.

4. Wire Trenching and Backfill

a. Depth: All buried wiring shall be installed at a minimum depth of 24 inches.

b. Backfill: The bottom 2 inches of the finished trench shall be sand or stone-free earth. The first 3 inches of the backfill shall be sand or stone-free earth placed directly on the wires. The remainder of the trench shall be backfilled with native earth with a maximum stone size of 2 inches and compacted as specified in Section 02223. Care shall be taken when installing wire and backfilling trench so that insulation is not broken, cut, nicked, or bruised. If wire insulation is damaged during installation, it shall be replaced completely at the contractor's expense.

c. Plastic Warning Tape: Plastic warning tape shall be run in the wire trench at a depth of 12-inches and above each buried wire

E. Flange Insulation Kits

1. General: A four-wire test station shall be installed at each buried insulating flange. Two test wires shall be installed on each side of the buried insulator according to this specification and the District Standard Plans CP-13 and CP-14.

2. Flange Kits: Insulating kits shall be installed as shown on the District Standard Plans CP-13, CP-14, and as recommended by the manufacturer. Moisture, soil, or other foreign matter must be carefully prevented from contacting any portion of the mating surfaces prior to installing insulator gasket. If moisture, soil or other foreign matter contacts any portion of these surfaces, the entire joint shall be disassembled, cleaned with a suitable solvent and dried prior to reassembly.

3. Handling of Gasket: Care shall be taken to prevent any excessive bending or flexing of the gasket.

4. Alignment: Alignment pins shall be used to properly align the flange and gasket.

5. Bolt Tightening: The manufacturer's recommended bolt-tightening sequence shall be followed. Bolt insulating sleeves shall be centered within the insulation washers so that the insulating sleeve is not compressed and damaged.

6. Paint Pigments: Neither aluminum, graphite, nor any other electronically conductive pigment shall be used in paints or coatings on the flanges, bolts, or washers of any insulating device.

7. Testing: All insulating flanges must be inspected, tested and approved by the Corrosion Engineer retained by the District as described in this specification section. All buried insulating flanges must be tested prior to wax tape wrap coating and backfilling.

F. Wax Tape Coating:

1. Primer: Surface shall be cleaned of all dirt, dust, and loose rust or mill scale by wire brush and by wiping with a clean cloth. The surface shall be dry. Apply primer by hand or brush. A thick coating of primer shall be worked into all crevices, around bolts and in threads, and shall completely cover all exposed metal surface. The primer should overlap the pipe coating by 3-inches minimum.

2. Wax-Tape: The petroleum wax-type can be applied immediately after primer application. Short lengths of tape shall be cut and formed completely around each individual bolt and stud-end. After all bolts are covered, the tape shall be applied circumferentially and formed by hand into all voids and spaces. There shall be no gaps or air spaces under the tape. The tape shall be applied with at least 55% overlap.

3. Outer Covering: The clear plastic outer covering shall be applied by hand such that the material conforms and adheres to the wax-tape surface. Three layers of plastic outer wrapping shall be applied.

4. Protective Overwrap: The edges of all flanges 18-inches in diameter and larger shall be wrapped with 10-mil pipe tape (two layers, 50% overlap) to protect wax tape during backfilling process

G. Casing Seals

The casing end seal ("rubber link" or "sleeve" type) shall be installed wherever a metallic pipeline passes through a steel casing in order to restrict water intrusion into the casing annular space. The casing seal shall be installed according to the manufacturer's recommendations.

H. Casing Isolation

The encased sections of metallic piping shall be electrically isolated from the casing. Use casing insulators to prevent metallic contact and ensure a minimum amount of standoff between casing and carrier pipe. Distance between spacers shall be small enough to prevent excessive sagging of the line.

I. Zinc Anodes

1. General: Where called for on the drawings, prepackaged zinc anodes shall be installed in excavated, drilled, or punched holes a minimum of 8-inches in diameter. Anodes shall be installed below the level of the service or air/vac line, with a minimum separation of 2 feet between the copper water tubing and the zinc anode maintained at all times. Anodes shall not be lowered, transported, handled, or lifted by the lead wire.

2. Location: Anode shall be installed approximately midway between pipeline and meter box.

3. Backfilling: After the prepackaged anode is placed in the hole, approximately 5 gallons of water shall be poured into the hole so that the anode is completely covered with water. Allow water to soak for 30 minutes. Stone-free native soil shall then be used to backfill the anode hole. Imported sand shall not be used for backfilling. The anode hole shall be

backfilled in stages and carefully compacted to ensure that no voids exist around the bag and that the bag and anode wire are not damaged. After backfill is level with the top of the anode, another 5 gallons of water shall be poured into the hole to completely saturate the soil backfill. More water shall be added if it is suspected that the backfill is not completely saturated. Care shall be taken to avoid damage to the anode and anode lead wires.

4. Anode Lead Wire: The anode lead wire shall extend from the anode along the copper pipe to the water service or air/vac meter box. The anode lead wire shall be attached to the copper water service or air/vac riser inside the meter box using a bronze mechanical grounding clamp.

PART 4 - REQUIRED TESTING AND RECORD KEEPING

A. Test Lead And Bond Wire Welds

1. Responsibility: The contractor shall be responsible for inspection all wire insulation for damage and for testing all test lead and bond wire welds.

2. Test Method: All wire insulation shall be visually inspected. All completed wire connection welds shall be tested for strength by striking the weld with a sharp blow with a 2-pound hammer while pulling firmly on the wire. Welds failing this test shall be re-welded and re-tested. Wire welds shall be spot tested by the District representative. After backfilling pipe, all test lead pairs shall be tested using a standard ohmmeter for broken welds.

3. Acceptance: The resistance between each pair of test leads shall not exceed 150% of the total wire resistance as determined from published wire data.

B. Test Lead Trenching And Backfill

1. Responsibility: The District representative, at his discretion, shall inspect wire trenches, backfill material and compaction methods.

2. Method: The trench depth, bottom padding, and backfill material shall be visually inspected prior to backfilling. Compaction and surface finish inspection shall be per Section 02223.

3. Acceptance: Conformance with the specifications and good workmanship.

C. Test Station Installations

1. Responsibility: The District representative shall inspect final test station installations.

2. Method: Visual inspection.

3. Acceptance: Post and at-grade test stations shall be fully installed and finished as indicated in the drawings and described in these specifications. Wire in post-mounted stations shall be connected to the panel and properly labeled. Enclosures, conduit and posts shall be fully secured. At-grade test stations shall be mounted in the pavement or

concrete pad. All wires shall be of proper length and identified with brass tags stamped and attached as specified herein. All work shall be in compliance with this specification section and consistent with good workmanship.

D. Insulating Flange Kits

1. Responsibility: Insulating flanges shall be inspected and tested by the Corrosion Engineer retained by the District. Buried insulators must be tested and approved prior to application of wax tape and backfilling.

2. Method: The assembled flange shall be tested with a Gas Electronics Model 601 Insulator Checker or equivalent instrument that is specifically designed for the testing of insulating flanges. The testing shall be done in accordance with NACE RP0286-97. If a short is indicated, each bolt shall be tested to verify the integrity of each insulating sleeve before the flange is disassembled. The contractor shall provide assistance in finding any and all shorts or shorted bolts.

3. Acceptance: The installation of the insulating flange kit shall be shall be considered complete when the testing instrument indicates that no shorts or partial shorts are present. Any deflection of the meter, no matter how small, indicates a short. All disassembly and re-assembly necessary for acceptance shall be done at no additional cost to the District.

4. Retest: All repaired insulating flanges shall be re-tested as indicated above until they pass. All re-testing shall be done at no additional cost to the District.

E. Wax Tape Wrap

1. Responsibility: The District representative shall inspect all completed wax tape wrapping for compliance with these specifications prior to backfilling.

2. Method: Visual inspection.

3. Acceptance: Conformance with this specification and good workmanship. The wax tape must be tight and have no air pockets and each individual bolt; nut or coupling tie-rod must be individually wrapped. The plastic outer wrap shall be have three layers and shall be neat and tight against the wax tape.

4. Pipe Tape Overwrap: All flange 18-inches or over shall have their edges overwrapped with pipe tape as described above.

F. Pipeline Continuity Through Bonded Or Mechanical Joints

1. Responsibility: The Corrosion Engineer retained by the District shall verify the continuity of buried metallic pipe where continuity is required. All sections that contain non-welded (bonded) joints, in-line mechanical joints, i.e., flanges, valves couplings and flex joints shall be tested.

2. Method: Continuity is verified when the measured linear resistance of section of pipe being tested is approximately equal its theoretical value. Resistance shall be measured by the linear resistance method. A direct current shall be impressed from one end of the test

section to the other (test station to test station) using a DC power supply (battery). A voltage drop is measured through the test section at several current levels. The resistance (R) is calculated using the equation R = dV/I, where dV is the voltage drop and I is the current. The resistance shall be calculated for three or four different current levels.

3. Acceptance: Acceptance is reasonable comparison of the measured resistance with the calculated or theoretical resistance. The measured resistance shall not exceed the theoretical resistance by more than 130%. The theoretical resistance is the sum of the pipe resistance and the bond (wire or clip) resistance.

4. Deficiencies: If a discontinuity or a high resistance is found within a section of pipe that section is defective. It is the contractor's responsibility to locate, excavate, and repair or replace all bonds that are found to be damaged or missing. Continuity tests shall be repeated after repairs are made. All continuity repairs and re-testing shall be done at no additional cost to the District.

5. Test Scheduling: Continuity testing shall be scheduled as soon as possible after the pipe is installed and fully backfilled. Early testing will allow excavations and repairs to be made, if needed, before the surface is paved or finished.

G. Casing Isolation

1. Responsibility: The Corrosion Engineer retained by the District shall test all casings to verify that they are metallically isolated from the pipe.

2. Method: The casing shall be considered fully isolated if the difference between the structure-to-soil potential of the casing and the pipe is more than 30 millivolts. If this potential difference is less than 30 millivolts the casing and the pipe may still be adequately isolated. In this case the Corrosion Engineer shall submit a test approach and test data to verify isolation.

3. Acceptance: A potential difference of 30 millivolts or greater or the District's representative acceptance of the Corrosion Engineer's test report.

H. Potential Pipe-To-Soil Performance Summary

1. Responsibility: The Corrosion Engineer retained by the District shall conduct a pipe-to-soil potential survey after all test stations are installed.

2. Method: Native or initial pipe-to-soil potential shall be measured at all test stations and with all wires in each test station. All potentials shall be measured using a high impedance digital voltmeter and suitable leads with respect to a standard, recently-calibrated copper\copper sulfate reference electrode.

3. Report: The potential data shall be submitted in tabular form. The as-built location of each test reading shall be fully described.

4. Acceptance: A complete report and certification by the Corrosion Engineer that the test method was in accordance with industry standards and NACE RP0169.

I. Report

1. Verbal Report: All deficiencies found during testing or inspection shall be reported immediately to the District representative.

2. Written Report: The Corrosion Engineer retained by the District shall prepare a final report that contains the following:

   a. Verification that all test stations have been installed and installed properly.

   b. Verification that all insulating flanges have been tested with an approved test instrument and that all have passed.

   c. Field continuity test data, calculations of actual (measured) pipe resistance from the data and calculations of the theoretical resistance for each section of pipe tested. The report shall include a statement that each section of pipe that contains a bonded or mechanical joint was tested and that the resistance of each section tested was less than or equal to 130% of the theoretical resistance.

   d. Verification that all casings are isolated from the pipe.

   e. Tabulation of all pipe-to-soil potential survey data.

   f. Other information that the Corrosion Engineer believes is pertinent with respect to the corrosion status or long-term performance of the pipeline or structure installed.

J. Compliance With Specifications

1. Deficiencies: Any deficiencies or omissions in materials or workmanship found by these tests shall be rectified by the contractor at his expense. Deficiencies shall include but are not limited to: damaged wire; broken or missing test leads; improper or unclean wire trench backfill; lack of 18-inch slack wire in test boxes; improperly mounted or located test boxes; shorted insulators; discontinuous pipe; shorted casings; and other deficiencies associated with the workmanship, installation and non-functioning equipment.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15041

CHLORINATION OF DOMESTIC WATER MAINS AND SERVICES FOR DISINFECTION

PART 1 - GENERAL

A. Description

This section describes requirements for disinfection of domestic water mains, services, appurtenances and connections by chlorination and all requirements for bacterial testing of the facilities, and obtaining subsequent clearances for operations issued by the District and all state and local health agencies having jurisdiction.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

Hydrostatic Testing of Pressure Pipelines: 15042

C. Referenced Standard

All domestic water mains, water services, attached appurtenances, and connections, if any, shall be disinfected in accordance with AWWA C601, C651-99 and as specified herein.

D. Application

Before being placed in service or connected to existing facilities, all facilities shall be chlorinated. Chlorine may be applied by direct chlorine gas feed, direct liquid chlorine feed, or calcium hypochlorite tablets per AWWA C651.

E. Retesting

Retesting of the system may be required if 90 days have passed between the date of testing and acceptance by the District.

F. Submittals

The Contractor shall submit a Disinfection Plan per Section 1300. The Disinfection Plan shall address trench treatment, flushing, chlorination, sampling and bacteriological testing procedures, and dechlorination procedures per Section 15041 and AWWA C651. The Contractor shall submit this plan 7 working days prior to beginning this work.

PART 2 - MATERIALS

A. Chlorine Gas.

Chlorine gas shall be supplied and converted from its liquid form to a gas as detailed in AWWA C651 Sections 2.1 and 5.2.

BA. Calcium Hypochlorite Tablets

Calcium hypochlorite tablets shall have an average weight of 0.009 pounds each and shall contain not less than 70% of available chlorine.

B. Liquid Chlorine

Liquid Chlorine shall conform to AWWA C651 4.1.1 or AWWA C651 4.1.2.

PART 3 - EXECUTION

A. Procedure

1. Contractor shall notify the District two (2) working days prior to chlorination of facilities.

2. All required corporation stops and other plumbing materials necessary for chlorination or flushing of the main shall be installed by and at the expense of the contractor.

3. All mains shall be thoroughly flushed prior to disinfection. Only the direct chlorine gas fuel method shall be used if contaminating material has entered the line.

4. Every service connection served by a main being disinfected shall be tightly shutoff at the curb stop before water is turned into the main. Care shall be taken to expel all air from the main and services during the filling operation.

5. Clean all pipe, fittings and valves and swab with chlorine disinfection prior to assembly.

6. Water shall be fed slowly into the pipeline with chlorine applied in amounts to produce a dosage of not less than 50 ppm nor more than 100 ppm in all sections of the pipeline and appurtenances.

7. Open and close valves in lines being disinfected several times during the contact period to disinfect gates.

8. Treated water shall be retained in the system for a minimum of 24 hours and shall contain a chlorine residual of not less than 25 ppm at the end of the retention period in all sections being disinfected.

B. Concurrent Testing

Disinfecting the mains and appurtenances, hydrostatic testing, and preliminary retention may run concurrently for the required 24-hour period, but in the event there is leakage and repairs are necessary, additional disinfection shall be made by injection of chlorine solution into the line as provided hereinafter.

C. Additional Disinfection

If the tests are not satisfactory the contractor shall provide additional disinfection as required by AWWA C651.

D. Flushing

After chlorination, the water shall be flushed from the line, in accordance with AWWA C651, at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. The chlorinated water may be used later for testing other lines, or if not so used, shall be disposed of by the contractor, as designated in AWWA C651, Section 6.2. The contractor shall be responsible for all costs to dechlorinate the water and shall obtain all permits before discharging water into storm drain or watercourse. Discharging shall be in accordance with State and local regulations. The District will not be responsible for loss or damage resulting from such disposal.

E. Bacteriological Testing

The sampling and bacteriological testing procedure for the newly disinfected facilities shall be in accordance with AWWA C651-99, Section 5.1. The sampling and bacteriological testing procedure for main repairs shall be in accordance with AWWA C651-99, Section 4.7. The contractor shall provide sampling containers approved by the District and the contractor shall notify the District two (2) working days prior to collecting samples. A District representative shall be present during the collection of the samples. The contractor shall deliver the samples to a California DOHS approved testing laboratory. The contractor shall be required to provide the District with signed copies of all test results and chain of custody documents.

All mains and services must successfully pass bacteriological tests prior to connecting to the existing system. Services must be tested per the following procedure. A minimum of 10 percent of water services or 1 water service lateral, which ever is greater, must be tested. If this first water service test fails, then a minimum of 20 percent of water services or 2 water service laterals, whichever is greater, must be tested.

F. Cutting Into Existing Mains

Following the opening of an existing domestic water main, the interior of all accessible pipes and fittings shall be swabbed with a hypochlorite solution. The drained portion of the existing line and any new section shall be flushed from two directions toward the cut-in, if possible.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15042

HYDROSTATIC TESTING OF PRESSURE PIPELINES

PART 1 - GENERAL

A. Description

This section describes the requirements and procedures for pressure and leakage testing of pressure distribution mains.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

C. Connection to Existing Mains

The test shall be made before connecting the new line with the existing District pipes and mains.

D. Tester Procedure Plan

Contractor shall submit to the District a Test Procedure Plan. All testing shall be performed by a District-approved testing company or the design engineer who will be required to provide the District representative with certified testing results. Tester will have a gage and meter, calibrated annually. No testing shall take place against closed valves.

E. Requirements Prior to Testings

1. Before testing, the pipe trench shall be backfilled and compacted to the ground surface per Section 02223.

2. All concrete anchor blocks shall be allowed to cure a sufficient time to develop a minimum strength of 2,000 psi, but not less than five (5) days, before testing, unless otherwise directed by the District representative.

3. Steel pipelines shall not be tested before the mortar lining and coating on all of the pipe lengths in the line have attained an age of 14 days. Cement-mortar lined pipe shall not be filled with water until a minimum period of eight hours has elapsed after the last joint in any section has been made.

4. All surrounding utilities shall be installed prior to testing.

F. Testing before Final Pavement

All pipelines shall be satisfactorily pressure tested prior to the placement of final pavement.

PART 2 - MATERIALS

A. Water

1. The same water used for chlorination of the pipeline may be used to fill the line for pressure testing.

2. Make up water for testing shall be domestic water. Contractor shall pay for all make up water.

3. Temporary manual air release valves shall be utilized when requested by the District.

4. Test bulkheads shall be utilized in testing. Testing against valves will not be permitted..

PART 3 - EXECUTION

A. General

1. All labor, materials, tools, and equipment for testing shall be furnished by the contractor.

2. The pipeline shall be subjected to a field hydrostatic pressure of 200 psi for pipe 12 inches or greater for a period of four hours. For pipelines 10 inches or smaller, the pipe shall be subjected to a field hydrostatic pressure of 50 psi in excess of the anticipated working pressure of the pipe for a period of four hours.

3. The water necessary to maintain test pressure shall be measured through a meter. The leakage shall be considered as the amount of water entering the pipe during the test, less the measured leakage through valves and fittings. Leakage shall not exceed the rate specified. Any noticeable leaks shall be stopped, and any defective pipe shall be replaced with new sections.

4. The test shall further be conducted with valves open, and the open ends of pipes, valves, and fittings suitably closed. Valves shall be operated during the test period.

5. In hilly areas, it may be necessary to conduct the test in segments so that no pipe section is tested at less than the pipe pressure class plus 50 psi, nor more than 1½ times the pipe pressure class.

B. Field Test Procedure

1. The pipeline shall be filled at a rate such that the average velocity of flow is less than 1 fps. At no time shall the maximum velocity of flow exceed 2 fps. The following table has been provided to relate the velocity filling rate to an equivalent volume flow rate.

   Filling Rate in gpm equivalent to filling velocities of 1 fps

Normal Size (inches)	Flow Rate Q (gpm)
4	38
6	88
8	158
12	353
16	624

2. All air should be purged from the pipeline before checking for leaks or performing pressure or acceptance tests on the system. To accomplish this, if air valves or hydrants or other outlets are not available, taps shall be made at the high points to expel the air, and these taps shall be tightly plugged afterwards.

3. After the pipeline has been filled and allowed to sit a minimum of 24 hours (48 hours for mortar-lined pipelines), the pressure in the pipeline shall then be pumped up to the specified test pressure. If a large quantity of water is required to increase the pressure during testing, entrapped air, leakage at joints, or a broken pipe can be suspected. TESTS SHOULD BE DISCONTINUED until the source of trouble is identified and corrected.

4. When the test pressure has been reached, the pumping shall be discontinued until the pressure in the line has dropped 25 psi, at which time the pressure shall again be pumped up to the specified test pressure. For HDPE pipe, a resting period of a minimum of 30 hours shall be used. This procedure shall be repeated until four hours have elapsed from the time the specified test pressure was first applied. At the end of the four-hour period, the pressure shall be pumped up to the test pressure for the last time.

5. The leakage shall be considered as the total amount of water pumped into the pipeline during the four-hour period, including the amount required in reaching the test pressure for the final time. Leakage shall not exceed the rates in the tables below. If the size, pipe material, or pressure fall outside of the table listed below, the leakage amount will be determined by the engineer.

DIP LEAKAGE ALLOWANCE

Pipe Size (inches)	Test Pressure (psi)	Allowable Leakage Gallons per four hours per 1,000 feet of pipe
4	250	1.7
6	250	2.6
8	250	3.4
12	225	5.4
16	225	7.2
20	225	9.0
24	225	10.8

PVC LEAKAGE ALLOWANCE

	Test Pressure		Allowable Leakage Gallons per four hours per 1,000 feet of pipe	
Pipe Size (inches)	Class 150 (psi)	Class 200 (psi)	Class 150	Class 200
4	200	250	1.5	1.7
6	200	250	2.3	2.6
8	200	250	3.0	3.4
12	225	250	5.1	5.7

STEEL PIPE ALLOWANCE

For steel pipe, the allowable loss rate shall be determined by the following formula:

$$L=\frac{HND(P)^2}{7,400}$$

In which:

L	=	Allowable loss (gallons)
H	=	Specific test period (hours)
N	=	Number of rubber-gasketed joints in the pipe tested *
D	=	Diameter of the pipe in inches
P	=	Specified test pressure (psig)

* Flanged, welded and grooved joints shall have zero leakage. The test period shall be four hours for 24-inches in diameter and smaller pipe. The test period shall be eight hours for pipes greater than 24-inches in diameter.

6. Any noticeable leak shall be stopped and all defective pipe, fittings, valves, and other accessories discovered in consequence of the test shall be removed and replaced by the contractor with sound material, and the test shall be repeated until the total leakage during a test of four hours (4) duration does not exceed the rate specified above.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15043

LEAKAGE AND INFILTRATION TESTING OF NON-PRESSURE PIPELINES

PART - 1 GENERAL

A. Description

This section describes the requirements and procedures for leakage and infiltration testing of gravity sewer systems, in accordance with ANSI/ASTM C828, Low Pressure Air Test.

B. Related Work Specified Elsewhere

1. PVC Sewer Pipe: 02715

2. Hydrostatic Testing of Pressure Pipelines: 15042

C. Testing

1. General: All tests shall be made in the presence of the District representative.

2. Leakage: Each section of sewer between two successive manholes shall be tested for leakage and the leakage test shall be made on all manholes.

3. Infiltration: The infiltration test shall be made where excessive groundwater is encountered in the trench.

4. Retesting: Even though a section may have previously passed the leakage or infiltration test, each section of sewer shall be tested subsequent to the last backfill compacting operation if, in the opinion of the District representative, heavy compaction equipment or any of the operations of the contractor or others may have damaged or affected the structural integrity or watertightness of the pipe, structure, and appurtenances.

5. Other Utilities: Official District tests will not be made until after all the other utilities have been installed and their trench compaction verified.

6. Excessive Leakage or Infiltration: If the leakage or infiltration rate is greater than the amount specified, the pipe joints shall be repaired or, if necessary, the pipe shall be removed and relaid by the contractor.

7. Acceptance: The sewer will not be accepted until the leakage or infiltration rate, as determined by test, is less than the maximum allowable.

8. House Laterals: House laterals are not to be connected until after the sewer main has been successfully tested.

9. Force Mains: Force mains shall be pressure tested per section 15042.

PART 2 - MATERIALS

The contractor shall furnish all equipment and materials required for testing.

PART 3 - EXECUTION

A. Air Test for PVC Gravity Sewers

1. Test Section: Each section of sewer between two successive manholes shall be tested by plugging all pipe outlets with suitable test plugs.

2. Addition of Air: Air shall be slowly added until the internal pressure is raised to 4.0 pounds per square inch gage (psig). The compressor used to add air to the pipe shall have a blowoff valve set at 5 psig to ensure that at no time the internal pressure in the pipe exceeds 5 psig.

3. Internal Pressure: The internal pressure of 4 psig shall be maintained for at least two minutes to allow the air temperature to stabilize, after which the air supply shall be disconnected and the pressure allowed to decrease to 3.5 psig.

4. Minimum Duration for Allowable Pressure Drop: The time in minutes that is required for the internal air pressure to drop from 3.5 psig to 3.0 psig shall be measured. The results shall not be less than the minimum permissible duration for air test pressure drop shown in Table I.

TABLE I

MINIMUM DURUATION FOR AIR TEST PRESSURE DROP	
Pipe Size (Inches)	Time (Minutes)
4	2-1/2
6	4
8	5
10	6-1/2
12	7-1/2
15	9-1/2

5. Retest: If the pressure drop from 3.5 psig to 3.0 psig occurs in less time than the above-tabulated or calculated values, the pipe shall be overhauled and, if necessary, replaced and relaid until the joints and pipe shall hold satisfactorily under this test.

B. Infiltration Test

1. Preparation of Test Section: The end of the sewer at the upper structure shall be closed to prevent the entrance of water, and pumping of groundwater shall be discontinued for at least three days, after which the section shall be tested for infiltration.

2. Allowable Infiltration Rate: The infiltration shall not exceed 0.025 gpm per inch of diameter per 1,000 feet of main line sewer being tested, not including the length of laterals entering that section.

3. Excessive Infiltration: Where infiltration in excess of the allowable amount is discovered before completion and acceptance of the sewer, the sewer shall be immediately uncovered and the amount of the infiltration reduced to a quality within the specified amount of infiltration, before the sewer is accepted.

4. Individual Leaks: Even if the infiltration is less than the allowable amount, any individual leaks that may be observed shall be stopped as ordered by the District representative.

5. Completion of Tests: All tests must be completed before the street or trench is resurfaced, unless otherwise directed by the District representative.

C. Deflection Test

1. General: All PVC main line pipe shall be tested for deflection, joint displacement, or other obstruction by passing a rigid mandrel through the pipe by hand, not less than 30 days after completion of the trench backfill, but prior to permanent resurfacing. The mandrel shall be a full circle, solid cylinder, or a cylinder, approved by the District as to design and manufacture. The circular cross section of the mandrel shall have a diameter of at least 95 percent of the specified average inside pipe diameter of the pipe, as follows:

Pipe Material	Nominal Size Inches	Minimum Mandrel Diameter Inches
PVC-ASTM D 3033	6	5.169
(SDR 35)	8	7.309
	10	9.137
	12	10.963

D. Manhole Test (If required in the contract specifications)

1. General: Water tightness of manholes shall be tested in connection with tests of sanitary sewers, or at the time the manhole is completed and backfilled.

2. Plugs: All manhole inlets and outlets shall be plugged with approved stoppers or plugs.

3. Fill Level: The manhole shall be filled with water to 2-inches below the bottom of the tapered cone section, with a minimum depth of 4 feet and a maximum depth of 20 feet. The water shall stand in the manhole for a minimum of one hour to allow the manhole material to reach maximum absorption. Before the test is begun, the manhole shall be refilled to the original depth as needed.

4. Test Requirements: The drop in water surface shall be recorded after a period of from 15 minutes to one hour. The time of the test shall be determined by the District representative and may be varied to fit the various field conditions. The maximum allowable drop in the water surface shall be 1/2 inch for each 15-minute period of testing.

5. Visible Leaks: Even though the leakage is less than the specified amount, the contractor shall stop any leaks that may be observed, to the satisfaction of the District representative.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15050

HOT TAP CONNECTIONS

PART 1 - GENERAL

A. Description

This section describes materials, requirements and procedures for hot tap (system under pressure) connections to existing distribution systems.

B. Related Work Specified Elsewhere

1.	Existing Facilities	01045
2.	Chlorination of Domestic Water Mains for Disinfection	15041
3.	Hydrostatic Testing of Pressure Pipelines	15042
4.	Copper, Brass and Bronze Pipe, Fittings and Appurtenances	15057
5.	Manual Valves	15100

C. Approved Manufacturers

1. Service Saddles and Corporation Stops

   See Section 15057

2. Tapping Sleeves

   Mueller JCM 432

3. Tapping Valves

   See Resilient Seated Wedge Gate Valves Section 15100

D. Direct Tap

All taps into existing pipes will be made through a service saddle, tapping sleeve, welded nozzle or welded coupling. Taps of the same size as the pipe are not permitted. Size on size connections shall be tees. Saddles are required for all taps. Direct taps are not permitted.

PART 2 – MATERIALS

A. Service Saddles and Corporation Stops

Service saddles and corporation stops shall comply with Section 15057.

B. Tapping Sleeves

1. Tapping sleeves onto pipelines 12-inch and smaller shall be full circle cast iron with mechanical joint end glands or fabricated stainless steel or as approved by District Engineer.

2. Gaskets shall be Bunz-N rubber with a wide cross section.

3. Tapping sleeves onto 14-inch and larger ACP shall be fabricated steel with mechanical joint ends. All fabricated parts shall be epoxy coated per Section 09900. All bolts and trim hardware shall be Type 316 stainless steel.

C. Tapping Valves

Tapping valves shall be flanged resilient seat wedge gate valves per Section 15100.

D. Weld Nozzles

Weld nozzles and reinforcing plates shall be fabricated steel per Section 15076.

PART 3 – EXECUTION

A. Notification

The contractor shall provide proper notification to the District inspector prior to making a hot tap connection per Section 01045.

B. Verification

The contractor shall pothole the proposed connection to verify the outside diameter, location and type of pipe to be tapped.

C. Surface Preparation

The pipe barrel to be tapped shall be thoroughly cleaned with a wire brush to provide a smooth, hard surface for the saddle, sleeve or nozzle.

D. Service Saddle and Corporation Stop

Service saddles and corporation stops will be installed onto ACP, DIP or PVC mains in accordance with the manufacturer's accordance and Section 15057. The outlet shall be oriented to comply with the intended use of the service connection.

E. Tapping Sleeves

1. The tapping sleeve shall be installed in accordance with the manufacturer's instructions and to the satisfaction of the District representative.

2. The pipe barrel shall be thoroughly cleaned with a wire brush to provide a smooth, hard surface for the sleeve.

3. The sleeve shall be supported independent of the pipe during the tapping operation.

4. The sleeve shall be pressure tested in the presence of the District representative prior to tapping.

5. Thrust blocks shall be provided at the tapping sleeve per Standard Plan W-17 03300.

F. Tapping Valve

The tapping valve shall be installed on the tapping sleeve or weld nozzle per Section 15100. All flange bolts shall be Type 316 stainless steel.

G. Hot Tap

1. The hot tap into the existing pipe shall be made using the appropriate type of cutting machine and shell cutting bit for the material being tapped.

2. The company performing the hot tap must be approved by the District. The tapping machine shall be operated per the manufacturer’s operating instructions.

3. Proper care shall be taken to prevent cutting material from entering the pipeline. The tapping coupon must be extracted.

H. Exterior Coating Repair

The exterior bituminous or mortar coating on steel or iron pipe shall be repaired in accordance with the manufacturer’s directions and/or Section 09900.

I. Disinfection

The interior of the tapping valve and connecting piping shall be sprayed with a sodium hypochlorite solution prior to connection.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15056

DUCTILE-IRON PIPE AND FITTINGS

PART 1 - GENERAL

A. Description

This section includes materials, installation, and testing of ductile-iron pipe and fittings.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Trenching, Backfilling, and Compacting:	02223
2.	Concrete:	03300
3.	Corrosion Protection and Joint Bonding	13110
4.	Chlorination of Domestic Water Mains for Disinfection:	15041
5.	Hydrostatic Testing of Pressure Pipelines:	15042

C. Approved Manufacturers

1. Fittings
   - Tyler
   - Trinity Valley
   - Dayton
   - Sigma
   - One Bolt
   - Or equal

2. Pipe
   - Pacific States
   - U.S. Pipe
   - American Pipe
   - Or equal

3. Gaskets
   - Johns Manville 109
   - Tripac 2000
   - John Crane Company Style 777

US Pipe
Or equal

D. Use of Gray-Iron Fittings

Gray-iron fittings may not be substituted for ductile-iron.

E. Submittals

Contractor shall provide submittals for review and approval by the engineer in accordance with these specifications.

PART 2 - MATERIALS

A. Ductile-Iron Pipe

1. Pressure class or thickness class of DIP shall be determined by the design method detailed in AWWA C150 the "Thickness Design Method."

2. Ductile-iron pipe shall be manufactured in accordance with AWWA C151.

3. All ductile-iron pipe shall be pressure class shown on the plans for bell and spigot pipe. Flanged pipe shall be thickness class 53 unless indicated otherwise.

4. All domestic and recycled water ductile-iron pipe shall be cement-mortar lined in accordance with AWWA C104.

5. Unless otherwise called out on the plans, a "push-on" type joint shall be used. The joint dimensions and gasket shall be as specified in AWWA C111.

6. Where restrained joints are called, push-on joints shall be restrained with locking gasket rated for 250 psi operating pressure for DIP.

7. Flanges for ductile-iron pipe shall be the "screwed-on" type in accordance with AWWA C115.

8. Outlets for DIP shall be as follows:

2” or smaller:	bronze service saddle
2-1/2”:	tapped tee or service saddle
4” to 8”and larger:	D.I. tee fitting or service saddle
12” and larger	D.I. tee fitting

9. All buried ductile iron pipe for domestic and recycled water use shall have a factory applied bituminous coating of not less than 1 mil. in thickness.

10. All ductile iron pipe and fittings in sewer applications shall be polyurethane or polyethylene lined.

B. Ductile-Iron Fittings for PVC and Ductile Iron Pipe

1. Ductile-iron fittings shall be manufactured in accordance with AWWA C110 or C153. All fittings shall be epoxy coated and epoxy lined per AWWA C116.

2. Non-restrained fittings may be used where a thrust block is used. Non-restrained fittings may be mechanical to mechanical fittings, mechanical to flange fittings, one-bolt fittings, and flange to flange fittings. Push-on to push-on fittings shall not be used unless restraints are provided as described below.

   Restrained fittings shall be used where a thrust block is not specified. Where restrained joints are called, push-on joints shall be restrained with locking gasket rated for 250 psi operating pressure for DIP. Push-on joints shall be restrained with a mechanical type bell restraint for C-900 PVC pipe. Mechanical joint restraints shall be EBBA IRON, INC., MEGALUG, UNIFLANGE Series 1400, One-Bolt, or approved equal. Flanged fittings may be used.

   All fittings shall consist of stainless steel bolts and nuts, except wedge bolts, etc.

3. All buried ductile iron fittings shall have a factory applied bituminous coating of not less than 1 mil in thickness.

4. Unless otherwise indicated on the drawings, all fittings with flanged ends shall be ductile iron class 150. The gasket surface shall have a serrated finish of approximately 16 serrations per inch, approximately 1/32-inch deep, with serrations in either a concentric or spiral pattern. All flanges shall be flat faced. In addition, all flanges shall meet the following tolerances:

Bolt circle drilling	$\pm$1/16 inch
Bolt hole spacing	$\pm$1/32 inch
Eccentricity of bolt circle and Maximum facing with respect to bore	$\pm$1/32 inch

C. Gaskets

1. Gaskets for flanged joints shall be 1/8-inch thick, cloth-inserted rubber. Full face type gaskets with pre-punched holes shall be used where both flanges are flat face. Ring gaskets extending to the inner edge of the bolts may be used where a raised face flange is present.

2. Rubber gaskets for push-on joints shall be synthetic or natural rubber manufactured in accordance with AWWA C111.

D. Bolts and Nuts

1. All bolts and nuts shall be Type 316 stainless steel conforming to ASTM F593 G or H for bolts, and ASTM F594 with Tripac 2000 Blue Coating for nuts.

2. The length of each bolt or stud shall be such that between 1/4 inch and 3/8 inch will project through the nut when drawn tight.

E. Plastic Film Wrap

All ductile-iron pipe and fittings buried underground shall be protected with plastic film wrap in accordance with AWWA C105, unless noted otherwise below. Wrap shall be a loose 8-mil-thick polyethylene tube. All joints between plastic tubes shall be wrapped with 2-inch-wide polyethylene adhesive tape, Polyken 900, Scotch wrap 50, or approved equal.

F. Polyethylene Lining for Sewer Applications

1. Lining material for ductile iron pipe and fittings (sewer applications) shall be virgin polyethylene complying with ASTM D1248 and bonded to the interior of the pipe fittings by heat process. The lining material shall be compounded with inert filler and a compound which resists ultraviolet light.

2. The lining shall cover the interior surface of the pipe/fitting from the lain or beveled end to the rear of the gasket socket. The lining thickness shall be not less than 20 mils. The lining may taper at the ends, starting at 4 inches from the edge of the pipe. The minimum thickness at the end of the taper shall be 10 mils.

3. Each pipe shall be guaranteed against separation of the lining from the pipe. Random checks for operation will be made during construction and any indication of separation shall be cause for rejection. The test method shall be mutually agreed upon by the contractor and the District.

G. Polyurethane Lining System

1. The lining material shall consist of a liquid-applied polyurethane coating especially formulated for use as a protective lining of pipelines carrying sewage. The material shall be Corropipe II Wasteliner or approved equal. The dry film thickness (DFT) of the lining shall be 40 mils (0.040 inch) nominal.

2. In order to minimize potential dimensional and assembly problems, the coating thickness on sealing areas in the bell socket interior and on the spigot end of the pipe exterior shall be 8 mils (0.008 inch) nominal with a maximum of 10 mils (0.010 inch). Thicker coatings in these areas are acceptable if it is demonstrated that joint dimensions are within allowable tolerances after coatings.

3. The lining material shall be applied to the pipe and fittings by an applicator certified or approved by the coating manufacturer. The coating shall be holiday tested with a high voltage tester at 50 volts/mil of material thickness. The material shall be applied and repaired to the pipes and fittings in strict accordance with the manufacturer's requirements with no exceptions. District shall be notified five (5) days in advance of the coating installation for factory inspection during the application of the material.

4. All field cut ends shall be repaired and sealed prior to installation per the manufacturer's recommendations.

H. Lubricants

Lubricant for pipe insertion shall be NSF food grade, and biodegradable.

PART 3 - EXECUTION

A. General

Ductile-iron pipe and ductile iron fittings shall be installed in accordance with the applicable Sections of AWWA C600 and as specified herein.

B. Trenching, Backfilling, and Compacting

1. Trenching, backfilling, and compacting shall be in accordance with Section 02223 and as specified herein.

2. Backfill within the pipe zone, including the pipe base, shall be imported sand placed and compacted in accordance with Section 02223.

3. Backfill within the trench zone shall be native earth backfill placed and compacted in accordance with Section 02223.

C. Placement of Pipe in Trench

1. Lay pipes uphill if the grade exceeds 10%.

2. The radius of curvature of the trench shall determine the maximum length of pipe section that can be used without exceeding the allowable deflection at a joint. Combined deflections at rubber gasket, restrained joint, deflection coupling or flexible coupling joints shall not exceed 2 degrees or that recommended by the manufacturer, if smaller.

   The manufacturer's printed installation guide outlining the radius of curvature that can be negotiated with pipe sections of various length and the deflection couplings shall be followed if applicable.

3. The pipe shall be laid true to the line and grade shown on the plans within acceptable tolerances. The tolerance on grade is 1 inch. The tolerance on line is 2 inches.

4. Wrap ductile-iron pipe and fittings with plastic film wrap in accordance with AWWA C105.

5. Fittings shall be supported independently of the pipe.

6. Until thrust blocks and supports are poured, fittings shall be temporarily supported by placing wooden skids under the bells so that the pipe is not subjected to the weight of the fitting.

7. All exposed flanges and other metal surfaces and all damaged coatings shall be coated after assembly with a mastic, 3M, Minnesota Mining and Manufacturing EC 244, or an approved equal. Stainless steel bolts shall not be coated.

D. Anchors and Thrust Blocks

Concrete anchors and thrust blocks shall be poured against wetted undisturbed soil in accordance with Section 03300 and MCWD Standard Plans W-13, and W-14.

E. Flanged Connections

1. Bolt holes of flanges shall straddle the horizontal and vertical centerlines of the pipe run.

2. Clean flanges by wire brushing before installing gasket.

3. Clean flange bolts and nuts by wire brushing, lubricate threads with anti-seize compound, and tighten nuts uniformly and progressively. Between 1/4 inch and 3/8 inch shall project through the nut when drawn tight.

4. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseat or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

F. Pipe Support

All exposed pipe shall be supported as detailed in the plans.

G. Disinfection

All domestic water piping shall be disinfected by chlorination in accordance with Section 15041.

H. Testing

All domestic water and recycled water piping shall be hydrostatically pressure tested in accordance with Section 15042.

I. Bonding

Bonding of joints to provide continuity for cathodic protection shall be as specifically shown on the project plans, or directed by the District representative. Bonding of joints shall be per Section 13110.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15057

COPPER, BRASS, AND BRONZE PIPE FITTINGS AND APPURTENANCES

PART 1 - GENERAL

A. Description

This section includes materials and installation of copper, brass, and bronze pipe, fittings and appurtenances.

B. Approved Manufacturers

1. All materials shall be the appropriate model number specified on MCWD Standard Plans W-1, W-2, W-3, and W-4 as manufactured by the companies listed herein or approved equal.

2. Copper Tubing
   Cambridge Lee

3. Service Saddle
   Jones
   Mueller
   Ford
   A.Y. McDonald

4. Corporation Stop
   Jones
   Mueller
   Ford
   A.Y. McDonald

5. Insulating Pipe Bushings, Unions, or Couplings
   Pipeline Coating and Engineering Co.
   1566 East Slauson Avenue, Los Angeles
   Smith Blair
   Pipe Seal and Insulator Company

PART 2 - MATERIALS

A. Copper Tubing

1. Copper tubing shall conform to the requirements of ASTM B 88 for seamless copper water tube. Piping located aboveground or suspended within vaults shall be Type L. Buried piping shall be Type K. Copper pipe shall be of domestic manufacture. Compression joints for connections are allowed if approved by the District Engineer.

2. If indicated in soils report, all copper lines shall be encased within a 8-mil polyethylene sleeve. Sleeves shall be color coded per Section 15151.

B. Brass Pipe, Nipples, and Fittings

Short threaded nipples, brass pipe and fittings shall conform to ASTM B 43, regular wall thickness, except that nipples and pipe of sizes 1-inch and smaller shall be extra strong. Threads shall conform to ANSI B2.1.

C. Bronze Appurtenances

1. All items specified herein shall be manufactured of bronze conforming to ASTM B 62, "Composition Brass or Ounce Metal Castings."

2. All size service saddles shall be of the double-strap type for any type of pipe. The straps (or bails) shall be flat and shall be manufactured of bronze for ACP and of stainless steel for C900 PVC and ductile iron pipe. The body shall be manufactured of bronze and shall be tapped for an iron pipe thread. The seal with the pipe shall be affected with either a rubber gasket or an O-ring.

3. Corporation stops shall be ball valve type and shall be manufactured of bronze. The inlet fitting shall be a male iron pipe thread when used with saddle and the outlet connection shall be a compression type.

4. Copper setters shall be for 1-inch and 2-inch meter sizes or as approved by the District Engineer and using lead free solder. The inlet and outlet service line connections shall be for 1-inch services and for horizontal connections using compression type connections. A dual purpose type connection may be used for the outlet service line connection. The meter connection shall have a key type inlet and outlet valve. When using a copper setter that is sized larger than the meter, use appropriate adaptors as approved by the Engineer. Copper setters shall be 15-inches in height with a lock wing.

PART 3 - EXECUTION

A. Copper Tubing and Fittings

1. Cut tubing square using a cutter designed for cutting copper tubing and remove burrs. Clean both the inside and outside of fitting and pipe ends with steel wool and muriatic acid. Prevent annealing of fittings and tubing when making connections. Do not miter joints for elbows or notch straight runs of pipe for tees.

2. Threads of fittings shall receive a liberal coating of pipe thread compound conforming with the requirements of ASTM B88, Type K.

3. Any damage to the fitting including but not limited to evidence of overtightening, misaligned threads, burring or scarring of machined faces, or any evidence of leakage shall be cause for rejection. If a leak is found to be caused by debris, the debris shall be cleared and the fitting visually inspected for damage before being charged. If the leak recurs upon charging of the line, the fitting shall be removed and replaced whether or not the cause can be determined.

4. Bends in soft copper tubing shall be long sweep. Shape bends with shaping tools. Form bends without flattening, buckling, or thinning the tubing wall at any point.

5. Buried piping shall be installed with some slack to provide flexibility in the event of a load due to settlement, expansion or contraction. A MINIMUM COVER OF 24 INCHES BELOW THE FINISHED STREET GRADE SHALL BE ADHERED TO. The tubing is to be bedded and covered with sand or select material as determined by the District representative.

6. All domestic service laterals shall be 1-inch minimum size copper tubing. End connections shall be compression type.

7. All 2-inch size services shall be installed with straight lengths of soft copper water tube Type K. End connections shall be compression type.

8. The service line shall extend perpendicular to the centerline of the street from the water main to the meter stop or structure, except in a cul-de-sac, where the service shall run in a straight line from the water main to the meter stop.

9. The service line shall be placed within an 8-mil polyethylene sleeve, color-coded for the type of service. The ends and splices in the sleeve shall be sealed with 20-mil tape.

B. Service Saddle

1. The service saddle shall be no closer than 18 inches to a valve, coupling, joint, or fitting.

2. The surface of the pipe shall be filed to remove all loose material and to provide a hard, clean surface before placing the service saddle.

3. The service saddle shall be tightened per manufacturer’s recommendation. Care shall be used to prevent damage or distortion of either the corporation stop or service saddle by over tightening.

4. The tap into the pipe shall be made in accordance with the pipe manufacturer's recommendation.

C. Installing Flange Bolts and Nuts

1. Lubricate bolt threads with anti-seize compound prior to installation.

2. Set flanged pipe with the flange bolt holes straddling the pipe horizontal and vertical centerlines.

D. Insulating Bushings and Unions

Pipe or fittings made of nonferrous metals shall be isolated from ferrous metals by nylon insulating pipe bushings, union, or couplings.

E. Backfill Material

The pipe zone material for all service laterals shall be compacted sand per Section 02223.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15064

PVC PRESSURE DISTRIBUTION PIPE

PART 1 - GENERAL

A. Description

This section includes materials, installation, and testing of polyvinyl chloride (PVC) distribution pipe.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Trenching, Backfilling, and Compacting:	02223
2.	Jacked Casing:	02315
3.	Concrete:	03300
4.	Painting and Coating:	09900
5.	Chlorination of Domestic Water Mains for Disinfection:	15041
6.	Hydrostatic Testing of Pressure Pipe:	15042
7.	Ductile-Iron Pipe and Fittings:	15056
8.	Copper, Brass and Bronze Pipe, Fittings, and Appurtenances:	15057
9.	Combination Air and Vacuum Release Assembly:	15089
10.	Manual Valves:	15100
11.	Underground Facilities Identification:	15151

C. Approved Manufacturers

1. J-M Manufacturing
2. Vinyltech

3. P W Pipe

4. Certainteed

5. Diamond Plastics

D. Application

1. Class 150PVC Pipe shall be used unless specifically shown otherwise on the plans.

2. PVC pipe shall be used as a valve can riser.

E. Reference Standard

Conform to AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch for Water" or AWWA C905, "Polyvinyl Chloride (PVC) Pressure Pipe, 14-inch through 48-inch for Water Transmission and Distribution", as applicable unless noted otherwise below. Where C900 is used, C905 is implied for larger pipe.

PART 2 - MATERIALS

A. PVC Pipe

1. PVC pipe shall be manufactured in accordance with AWWA C900. The pipe shall have gasket bell end or plain end with elastomeric gasket coupling.

2. Laying lengths shall be 20 feet with the manufacturer's option to supply up to 15% random (minimum length 10 feet).

3. Each pipe length shall be marked showing the nominal pipe size and O.D. base, the AWWA pressure class, and the AWWA specification designation (AWWA C900). For domestic water application, the seal of the testing agency that verified the suitability of the material for such service shall be included.

4. Pipe for recycled lines shall be purple in color and marked as detailed in Section 15151.

B. Fittings

Fittings shall be ductile-iron conforming to Section 15056.

C. Manual Valves

Manual valves shall conform with Section 15100.

D. Service Saddles

All service saddles shall be designed for use on C900 PVC pipe and in accordance with Section 15057.

E. Lubricants

Lubricant for pipe insertion shall be NSF food grade, and biodegradable.

PART 3 - EXECUTION

A. General

1. The contractor shall install all the pipe, closure sections, fittings, valves, and appurtenances shown including pipe supports, bolts, nuts, gaskets, and jointing materials.

2. At all times when the work of installing pipe is not in progress, all openings into the pipe and the ends of the pipe in the trenches or structure shall be kept tightly closed to prevent the entrance of animals and foreign materials. The contractor shall maintain the inside of the pipe clean, sanitary, and free from foreign materials until its acceptance by the District.

3. Where closure sections are required by the contractor's installation operations, the sections shall be installed in accordance with the applicable sections of these specifications.

4. The pipe sections shall be laid in the trench to true alignment and grade in accordance with the drawings. The pipe grade shall be approved by the District.

5. The pipe shall not be laid along curves at a radius less than that listed below:

   The minimum-radius curves are determined by the limit of 2-degree deflection for PVC pipe joints with factory-assembled bell couplings:

Length of Pipe Section	Minimum Curve Radius
20 feet	573 feet
10 feet	287 feet

   For curves of smaller radius, use high- deflection couplings or ductile-iron fittings.

B. Installation

1. Trenching, backfilling, and compacting shall be in accordance with Section 02223 and as specified herein. Compacted pipe bedding material conforming to Section 02223 shall be installed in the bottom of the trench and compacted prior to placing pipe in the trench. Excavate bell holes at each joint to permit proper assembly and inspection of the entire joint and to assure the pipe is fully supported by the pipe barrel.

2. Proper care shall be used to prevent damage in handling, moving, and placing the pipe. Tools and equipment satisfactory to the District representative shall be provided and used by the contractor.

3. The contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source; shall assume full responsibility for any damage due to this cause; and shall pay for and perform the work to restore and replace the pipe to its specified condition and grade if any displacement occurs due to floating.

4. Pipe shall be cut by a method recommended in the pipe manufacturer's installation guide, as approved by the District representative. When pipe is cut and is to be joined to a cast-iron

fitting or another piece of pipe the end shall be beveled in the field or place of manufacture to create a beveled end equal in quality to the machined ends of the pipe as furnished by the manufacturer. Such machining shall not result in undercutting the wall thickness and must be approved by the District representative before installation.

5. All connecting parts of pipe, rings, couplings, and castings shall be cleaned before assembly. After bearing has been obtained, couplings shall be assembled in a proper manner (as determined by the District representative). The use of excessive lubricant will not be permitted, and the assembly of the couplings and rings shall be in accordance with the manufacturer's recommendations. Lubricant and rubber rings shall be supplied by the pipe manufacturer. All fittings and valves shall have joints that match the type of adjoining pipe.

6. All fittings and valves shall be supported so that the pipe is not subjected to the weight of these appurtenances.

7. End of line fittings shall be restrained by thrust blocks.

8. Concrete thrust blocks of the size shown on MCWD Standard Plans W-13 and W-14 and as specified herein shall be provided at the location of all cast-iron fittings, valves, fire hydrants, and end of line plugs. Restrained joints are acceptable in lieu of thrust blocks.

9. Pipe and trench zone backfill shall be per Section 02223.

10. Manual valves shall be installed in accordance with Section 15100.

C. Installations within Jacked Casing

1. Certain portions of the project, such as crossings of some roads, highways, and railroads, may be required to be installed within a jacked casing pipe.

2. The casing size and type shall be in accordance with Section 02315.

3. Work shall not proceed without permission of the District representative. Refer to MCWD Standard Plan W-15.

4. All pipe installed within a casing shall have restrained joints.

D. Combination Air and Vacuum Relief Valves

1. Air release valve assemblies and combination air and vacuum valves shall be installed at each point in the pipeline as shown on the drawings or as specified by the District representative.

2. The tap for the air valves shall be made in a level section of pipe no closer than 18 inches to a bell, coupling, joint, or fitting.

3. Air release valve assemblies shall be installed in accordance with MCWD Standard Plan W-10 and Section 15089.

E. Blow-Off Assemblies

1. Either in-line type or the end-of-line type blow off assemblies shall be installed in accordance with the standard drawings at locations noted on the plans and at such additional locations as required by the District representative for removing water or sediment from the pipeline.

2. The assembly shall be installed in a level section of pipe.

3. The tap for blow off in the line shall be no closer than 18 inches to a valve, coupling, joint, or fitting.

4. Blow offs shall not be connected to any sewer, submerged in any stream, or installed in any manner that will permit back siphoning into the distribution system.

5. Blow offs shall be installed in accordance with MCWD Standard Plan W-11 and the applicable sections of these specifications.

F. Pipe Identification

Warning and locator tape shall be installed on all on-site recycled water pipelines and domestic water piping installed within the limits of a non-potable irrigation system. The pipe identification shall be in accordance with Section 15151.

G. Locator Wire

A bare 10-gauge stranded copper wire shall be placed continuously on the top center of the pipe. The wire shall not be spliced at any point, and shall be continuous from riser to riser. The wire shall be brought to the surface at valve locations and shall be accessible by removing the valve can cover. The wire shall be brought up the outside of the valve riser and folded over between the inside of the valve box and the valve riser. The wire shall be brought to within 6 inches of finish grade. The wire shall also be tapped in place by means of a plastic adhesive tape, placed at 10 foot intervals.

H. Thrust Blocks

1. Thrust blocks shall be constructed where shown on the drawings, or where directed by the District representative and as specified herein. In general, thrust blocks will be placed at all angles greater than 5 degrees, at changes in pipe size, at fittings, at hydrant ells, and at valves.

2. Fittings used with thrust blocks shall conform to Section 15056.

3. The area and design of the bearing surface shall be per MCWD Standard Plans W-13 and W-14.

4. The bearing surface shall be against undisturbed ground in all cases, except where unstable conditions are encountered. In unstable conditions, the bearing surface shall be as directed by the District representative.

5. Unless otherwise directed by the District representative, the blocking shall be placed so that the pipe and fitting joints are accessible for repair.

6. Metal harness of tie rods and pipe clamps shall be used to prevent movement if shown on the plans or directed by the District representative.

7. Exposed non-steel rods and clamps shall be coated with bituminous mastic per Section 09900.

8. Reinforcing steel tie-down rods shall be used on all line valves.

9. The depth of thrust blocks below valves shall conform with the size of the valve and shall be cut into the side of the trench a minimum of 12-inches on each side.

10. Concrete for thrust blocks shall be Class "A" per Section 03300.

I. Slope Protection

1. Slope protection shall be installed where shown on the plans in accordance with Section 02223, wherever the profile of the ground surface above the pipeline exceeds 20% and where no pavement or other surfacing is to be laid over the facility.

2. The installation of the slope protection shall be considered a part of the work, and the contractor shall include the expense in the contract cost.

3. A reinforced concrete encasement may be used as directed by the District representative. The encasement shall extend to within 1-foot of the ground surface and to within 1-foot of the toe of slope in which the pipe is constructed.

J. Disinfection

All domestic water pipelines shall be disinfected in accordance with Section 15041 prior to connection to the existing distribution system.

K. Hydrostatic Testing

All pipelines shall pass a hydrostatic pressure test in accordance with Section 15042.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15089

COMBINATION AIR VACUUM / AIR-RELEASE VALVE ASSEMBLY

PART 1 - GENERAL

A. Description

This section includes materials and installation of combination air vacuum/air-release valves.

Valves are to be provided and installed per AWWA C 512, unless noted otherwise in this section.

B. Application

1. Combination valves shall be installed at high points on the line or as shown on the plans.

2. If the profile changes during construction from that shown on the drawings, valve assemblies shall be installed at the high points in lines as constructed.

3. The installation shall be complete as shown on MCWD Standard Plan W-10.

4. Combination valve assemblies shall function to slowly release pockets of air which accumulate at high points, or changes in line gradient, exhaust large quantities of air from pipeline while being filled and admit large quantities of air into pipeline when being drained to prevent air lock or vacuum collapse of the pipe.

C. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Concrete:	03300
2.	Painting and Coating:	09900
3.	Hydrostatic Testing of Pressure Pipelines:	15042
4.	Copper, Brass and Bronze Pipe, Fittings and Appurtenances:	15057
5.	Manual Valves:	15100

D. Approved Manufacturers

1. APCO
2. Val-Matic
3. Crispin

PART 2 - MATERIALS

A. Combination Air Release Valves

1. Materials of construction for combination air and vacuum release valves shall be as described below:

Item	Material	Specification
Body and Cover	Cast Iron	ASTM A126, Class B
Float, Lever Poppet	Stainless Steel	ANSI Type 316 (ASTM A240 or A276)
Seat	Rubber	Buna-N (Chlorine Resistant)
Drain Plug	Bronze	85,5,5,5 Alloy
Casing bolts/nuts	Stainless Steel	ANSI Type 316

2. Interior of valve shall be epoxy lined per Section 09900. Internal lining for domestic water facilities shall be NSF 61 approved epoxy to a minimum thickness of 12 mils (DFT) and holiday tested.

3. All valves 2-inch and smaller shall have threaded inlets. All valves 3-inch and larger shall have flanged inlets.

4. For valves 4-inch and smaller, both air-vacuum and air-release functions shall be contained in one valve body. On valves 6-inch and larger, separate valves for each function piped together to function as one unit is permitted. An isolation valve shall be installed between the two units.

B. Fiberglass Air Release Valve Enclosure

The fiberglass enclosure shall be as specified by the Engineer.

C. Service Piping

Water service piping utilized in the installation of the combination air and vacuum relief valve shall be Type K copper with bronze accessories per Section 15057.

D. PVC Pipe Sleeve

PVC pipe fittings, Schedule 80.

PART 3 - EXECUTION

A. Location

1. Combination air-vacuum/air-release valves shall be installed on the pipeline as shown on the drawings or as specified by the District representative.

2. The tap for the air valves shall be made in a level section of pipe no closer than 18 inches to a bell, coupling, joint, or fitting. No tap shall be permitted in any machined section of ACP.

3. The center of the PVC sleeve shall be, except as otherwise approved by the District representative, located as shown on MCWD Standard Plan W-10 as described below:

   a. Where concrete curb or asphalt concrete (A.C.) berm exists or is to be constructed, and the sidewalk is next to the property line; 40 inches back of the face of the curb.

   b. Where 6-foot wide or narrower sidewalk is to be installed or exist next to the curb; 12 inches back of sidewalk edge. Where there is insufficient public right-of-way behind of the sidewalk, an easement will be required.

   c. Where there is no curb or berm, the location shall be designated by the District.

B. Installation

1. Combination valves shall be installed in accordance with MCWD Standard Plan W-10.

2. The tap and piping shall be installed per Section 15057.

3. The concrete pad and support shall be constructed per Section 03300. Riser piping shall extend through concrete slab within a minimum 4-inch diameter PVC sleeve.

4. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.

5. The combination valve and the steel vented pipe cover shall be painted in accordance with Section 09900. The final coat of paint shall be applied immediately prior to the final inspection.

6. A bronze ball valve with handle shall be installed on the copper service line above the concrete slab.

7. Stainless steel nipple shall be installed between the shutoff valve and the air release valve.

C. Valve Pressure Testing

1. Test valves at the same time that the connecting pipelines are pressure tested. See Section 15042 for pressure testing requirements.

2. Protect or isolate any parts whose pressure rating is less than the test pressure.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15100

MANUAL VALVES

PART 1 - GENERAL

A. Description

This section includes materials, testing, and installation of manually operated valves.

Manual valves to be supplied and installed per AWWA C 507, and C 509, unless noted otherwise below.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Trenching, Backfilling, and Compacting:	02223
2.	Concrete:	03300
3.	Painting and Coating:	09900
4.	Hydrostatic Testing of Pressure Pipelines:	15042
5.	Ductile-Iron Pipe and Fittings:	15056
6.	Underground Facilities Identification.	15151

C. Approved Manufacturers as listed or approved equal.

1. Gate Valves - Aboveground Smaller Than 2 Inch
   - Red & White
   - Milwaukee

2. Ball Valves Smaller than 3-inch
   - Nibco

3. Resilient - Seated Gate Valves: 4 Inch through 12 Inch
   - Clow
   - Mueller
   - AFC

4. Butterfly Valves
   Henry Pratt Company
   Dezurik
   AFC

5. Valve Boxes
   Christy G5 with cast iron cover

D. Reference Standards

Valves shall conform, as applicable, with the latest editions of the following codes and standards.

AWWA C504	Rubber-Seated Butterfly Valves
AWWA C509 & C515	Resilient Seated Gate Valves
ASTM B62	Composition Brass or Ounce Metal Castings
	Ductile Iron Castings for Valves
	Ductile Iron Pipe Flanges
ASTM D 429	Tests for Rubber Property – Adhesion to Rigid Substrates

E. Flanged End

All valves connecting to mains shall be flanged on at least one side and bolted to the fitting on the main.

F. Single Type of Valve

The developer shall choose an approved valve and then use only that valve throughout the development (i.e., only one manufacturer and model per type of valve).

G. Detector Check and Backflow Prevention Assembly

Isolation valves on a detector check or backflow prevention assembly are to be part of an integral unit, furnished and assembled by the manufacturer of the device.

H. Butterfly Valves

Butterfly valves shall only be used on lines 14 inches and larger or as specifically shown on the plans.

I. Resilient Wedge Gate Valves

Resilient gate wedge valves shall be used on all pressure class 150 lines 4 inch through 12 inch.

J. Field Hydrostatic Test

All valves 16-inch and larger shall be field hydrostatically tested to the valves working pressure in the presence of the District inspector. Each side of the valve shall be tested independently.

PART 2 - MATERIALS

A. General

1. Product data shall be shop drawings, manufacturer's product data and installation instructions demonstrating that the proposed valve is in compliance with the reference standards as well as the intended service. If drawings are returned disapproved or not stamped, they shall be revised or corrected as necessary and resubmitted for review, acceptance, and stamping.

2. Certified test reports shall be provided with each delivery that the valve(s) delivered complies with this specification.

3. Valves shall be installed complete with operating handwheels or levers, extension stems, worm gear operators, operating nuts, and wrenches required for operation.

4. Valves shall have the name of the manufacturer and the size of the valve cast or molded onto the valve body or bonnet or shown on a permanently attached plate.

5. Valve body and trim casting shall be of domestic origin.

6. Bolts for all valves shall be 316 stainless steel. Bolts consisting of 304 stainless steel shall not be permitted.

7. Suitable valves shall be provided to connect to adjoining piping as specified for pipe joints.

B. Valve Operators

1. Provide lever or wrench operators having adjustable, "position indicator" for exposed butterfly valves smaller than 6 inches and hand-wheels for above ground gate valves.

2. Provide 2-inch AWWA operating nuts for buried and submerged valves.

3. Provide gear operators on butterfly valves 6 inches and larger. Gear operators for valves 8-inches and larger shall be of the traveling nut type. For large valves, worm gears shall be used with the approval of the Engineer.

4. Gear operators shall be enclosed with seals provided on shafts to prevent entry of dirt and water into the operator. Gear operators for valves located above ground or in vaults and structures shall have handwheels. Minimum handwheel diameter shall be 12 inches. The operator shall contain a dial indicating the position of the valve disc or plug. Gear operators for buried or submerged valves shall have 2-inch square AWWA operating nuts.

5. For buried or submerged service, provide watertight shaft seals and watertight valve and actuator cover gaskets. Provide totally enclosed operators designed for buried or submerged service.

6. Traveling nut and worm gear operators shall be of the totally enclosed design so proportioned as to permit operation of the valve under full operating head with a maximum pull of 80 pounds on the hand-wheel. Provide stop limiting devices in the operators in the

open and closed positions. Operators shall be of the self-locking type to prevent the disc or plug from creeping. Design operator components between the input and the stop-limiting devices to withstand without damage a pull of 200 pounds for handwheel or chainwheel operators and an input torque of 300 foot-pounds for operating nuts when operating against the stops.

7. Operators on buried valves shall produce the required torque on the operating nut with a maximum input of 150 foot-pounds.

8. Valve operators, handwheels, or levers shall open by turning counterclockwise.

C. Painting and Coating

1. Coat metal valves (except bronze and stainless-steel valves) located above ground or in vaults and structures in accordance with Section 09900. Apply the specified prime coat at the place of manufacture. Apply finish coat in field. Finish coat shall match the color of the adjacent piping. Coat handwheels the same as the valves.

2. Coat buried metal valves at the place of manufacture per Section 09900.

3. Valves 4 inches and larger shall be coated on their interior metal surfaces excluding seating areas and bronze and stainless steel pieces in accordance with AWWA C550 and these specifications. Sandblast surfaces in accordance with SSPC SP-5. Remove all protuberances which may produce pinholes in the lining. Round all sharp edges to be coated. Remove any contaminants which may prevent bonding of the lining. Coat the interior ferrous surfaces using one of the following methods:

   a. Apply powdered thermosetting epoxy (3M Scotchkote 6251 Fusion Bonded Epoxy or equal) per the manufacturer's application recommendations to a thickness of 7 to 9 mils. All gaskets and seals must be removed prior to applying coating.

   b. Apply two coats of catalytically setting epoxy (Tnemec Series N140, or equal) to a dry-film thickness of 7 to 9 mils total. Follow the paint manufacturer's application recommendations including minimum and maximum drying time between the required coats.

   All valve coatings shall be factory applied or by the manufacturer’s qualified distributor. Touch up and repair of valve coatings shall be only done by authorized factory distributors.

D. Aboveground Ball Valves 2 Inches and Smaller

1. Aboveground threaded end ball valves, 1/4 inch through 3 inches, for water service shall be full bore port ball type having a minimum working pressure of 200 psi. Valves shall have plastic coated lever operators.

2. Materials of construction shall be as described below:

Component	Material	Specification
Body	Bronze	ASTM B 62
Ball	Stainless Steel	ASTM B 62
Seat, Seals	Teflon	
Stem	Bronze or Copper silicon	ASTM b 62, B 99 (Alloy 651), B 584 B 371 (Alloy 694)

3. Stem material shall have a minimum tensile strength of 60,000 psi and a minimum yield strength of 30,000 psi.

E. Resilient-Seated Wedge Gate Valves

1. Valves shall conform to AWWA C509 and C515 and the requirements listed herein.

2. All valves shall be bubble tight at 200 psi working pressure.

3. Valves shall have non-rising low-zinc stems, opening by turning counter-clockwise and provided with 2-inch-square operating nut. Outside stem and yolk valves shall be used on backflow device shutoff valves.

4. Each valve shall have a smooth unobstructed waterway free from any sediment pockets.

5. Stuffing boxes shall by O-ring seal type with two rings located in stem.

6. Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

7. Materials shall be as described below:

Component	Material	Specification
Body, Operating Nut Bonnet, Seal Plate	Cast Iron or Ductile Iron	ASTM A 126 Class B
Gate	Cast Iron or Ductile Iron	Type 316
Bonnet and Seal Bolts	Stainless Steel	Type 316
O-Rings	Synthetic Rubber	ASTM D2000

8. All internal working parts (excluding gate) shall be all bronze containing not more than 2 percent aluminum or more than 7 percent zinc. Valve stems shall be cast or forged from bronze having a tensile strength of not less than 60,000 psi, a yield point of not less than 30,000 psi, and an elongation of not less than 10 percent in 2 inches.

9. All gates shall be encapsulated in Buna-N rubber or a nitrile elastomer.

F. Tapping Valves

1. Tapping valves shall conform with all requirements for gate valves 2 inches and larger and the additional requirements listed herein.

2. All valve ends shall be flanged. The flange on one end shall have slotted bolt holes to fit all standard tapping machines.

3. Seat rings shall be oversized to permit the use of full-size cutters.

4. Resilient wedge valves may be used as tapping valves, provided that the disk fully retracts to produce a full port opening.

G. Butterfly Valves

1. Butterfly valves shall be short body, conforming to AWWA C504, Class 150. Minimum working differential pressure across the valve disc shall be 150 psi unless specified otherwise on the drawing.

2. Butterfly valves shall be furnished and installed with the type of ends as shown on the plans and as herein specified. Wafer style valves will not be permitted.

3. Each valve body shall be tested under a test pressure equal to twice its design water working pressure.

4. Valves shall be bubble tight at rated pressures and shall be satisfactory for throttling service and frequent operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the full-open position to the tight-shut position.

5. Valve ends shall be as shown on the drawings; flanged ends shall be Class 125, ANSI B16.1.

6. Valve shafts shall be Type 316 stainless steel or carbon steel with Type 316 stainless-steel journals and static seals. Valve shafts shall be dual stub shafts or a one-piece shaft extending completely through the valve disc.

7. Materials of construction shall be as described below:

Component	Material	Specification
Body	Cast Iron or Ductile Iron	
Exposed Body Capscrews, and Bolts and Nuts	Stainless Steel	Type 316
Discs	Cast Iron Ductile Iron, or Ni-Resist	
Seat	Buna-N (in body)	

8. The rubber seat shall be an integral part of the valve body. Rubber seats fastened to the disc by any means shall not be permitted.

H. Bolts and Nuts for Flanged Valves

Bolts and nuts for flanged valves shall be Type 316 stainless steel in accordance with Section 15056.

I. Gaskets

Gaskets for flanged end valves shall be as described in Section 15056.

J. Valve Boxes for Buried Valves

1. Valve extension pipe material shall be 8-inch PVC SDR 35 pipe.

2. Design cast iron cap to rest within a frame on a cast-in-place concrete ring surrounding the valve extension pipe; size the tapered skirt of the cap for a close fit inside the upper sleeve portion of the valve box. Caps for the domestic water system shall be circular with the word "WATER" cast on the cap. Caps for the recycled water system shall be circular with “RECYCLED” cast on the cap. Coat the cap and frame with asphalt or coat-tar paint.

k. Extension Stems for Buried Valve Operators

1. Where the depth of the valve is such that its centerline is more than 4 feet below grade, provide operating extension stems to bring the operating nut to a point 24 to 30-inches below the surface of the ground and/or box cover.

2. Extension stems shall be steel and shall be complete with 2-inch-square operating nut.

3. Valve stem extensions shall be of a solid design (no pinned couplings permitted) with guides.

4. Valve extensions shall conform with MCWD Standard Plan W-7.

PART 3 - EXECUTION

A. Joints

1. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Clean flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil and graphite, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseat or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

2. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound OR Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.

3. Rubber ring grooves of valves shall be inspected before installation by the contractor for ridges or holes that would interfere with the rubber ring. Interferences with the rubber ring shall be corrected to a satisfactory connection or the valves replaced, as required by the District. (All valves shall have the same rubber-ring groove profile as the groove of the pipe couplings furnished with the pipe.)

B. Butterfly Valve Operators

Butterfly valves shall be installed with the operators on the street centerline side of the pipeline.

C. Exterior Protection

1. All exposed flanges and other metal surfaces and all damaged coatings shall be coated after assembly with bituminous mastic per Section 09900. Coating of stainless steel flange bolts is not required.

2. Wrap buried valves with 8-mil polyethylene wrap per AWWA C105.

D. Concrete Supports

1. Valves shall be anchored in concrete as shown in MCWD Standard Plan W-7.

2. Concrete supports will not be required under valves bolted to flanged fittings.

3. Until supports are poured, valves shall be temporarily supported by placing wooden skids underneath the valve so that the pipe is not subjected to the weight of the valve.

4. All concrete anchors and thrust blocks specified or required by the District representative are considered as part of the pipeline installation.

E. Valve Boxes

1. Valve boxes shall be firmly supported and shall be kept centered and plumb over the operating nut of the valve.

2. Beveled sections of pipe will not be allowed at the top of the valve extension pipe. The top cut shall be square and machine made.

3. During the construction of new tracts, the valve extension pipes for "key valves" shall extend well above the ground level to permit ease of location in case of emergency shutoffs.

4. The box cover shall be flush with the surface of the finished pavement or at any other level designated by the District representative.

F. Backfill

1. All backfill within 24 inches of a valve shall be clean, washed sand.

2. Backfill is to be placed and compacted in accordance with Section 02223.

G. Valve Leakage Testing

1. Test valves for leakage at the same time that the connecting pipelines are tested. See Section 15042 for pressure testing requirements.

2. Valves shall have a pressure rating higher than or equal to the test pressure.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15139

FIRE HYDRANTS

PART 1 - GENERAL

A. Description

This section includes the materials, installation and testing of fire hydrants.

Hydrants shall be supplied and installed per MCWD Standard Plan W-5, AWWA C 503 and as described herein.

B. Related Work Described Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Trenching, Backfilling, and Compacting:	02223
2.	Concrete:	03300
3.	Painting and Coating:	09900
4.	Hydrostatic Testing of Pressure Pipelines:	15042
5.	Ductile Iron Pipe and Fittings:	15056
6.	Manual Valves:	15100

C. Approved Wet Barrel Hydrants

1. Residential Use
   James Jones 3760 (Hydrant Head and Fluted Spool),
   Clow 2060

2. Commercial and Industrial Use
   James Jones 3770 (Hydrant Head and Fluted Spool)
   Clow 2065

PART 2 - MATERIALS

A. Wet Barrel Hydrant

1. Hydrant Top Section

a. Fire hydrants shall have individual valves for each outlet opening counter clockwise. Fire hydrants for residential use shall have two 2-1/2 inch hose nozzle and one 4-1/2-inch pumper nozzle. Fire hydrants for commercial or industrial developments shall have one 2-1/2 inch hose nozzle and two (2) 4-1/2-inch pumper nozzles.

b. All outlets shall have National Standard Hose Threads.

c. The hydrant top section shall be manufactured of bronze conforming to ASTM B 62.

d. All interior working parts, including stems, shall be of bronze containing no more than 7% zinc or 2% aluminum.

e. Hydrants are to be provided with:

1-1/8-inch sized pentagon-shaped operating nut, and
1-1/8-inch capnuts.

f. All fire hydrants shall have the name of the manufacturer cast onto the hydrant body or shown on a permanently attached plate.

g. Plastic outlet nozzle caps shall be provided for all outlets. Caps shall be securely chained to the barrel with non-kinking metal chain in a manner to permit free rotation of the cap.

h. All hydrant flanges shall be eight-hole regular, Class 125, American Standard cast iron flange drilling.

2. Bury Section

a. The bury section shall be 6-inch cast iron long radius bury elbow and shall be cement lined in conformance with Section 15056. Bury inlet shall be 6-inch rubber-ring hub bell connection for C900 PVC pressure pipe.

b. A flanged ductile iron spool shall be installed to position the hydrant flange 4 inches above the concrete pad (finish grade).

c. All wet-barrel fire hydrant cast-iron buries are to be cement lined.

d. When using a riser spool, bolts shall be stainless steel 316, standard non-break-away.

e. Bury section outlet and riser spool flanges shall be eight-hole regular, Class 125, American Standard cast-iron flange drilling.

C. Break-Off Check Valve

1. Break-off check valve shall be installed on hydrant riser with break-off segment above finished grade.

2. Break-off check valve shall be Clow model LBI-400A or equal.

D. Valve

The shut-off valve shall be a resilient-seated gate valve per Section 15100, including the valve box. Butterfly valves will not be permitted on fire hydrant laterals.

E. Ductile Iron Pipe

Ductile iron pipe shall be per Section 15056.

F. Ductile Iron Pipe and Fittings

Ductile-iron Pipe and fittings shall be in accordance with Section 15056.

G. Concrete

Concrete pads and supports shall be Class B concrete conforming with Section 03300.

H. Gaskets

Gaskets shall be of rubber composition per Section 15056.

PART 3 - EXECUTION

A. General

1. Fire hydrant assemblies shall be installed in accordance with the standard drawing and as specified herein, and shall include the connection to the main, the fire hydrant, hydrant bury, shutoff valve, valve well and valve box, connection piping, concrete thrust blocks, and appurtenances.

2. Refer to MCWD Standard Plan W-5.

B. Location

Fire hydrant assemblies shall be located as shown on the plans or as approved by the District representative. The center of the fire hydrant shall be, except as otherwise approved by the District representative, located as described below:

1. Where concrete curb or asphalt concrete (A.C.) berm exists or is to be constructed, and the sidewalk is next to the property line; 1 feet 6 inches back of the back edge of the curb.

2. Where 6-foot-wide or narrower sidewalk is to be installed or exists next to the curb; 12 inches back of sidewalk edge. Where there is insufficient public right-of-way behind the sidewalk, an easement will be required. For sidewalks wider than 6 feet; 18 inches back of the curb face.

3. Where there is no curb or berm, the location shall be designated by the District representative.

4. The flange elevation at the base of the hydrant shall be set 4-inches above the curb or sidewalk, or the surrounding graded area, or as approved by the District representative. Spools additional will not be permitted when correcting the flange elevation.

C. Trenching, Backfilling, and Compacting

All trenching, backfilling, compaction and other excavation shall be in accordance with Section 02223.

D. Valve and Valve Box

The valve and valve box shall be installed in accordance with Section 15100.

E. Ductile Iron Pipe

Ductile iron pipe shall be installed in conformance with Section 15056.

F. Concrete

The concrete pad shall be Class B concrete and thrust blocker shall be Class A concrete and shall be placed per Section 03300.

G. Painting

All public fire hydrants shall be painted with one prime coat and two finish coats of yellow paint at the place of manufacture. Before the fire hydrant has been installed in accordance with Section 09900. A final touch-up coat shall be applied just prior to the final inspection.

H. Testing

Test hydrants at the same time that the connecting pipeline is pressure tested. See Section 15042 for pressure testing requirements.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15150

METERS

PART 1 - GENERAL

A. Description

This section describes the purchase, materials, installation and testing of meter assemblies.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Structure Excavation:	02200
2.	Concrete:	03300
3.	Precast Concrete Vaults:	03462
4.	Painting and Coating:	09900
5.	Ductile-Iron Pipe and Fittings:	15056
6.	Copper, Brass, and Bronze Pipe, Fittings, and Appurtenances:	15057
7.	Manual Valves:	15100
8.	Flexible Pipe Couplings and Expansion Joints	15162

C. Approved Manufacturers

1. Positive Displacement – 5/8 inch
   Master Meter

2. Multi-Jet – 3/4 inch through 2-inch
   Master Meter

3. Turbine Meters
   Master Meter

3. Compound Meters
   Master Meter

4. Fire Service Meter Assembly
   - Master Meter
   - Badger

5. Meter Boxes
   - Christy
   - Armorcast
   - BES

D. Residential Meters

1. The District shall furnish and install residential meters. The fee to furnish and install the meter will be established by the District.

2. The developer shall expose and set to grade all coppersetters prior to requesting meters.

3. The developer is responsible for the installation of the meter box, coppersetters, meter (as required by the District) and customer service valve.

4. Prior to occupancy, the District will, upon finding the installation to be acceptable, record all meter account information and padlock the curb stop in the off position. The developer will subsequently be relieved of any additional responsibility for consumption or service charges for this service.

5. Subsequent applications for permanent service shall be made in accordance with the District's Rules and Regulations.

E. By-Pass Line

1. A by-pass line shall be installed on all meter assemblies 3-inch and larger. A by-pass line is not required on irrigation services, or as determined by the District.

2. A lockable valve shall be installed in all by-pass lines.

3. A by-pass line may be required on smaller installations which require continuous service.

PART 2 - MATERIALS

A. General

1. All meters shall be new and of current manufacture design.

2. All parts of the meters of the same size and model shall be interchangeable.

B. Registers

1. The registers on all meters shall have straight reading dials with full sweep test circles.

2. All registers are to be calibrated to read in cubic feet.

3. All registers are to be direct read. This may require the stamping of a zero or zeros on the register dial face. The last two digits including the zero or zeros stamped on the register dial face shall be easily distinguishable from the balance of the digits either by contrast of white numbers on black or red numbers on white.

4. Registers for positive displacement, compound, and turbine meters are to be hermetically roll sealed.

5. Register gears shall be self-lubricating molded plastic unless stated otherwise.

6. Registers for positive displacement and turbine meters shall not have replaceable change gears.

7. Registers shall be driven by a magnetic coupling.

8. All register lenses shall be tempered glass.

9. All registers shall be provided with low flow detectors.

10. The register must be attached to the meter case by a bayonet attachment. The register assembly shall be able to orient to any of four positions. On positive displacement and multi-jet meters the standard mount position shall read from the meter inlet side.

C. Automatic Meter Reading Device

1. Meter registers shall be equipped with Master Meter 3G Automatic Meter Reading (AMR) transmitters.

2. Coordinate meter purchase with District Engineer to ensure compatibility with current AMR system.

D. Stainless Steel Hardware

All bolts, nuts, capscrews, studs, and washers shall be Type 316 stainless steel ASTM A 193 B8M for bolts, and ASTM A 194 8M for nuts.

E. Positive Displacement Type Meters (5/8 inch)

1. Meters shall conform to the material and performance requirements of AWWA C700, as most recently revised, and as specified herein.

2. The manufacturer shall furnish certified results for each meter showing that it has been tested for accuracy of registration and that it complies with accuracy and capacity requirements of AWWA C700 when tested in accordance with AWWA Manual M6.

3. All meters body components resisting pressure shall be bronze.

4. All register boxes and covers shall be synthetic polymer or bronze.

5. Casing bolts shall be stainless steel or bronze.

6. All internal hardware shall be stainless steel.

7. 5/8-inch meters shall have external straight threads.

8. The face-to-face length shall be 7-1/2 inches.

9. All meters shall have plastic or stainless steel internal strainers.

10. All registers and register boxes shall be secured to the main casing by acceptable tamper-proof means. Safety wiring of standard bolts and screws is NOT considered an acceptable method of tamper-proofing.

11. The serial number of each meter shall be imprinted on the register box cover, and the main case.

12. Register shall be removable without reducing pressure or removing the main case from the installation.

13. All positive displacement meters shall be supplied with the following warranty, which shall not be prorated under any conditions:

    a. All meters shall be guaranteed to maintain new-meter accuracy (±1½%) for two years.

    b. All measuring chambers and disks or pistons shall be guaranteed against malfunction for fifteen years.

    c. All registers shall be guaranteed for fifteen years.

F. Multi-Jet Type Meters (5/8 inch through 2 inch)

1. Meters shall conform to the material and performance requirements of AWWA C708, as most recently revised, and as specified herein.

2. The manufacturer shall furnish certified results for each meter showing that it has been tested for accuracy of registration and that it complies with accuracy and capacity requirements of AWWA C708 when tested in accordance with AWWA Manual M6.

3. All meters body components resisting pressure shall be bronze.

4. All register boxes and covers shall be synthetic polymer or bronze.

5. Casing bolts shall be stainless steel or bronze.

6. All internal hardware shall be stainless steel.

7. 5/8-inch through 1-inch meters shall have external straight threads. 1½-inch and 2-inch meters shall have flanges on ends.

8. The face-to-face length and maximum profile height of the meter shall be as described below:

Meter Size	Face-to-Face	Maximum Profile Height

(inches)	Dimension (inches)	Centerline Inlet to Register Cover (inches)
5/8 x 3/4	7-1/2	3-1/4
3/4	7-1/2	3-1/4
1	10-3/4	3-1/4
1-1/2	13	4-1/4
2	17	5

9. All meters shall have plastic or stainless steel internal strainers.

10. All registers and register boxes shall be secured to the main casing by acceptable tamper-proof means. Safety wiring of standard bolts and screws is NOT considered an acceptable method of tamper-proofing.

11. The serial number of each meter shall be imprinted on the register box cover, and the main case.

12. Register shall be removable without reducing pressure or removing the main case from the installation.

13. All positive displacement meters shall be supplied with the following warranty, which shall not be prorated under any conditions:

    a. All meters shall be guaranteed to maintain new-meter accuracy (±1½%) for two years.

    b. All measuring chambers and disks or pistons shall be guaranteed against malfunction for fifteen years.

    c. All registers shall be guaranteed for fifteen years.

G. Turbine Meters (1½-inch and larger)

1. All meters shall conform with AWWA C701 Class II and the requirements specified herein.

2. The manufacturer shall furnish certified test results for each meter showing that it has been tested for accuracy of registration and that it complies with accuracy and capacity requirements of AWWA C701 when tested in accordance with AWWA Manual M6.

3. Turbine meters shall have all bronze main cases.

4. Straightening vanes shall be provided in the main case of all meters.

5. A calibration adjusting vane located in the measuring chamber shall be provided on all meters.

6. All rotors shall be thermoplastic with graphite bearings (PTFE) rotating on a stainless steel or tungsten carbide shaft.

7. All motion shall be transmitted from the rotor to the register through a magnetic coupling.

8. All register boxes and covers shall be bronze.

9. All registers and register boxes shall be secured to the measuring chamber by acceptable tamper-proof means. Safety wiring of standard bolts and screws is NOT considered an acceptable method of tamper-proofing.

10. All turbine meters shall be equipped with strainers. The strainer body and cover shall be cast bronze for meters 2-inch through 6-inch. Ductile iron will be permitted only on 8-inch and larger or fire service strainers. All ductile iron strainers shall be epoxy lined in accordance with Section 09900. All strainers shall be furnished with bronze or stainless steel screens with an effective open area at least double the area of the meter. On metered fire service installations, a U.L. approved strainer with an effective open area at least 4 times the equivalent open area of the meter will be required.

11. All measuring chamber, strainer cover, and flange bolts shall be Type 316 stainless steel.

12. The serial number of each meter shall be imprinted on the register cover, and the main case.

13. All meter registers shall be provided with a remote touchread device.

H. Compound Meters (3-inch and larger)

1. All meters shall conform with AWWA C702 and the requirements specified herein.

2. The manufacturer shall furnish certified test results for each meter showing that it has been tested for accuracy of registration and that it complies with accuracy and capacity requirements of AWWA C702 when tested in accordance with AWWA Manual M6.

3. Compound meters shall have all bronze main cases.

4. All compound meters shall have flanged connections.

5. A test plug shall be provided in the outlet side of the main case of all meters.

6. The measuring chamber shall be capable of operating within the specified AWWA accuracy limits without recalibration when transferred from one main case to another.

7. A calibration adjusting vane located in the measuring chamber shall be provided on all meters.

8. All rotors shall be thermoplastic with graphite bearings rotating on a stainless steel shaft.

9. All motion shall be transmitted from the rotor to the register through a magnetic coupling. Worm gears will NOT be permitted.

10. All register boxes and covers shall be bronze, or synthetic polymer.

11. All registers and register boxes shall be secured to the measuring chamber by acceptable tamper-proof means. Safety wiring of standard bolts and screws is NOT considered an acceptable method of tamper-proofing.

12. All compound meters shall be equipped with strainers. The strainer body and cover shall be bronze for 2-inch through 6-inch meters. Ductile iron will be permitted only on 10-inch and larger or fire service strainers. All ductile iron strainers shall be epoxy lined in accordance with Section 09900. All strainers shall be furnished with bronze or stainless steel screens with an effective open area at least double the area of the meter.

13. All measuring chamber, strainer cover, and flange bolts shall be Type 316 stainless steel.

14. The serial number of each meter shall be imprinted on the register cover, and main case.

15. All meter registers shall be provided with remote touchread devices.

I. Fire Line Meter Assembly

1. A fire line meter assembly may be required for residential structures and commercial and industrial installations where separate fire service installations are not provided.

2. Fire line meter assemblies shall be furnished as complete units by the manufacturer. Each fire line meter assembly shall consist of a U.L. approved strainer with a stainless steel strainer basket, a turbine meter sized for fire flow, a positive displacement or turbine meter sized for maximum demand without fire flow, positive displacement meter piping, lockable ball valves to isolate the positive displacement meter, a check valve downstream of the positive displacement meter, and an internally weighted or spring loaded check valve adjusted to open prior to exceeding the maximum flow range of the positive displacement meter. The positive displacement meter piping shall extend from the outlet of the strainer to the downstream side of the swing check valve.

3. Each fire line meter assembly shall be constructed of components conforming to the appropriate sections of these specifications.

4. Cast iron or steel components shall be epoxy lined and coated per Section 09900.

5. Each fire line meter assembly shall conform the AWWA C703 and shall be U.L listed, and shall be F.M. approved for fire service use.

6. All meter registers shall be provided with remote touchread devices.

J. Totalizer - Transmitter

1. The totalizer - transmitter shall be furnished with all necessary mounting hardware for operation from the meter.

2. The transmitter shall have integrally mounted electronic circuitry to convert to both a true 2-wire 4-20 Ma DC output linear to flow rate and a true 2-wire scaled pulse.

   a. The 4-20 Ma DC output shall operate from an external regulated 18-30 VDC power supply with load capacity of 575 ohms at 28 VDC. The accuracy of the 4-20 Ma output shall be better than +/- 0.5% of scale.

   b. The pulse output shall operate from an external regulated 10-30 VDC power supply which can be either the 4-20 Ma DC power supply or a separate power

supply. The pulse circuit voltage drop across the transmitter shall be 3 VDC or less. Each pulse shall represent the volume of the least significant totalizer digit.

K. Copper, Brass, and Bronze Pipe, Fittings, and Appurtenances

All service connection and by-pass piping shall conform with Section 15057.

L. Ductile-Iron Pipe and Fittings

All piping for meter assemblies 3-inch and larger shall conform with Section 15056.

M. Manual Valves

1. All valves shall conform with Section 15100.

2. All valves on by-pass lines shall be lockable in the closed position. On 3-inch and larger by-pass lines, resilient seat gate valves with hand wheels and a chain and lock are permitted.

N. Meter Boxes

1. Precast concrete meter boxes for copper setters, 2-inch and smaller shall be purchased and installed by the contractor unless noted otherwise. Meter box lid shall be polymer type.

2. Sizes shall be as specified on the standard drawings for the various sizes and types of services.

3. Precast meter vaults and boxes shall conform with Section 03462 and the standard drawings.

O. Meter Box Covers

1. All meter box covers shall be furnished with rectangular reading lids.

2. Concrete meter box covers shall be installed in all locations.

PART 3 - EXECUTION

A. Meter Installations

1. All residential meters shall be installed by the contractor per MCWD Standard Plans W-1, W-2 and W-3.

2. All 3-inch and larger meter installations shall be as indicated on the Drawings.

B. Excavation and Backfill

Excavation and backfill for the meter installation shall be in accordance with Section 02223.

C. Service Piping

1. All piping for service lines and by-pass lines up to 2-inch shall be installed in conformance with Sections 15057 and 15058.

2. The piping for all service installations 3-inch and larger shall be in accordance with Sections 15056, 15064 and the applicable standard drawing.

D. Test Tap

On services 3 inches and larger, a 2-inch service saddle or welded coupling and corporation stop shall be installed on the spool downstream of the meter. The tap shall be located a minimum of three (3) pipe diameters downstream of the meter. On propeller meter installations, the location of the test tap will be determined by the District representative.

E. Meter Vault

All precast concrete meter vaults shall be installed in accordance with Section 03462 and the MCWD Standard Plans W-1 through W-3.

F. Concrete Work

All thrust blocks, foundations, and supports shall be of the sizes shown in the applicable standard drawings and conform with Section 03300.

G. Valves

All valves installed shall conform with the Section 15100.

H. Painting and Coating

1. All exposed and buried piping shall be painted or coated in accordance with Section 09900.

2. The meter reading lids on all recycled water services shall be painted in accordance with Section 09900.

I. Testing

1. All meter services shall be hydrostatically pressure tested during the testing of pipeline in accordance with Section 15042.

J. Meter Boxes

1. Boxes shall be set true to line and to the grade of the top of the curb, sidewalk, or surrounding graded area.

2. Meter boxes are not to be set until fine grading for landscape grading has been completed by the developer.

3. Retaining walls may be required around meter boxes installed on slopes as determined by the District representative.

END OF SECTION

STANDARD SPECIFICATIONS

SECTION 15151

UNDERGROUND FACILITIES IDENTIFICATION

PART 1 - GENERAL

A. Description

This section describes special identification, markings, materials and their installation procedures for underground water, sewer and recycled water facilities.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.	Painting and Coating:	09900
2.	Installation of Gravity Sewer Pipelines	02701
3.	Ductile Iron Pipe and Fittings:	15056
4.	PVC Pressure Distribution Pipe:	15064
5.	Combination Air and Vacuum Release Valves:	15089
6.	Manual Valves:	15100
7.	Fire Hydrants:	15139
8.	Water Meters:	15150

C. Approved Manufacturers

1. Warning Tape and Pipe Sleeves

   a. Griffolyn, Division of Reef Industries

   b. Terra Tape, Division of Reef Industries

   c. T. Christy Enterprises, Inc.

2. Witness Markers

   Carsonite Water line Markers
   Or approved equal

D. Identification

1. Ductile iron pipe (DIP) shall be encased within an 8-mil polyethylene sleeve per section 15056. Sleeves for potable water pipe shall be blue with the words “POTABLE WATER” or “DOMESTIC WATER” stenciled in 2-inch black letters. Sleeves for recycled water pipe shall be purple with the words "RECYCLED WATER" stenciled in 2-inch black letters.

2. PVC pipe carrying potable water shall be blue in color, or shall be installed with a blue 8-mil polyethylene sleeve as for DIP.

3. PVC pipe carrying recycled water shall be purple in color or shall be installed with a purple 8-mil polyethylene sleeve as for DIP.

4. PVC pipes for sanitary gravity sewers shall be green in color. PVC pipes for sanitary sewer force mains shall be green in color or shall be installed with a green 8-mil polyethylene sleeve as for DIP.

5. All water service lateral lines shall be encased within a color-coded 8-mil polyethylene sleeve. Sleeve shall be blue in color for all domestic water services and purple in color for all recycled water services.

E. Valve Boxes

1. Valve boxes for domestic water systems shall be as specified in Section 15100.

2. Valve boxes for recycled water facilities shall have circular valve box covers with the inscription "RECYCLED " cast thereon per Section 15100, and shall be painted purple.

3. All valve boxes installed in unpaved areas (open space areas) shall be marked with a witness pole, in addition to the above referenced markings.

F. Color and Painting Schedule

1. Comply with the APWA Uniform Color Code for underground utilities.

2. Domestic water facilities shall be blue, with the exception of fire hydrants which shall be painted as specified in Section 15139. Witness poles for domestic water lines, valves and appurtenances shall be blue.

3. Sanitary sewer facilities shall be green per Section 09900. Witness poles for sanitary sewer lines and appurtenances shall be green.

4. Recycled water facilities shall be purple per Section 09900. Witness poles for recycled water lines, valves and appurtenances shall be purple.

G. Restriction of Public Access to Recycled Water Facilities

1. All off-site recycled water facilities shall be restricted from public access so that the general public cannot draw water from the system. Facilities such as air release assemblies, blow-

off hydrants, blow offs on strainers, and other such facilities, shall be restricted from public access.

2. Recycled water facilities, both above and below grade, shall be housed in an approved lockable container colored purple. A sign reading "CAUTION: RECYCLED WATER" shall be installed, its size approved by the District representative. Other means of restricting public access may be approved by the District representative.

H. Recycled Water Warning Signs and Labels

1. Warning labels shall be installed on all recycled water appurtenances in vaults, such as, but not limited to, air release valves, blow offs, and meters.

2. Warning signs or labels shall be installed on all exposed recycled water facilities such as, but not limited to, controller panels, irrigation pumps, water trucks and temporary construction services.

PART 2 - MATERIALS

A. Buried Piping Warning Tape

1. Plastic warning tape shall be an inert plastic film specifically formulated for prolonged underground use. The minimum thickness shall be 4 mils and the minimum width of the tape shall be 6 inches. Printing shall be a minimum of 2-inch block letters.

2. Warning tape for domestic water pipelines shall be blue with black printing having the words "CAUTION: DOMESTIC WATER-LINE BURIED BELOW."

3. Warning tape for sanitary sewer pipes shall be green with black printing having the words "CAUTION: SANITARY SEWER BURIED BELOW."

4. Warning tape for recycled water pipelines shall be purple with black printing having the words "CAUTION: RECYCLED WATER-LINE BURIED BELOW."

B. Warning Labels for Recycled Water Fixtures

Labels shall be inert plastic film specifically formulated for prolonged exposure and shall be prepared with black printing on a purple field having the words: "CAUTION: RECYCLED WATER – DO NOT DRINK" and “AVISO: AGUA IMPURA – NO TOMAR.” The minimum thickness shall be 4 mils for adhesive backed labels and 10 mils for tag type labels. Tag type labels shall have reinforced tie holes and shall be attached with heavy-duty nylon fasteners. The size, type of label and location will be dictated by each individual application and subject to acceptance by the Districts representative. The minimum printing size shall be 1/2-inch letters.

C. Warning Signs for Recycled Water Facilities

Signs shall be metal or rigid plastic designed for outdoor installation, as approved by the District Engineer. Printing shall be black or white on a purple background. Wording shall be in English and Spanish: "CAUTION: RECYCLED WATER – DO NOT DRINK" and “AVISO: AGUA IMPURA – NO TOMAR.” Size shall be as indicated on the Drawings. The minimum printing size shall be 1-inch letters.

D. Warning Tags for Recycled Water Facilities

Tags shall be weatherproof plastic, 3" by 4", purple in color, with the words "WARNING - RECYCLED WATER - DO NOT DRINK" in English and Spanish. Imprinting shall be permanent and black in color. Use tags manufactured by T. Christy Enterprises or approved equal.

PART 3 - EXECUTION

A. Installation of Pipe Warning Tape

Warning tapes shall be installed a minimum 1-foot above and centered on the pipe. The warning tape shall be installed continuously for the length of the pipe and shall be fastened to valve stem casings or other vertical appurtenances by plastic adhesive tape.

B. Installation of Warning Labels

Warning labels shall be firmly attached to all appurtenances using heavy-duty nylon fasteners.

C. Installation of Warning Tags

1. All recycled water sprinkler control valves, pressure regulators, quick couplers, and isolation valves shall be tagged with purple warning tags.

2. One tag shall be attached to each appurtenance in one of the following manners:
   a. Attach to valve stem directly with plastic tie wrap, or
   b. Attach to solenoid wire directly with plastic tie wrap, or
   c. Attach to the body of the relative appurtenance with a plastic tie wrap.

D. Installation of Witness Markers

1. Witness markers shall be installed over pipe in unpaved open-space areas at intervals not greater than 200 feet. Place markers at appurtenances, including but not limited to valves, air release/vacuum breaks, dead ends, inflection points and tees.

2. Witness markers shall be embedded into the soil at least 18-inches and shall be equipped with a barb or other such device to secure it in the surrounding soil.

END OF SECTION