CITY OF IMPERIAL

Manhole and Lift Station Rehabilitation and New Manhole Installation Bid No. 2025-01

MARCH 2025

PREPARED BY

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PREPARED FOR

CITY OF IMPERIAL
PUBLIC WORKS DEPARTMENT
420 SOUTH IMPERIAL AVENUE
IMPERIAL, CA 92251
(760) 355-1152

BID INVITATION PACKAGE

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

Bid Package Contents:

1. Notice and Invitation to Bidders;
2. Instructions to Bidders;
3. Bid Form;
4. Bid Bond;
5. List of Proposed Subcontractors;
6. Noncollusion Affidavit;
7. General Conditions;
8. Certificate Regarding Workers' Compensation;
9. Project Contract Execution Document;
10. Special Requirements
11. Detailed Specifications

TABLE OF CONTENTS

Division 3 - Concrete

Division 7 – Thermal and Moisture Protection

Division 9 - Finishes

NOTICE AND INVITATION TO BIDDERS

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation
BID 2025-01

NOTICE IS HEREBY GIVEN that sealed bids for the above project shall be received at the offices of the City Clerk at the City of Imperial at 420 So. Imperial Ave, Imperial, CA 92251, until **2:00 p.m.** Pacific Standard Time, on ***April XX, 2025***. Bids will be publicly opened on ***April XX, 2025,*** at **2:05 p.m.** Pacific Standard Time, or as soon thereafter as possible, at the City of Imperial located at 420 So. Imperial Ave., Imperial, CA 92251.

The Contract for the work advertised shall be awarded to lowest responsible bidder. City reserves the right to reject all bids.

A prebid site tour will not be conducted. Bidders are directed to **Appendix A** to view photos of the manholes and lift station wetwells or can coordinate with the City to arrange a site visit.

PROJECT DESCRIPTION:

Contractor shall furnish all labor, material, equipment and services to perform and complete all work required for the **Manhole and Lift Station Rehabilitation and New Manhole Installation** as per the Project Specifications.

The Project will generally include:

- The rehabilitation and lining of existing manholes throughout the City and the replacement of existing manholes with new concrete manholes. Existing manholes to be rehabilitated that do not have drop pipes or forcemains entering them will receive a cured-in-place liner. Existing manholes to be rehabilitated that cannot receive a cured-in-place liner will receive a geopolymer epoxy manhole liner. Work will likely include sewer bypass operations depending on the rehabilitation and/or replacement required.
- Removal of an existing sewer clean-out, followed by the installation of a new flow through concrete manhole in its place around an existing sanitary sewer main.
- Construction and installation of three (3) new precast concrete manholes around the existing sanitary sewer main within Barioni Boulevard and generally located between H Street and K Street.
- Isolation of the Cross Street lift station existing wetwells by means of plugging all pipe connections, followed by draining and cleaning of the existing wetwells, and protection of existing pumps and piping.
- Surface preparation and coating of the existing Cross Street lift station wetwell walls and floor.

- Removal of pipe plugs for wetwell isolation and return of pump station to service. Contractor shall be responsible to verify operability of pumps and level control system.
- Removal of three existing manholes located on Clark Road, to be replaced with a single 72" diameter manhole, along with new force main pipe and fittings to connect to the new manhole.

Bid packages are available on the City's website, www.cityofimperial.org.

Engineer's Estimate for this Project is $500,000.

CONTRACTOR'S LICENSE:

Contractor must have a California State Contractor's Class "A" license. A City of Imperial business license is required prior to start of project.

A bid submitted by any contractor not properly licensed shall be considered non-responsive and will be rejected.

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) 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 projects (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code 1725.5. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Any bid submitted by a contractor or subcontractor not property licensed any not registered with the Department of Industrial Relations shall be considered non-responsive and will be rejected.

APPRENTICES:

Section 1777.5 requires the Contractor or Subcontractor employing tradesmen in any apprenticeable occupation to apply to the Joint Apprenticeship Committee nearest the site of the public works project and which administers the apprenticeship program in that trade for a certificate of approval. The certificate will also fix the ratio of apprentices to journeymen to be used in the performance of the contract.

The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if he employs registered apprentices or journeymen in any apprenticeable trade and if other Contractors on the public works site are making such contributions.

Information relative to apprenticeship standards, contributions, wage schedules and other requirements may be obtained from the State Director of Industrial Relations or from the Division of Apprenticeship Standards.

PREVAILING WAGE RATES:

Not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which this contract is to be performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in Chapter 1 (commencing with Section 1720) Part 7, Division 2 of the Labor Code, shall be paid to all workers employed on this public work. Statutory provisions for penalties for failure to pay prevailing wages will be enforced. A copy of the applicable rate of per diem wages is on file in the office of the City Clerk, 420 South Imperial Avenue, Imperial, California.

BID BOND:

Each bid must be accompanied by a guaranty of cash, certified check, cashier's check or bid bond made payable to the City of Imperial for an amount equal to at least ten percent (10%) of the bid. Such guaranty to be forfeited should the bidder to whom the contract is awarded fails to enter the contract. All guaranties to be returned after the contract is awarded. In conformance with the State of California Public Contract Code Section 22300, the contractor may substitute securities for any funds withheld by the City to ensure performance under the contract.

At request and expense of the contractor, securities equivalent to the amount withheld shall be deposited with the City or with a State or Federally chartered bank as the escrow agent who shall pay such funds to the contractor upon notification by the City of contractor's satisfactory completion of contract.

The type of securities deposited and the method of release shall be approved by the City Attorney.

PAYMENT BOND:

If the successful bid is in excess of $25,000, the successful bidder shall be required to post a payment bond in the amount of the bid in accordance with California Civil Code Section §3247.

RETENTION:

The City shall retain five (5%) percent of the Contract price. The retention shall be released (with the exception of one hundred fifty percent of any disputed amount) within sixty days after the date of completion of the work. The Contractor may substitute securities in place of the retained funds withheld by the City. Alternatively, an escrow

agreement, in the form prescribed under Ca. Pub. Cont. Code § 22300, may be used by Contractor.

RESOLUTION OF CLAIMS:

Claims shall be managed as set forth in Public Contracts Code Section 20104 and 9204. Where there is conflict, the provisions of 9204 shall control. In general terms, said process contemplates a meet and confer procedure and non-binding mediation as a precursor to litigation.

MISCELLANEOUS:

All inquiries regarding this project should be directed to:

City of Imperial
David Dale, PE – Public Services Director
420 South Imperial Avenue
Imperial, California 92251
760-355-3336
ddale@imperial.ca.gov
THE CITY OF IMPERIAL

By: Dennis Morita, City Manager

INSTRUCTIONS TO BIDDERS

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation
BID 2025-01

1. Explanations to Bidders

(a) Any explanation desired by a bidder regarding the meaning or interpretation of the Invitation for Bids, including drawings, specifications, prior approvals, etc., must be requested in writing no later than 5 calendar days before the bid deadline. Any interpretation made will be in the form of an addendum to the Invitation for Bids and will be furnished to all prospective bidders. Receipt of Addenda by the bidder must be acknowledged in the space provided on the Bid Form or by letter or transmittal received before the time set for opening of sealed bids. Verbal explanations or instructions given before the award of the contract will not be binding.

(b) All questions regarding the Invitation for Bids shall be in writing and directed to:

City of Imperial
David Dale, PE
Public Services Director
420 South Imperial Avenue
Imperial, CA 92251
760-355-3336
ddale@cityofimperial.org

Albert A. Webb Associates
Shane Bloomfield
Design Engineer
3788 McCray Street
Riverside, CA 92506
951-248-4293
shane.bloomfield@webbassociates.com

2. Conditions Affecting the Work

(a) Before submitting a bid, each bidder must (1) examine the bid and contract documents thoroughly, (2) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the work (**Optional**), (3) familiarize himself with federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the work; and (4) study and carefully correlate bidder's observations with the bid and contract documents. Failure to do so will not relieve bidders from responsibility for estimating properly the difficulty or cost of successfully performing the work. The City will assume no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of the contract, unless included in the bid or contract documents.

(b) The submission of a bid will constitute an incontrovertible representation by the Bidder that it has complied with every requirement of the request for bids and that the bid and contract documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

3. Bidder's Qualifications

(a) Contractor must have a California State Contractor's Class "A" license to perform the work and all electrical work shall be performed by a C-10 State Contractor. Any bid submitted by a contractor not properly licensed shall be considered non-responsive and will be rejected.

4. Bid Guaranty

(a) The bid guaranty shall be in the form of a bid bond, certified check, or cashier's check, payable to the order of the City of Imperial, in an amount not less than 10% of the Bid. If the bid guaranty is in the form of a bond it must be of the type included in this bid package. Any bid bond shall be executed by a corporate surety acceptable to the City and authorized to issue such surety bond in the State of California. Bid guaranties, other than bid bonds, will be returned (1) to unsuccessful Bidders as soon as practicable after the opening of bids, and (2) to the successful Bidder upon execution and delivery of all contract documents. However, the City reserves the right to retain the bid guaranty of the second lowest qualified Bidder until the lowest qualified Bidder executes and delivers all required contract documents to the City or until 60 calendar days after bid opening, whichever occurs first.

(b) Failure to furnish a bid guaranty in the proper form and amount, by the time set for the receipt of bids, shall be cause for rejection of the bid.

(c) If the successful Bidder, upon acceptance of its bid by the City fails to execute and deliver all contract documents within 10 calendar days after receipt of City's Notice of Award, the successful Bidder's bid guaranty shall be retained by the City as liquidated damages. Such failure on the Bidder's part to execute and deliver those documents will cause substantial damage to the City, including delay in its construction program, which damage is not easily reduced to monetary terms and, therefore, the full amount of the bid guaranty is properly considered to be liquidated damages.

5. Preparation of Bids

(a) Bids shall be submitted on the forms furnished, or copies thereof, and must be manually signed. All blank spaces shall be filled in. If erasures or other changes appear on the forms, each erasure or change must be initialed by

the person signing the bid. Telephonic or fax bids will not be considered.

(b) Substitutions for specified materials will not be considered without prior approval.

(c) Modifications of bids already submitted will be considered if received at the office designated in the invitation for bids by the time set for receipt of bids. Telephonic or fax modifications will not be considered.

(d) Discrepancies between words and figures shall be resolved in favor of words.

(e) Discrepancies between the indicated sum of any column of figures and the correct sum thereof shall be resolved in favor of the correct sum.

6. Submission of Bids

(a) Bids must be sealed, marked, and addressed as indicated below. Failure to do so may result in a premature opening of, or a failure to open, such bid, thereby eliminating that Bidder from consideration. The sealed envelope containing the bid should be enclosed in another envelope addressed as indicated below.

(b) All bids shall be received no later than **2:00 p.m.** Pacific Standard Time, on ***April XX, 2025*** hand-delivered or mailed, addressed to:

Jillian Mehdipour, Public Records Analyst
City of Imperial
420 South Imperial Avenue
Imperial, California 92251

(c) The envelope containing the original copy of the bid must be sealed, marked, and addressed as follows:

(1) Name and address of Bidder

(2) Marked in the lower left-hand corner of the envelope:

CITY OF IMPERIAL, MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION - BID NO. 2025-01

(d) The original bid shall consist of those documents listed below. The original document shall be returned with the bid.

(1) Bid Form;

(2) List of Proposed Subcontractors;

(3) Bid Bond;

(4) Noncollusion Affidavit; and

(5) Contractor's Certificate Regarding Workers' Compensation

7. Late Bid, Modification or Withdrawal of Bid by Bidder

(a) Any bid received by the City after the exact time specified for receipt will be returned unopened.

(b) Any modification or withdrawal of bids must be made in writing and is subject to the same condition as in (a) above. A bid may be withdrawn by written or transmittal request received from a Bidder prior to the time set for opening bids. A bid may also be withdrawn in person by a Bidder or the Bidder's authorized representative, provided the representative's identity is made known and the representative signs a receipt for the bid, but only if the withdrawal is made prior to the time set for opening bids.

8. City Modifications Prior to Date Set for Opening Bids

The City may revise or amend the bid or contract documents, including the specifications and drawings, prior to the date set for opening bids. Such revisions and addenda, if any, will be announced by addenda to the Invitation for Bids. If the revisions and addenda are of a nature which require material changes in the bid, the date set for opening bids may be postponed by such number of days as in the opinion of the City will enable Bidders to revise their bids. In such a case, the addendum will include an announcement of the new date and time for opening bids.

9. Public Opening of Bids

Bids will be publicly opened at the time set for opening in the Notice to Bidders. Their content will be made public for the information of Bidders and others interested, who may be present either in person or by representative.

10. Award of Contract

(a) Award of contract will be made to the low responsible Bidder whose bid, conforming to the Invitation for Bids, is most advantageous to the City, price and other factors considered.

(b) The City Council may, when in its interest, reject any or all bids.

(c) The City may accept any item or combination of items of a bid, unless precluded by the Invitation for Bids or the Bidder includes in its bid a

restrictive limitation.

11. Bonds and Insurance

(a) If the successful bid is in excess of $25,000, the bidder to whom the contract is awarded shall furnish a Payment Bond on forms approved by the City, executed by a corporate surety acceptable to the City and authorized to issue such surety bonds in the State of California. The Payment Bond shall be in an amount equal to 100% of the Contract Price. The entire cost of bond shall be borne by the successful Bidder.

(b) The successful Bidder shall furnish a Performance Bond on forms approved by the City, executed by a corporate surety acceptable to the City, and authorized and admitted to issue surety bonds in California. The Performance Bond shall be in an amount equal to 100% of the Contract Price. The entire cost of the Performance Bond shall be borne by the successful Bidder.

(c) The successful Bidder shall deliver to the City certification attesting to the fact that the required policies of insurance have been obtained by the Bidder to the limits described in section 5.1.1 of the *General Conditions (pg GC-3)*.

(d) The signed contract required bonds and certificates of insurance shall be delivered to the City within 10 calendar days after receipt by Bidder of City's Notice of Award.

12. Subcontractors

(a) Each Bidder in its bid shall set forth the following:

(1) The name and location of the place of business of each subcontractor whom it intends to use to perform work or labor, or render service to the Bidder in or about construction of any work, in an amount in excess of 0.5% of the Base Bid. (California law forbids the substitution of subcontractors on public works projects, such as this project, except under very narrow and limited circumstances.)

(2) The portion of the work which will be done by each such proposed subcontractor, if the Bidder is awarded the Contract.

(b) Each Bidder shall furnish such information in substantially the form set forth in the Invitation for Bids. If no subcontractors are to be used, other than within the 0.5% limit referred to above the Bidder shall state "None" on the form.

(c) Each proposed subcontractor must complete a Subcontractor's Experience Statement, which shall be attached to the List of Proposed Subcontractors in order for the bid to be considered complete.

13. Noncollusion Affidavit

Each Bidder shall include a noncollusion affidavit with its bid in substantially the form set forth in the Invitation for Bids.

14. Permits and Fees

The Bidder's attention is called to the requirements of the General Conditions regarding the acquisition of and payment for permits, licenses and fees related to the work of this project. All such acquisitions and payments are the sole responsibility of the Contractor. It is the sole responsibility of the Bidder to contact agencies or utilities having jurisdiction over the project to ascertain the extent of permits and fees required and the cost thereof, and to include all such costs in its bid.

15. Prevailing Wage Rates

Not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which this contract is to be performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in Chapter 1 (commencing with Section 1720) Part 7, Division 2 of the Labor Code, shall be paid to all workers employed on this public work. Should the prevailing wage rate be increased, decreased, or eliminated a corresponding adjustment shall be made to the Contract Price which shall reflect the effect of that change in or elimination of the prevailing wage rate. A copy of the applicable rate of per diem wages is on file in the office of the City Clerk, 420 South Imperial Avenue, Imperial, California.

The successful Bidder must also comply with statutory requirements relating to certified copies of payroll and maintenance records, and availability for inspection of same. Successful Bidder must comply with statutory requirements relating to employment of apprentices.

16. Construction Schedule

After the Contract Documents are executed, the City will give the Contractor notice to proceed. After this notice is given, the Contractor shall substantially complete the project within **One-Hundred Fifty (*150)*** Calendar days. The Contractor will be liable for damages for any inexcusable delay beyond this period. Liquidated damages for such delay shall be $500 per calendar day for each day past the substantial completion date.

17. Debarment of Contractors and Subcontractors

In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 or the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to the City. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

Verification of Compliance with Economic Sanctions

Per California Executive Order N-6-22, the City of Imperial is required to assure that all contractors doing business with the City of Imperial are in compliance with economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as sanctions imposed under state law, if any. Please execute this document to verify current compliance of contractor with Executive Order N-6-22 and to ensure that this project will be in compliance with Executive Order N-6-22.

NOTICE: Having conducted a good faith review, I attest that the contractor submitting this bid is in compliance with the economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as sanctions imposed under state law, if any. Further, I attest that I am aware of Executive Order N-6-22 and agree monitor the project to ensure the project remains in compliance with Executive Order N-6-22.

Contractor's Signature below:

Note that responses may be subject to disclosure under the California Public Records Act. Accordingly, it is within the discretion of the respondent to determine what information to provide. Additionally, please do not include any confidential information or disclosures that could pose security risks.

BID FORM

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

BID 2025-01

To: City Of Imperial
Public Works Department
420 South Imperial Avenue
Imperial, California 92251

In response to the Invitation for Bids, the undersigned Bidder hereby proposes to furnish all labor, material, equipment and services and perform and complete all work required for the **Manhole and Lift Station Rehabilitation and New Manhole Installation** Project as described in the Plans and Specifications.

Performance shall include all work necessary to complete the Project in strict accordance with the Contract and for the price(s) to be specified by the Bidder below, including all applicable taxes.

Bidder certifies that it has examined and is fully familiar with all of the provisions of the Invitation for Bids and any Addenda thereto; that it is submitting this Bid in strict accordance with the Instructions to Bidders; and that it has carefully reviewed the accuracy of all statements attached to this Bid.

Bidder certifies that it has visited and examined the work site (Optional), and is satisfied with the nature and location of all work, the general and local conditions to be encountered in the performance of the work, the requirements of the Contract and all other matters which can in any way affect the work or the cost thereof. Bidder further certifies that Bidder has performed such tests deemed necessary for the preparation of this bid.

Bidder agrees that this Bid constitutes a firm offer to the City which cannot be withdrawn by Bidder for 60 calendar days from the date of actual opening of bids. If awarded the Contract, Bidder agrees to execute and deliver to the City within 10 calendar days after receipt of City's Notice of Award, the applicable Construction Contract form and the required Payment Bond, Certificates of Insurance, and any other required Contract Documents.

BIDDING SCHEDULE

MANHOLE AND LIFT STATION REHABILIATION AND NEW MANHOLE INSTALLATION

CITY OF IMPERIAL

BID SCHEDULE I

Item No.	Description	Qty [1]	Unit	Unit Bid Price*	Bid Extensions*
101	Mobilization (all equipment, tools, and staff), Insurance, Bonds, Preconstruction Video, and Demobilization[2]	1	LS	$_____	$_____
102	Furnish, install, and maintain traffic control, including preparing traffic control plans and Encroachment Permits for in-place manhole rehabilitations for approval by City of Imperial.	1	LS	$_____	$_____
103	Sewer manhole rehabilitation (MH ID 28, 42, 51, 54, 55, 56, 58, 59, 60, 345, 346, 347, 348, 349, 350, 1022, 1023, 1028, 1102 & 1142), including protection of existing flow channel, internal flow through by-pass (as required), manhole bench restoration, replacement of manhole frame and cover per City Std. Det. No. 200; associated asphalt repair, installing CIPL per Section 09872 or epoxy liner per Section 09875, complete in place.	20	EA	$_____	$_____
104	Field orders for appropriate modifications to scope made by Engineer and Owner for mutually agreed upon prices with the Contractor	1	LS	$25,000	$25,000

Total Bid Schedule I $_____*

(Sum of Extension Nos. 101 thru 104) (Figures)

TOTAL BID PRICE FOR BID SCHEDULE I_____

_____ DOLLARS

(DOLLAR AMOUNT IN WRITTEN FORM)

[1] Quantities (except for "Lump Sum:" item numbers) are estimated and are for the purpose of comparing bid only. Payment will be based upon actual quantities furnished, installed or constructed in accordance with the Contract Documents.

* The above prices include any amount payable by the Owner for taxes by reason of this contract.

[2] Payment shall not exceed 5% of the total for Bid Schedule I.

BID SCHEDULE II

Item No.	Description	Qty [1]	Unit	Unit Bid Price*	Bid Extensions*
201	Removal and disposal of 48" dia. Manhole ID Nos. 1024, 1025, 1026, 1027 and CO-60.	4	EA	$_____	$_____
202	Removal and disposal of existing 60" dia. manholes (Manhole ID No. 359 and two unnumbered manholes) and cutting of existing 21" dia. gravity sewer pipe as indicated on Sheet No. 3, Detail No. 1 of the Contract Drawings.	3	EA	$_____	$_____
203	Furnish and install new 48" dia. Manholes over ex. gravity sewer per City of Imperial Std. Det. No. 200 in the place of Manhole ID Nos. CO-60, 1024, 1025, 1026, and 1027, including sewer by-pass (as required).	5	EA	$_____	$_____
204	Furnish and install new 72" dia. Manhole w/eccentric flat top over ex. 21" sewer line to the north of existing Manhole No. 359 as shown on Sheet No. 3, per City of Imperial Std. Det. No. 200, including internal flow through by-pass (as required).	1	EA	$_____	$_____
205	Furnish and install new 48" dia. Manhole per City of Imperial Std. Det. No. 200 for three (3) locations along Barioni Boulevard indicated on Sheet No. 9 over the existing gravity sewer, including internal flow through by-pass (as required).	3	EA	$_____	$_____
206	Preparation and Implementation of Sewage Spill Containment Plan and External Sewer Bypass Plan for manholes to be removed and new manhole installation as deemed necessary by the Contractor and per Section 01350 of the specifications.	1	LS	$_____	$_____

[1] Quantities (except for "Lump Sum:" item numbers) are estimated and are for the purpose of comparing bid only. Payment will be based upon actual quantities furnished, installed or constructed in accordance with the Contract Documents.

* The above prices include any amount payable by the Owner for taxes by reason of this contract.

Item No.	Description	Qty [1]	Unit	Unit Bid Price*	Bid Extensions*
207	Furnish, install, and maintain traffic control for existing manhole removal and new manhole construction, including preparing traffic control plans and Encroachment Permits for approval by City of Imperial.	1	LS	$_____	$_____
208	Excavation, trench sheeting, shoring, bracing, spoils handling, backfilling, pavement surface and structural section repair for existing manhole removal and new manhole installations (9 EA).	1	LS	$_____	$_____
209	Dewatering of excavations as required, including handling of water into the excavation.	1	LS	$_____	$_____
210	Furnish and install 8-inch PVC C-900 (CL 165) force main pipe as indicated on Detail No. 1 on Sheet No. 3	67	LF	$_____	$_____
211	Furnish and install 12-inch PVC C-900 (CL 165) force main pipe as indicated on Detail No. 1 on Sheet No. 3	75	LF	$_____	$_____
212	Potholing of existing utilities prior to construction.	1	LS	$_____	$_____
213	Field orders for appropriate modifications to scope made by Engineer and Owner for mutually agreed upon prices with the Contractor.	1	LS	$50,000	$50,000

Total Bid Schedule II $_____ *

(Sum of Extension Nos. 201 thru 213) (Figures)

TOTAL BID PRICE FOR BID SCHEDULE II_____

_____

DOLLARS

_____

(DOLLAR AMOUNT IN WRITTEN FORM)

[1] Quantities (except for "Lump Sum:" item numbers) are estimated and are for the purpose of comparing bid only. Payment will be based upon actual quantities furnished, installed or constructed in accordance with the Contract Documents.

* The above prices include any amount payable by the Owner for taxes by reason of this contract.

BID SCHEDULE III

Item No.	Description	Qty.[1]	Unit	Unit Bid Price*	Bid Extension*
301	Isolation of Cross Street wetwell, temporary sewage bypass of about 500 gpm, surface preparation and coating of wetwell in accordance with Section 09875, and all other work, as described in the contract documents.	1	LS	$_____	$_____
302	Preparation and Implementation of Sewage Spill Containment Plan and External Sewer Bypass Plan for Cross St Lift Station as deemed necessary by the Contractor and as described in Section 02250 of the specifications.	1	LS	$_____	$_____
303	Force Account	1	LS	$20,000	$20,000

Total Bid Schedule III $_____*
(Sum of Extension Nos. 301 thru 303) (Figures)

TOTAL BID PRICE FOR BID SCHEDULE III_____

_____

_____ DOLLARS
(DOLLAR AMOUNT IN WRITTEN FORM)

[1] Quantities (except for "Lump Sum:" item numbers) are estimated and are for the purpose of comparing bid only. Payment will be based upon actual quantities furnished, installed or constructed in accordance with the Contract Documents.

* The above prices include any amount payable by the Owner for taxes by reason of this contract.

PROPOSAL
BIDDING SHEET SUMMARY

(to be filled in by Bidder)

TOTAL BID PRICE FOR BID SCHEDULE I (Nos. 101 thru 104) $ _____ *

TOTAL BID PRICE FOR BID SCHEDULE II (Nos. 201 thru 213) $ _____ *

TOTAL BID PRICE FOR BID SCHEDULE III (Nos. 301 thru 303) $ _____ *

TOTAL BID PRICE FOR SCHEDULES I, II, and III $ _____ *

_____

_____

_____ DOLLARS

(DOLLAR AMOUNT IN WRITTEN FORM)

The undersigned agrees that these Proposal/Bid Forms constitute a firm offer to the Owner which cannot be withdrawn for the number of Calendar Days indicated in the Notice Inviting Bids from and after the bid opening date, or until a Contract for the Work is fully executed by the Owner and a third party, whichever is earlier. The undersigned also agrees that if there is a discrepancy between the written amount of the Bid Price and the numerical amount of the Bid Price, the written amount shall govern.

Acknowledgement of reading above statement:

By: _____ _____
Signature **Date**

* Prices include any amount payable by the City for taxes by reason of the Contract

ATTACHMENTS

Attached are the following forms which have been completed by Bidder and made a part of this bid:

1. List of Proposed Subcontractors;

2. Noncollusion Affidavit;

3. Contractor's Certificate Regarding Workers' Compensation

ADDENDA

Bidder also acknowledges receipt of the following Addenda, which Addenda have been considered by Bidder in submitting this Bid (if none, state "None"):

Addenda Nos. _____

CONTRACTOR'S LICENSE

Bidder certifies that Bidder is currently licensed under the California State Contractor's License Law as follows:

Contract License Number	Name of Licensee	Type of License	Issue and Expiration date

COMPLETION TIME

The Project, including its respective components, must be substantially completed within ***One Hundred Eighty (180) Calendar*** days after the notice to proceed. Substantial completion is defined in the Special Requirements. Bidder certifies that it can complete the Project within this time period.

Submitted by,

BIDDER'S NAME:

_____

By: _____

Title :_____

BIDDER'S BUSINESS ADDRESS:

_____

_____

BIDDER’S TELEPHONE AND FAX NUMBERS:

_____

_____

IF BIDDER IS A CORPORATION:

State and date of incorporation

_____

IF A PARTNERSHIP OR JOINT VENTURE:

Full names of all partners or joint venturers (attach additional pages if necessary)

_____

_____

DIRECTIONS FOR SUBMITTING BIDS:

1. The envelope containing the original of this Bid Form with all attachments must be sealed, marked, and addressed as follows:

   a. Marked in the lower left-hand corner of the envelope:

      The City of Imperial**, Manhole and Lift Station Rehabilitation and New Manhole Installation – BID NO. 2025-01**

   b. Addressed to:

      Jillian Mehdipour, Public Records Analyst
      City of Imperial
      420 South Imperial Avenue
      Imperial, CA 92251

LIST OF PROPOSED SUBCONTRACTORS

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation
Bid 2025-01

NAME OF BIDDER: _____

If awarded the Contract, Bidder shall employ the following subcontractors who will perform work or labor, or render service to the Bidder in or about the project, in an amount in excess of 0.5% of the bid lump sum listed on the Bid Form. If no subcontract work is proposed, other than within the 0.5% limit set forth, Bidder shall so state. (Attach additional pages if necessary.)

Names and Addresses of Subcontractors	Description of Work to be Subcontracted	DIR Registration Number

Bidder _____ Date _____
Firm Name

Signed by _____ _____
Name Title

BID BOND

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

(Not required if Certified Check of Cashier's Check accompanies Bid)

KNOW ALL PERSONS BY THESE PRESENTS: That we_____
as Principal, and _____
as Surety, are held and firmly bound unto the City of Imperial, in the sum of $_____
[10% OF THE TOTAL AMOUNT OF THE BID] for the payment of which sum we hereby bind ourselves, our successors, heirs, executors, and administrators, jointly and severally, firmly as set out more fully herein.

The condition of the foregoing obligation is such that, whereas the above principal is about to submit to the City of Imperial a bid for the performance of the work for the above project in compliance with the plans and specifications therefore and pursuant to a published notice inviting bids.

Now, if the bid of the principal is accepted and the work awarded to the principal by the City of Imperial, and if the principal shall fail or neglect to enter into a contract, therefore, in accordance with the provision of said bid and the accompanying Instructions to Bidders and to furnish adequate faithful performance and labor and material surety bonds and certificates of insurance to the satisfaction of the City of Imperial; then the total sum guaranteed by this bond is forfeited to the City of Imperial as liquidated damages.

In the event suit is brought by the City of Imperial and judgment is entered in its favor, the surety shall pay all costs incurred by the City in such suit, including reasonable attorneys' fees to be fixed by the Court, in addition to the above sum.

WITNESS our hands and seals this _____ day of _____, 2025.

(Seal)

By_____ Name/Title_____

(Seal)

NOTE: Signatures of those executing for the surety must be properly acknowledged.

Bond No. _____

NONCOLLUSION AFFIDAVIT

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

(To Be Executed by Bidder and Submitted With Bid)

State of California) ss.
County of _____)

_____, being first duly sworn, deposes and says that he or she is _____ of _____, 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 a 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 of 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.

Executed this ____day of _____, 2025 at _____.

Signature of:
Bidder, if the Bidder is an Individual,
Partner, if the Bidder is a Partnership,
Officer, if the Bidder is a Corporation
Name_____
Title_____

GENERAL CONDITIONS

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

1.0 PARAGRAPH HEADINGS AND DEFINITIONS

1.1 Paragraph headings in this Contract are for convenience only, and are not to be construed to define, limit, expand, interpret, or amplify the provisions of this Contract. When initially capitalized in this Contract, or amendments hereto, the following words or phrases shall have the meanings specified:

1.2.1 Adjusted Contract Price - The initial Contract Price adjusted for change orders, Force Majeure, termination for convenience or any other reason permitted by this Contract.

1.2.2 Best Efforts - Those efforts which a competent, experienced, and prudent contractor would use to perform and complete the requirements of this Contract in a timely manner, exercising the degree of care, competence, and prudence customarily imposed on a contractor performing similar work in the State of California.

1.2.3 Contract - This agreement, including all referenced documents, between the City of Imperial and Contractor for the performance of the Work, and subsequent written modifications executed by the City and Contractor.

1.2.4 Contractor - The legal entity which executes this Contract with the City to perform the Work.

1.2.5 Contract Manager- The title of the person designated by the City to be its representative with authority to act for and bind the City.

1.2.6 Documentation - Drawings, plans, models, studies, surveys, specifications, reports, design analysis, data, policies, information, work product, proposals, and any other similar documents or material prepared or used in connection with the Work.

1.2.7 Final Completion Date - The date when the Work is completed in accordance with the Contract, including all Punch List Items.

1.2.8 Force Majeure - An act of God, or event beyond the control of a party, including an act or omission of government, act or omission of civil or military authority, strike or lockout, act of a public enemy, war, blockade,

insurrection, riot, epidemic, landslide, earthquake, fire, storm, lightning, flood, washout, or civil disturbance which could not have been avoided through the exercise of reasonable care and prudence.

1.2.9 Price or Contract Price - The total sum to be paid by the City to Contractor for performance of the Work.

1.2.10 Project - Contractor shall furnish all labor, material, equipment and services and perform and complete all work required as per the project specifications.

1.2.11 Project Engineer or Coordinator - The title of the person designated by the City to be its representative with authority to act for the City regarding engineering and construction matters.

1.2.12 Punch List Items - Items of work comprising a part of the Work as set out on a Punch List prepared by the City, with said items to be completed by Contractor consistent with the terms and conditions and scope of the Contract.

1.2.13 Schedule - The time frame for the construction project as established by the City and/or the Contract Documents.

1.2.14 Site - The area where Contractor shall perform the Work.

1.2.15 Work or Scope of Work - All obligations undertaken by Contractor pursuant to the Contract.

2.0 SCOPE OF WORK

Contractor shall perform and complete the Work in a safe manner, and shall supply all personnel, tools, equipment, and material to complete the Work. The scope of work is further established in the following documents: Plans and Specifications**.**

3.0 SCHEDULE

Contractor shall perform and substantially complete the Work within ***Sixty (60) Calendar*** days after the date in the notice to proceed. After execution of this Contract, Contractor shall develop and submit for City's approval, a detailed construction schedule designed to meet City's project schedule. Any abnormal expenses such as premium time or overtime incurred by Contractor to meet the detailed schedule, unless specifically directed or approved by the City in writing, shall be borne by Contractor.

4.0 COMPENSATION AND PAYMENT

The City shall compensate Contractor through progress payments according to percentage of completion and/or milestones, as determined by the City Contract Administrator or as agreed hereafter by the parties. The City shall not be obligated to make final payment(s) until Contractor has submitted to the City written evidence that the Work has been fully completed in accordance with this Contract, and satisfactory evidence that all of Contractor's indebtedness in connection with the Work has been paid or written releases provided of all potential liens arising out of this Contract. Upon receipt of such evidence, the City will record a Notice of Completion in Imperial County. City shall retain 5% of the Contract Price. Contractor may substitute securities or provide an escrow agreement pursuant to California Public Contracts Code section 22300.

5.0 INSURANCE AND BONDS

5.1 Prior to the beginning of and throughout the duration of the Work, CONTRACTOR and its subcontractors shall maintain insurance in conformance with the requirements set forth below. CONTRACTOR will use existing coverage to comply with these requirements. If that existing coverage does not meet the requirements set forth herein, CONTRACTOR agrees to amend, supplement or endorse the existing coverage to do so.

CONTRACTOR acknowledges that the insurance coverage and policy limits set forth in this section constitute the minimum amount of coverage required. Any insurance proceeds available to CONTRACTOR or its subcontractors in excess of the limits and coverage identified in this Agreement and which is applicable to a given loss, claim or demand, will be equally available to AGENCY.

A. CONTRACTOR shall provide the following types and amounts of insurance:

Without limiting CONTRACTOR’s indemnification of AGENCY, and prior to commencement of Work, CONTRACTOR shall obtain, provide and maintain at its own expense during the term of this Agreement, policies of insurance of the type and amounts described below and in a form satisfactory to AGENCY.

5.1.1 General Liability Insurance – CONTRACTOR shall commercial general liability insurance with coverage at least as broad as Insurance Services Office from CG 00 01, in an amount not less than $1,000,000 per occurrence and $2,000,000 general aggregate, for bodily injury, personal injury, and property damage, and a $2,000,000 completed operations aggregate. The policy must include contractual liability that has not been amended. Any endorsement restricting standard ISO “insured contract” language will not be accepted.

5.1.2 Automobile liability insurance. CONTRACTOR shall maintain automobile insurance at least as broad as Insurance Services Office form CA 00 01 covering bodily injury and property damage for all activities of the CONTRACTOR arising out of or in connection with Work to be performed under this Agreement, including coverage for any owned, hired, non-owned or rented vehicles, in an amount not less than $1,000,000 combined single limit for each accident.

5.1.3 Umbrella or excess liability insurance. [Optional depending on limits required] CONTRACTOR shall obtain and maintain an umbrella or excess liability insurance that will provide bodily injury, personal injury and property damage liability coverage at least as broad as the primary coverages set forth above, including commercial general liability, automobile liability, and employer's liability. Such policy or policies shall include the following terms and conditions:

- A drop-down feature requiring the policy to respond in the event that any primary insurance that would otherwise have applied proves to be uncollectable in whole or in part for any reason;
- Pay on behalf of wording as opposed to reimbursement;
- Concurrency of effective dates with primary policies;
- Policies shall "follow form" to the underlying primary policies; and
- Insureds under primary policies shall also be insureds under the umbrella or excess policies.

5.1.4 Workers' compensation insurance. CONTRACTOR shall maintain Workers' Compensation Insurance (Statutory Limits) and Employer's Liability Insurance (with limits of at least $1,000,000) for CONTRACTOR's employees in accordance with the laws of the State of California, Section 3700 of the Labor Code. In addition, CONTRACTOR shall require each subcontractor to similarly maintain Workers' Compensation Insurance and Employer's Liability Insurance in accordance with the laws of the State of California, Section 3700 for all of the subcontractor's employees.

CONTRACTOR shall submit to AGENCY, along with the certificate of insurance, a Waiver of Subrogation endorsement in favor of AGENCY, its officers, agents, employees and volunteers.

5.1.5 Pollution liability insurance. Environmental Impairment Liability Insurance shall be written on a CONTRACTOR's Pollution Liability form or other form acceptable to AGENCY providing coverage for liability arising out of sudden, accidental and gradual pollution and remediation. The policy limit shall be no less than $1,000,000 dollars per claim and in the aggregate. All activities contemplated in this Agreement shall be specifically scheduled on the policy as "covered operations." The policy shall provide

coverage for the hauling of waste from the project site to the final disposal location, including non-owned disposal sites.

5.1.6 Builder's risk insurance. Upon commencement of construction and with approval of AGENCY, CONTRACTOR shall obtain and maintain builder's risk insurance for the entire duration of the Project until only the AGENCY has an insurable interest. The Builder's Risk coverage shall include the coverages as specified below.

The named insureds shall be CONTRACTOR and AGENCY, including its officers, officials, employees, and agents. All Subcontractors (excluding those solely responsible for design Work) of any tier and suppliers shall be included as additional insureds as their interests may appear. CONTRACTOR shall not be required to maintain property insurance for any portion of the Project following transfer of control thereof to AGENCY. The policy shall contain a provision that all proceeds from the builder's risk policy shall be made payable to the AGENCY. The AGENCY will act as a fiduciary for all other interests in the Project.

Policy shall be provided for replacement value on an "all risk" basis for the completed value of the project. There shall be no coinsurance penalty or provisional limit provision in any such policy. Policy must include: (1) coverage for any ensuing loss from faulty workmanship, Nonconforming Work, omission or deficiency in design or specifications; (2) coverage against machinery accidents and operational testing; (3) coverage for removal of debris, and insuring the buildings, structures, machinery, equipment, materials, facilities, fixtures and all other properties constituting a part of the Project; (4) Ordinance or law coverage for contingent rebuilding, demolition, and increased costs of construction; (5) transit coverage (unless insured by the supplier or receiving contractor), with sub-limits sufficient to insure the full replacement value of any key equipment item; (6) Ocean marine cargo coverage insuring any Project materials or supplies, if applicable; (7) coverage with sub-limits sufficient to insure the full replacement value of any property or equipment stored either on or off the Site or any staging area. Such insurance shall be on a form acceptable to Agency to ensure adequacy of terms and sublimits and shall be submitted to the Agency prior to commencement of construction.

5.2 Other provisions or requirements

5.2.1 Proof of insurance. CONTRACTOR shall provide certificates of insurance to AGENCY as evidence of the insurance coverage required herein, along with a waiver of subrogation endorsement for workers' compensation. Insurance certificates and endorsements must be approved by AGENCY's risk manager prior to commencement of performance. Current certification of insurance shall be kept on file with AGENCY at all times during the term

of this contract. AGENCY reserves the right to require complete, certified copies of all required insurance policies, at any time.

5.2.2 Duration of coverage. CONTRACTOR shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property, which may arise from or in connection with the performance of the Work hereunder by CONTRACTOR, his agents, representatives, employees or subcontractors. CONTRACTOR must maintain general liability and umbrella or excess liability insurance for as long as there is a statutory exposure to completed operations claims. AGENCY and its officers, officials, employees, and agents shall continue as additional insureds under such policies.

5.2.3 Primary/noncontributing. Coverage provided by CONTRACTOR shall be primary and any insurance or self-insurance procured or maintained by AGENCY shall not be required to contribute with it. The limits of insurance required herein may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of AGENCY before the AGENCY's own insurance or self-insurance shall be called upon to protect it as a named insured.

5.2.4 Products/completed operations coverage. Products/completed operations coverage shall extend a minimum of three (3) years after project completion. Coverage shall be included on behalf of the insured for covered claims arising out of the actions of independent contractors. If the insured is using subcontractors, the Policy must include work performed "by or on behalf" of the insured. Policy shall contain no language that would invalidate or remove the insurer's duty to defend or indemnify for claims or suits expressly excluded from coverage. Policy shall specifically provide for a duty to defend on the part of the insurer. The AGENCY, its officials, officers, agents, and employees, shall be included as additional insureds under the Products and Completed Operations coverage.

5.2.5 Agency's rights of enforcement. In the event any policy of insurance required under this Agreement does not comply with these requirements or is canceled and not replaced, AGENCY has the right but not the duty to obtain the insurance it deems necessary and any premium paid by AGENCY will be promptly reimbursed by CONTRACTOR or AGENCY will withhold amounts sufficient to pay premium from CONTRACTOR payments. In the alternative, AGENCY may cancel this Agreement.

5.2.6 Acceptable insurers. All insurance policies shall be issued by an insurance company currently authorized by the Insurance Commissioner to transact business of insurance or is on the List of Approved Surplus Line Insurers

in the State of California, with an assigned policyholders' Rating of A- (or higher) and Financial Size Category Class VII (or larger) in accordance with the latest edition of Best's Key Rating Guide, unless otherwise approved by the AGENCY's risk manager.

5.2.7 Waiver of subrogation. All insurance coverage maintained or procured pursuant to this agreement shall be endorsed to waive subrogation against AGENCY, its elected or appointed officers, agents, officials, employees and volunteers or shall specifically allow CONTRACTOR or others providing insurance evidence in compliance with these specifications to waive their right of recovery prior to a loss. CONTRACTOR hereby waives its own right of recovery against AGENCY, and shall require similar written express waivers and insurance clauses from each of its subconsultants.

5.2.8 of contract provisions (non estoppel). CONTRACTOR acknowledges and agrees that any actual or alleged failure on the part of the AGENCY to inform CONTRACTOR of non-compliance with any requirement imposes no additional obligations on the AGENCY nor does it waive any rights hereunder.

5.2.9 Requirements not limiting. Requirements of specific coverage features or limits contained in this Section are not intended as a limitation on coverage, limits or other requirements, or a waiver of any coverage normally provided by any insurance. Specific reference to a given coverage feature is for purposes of clarification only as it pertains to a given issue and is not intended by any party or insured to be all inclusive, or to the exclusion of other coverage, or a waiver of any type. If the CONTRACTOR maintains higher limits than the minimums shown above, the AGENCY requires and shall be entitled to coverage for the higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the AGENCY.

5.2.10 Notice of cancellation. CONTRACTOR agrees to oblige its insurance agent or broker and insurers to provide to AGENCY with a thirty (30) day notice of cancellation (except for nonpayment for which a ten (10) day notice is required) or nonrenewal of coverage for each required coverage.

5.2.11 Additional insured status. General liability policies shall provide or be endorsed to provide that AGENCY and its officers, officials, employees, agents, and volunteers shall be additional insureds under such policies. This provision shall also apply to any excess/umbrella liability policies.

5.2.12 Prohibition of undisclosed coverage limitations. None of the coverages required herein will be in compliance with these requirements if they

include any limiting endorsement of any kind that has not been first submitted to AGENCY and approved of in writing.

5.2.13 Separation of insureds. A severability of interests provision must apply for all additional insureds ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the insurer's limits of liability. The policy(ies) shall not contain any cross-liability exclusions.

5.2.14 Pass through clause. CONTRACTOR agrees to ensure that its subconsultants, subcontractors, and any other party involved with the project who is brought onto or involved in the project by CONTRACTOR, provide the same minimum insurance coverage and endorsements required of CONTRACTOR. CONTRACTOR agrees to monitor and review all such coverage and assumes all responsibility for ensuring that such coverage is provided in conformity with the requirements of this section. CONTRACTOR agrees that upon request, all agreements with consultants, subcontractors, and others engaged in the project will be submitted to AGENCY for review.

5.2.15 Agency's right to revise requirements. The AGENCY reserves the right at any time during the term of the contract to change the amounts and types of insurance required by giving the CONTRACTOR a ninety (90) day advance written notice of such change. If such change results in substantial additional cost to the CONTRACTOR, the AGENCY and CONTRACTOR may renegotiate CONTRACTOR's compensation.

5.2.16 Self-insured retentions. Any self-insured retentions must be declared to and approved by AGENCY. AGENCY reserves the right to require that self-insured retentions be eliminated, lowered, or replaced by a deductible. Self-insurance will not be considered to comply with these specifications unless approved by AGENCY.

5.2.17 Timely notice of claims. CONTRACTOR shall give AGENCY prompt and timely notice of claims made or suits instituted that arise out of or result from CONTRACTOR's performance under this Agreement, and that involve or may involve coverage under any of the required liability policies.

5.2.18 Additional insurance. CONTRACTOR shall also procure and maintain, at its own cost and expense, any additional kinds of insurance, which in its own judgment may be necessary for its proper protection and prosecution of the Work.

5.3 Bonds - Contractor shall furnish the following surety bond with surety acceptable to City.

5.3.1 If the successful bid is in excess of $25,000, the successful bidder shall be required to post a payment bond in the amount of the bid in accordance with California Civil Code Section §3247. This bond shall give labor and material suppliers direct right of action against the surety. Contractor shall furnish the Payment bond on a form acceptable by the City.

5.3.2 Successful Bidder shall post a Performance Bond in the amount of 100% of the Contract Price by a corporate surety authorized and admitted to issue such surety bond in the State of California.

5.4 Sureties

5.4.1 Should any surety upon any bond furnished in connection with this Contract become unacceptable to the City, or should any such surety fail to furnish reports as to its financial condition as may be requested by the City at any time while the bond is in force, Contractor shall promptly furnish such additional surety or alternate bond at Contractor's expense as may be required by the City to protect the interests of the City or of persons supplying labor or material in the performance of this Contract.

5.4.2 Contractor shall keep the sureties informed as to all material matters or changes affecting the project and this Contract.

6.0 INDEMNITY, DEFENSE AND HOLD HARMLESS AGREEMENT

CONTRACTOR shall indemnify, defend with legal counsel approved by AGENCY, and hold harmless AGENCY, its officers, officials, employees and volunteers from and against all liability, loss, damage, expense, cost (including without limitation reasonable legal counsel fees, expert fees and all other costs and fees of litigation) of every nature arising out of or in connection with CONTRACTOR's negligence, recklessness or willful misconduct in the performance of work hereunder or its failure to comply with any of its obligations contained in this Agreement, except such loss or damage which is caused by the sole or active negligence or willful misconduct of the AGENCY. Should conflict of interest principles preclude a single legal counsel from representing both AGENCY and CONTRACTOR, or should AGENCY otherwise find CONTRACTOR’s legal counsel unacceptable, then CONTRACTOR shall reimburse the AGENCY its costs of defense, including without limitation reasonable legal counsel fees, expert fees and all other costs and fees of litigation. The CONTRACTOR shall promptly pay any final judgment rendered against the AGENCY (and its officers, officials, employees and volunteers) with respect to claims determined by a trier of fact to have been the result of the CONTRACTOR’s negligent, reckless or wrongful performance. It is expressly understood and agreed that the foregoing provisions are intended to be as broad

and inclusive as is permitted by the law of the State of California and will survive termination of this Agreement.

CONTRACTOR obligations under this section apply regardless of whether such claim, charge, damage, demand, action, proceeding, loss, stop notice, cost, expense, judgment, civil fine or penalty, or liability was caused in part or contributed to by an Indemnitee. However, without affecting the rights of AGENCY under any provision of this agreement, CONTRACTOR shall not be required to indemnify and hold harmless AGENCY for liability attributable to the active negligence of AGENCY, provided such active negligence is determined by agreement between the parties or by the findings of a court of competent jurisdiction. In instances where AGENCY is shown to have been actively negligent and where AGENCY'S active negligence accounts for only a percentage of the liability involved, the obligation of CONTRACTOR will be for that entire portion or percentage of liability not attributable to the active negligence of AGENCY.

7.0 GENERAL REQUIREMENTS

7.1 Physical Site Conditions - Contractor shall satisfy itself concerning the nature and location of the Work, the general and local conditions, and other restrictions affecting the Work. The failure of Contractor to acquaint itself with any applicable conditions and restrictions shall not relieve it from the responsibility for properly estimating either the difficulties or the costs of successfully performing the Work and completing this Contract, and shall not be grounds for adjusting either the price or the schedule.

7.2 Independent Contractor - Contractor represents that it is fully experienced and properly qualified to perform the Work, is properly licensed in the state where the Work is performed, and is equipped, organized, and financed to perform such Work. The Contractor or a subcontractor of the Contractor shall act as an independent contractor and not as an agent of the City in performing the Work and duties of this Contract.

7.3 Performance Requirements

7.3.1 Best Efforts - Contractor shall use Best Efforts in the performance of this Contract. Contractor shall, to the best of its abilities, cooperate with the City to enable the successful completion of the Work according to the terms of this Contract including, but not limited to, commitment of additional resources, material and personnel, if requested by the City, to assure that the Work is properly performed on time and completed in accordance with the provisions of this Contract.

7.3.2 Quality of Equipment Supplied by Contractor - Contractor shall provide and use only such construction equipment and facilities as are capable of

producing the quality and quantity of Work required by this Contract within the time specified herein. Upon written notice from the City or its designated representative, Contractor shall promptly remove from the Site all unsatisfactory construction equipment and facilities furnished or provided by Contractor.

7.4 Precedence of Operating Facilities - Continuity of service of the operating facilities is of the essence. In the event of a conflict of interest between any and all Work and any operating facilities, the operating facilities shall have precedence.

7.5 Responsibility for Work and Material - Contractor shall be responsible for and shall bear all risk of loss of or damage to Work in progress, all Work-related material and equipment delivered to the Site or in transit under Contractor control, until completion and final acceptance of the Work.

8.0 CHANGES

8.1 General - Notwithstanding any other provisions of this Contract to the contrary, the City reserves the right for any reason, without invalidating this Contract or without notice to sureties, to make any changes in the Work including the performance of additional services. Such change shall be made in writing by a City representative, except for emergency conditions, where such change shall be confirmed in writing.

8.2 Price of Change - All change orders shall be accepted by Contractor pursuant to the terms contained in this Contract and Contractor shall promptly proceed to implement such change. Should any change result in an increase or decrease in Price or a change in Schedule, Contractor shall, within 10 calendar days following receipt of the written change order, submit to the City a written proposal which illustrates the price for Contractor to perform the change and the proposed adjustment to the Schedule. Sufficient detail shall be given in the proposal to permit a thorough analysis and evaluation. No claim shall be made by Contractor based solely on the number or volume of changes made.

8.3 Price Adjustment - The price of such change will be agreed upon by the parties. If the parties cannot agree, an adjustment will be determined by the City on the basis of Contractor's reasonable expenditures and savings, including a reasonable allowance for overhead and profit.

8.4 Delegation - Only a City officer, or the designated City representative concerning the Project, may issue and sign written change orders on behalf of the City.

8.5 Contractor Objections - In the event a change requested by the City would, in the opinion of Contractor, affect Contractor’s ability to meet its obligation under the Contract, Contractor will deliver to the City, within 5 calendar days of receipt of

the change request, written notice of the fact before accepting such change request. If the City feels such a change is warranted, an appropriate modification to the Contract shall be made before the Contractor is required to proceed.

8.6 Changes by Contractor - The Contractor may propose changes in the specifications for reasons of improved quality, delivery or economy provided such changes do not impair quality or delivery. Such changes must be approved in writing by the City prior to implementation. Approval shall be at the discretion of the City.

9.0 WARRANTY

9.1 Performance and Workmanship - Contractor warrants that the workmanship performed by Contractor and its subcontractors will be performed in accordance with Best Efforts. The warranty period shall be for a period equal to 1 year after the Final Completion Date.

10.0 RETENTION AND ACCEPTANCE OF MATERIAL AND WORKMANSHIP

10.1 Retention - The City shall retain 5% of the Contract price. The retention shall be released (with the exception of 150% of any disputed amount) within 35 days after the date of final completion of the work. Contractor may substitute securities in place of the retained funds withheld by the City. Alternatively, an escrow agreement, in the form prescribed under Ca. Pub. Cont. Code Section 22300, may be used by Contractor.

10.2 Inspection of Work - All Work and materials, both before and after installation, shall be subject to City's inspection, and any deficiencies detected by the City will be addressed by Contractor immediately. The City may take inventory and inspect the Work and witness tests thereon at all reasonable times and places during the progress of the Work. If Contractor covers all or any portion of the Work prior to any inspection or tests as required by the Scope of Work, the cost of any necessary uncovering and replacing shall be borne by Contractor.

10.3 Notice of Completion

10.3.1 When Contractor, in its opinion, has completed the performance of the Work, it shall so notify the City in writing that the Work is completed and ready for final acceptance by the City. Within 10 calendar days after receipt of such written notice, the City shall inspect the Work and advise Contractor of its concurrence.

10.3.2 If the City advises Contractor that the Work is not satisfactorily completed, the City shall at the time of such notice, submit to Contractor, a Punch List of all additions and corrections necessary for the completion of this Contract.

10.3.3 Upon receipt of the Punch List, Contractor shall commence action with respect thereto at no cost to the City. All corrections shall be made within the time period given in the Contract as established in the Project Schedule. Upon completion of such Work, Contractor shall again notify the City in writing that the Work is completed and ready for final acceptance by the City. Within 10 calendar days after receipt of such written notice, the City shall inspect the Work and advise Contractor whether it concurs. The punch List process will continue until the Work is completed to the satisfaction of the City. Contractor shall be obligated to make good, correct or modify any rejected material or workmanship prior to final acceptance of the Work by the City.

10.3.4 If the City concurs that the Work has been completed satisfactorily, the City will record a Notice of Completion with the County of Imperial which will specify the Final Completion Date. Such Notice of Completion shall not be unreasonably withheld.

11.0 FORCE MAJEURE

In the event either party by reason of a Force Majeure is rendered unable to perform its duties under this Contract, then upon the party giving written notice of the particulars and estimated duration of Force Majeure to the other party within 5 calendar days after knowledge of the occurrence of the Force Majeure, the party may have the time for performance of its duties extended for the period equal to the time performance is delayed by the Force Majeure. The effects of the Force Majeure shall be remedied with all reasonable dispatch, and the party giving notice shall use Best Efforts to eliminate and mitigate all consequences. A Force Majeure for which notice has not been given shall be an unexcused delay.

12.0 DELAYS AND EXTENSION OF TIME

Time for performance may be extended by the City because of delays such as Force Majeure, changes, or suspension. Any such extension shall not be grounds for a claim by Contractor for damages or for additional compensation, except as specifically authorized in this Contract. In the event of delay in the performance of the Work not caused by the City or its representatives, whether or not the cause thereof is within the control of Contractor, the City shall be entitled to suspend the applicable portion of the scheduled payments for the period of such delay.

13. 0 TERMINATION FOR CONVENIENCE

13.1 General - The City may, at any time, terminate the Contract or any portion of the Work not then completed by giving Contractor written notice of termination. Upon receipt of notice of termination, Contractor, unless the notice requires

otherwise, shall (1) discontinue Work on the date and to the extent specified in the notice, except Work necessary to preserve and protect the Work in progress, (2) place no further orders or subcontracts for material, services, or supplies related to terminated Work, (3) make every reasonable effort to procure termination of all orders, subcontracts, and rental agreements to the extent they relate to performance of Work terminated upon terms satisfactory to the City, and (4) otherwise minimize costs and mitigate damages to the City .

13.2 Compensation - In the event of termination under this Section, there shall be an equitable adjustment to the Contract Price taking into account, among other things (1) decreases for Work not performed, (2) the cost of any work requested by the City from the date of termination.

14.0 TERMINATION FOR CAUSE; NOTICE AND CURE OF DEFAULT

14.1 General - The City may declare this Contract canceled for default by notifying Contractor in writing, should Contractor at any time (1) materially refuse or neglect to meet the Schedule(s), (2) refuse to supply sufficient and appropriately skilled workmen or equipment to perform the Work, (3) become insolvent or unable to meet its payroll or other current obligations.

14.2 Notice of Termination - Prior to termination for cause, the City shall give Contractor written notice describing such default in reasonable detail and demand that Contractor cure such default within 30 calendar days after receipt of such notice of default. If Contractor does not cure the default within 30 calendar days after its receipt of such notice or if the default cannot be cured within such 30 calendar day period and Contractor has not initiated action or proposed a plan within such 30 calendar day period to cure the default within a reasonable period which the City reasonably agrees will cure such default, then the City shall have the right to terminate this Contract.

15.0 LAWS AND REGULATIONS

Contractor and its employees shall at all times comply with all applicable laws, including those relating to wages, hours, discrimination, and safety (including CAL/OSHA).

16.0 EMPLOYEES

16.1 Prevailing Wage Law-

16.1.1 Not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which this Contract is to be performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in Chapter 1 (commencing with

Section 1720) Part 7, Division 2 of the Labor Code, shall be paid to all workers employed on this public work.

16.1.2 Should the prevailing wage rate be increased, decreased, or eliminated a corresponding adjustment shall be made to the Contract Price which shall reflect the effect of that change in or elimination of the prevailing wage rate.

16.2 Payroll Records -

16.2.1 Contractor and its subcontractors shall keep an accurate payroll record, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the Project.

16.2.2 The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of Contractor.

17.0 SAFETY REQUIREMENTS

17.1 General - Contractor shall implement the following general safety precautions:

17.1.1 Safe Work - Contractor shall carry out the Work in a safe manner. Contractor's site representative shall be knowledgeable of all applicable safety rules, regulations and practices that relate to the assigned work. If necessary, a qualified safety representative should be contracted to fulfill this requirement.

18.0 GOVERNING LAW AND VENUE

This Contract shall be interpreted in accordance with the substantive and procedural laws of the State of California.

19.0 AUTHORIZED REPRESENTATIVES AND NOTICES

19.1 Representatives - Prior to commencement of the Work, the City and Contractor shall each designate a representative authorized to act in behalf of each party and shall advise the other party in writing of the name, address and telephone number of such designated representative and shall inform the other party of any subsequent change in such designation.

19.2 Notice and Communications - All communications relating to the day to day activities under this Contract shall be exchanged between the representatives of the City and Contractor. All legal notices and communications required under or related to this Contract shall be in writing, and shall be delivered personally or

mailed by certified mail, postage prepaid, return receipt requested, to the representative of the City and Contractor identified below. Notice shall be effective on the date of delivery.

To the City:	To Contractor:
David Dale	_____
Public Services Director	
City of Imperial	_____
420 South Imperial Ave.	
Imperial, CA 92251	_____

A party may change or supplement the addresses given above, or designate additional addresses, for purposes of this Section by giving the other party written notice of the new address in the manner set forth above.

19.3 Unfair Business Practice Claims – In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the City 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 the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

19.4 Resolution of Claims – Claims of $375,000.00 or less shall be addressed as set forth in California Public Contracts Code §§20104, set seq. In general terms, said process contemplates a meet and confer procedure and non-binding mediation as a precursor to litigation.

19.5 Utilities Relocation – The provisions of Government Code Section 4215 are hereby incorporated by this reference. Said section provides, among other things, that the Contractor will be compensated for costs of locating, repairing damage not due to the failure of the Contractor 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. Contractor shall not be assessed liquidated damages for delay in completion of the Project when such delay was caused by the failure of the public agency or the owner of the utility to provide for removal or relocation of such utility facilities.

If Contractor discovers utility facilities not identified by City in the contract plans or specifications, Contractor shall immediately notify City and utility in writing.

20.0 ATTORNEYS FEES

If either party to this Contract shall bring any action, claim, appeal, or alternative dispute resolution proceedings, for any relief against the other, declaratory or otherwise, to enforce the terms of or to declare rights under this Contract (collectively, an Action), the losing party shall pay to the prevailing party a reasonable sum for attorneys' fees and costs incurred in bringing and prosecuting such Action and/or enforcing any judgment, order, ruling, or award (collectively, a Decision) granted therein. Any Decision entered in such Action shall provide for the recovery of attorneys' fees and costs incurred in enforcing such Decision. The court or arbitrator may fix the amount of reasonable attorneys' fees and costs on the request of either party. For the purposes of this paragraph, attorneys' fees shall include, without limitation, fees incurred in the following: (1) postjudgment motions and collection actions; (2) contempt proceedings; (3) garnishment, levy, and debtor and third party examinations; (4) discovery; and (5) bankruptcy litigation. "Prevailing party" within the meaning of this paragraph includes, without limitation, a party who agrees to dismiss an Action on the other party's payment of the sums allegedly due or performance of the covenants allegedly breached, or who obtains substantially the relief it seeks.

21.0 WAIVER

The failure of the City to insist upon strict performance of any of the terms and conditions of this Contract, or to exercise or delay the exercise of any rights or remedies provided by this Contract or by law, or the acceptance of Work or payment for Work shall not release Contractor from any of the responsibilities or obligations imposed by law or by this Contract and shall not be deemed a waiver of any right of the City to insist upon strict performance of this Contract. None of the provisions of the Contract shall be considered waived by either party except when such waivers are agreed upon in writing by the parties.

22.0 ASSIGNMENT

Contractor shall not assign the rights, nor delegate the duties, or otherwise dispose of any right, title, or interest in all or any part of this Contract, or assign any monies due or to become due to Contractor without the prior written consent of the City. Any such approved assignment or delegation shall be for the benefit of, and shall be binding on Contractor, assignee, and all future successors; and shall not relieve Contractor, assignee, or future successors of any duties or obligations. If the City approves any assignment of monies due or to become due to Contractor hereunder, such assignment shall not become effective until at least 30 calendar days after City’s approval.

23.0 ACCEPTANCE

The City will be deemed to have accepted Contractor's performance of the Work when the City officer or manager signing this Contract, or the designated representative of said officer or manager, records a Notice of Completion that the Work is accepted.

24.0 EXECUTION AND EFFECTIVE DATE

This Contract has been executed by the duly authorized officers of the parties and shall be effective as of the date that the **PROJECT CONTRACT EXECUTION DOCUMENT** is signed by the parties.

25.0 PRECAUTIONS ON THE JOB SITE

When the Work involves trenching of more than four feet in depth, Contractor shall promptly, and before the following conditions are disturbed, notify the City, in writing, of any:

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

25.2 Subsurface or latent physical conditions of Site differing from those indicated.

25.3 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.

Upon receipt of such notice, City 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, shall issue a change order under the procedures described in the contract.

In the event that a dispute arises between the City 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 Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the parties.

CERTIFICATE OF CONTRACTOR REGARDING WORKERS' COMPENSATION

The successful Bidder shall execute the following certificate:

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.

Dated: _____ Contractor

By_____

PROJECT CONTRACT EXECUTION DOCUMENT

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation
Bid 2025-01

DATE OF CONTRACT:

NAME AND ADDRESS OF CONTRACTOR:

The City of Imperial and Contractor named above hereby mutually agree to perform this Contract in strict accordance with the following designated documents which were a part of the bid or required to be submitted under the Invitation for Bids as a part of the Contract Documents and which are hereby incorporated into this Contract by reference:

CONTRACT DOCUMENTS

1. Notice to Bidders;

2. Instructions to Bidders;

3. Bid Form, with Required Attachments;

4. General Conditions;

5. Specifications;

6. All Addenda to the Contract Documents;

7. Payment and Performance Bonds Submitted by Contractor;

8. Certificates of Insurance Submitted by Contractor; and

9. Certificate Regarding Workers' Compensation.

This Contract, together with all documents and exhibits incorporated herein by reference, constitutes the entire agreement of the parties. All prior or contemporaneous verbal agreements between the parties are revoked by this Contract.

In the event any section, sentence, clause or phrase of the Contract is adjudicated by a court of last resort, and of competent jurisdiction, to be invalid or

illegal, the remainder of this Contract shall be unaffected by such adjudication, and all other provisions of this Contract shall remain in full force and effect as though the section, sentence, clause or phrase so adjudicated to be invalid had not been included herein.

PROJECT DESCRIPTION

Contractor shall furnish all labor, material, equipment, and services and perform and complete all work required for the **Manhole and Lift Station Rehabilitation and New Manhole Installation**.

ALTERATIONS

The following alterations were made in this contract before it was signed by the parties hereto (if no alternates, state "NONE"):

The Project must be completed as set forth in the Project Schedule. Bidder certifies that he/she can complete the Project, ignoring Delays and Changes as defined in the General Conditions as set forth in the Project Schedule.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the date entered on the first page of the contract.

THE CITY OF IMPERIAL	CONTRACTOR
Signature _____	Signature _____
Title_____	Name_____
	Title
Attest:	EMPLOYER IDENTIFICATION NO. (As used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941)
_____ Jillian Mehdipour, Public Records Analyst City Clerk	BID 2025-01

SPECIAL REQUIREMENTS

TABLE OF CONTENTS
OF SPECIAL REQUIREMENTS

SPECIAL REQUIREMENTS

Manhole and Lift Station Rehabilitation and New Manhole Installation
Bid No. 2025-01

1. THE REQUIREMENT

The Contractor shall inspect the specified existing brick manholes and existing wet well at the Cross Street Lift Station within the City of Imperial's sewer service area and provide a recommendation to the City to either rehabilitate or replace the existing structures. As part of the work, the Contractor may need to bypass existing sewer flows, provide traffic control, and repair existing surface, for the City of Imperial, Imperial County, California; furnishing all labor, materials, equipment, and methods, necessary to complete said construction. The Contract work is listed in the Bid Item Schedule as Bid Schedules I, II, and III.

2. CONTRACT COMPLETION SCHEDULE

All work under this project shall be completed in ***One Hundred Eighty (180)*** **calendar days** following the date the City provides written "Notice of Award" of Contract.

Completion time in calendar days includes Saturdays, Sundays, and holidays.

IF CONTRACTOR DOES NOT CONFORM TO THE ABOVE LISTED CONTRACT COMPLETION SCHEDULE FOR BID SCHEDULE I, THEN THE OWNER WILL ENFORCE THE AGREEMENT IN THE CONTRACT APPENDIX TITLED "LIQUIDATED DAMAGES".

3. RIGHTS-OF-WAY

A. GENERAL

Construction under these Special Requirements, Basic Specifications, and Drawings is located upon the land and/or near existing interference facilities under the jurisdiction of the following organizations:

1. City of Imperial
2. County of Imperial Public Works
3. Southern California Gas Company
4. Imperial Irrigation District

B. CITY OF IMPERIAL

The City's existing water and sewer facilities are shown on the contract drawings, in accordance with the recorded locations per the City's records.

It shall be the Contractor's responsibility to conduct all his operations within the easements provided for him as shown on the Drawings. Additional easements that may be required by the Contractor to complete the work as hereby proposed shall be obtained by the Contractor at his own expense.

C. OTHER UTILITIES AND ORGANIZATIONS

The existing underground facilities are shown on the contract drawings in accordance with recorded locations per the particular utility's atlas sheets. Refer to section titled "Permits and Fees" for additional information.

4. PERMITS AND FEES

A. GENERAL

Contractor shall secure at his own expense all permits and/or licenses necessary to the prosecution of the contract work, except for any permits and/or licenses stated herein to have been secured and paid for by the City.

Contractor shall comply with the applicable requirements of all permits and/or licenses that have been secured by the City, all at no additional cost to the City.

B. RULES AND REGULATIONS OF UTILITIES AND OTHER ORGANIZATIONS

The Contractor shall determine and comply with all the applicable rules and regulations of the utilities and organizations listed in Paragraph "A" of section titled "Rights-of-Way" of these Special Requirements. The Contractor shall contact all of the listed utilities and/or organizations prior to the start of construction so they may mark the exact location of their facilities or utilities that may be in conflict with this project.

The cost of any work necessitated for the convenience of the Contractor during construction is reimbursable to that particular utility or organization, and the Contractor shall pay such charges to said utility or organization at no additional cost to the City.

C. CITY OF IMPERIAL

Contractor shall contact the City of Imperial on the requirements of encroachment permit including but not limited to, traffic control, pavement removal and restoration, working area, staging area and working hours prior to bid the project. Contractor shall include all his own expense in the bid proposal and no additional compensation will be allowed.

The Contractor shall determine and comply with all City rules and regulations applicable to the contract work, at no additional cost to the City.

The fee for the City of Imperial will be waived for the Contractor.

The Contractor shall obtain Business Registration from the City of Imperial. The Contractor shall pay the associated fee at his own expense.

5. DATA TO BE SUBMITTED BY CONTRACTOR

Contractor shall submit to the Engineer for approval detailed shop drawings and schedule for cylinder thicknesses, etc., for straight pipe and for all specials, fittings, and connections for all mainline piping. No pipe shall be manufactured until the thickness and joint detail drawings have been approved.

Owner requires four (4) sets of approved plans. The Owner will review and return submittals within ten (10) working days. The Contractor shall email an advanced copy of all submittals in PDF format to the City's Construction Manager and Webb Associates Project Manager.

The Engineer's approval of the Contractor's submittal data shall not relieve the Contractor from having the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for misfits due to any errors in the Contractor's submittal data.

Successful Bidder shall be required to submit a construction schedule within ten (10) calendar days following award of contract. The schedule shall conform to the completion schedule stated herein, and shall show dates for beginning and completing all aspects of contract work, including expected dates (both delivery and installation) for the required submittal data. Bidder shall understand that this schedule will be tentative, and subject to modification and updating by the Contractor (as approved by the City) as the contract work progresses. The schedule shall generally provide the following main items along with corresponding details:

- Submittals
- Review and approval period
- Material delivery
- Schedule of construction
  - Potholing
  - Priority connections
  - Installation
  - Testing
  - Final site work and cleanup

In addition to the above, the Contractor shall submit to the Engineer for approval, manufacturer's data sheets, brochures, etc. for appurtenant materials, shoring and bracing design, etc. A list of the minimum required submittals is as follows:

<u>Appurtenant Submittals</u>

Manhole Repair Materials	Concrete Mix Designs
Precast Manholes	AC Paving Mix Designs
Manhole/Wetwell Liner Material	Aggregate Base Gradation

Contractor shall submit updated project schedules to the City as follows:

- Once per month after Contractor receives written "Notice of Award" of contract
- Twice per month when Contractor has mobilized for construction
- Any time a change in the schedule and/or change in work has occurred
- Submitted with progress pay requests (status/completion items as shown on the schedules shall be consistent with the progress pay requests)

6. MATERIAL FURNISHED BY CONTRACTOR

The Contractor shall furnish all materials necessary to complete the contract work, all in strict accordance with the Contract Documents.

In addition, the Contractor shall furnish all labor, skills and services required for the installation of all materials to provide the Owner with a complete project, in accordance with the Contract Documents.

7. POTHOLING OF EXISTING UTILITIES BY CONTRACTOR

The Engineer has shown from a record research the approximate location of known underground interference facilities. If required, Contractor shall field determine the exact location and depth of all existing underground interference and provide the City the pothole data in the event there is a conflict with the proposed pipeline alignment or grades prior to construction of the mainline. Contractor shall “pothole” all utility line crossings, unless the utility “potholes”, in which event Contractor pays any potholing charges from the utility. The City reserves the right to make minor adjustments in alignment and grade, all at no additional cost to the City.

The horizontal position of existing underground utilities, including existing water mains, as shown on the drawings, were determined by record. Where no elevation is shown, the Contractor shall excavate the utilities shown to be within the construction area, and verify their position prior to construction. Any variation from the positions shown on the drawings with the position determined by verification shall be immediately reported to the Engineer.

Adjustments to the alignment and depth of the proposed water main, and to the connection details as shown on the drawings, shall be made based on the actual position and condition of the existing utilities as determined from the above verifications.

Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown on the Plans, the Contractor, for the purpose of preparing a Bid, shall assume that every property parcel will be served by at least one (1) service connection for each type of utility.

As provided in Section 4216 of the California Government Code, at least two (2) working days prior to commencing any excavation, if the excavation will be conducted in

an area which is known, to contain subsurface installations, the Contractor shall contact the regional notification center (Underground Service Alert to Southern California) and obtain an inquiry identification number.

8. EXISTING UNDERGROUND UTILITIES

Contractor shall understand that the existing underground facilities as shown on Drawings are from record only, and NO FIELD CHECK was made to establish their exact location. Also, other underground facilities may exist. Therefore, it shall be Contractor's responsibility to locate, protect, preserve, etc., all existing underground or overhead facilities, in accordance with other applicable provisions of the Contract Documents.

9. CONSTRUCTION WATER

Owner will furnish construction water to the Contractor, free of charge, from existing water systems adjacent to portions of the work. The Contractor shall furnish and install all necessary piping, certified backflow devices, fittings, connections, pumps, gages, etc., required to provide approved facilities to deliver construction water into pipelines to be constructed herein. Contractor shall fill all pipelines with construction water and may (through hydrants, blowoffs and air valves, etc.) obtain construction water to be used in compacting trench backfill. Contractor shall develop any other sources of construction water at his own expense.

The Contractor will be required to obtain a hydrant meter from the City for any construction water utilized from the City's system.

10. CONSTRUCTION VIDEO PHOTOGRAPHY

A. DESCRIPTION

This Section covers pre-construction video photography of the work area to support proof of pre-existing pavement conditions and sign locations for visual comparison to the post-construction conditions. The requirements specified in the Condition of Contract also form part of this Section.

B. VIDEO PHOTOGRAPHY

Provide DVD (video file format to be viewable on a standard DVD player/computer and/or as approved by the City) of the site prior to placing markings

of any kind on the pavement, sawcutting or removal of materials.

C. DESCRIPTION

List name of project, orientation of view, date and time of view, name and address of photographer.

D. TECHNIQUE

Provide factual presentation. Provide correct exposure and focus, high resolution and sharpness. Video construction area from a vehicle moving at a slow rate of speed to permit Owner to view the DVD and determine pre-existing conditions. Provide audio explanation of pavement failure areas and of other items which require special notation.

Areas of local distress shall be videoed with the camera held without moving, using zoom control to record pavement cracking and alligatoring.

E. SUBMITTALS

Contractor shall deliver the DVD(s) within three days after exposure with transmittal letter. The Owner will retain one of each DVD which will be the permanent record.

11. PROTECTION OF EXISTING IMPROVEMENTS, RESTORATION OF WORK SITE AND DISPOSAL OF SPOIL AND WASTE MATERIALS

Contractor shall complete operations so that existing improvements (including road and other paved surfaces adjacent to or in the vicinity of the work site) are not damaged. Contractor shall repair and restore, at Contractor's expenses, all disturbed or damaged private or public improvements which results from Contractor's operations (except that which is specifically a part of the contract work) to the satisfaction of the City, or the agency having jurisdiction over said improvements.

All work sites shall be restored to pre-job conditions and shall meet the requirements of the City, Agencies who have jurisdiction and property owner(s). The Contractor shall repair or replace at his expense the damages as directed by the City.

The City is obligated to keep visual impact of the work sites to a minimum; therefore, the Contractor is required to restore all areas altered by construction to pre-existing

conditions, unless shown otherwise on the Drawings. Such areas shall include, but shall not be limited to areas used for travel, parking, and storage of vehicles, equipment and materials or adjacent areas impacted by facilities construction.

The Contractor shall be responsible for the proper disposal of all waste materials resulting from project operations, including rubbish, packaging materials, discarded equipment parts, and damaged construction materials, in a manner and at locations suitable to the City and all health and other regulatory agencies.

12. MANHOLE CONSTUCTION

All sewer manholes are to be constructed in accordance with City of Imperial Standard Detail No. 200, unless specifically stated on the construction drawings. In existing non-paved areas, the contractor shall install a 6-foot by 6-foot square concrete pad around manholes. The pad shall be minimum of 6-inch thick. Manhole rim elevation shall be 6 inches above the existing grade unless stated otherwise on the construction drawings. Contractor shall install a water-tight manhole lid with an approved locking mechanism per Construction Drawings and specifications. In the paved streets Contractor shall construct a concrete collar around manholes. The collar shall be 1 foot in width, and 6 inches in depth. Where called out on the project plans, the cost for furnishing and installing a pad, collar, water tight or locking lid shall be included in the unit price per manhole, and no additional compensation will be made therefore.

13. SEWER BYPASS

Should the Contractor disrupt the operation of existing sanitary sewer facilities, or should disruption be necessary for performance of the Work, the Contractor shall bypass the sewage flow around the Work, provide pumper trucks at the lift station, or provide a flow through system. Sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches nor be covered by backfill.

Whenever sewage bypass and pumping is required by the Work, or the Contractor so elects to perform, the Contractor shall submit a working drawing detailing its proposed plan of sewage bypass and pumping in accordance with Section 02250.

Sewage Bypass and Pumping Plan - The plan shall indicate the locations and capacities of all pumps, sumps, suction and discharge lines. Equipment and piping shall be sized to

handle the peak flow of, the section of sewer line to be bypassed and pumped. Precise flow measurements have not been obtained. The Contractor shall include all costs of bypassing the sewer in the appropriate bid items and schedule all efforts in his schedule and no further compensation will be made to the Contractor by the City. Bypass piping, when crossing areas subject to traffic loads, shall be constructed in trenches with adequate cover and otherwise protected from damage due to traffic. Lay-flat hose or aluminum piping with an adequate casing and/or traffic plates may be allowed if so approved by the Engineer. Bypass pump suction and discharge lines that extend into manholes shall be rigid hose or hard pipe. Lay flat hose will not be allowed to extend into manholes. The Contractor shall provide a backup bypass pumping system in case of malfunction. The backup bypass system shall provide 100 percent standby capability, and be in place and ready for immediate use. Each standby pump shall be a complete unit with its own suction and discharge piping. In addition to the backup system, the Contractor shall furnish and operate vacuum trucks when required by the Plans or Special Provisions. No additional compensation will be made to the Contractor by the City for overnight operations.

Spill Prevention and Emergency Response Plan - The Contractor shall prepare and submit a spill prevention and emergency response plan. The plan shall address implementation of measures to prevent sewage spills, procedures for spill control and containment, notifications, emergency response, cleanup, and spill and damage reporting. The plan shall account for all storm drain systems and water courses within the vicinity of the Work which could be affected by a sewage spill. Catch basins that could receive spilled sewage shall be identified. Unless otherwise specified in the Special Provisions, these catch basins shall be sealed prior to operating the bypass and pumping system. The Contractor shall remove all material used to seal the catch basins when the bypass and pumping system operations are complete. The Contractor shall be fully responsible for containing any sewage spillage, preventing any sewage from reaching a watercourse, recovery and legal disposal of any spilled sewage, any fines or penalties associated with the sewage spill imposed upon by the Agency and/or the Contractor by jurisdictional regulatory agencies, and any other expenses or liabilities related to the sewage spill.

14. ACCESS TO CONFINED SPACES IN EXISTING STRUCTURES

The Contractor’s attention is directed to the General Industry Safety Orders of the State of California, Article 108, Permit-Required Confined Spaces, Section 5157 (Refer to California Code of Regulations, Title 8, Confined Spaces, Sections 5156, 5157 and 5158).

The Contractor shall provide personnel and equipment, including standby personnel, observers, and authorized competent person to stand by while entrants are inside the space, temporary ventilation equipment, or self-contained breathing apparatus, to assist the personnel of the Owner's Representative in obtaining access to permit-required confined spaces.

In addition to these guidelines, Contractor shall perform confined space entry per the Greenbook Standards, latest edition.

15. MISCELLANEOUS SPECIAL CONDITIONS

A. PROJECT MEETING

(1) ATTENDEES. Unless otherwise specified or required by the Owner, the meetings shall be attended by the Owner, the Engineer, the Inspector, and the Contractor and his Superintendent. Subcontracts may attend when involved in the matters to be discussed or resolved but only when requested by the Owner, Engineer, or Contractor.

(2) MEETING RECORDS. The Owner will record minutes of each meeting and will furnish copies to the Contractor within five (5) working days thereafter. If the Contractor does not submit written objection to the contents of such minutes within seven (7) days after presentation to him, it shall be understood and agreed that the Contractor accepts the minutes as a true and complete record of meeting.

(3) MEETING SCHEDULE. The dates, times and locations for the progress meeting shall be agreed upon and recorded at the preconstruction conference. Then after, changes to the schedule shall be by agreement between the Owner and Contractor, with appropriate written notice to all parties involved.

(4) PRECONSTRUCTION CONFERENCE. Prior to issuance of the Notice to Proceed, a preconstruction conference shall be held at the location, date, and time designated by the Owner. In addition to the attendees named herein, the meeting shall be attended by the representatives of regulatory agencies having jurisdiction of the

project, Owners and Operators of affected utilities, if required, and such other persons the Owner may designate.

(5) EXECUTION AND SUBMITTAL OF DOCUMETNS. At the preconstruction conference, unless otherwise specified or agreed by the Owner and Contractor, the Contract Agreement shall be executed by the parties hereto and the Contractor shall present to the Owner the Bonds, certificates of insurance, progress schedule, schedule of values, written safety program, and all other preconstruction documents required of him by the Contract Documents.

(6) AGENDA. In general, the matters to be discussed or resolved and the instructions and information to be furnished to or given by the Contractor at the preconstruction conference include:

a) Progress meeting schedule.

b) Progress schedule and schedule of values submitted by Contractor.

c) Communication procedures between the parties.

d) The names and titles of all persons authorized by the Contractor to represent and execute documents for him with samples of all authorized signatures.

e) The names, addresses, and telephone numbers of all those authorized by the Contractor to act for him in emergencies.

f) Construction permit requirements, procedures, and posing.

g) Public notice of starting Work.

h) Procedures concerning the installation of Work on public or private property not owned by the Owner.

i) Interfaces with the Contractors or with utility owners.

j) Access and rights-of-way furnished by the Owner.

k) Forms and procedures for Contractor’s submittals.

l) Change Order forms and procedures.

m) Payment application forms and procedures and the revised progress schedule and reports to accompany the applications.

n) Contractor’s safety and training program, and designation of the Contractor’s Safety officer and his qualifications.

o) First-aid and medical facilities to be furnished by Contractor.

p) Contractor's provisions for barricades, traffic control, utilities, sanitary facilities, and other temporary facilities and controls.

q) Project sign for Owner if required by the Specifications.

r) Engineer, Inspector and his duties.

s) Construction surveyor and initiation of surveying services.

t) Testing laboratory or agency, and testing procedures.

u) Methods of construction proposed by the Contractor.

v) Equipment proposed for use during construction by the Contractor.

w) Procedures for payroll and labor cost reporting by the Contractor.

x) Procedures to ensure nondiscrimination in employment on and for the Work.

y) Issuance of the Notice to Proceed.

z) Matters concerning construction within the city/county (traffic, police, fire, mail and waste collection services).

(7) PROGRESS MEETINGS. The meetings shall be held on a weekly basis in accordance with the agreed schedule. All matters bearing on the progress and performance of the Work since the preceding progress meeting shall be discussed and resolved, including without limitation any previously unresolved matters, deficiencies in the Work or the methods being employed for Work, and problems, difficulties, or delays which may be encountered.

(8) SPECIAL MEETINGS. Upon appropriate notice to the other parties, special meetings may be called by the Owner, Engineer, or Contractor. Special meetings will be held where and when designated by the Owner for the following purposes unless the matters are resolved at the preconstruction conference or at subsequent progress meetings.

(9) REGULATORY AGENCIES. When requested, the Contractor shall attend meetings held or required by the governmental regulatory agencies having jurisdiction of the Project or by various California State agencies or Owners of affected utilities.

B. REIMBURSEMENT TO OWNER FOR COMPACTION RE-TESTS

The Owner will arrange for a soils engineering laboratory to perform the trench compaction testing for the water pipelines. The Owner will pay for required compaction tests, with the exception that the Owner shall be reimbursed by the Contractor for any compaction tests that fail to meet the minimum relative compaction requirements. The Bidder is hereby notified that the amount of the reimbursement to the Owner shall be Seventy-Five Dollars ($75.00) for each required retest for insufficient compaction, said amount including costs for testing, overhead and administration.

C. PARTIAL PAYMENT REQUESTS

Contractor shall submit all invoicing and requests for payment for completed portions of the work directly to the District for approval on the District's approved form. Said invoicing shall be submitted at intervals no less than 30 calendar days and shall include an updated project schedule and updated as-built drawings for processing.

D. CONTRACTOR'S FIELD SUPERINTENDENT

The Contractor shall be required to have a field superintendent, from his organization, on the jobsite during construction activities, to manage the affairs of the Contractor and to receive directions or instruction from the District or Engineer. Contractor shall provide the District with a 24 hour emergency phone number for field superintendent prior to beginning of construction.

E. COOPERATION WITH OTHER CONTRACTORS

The Contractor shall cooperate with other Contractors that may be working within the project area, as directed by the District.

F. REQUIRED CERTIFIED PAYROLL SUBMITTALS

The District shall require the Contractor to submit Certified Payroll records per Section entitled “Prevailing Wage” of the General Provisions. The Contractor shall prepare said certified payroll records on a form acceptable

to and approved by the Owner; and the certified payroll records shall be submitted with each partial payment request.

G. AS-BUILT DRAWINGS

The Contractor shall be responsible for maintaining one up-to-date set of as-built drawings, on the job site, available for review by the Owner representative. These drawings shall be clean, neat, legible and show deviations from the original plan and profile design. This set of as-built drawings shall be submitted for review on the monthly basis and given to Owner upon project completion. The Notice of Completion will not be filed until Owner receives the as-built drawings.

Failure to provide acceptable up-to-date as-built drawings as required herein is considered a material breach of the Contract and shall result in withholding of progress payments and/or final payment at the sole discretion of Owner. Failure to submit the final as-built drawings shall of and by itself, be grounds for assessment of liquidated damages not withstanding any other contractual action which may be taken.

Full compensation for conforming to the above requirement will be considered as included in the prices bid for various contract items of work and no additional compensation will be allowed therefore.

DETAILED SPECIFICATIONS

THE CITY OF IMPERIAL
STATE OF CALIFORNIA

Manhole and Lift Station Rehabilitation and New Manhole Installation

DIVISION 1

GENERAL

DIVISION 1
TABLE OF CONTENTS

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 SUMMARY

This Section includes the preparation and submission of shop drawings, product data, and samples as specified herein and in the various sections of these specifications. The requirements specified herein are in addition to requirements for shop drawings, product data, samples, materials lists, substitutions of materials, or other submittals specified elsewhere in these specifications. The Conditions of the Contract and the other sections of Division 1 apply to this section as fully as if repeated herein. (Refer to "Special Provisions").

1.02 GENERAL SUBMITTAL PROCEDURES

A. SCHEDULING: Extension of Contract time will not be granted because of the Contractor's failure to make timely submittals. Do not purchase materials or equipment or begin construction activities covered by the required submittals until submittals have been reviewed, approved, and returned.

B. TRANSMITTAL: Accompany each submittal with a dated, signed and sequence numbered transmittal on forms prescribed by the City. Include information required by this form including project identification, name and address of Contractor and of subcontractor or supplier, a list of items included in the submittal, and identification of drawing numbers, specification section and paragraph numbers to which the submittal pertains, and space for Contractor's and Engineer's review and approval stamp.

C. SETS AND COPIES: Provide for approval a minimum of seven (7) sets of each required submittal.

1.03 SHOP DRAWINGS AND PRODUCT DATA

A. SHOP DRAWINGS: The term "shop drawings" as used herein includes fabrication and installation, layout and setting drawings; wiring and control diagrams; and other drawings.
   1. Check and verify all field measurements and submit for review, with such promptness as to cause no delay in the Work or in that of any other contractor or subcontractor, all shop or setting drawings and schedules required for the construction activities of the various trades.
   2. Drawings shall show all information required by the applicable technical section and shall be in sufficient detail as may be required

to show that fabricated materials, equipment or systems, and the positions thereof conform to the Contract Documents.

3. Shop drawings shall establish the actual detail of fabricated items, indicate proper relation of adjoining construction, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings shall be drawn to scale and shall be completely dimensioned.
4. Prepare shop drawings on sheet of same size as contract drawings or on 8-1/2" x 11" three-hole punched vellum-type sheets suitable for both xerox and ozalid reproduction.
5. Each shop drawing shall have a title block containing the following information:
   (a) Name and location of the Project.
   (b) Name and address of the Contractor.
   (c) Name and address of the subcontractor, manufacturer, supplier or distributor as applicable.
   (d) Name and address of City.
   (e) Date, scale of drawings and identification number.
   (f) Space for the Contractor's review and approval stamp.
6. Submit seven (7) blue or black line prints and one reproducible transparency of each shop drawing or email a PDF copy.

B. PRODUCT DATA: The term "product data" as used herein includes manufacturer's standard drawings, certificates of conformance, substantiating calculations and other data.
1. The data shall include all information required by the applicable technical section and shall be in sufficient detail to show that manufactured materials and equipment conform to the Contract Documents.
2. Catalog Cuts: Clearly mark each copy to indicate the product or model as well as optional sizes, finishes or other features proposed for use. Delete inapplicable data.

1.04 SAMPLE

Furnish for review samples of the various materials, together with the finish thereon, as specified for and intended to be used on or in the Work. Submit samples to the Engineer for review before purchasing, fabricating, applying, or installing such materials and finishes.

Submit samples, other than field samples, in duplicate. A cover letter shall accompany the sample and shall list all items being transmitted, designating their particular usage and

location in the Work and shall be identified as to manufacturer, trade name, style, model. One approved sample will be returned to the Contractor.

Approval of a sample shall not be taken in itself to change or modify any contract requirement. Materials, finishes, and workmanship in the completed building shall be equal in every respect to that of the approved sample.

1.05 ENGINEER'S ACTION

A. The Engineer will review the submittals with reasonable promptness, fourteen (14) calendar days maximum, and will affix the Engineer's initials or signature as follows:
   1. Submittals stamped "NO EXCEPTION TAKEN" require no further action, and fabrication or construction may proceed. The Engineer will forward to the Contractor two (2) stamped copies of shop drawings, brochures, schedules, materials lists, and other product data, except where required otherwise for the Engineer's review, approval and distribution to the Contractor.
   2. Submittals stamped "MAKE CORRECTIONS NOTED" or "APPROVED AS NOTED" require no further action, and fabrication or construction may proceed contingent upon all corrections being made as noted. Quantities returned will be as specified in paragraph 1.05.A.1.
   3. Submittals stamped "REJECTED" or "REVISE AND RESUBMIT" require the Contractor to resubmit them with reasonable promptness, and no fabrication or construction may begin. The Engineer will return to the Contractor two (2) marked copies of shop drawings, brochures, schedules, materials lists, and other product data (all stamped).

B. RESUBMITTALS: If first or subsequent submittal is stamped "REJECTED" or "REVISE AND RESUBMIT", corrective action shall be taken and resubmittal procedure shall be the same as for first submittal. Upon resubmitting, the Contractor shall direct specific attention in writing to revisions other than those corrections requested by the Engineer on the returned, original submittal or shop drawings.

C. The Engineer will check and take action on such drawings and schedules only for conformance with the design concept of the Work and compliance with information given in the Contract Documents. When so directed by the Engineer or the City, the Contractor shall make corrections required.

D. The Engineer's and City's review of shop drawings will be general only and shall not relieve the Contractor from responsibility for errors of any sort, for deviations from Drawings or Specifications, or for conflict with the construction activities of others that may result from such deviations.

Engineer's and City's review of a separate item does not indicate a review of an assembly in which the item functions.

1.06 CONTRACTOR'S ACTION

A. DISTRIBUTION COPIES: The Contractor shall be responsible for obtaining required prints and for distribution to subcontractors. Distribution copies shall be made from the transparency bearing the Engineer's stamp.

B. The Contractor shall check the drawings of his suppliers and subcontractors as well as his own drawings before submitting them. In particular, the Contractor shall ascertain that the drawings meet all requirements of the Contract Drawings and Specifications and conform to the structural and space conditions. If such shop drawings show variations from Contract Documents, whether because of standard shop practice or other reasons, the Contractor shall clearly describe such variations including other changes required to correlate the construction in his letter of transmittal.

C. Each submittal by the Contractor shall have the following Certification Statement, signed by the Contractor:

"Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable submittals and other requirements of the contract documents."

D. Submittals shall be complete in all respects. If the submittals show any deviations from the requirements of the contract documents because of standard shop practices or other reasons, the deviations and the reasons therefor shall be set forth in the letter of transmittal.

E. By submitting the submittals, the Contractor represents that the material, equipment, and other work shown thereon conforms to the contract documents, except for the deviations set forth in the letter of transmittal.

END OF SECTION 01340

SECTION 01510
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION
This Section includes the requirements for temporary facilities for the project work. Contractor shall provide the temporary facilities for the entire duration of the project work at no additional cost to the City.

1.02 FIRST AID AND PROTECTIVE FACILITIES
First aid facilities and supplies shall be kept on the jobsite. Instructions in first aid shall be given, and Contractor shall provide emergency first aid treatment and supplies for his employees sufficient to comply with all legal requirements.

1.03 FACILITIES FOR EMPLOYEES
Contractor shall, at his own expense, provide all labor, materials, equipment, and facilities which may be required to carry out effectively the provisions of these specifications.

1.04 POWER
Provide all necessary power required for operations under the contract. The Contractor shall provide and maintain in good order such modern power equipment and installation as shall be adequate, in the opinion of the City, to perform in a safe and satisfactory manner the work required by the Contract.

1.05 SANITATION
All parts of the work shall be maintained in a neat, clean, sanitary condition. Fixed and portable toilets, which are made inaccessible to flies, shall be provided wherever needed for use of employees, and their use shall be strictly enforced. All waste and refuse from sanitary facilities provided by the Contractor or from any source related to Contractor's operations shall be disposed of in a sanitary manner, satisfactory to the City, and in accordance with the laws and regulations pertaining thereto. Contractor shall rigorously prohibit and prevent committing of nuisance within the work site area or upon the City's right-of-way or adjacent to private property. Contractor shall furnish all facilities and means for proper sanitation of the work, and shall protect and safe harmless the City, its officers and employees from any liability resulting from improper or insufficient sanitation.

1.06 PROJECT CLEANUP

A. CLEANUP REQUIREMENTS:
   1. Maintain project site(s) in a neat and clean condition at all times.
   2. Abate dust nuisance by cleaning, sweeping and sprinkling with water; and other means as necessary.

3. Prevent spillage on haul routes.
4. Immediately remove excess excavated material from pipe trench except for sufficient backfill material.
5. Remove forms and lumber from site immediately after stripping.
6. Do not discharge smoke, dust or other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority.

B. COMPLIANCE: Failure of the Contractor to comply with the City's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

C. FINAL CLEANUP: Upon completion of work and before the final estimate is submitted, the Contractor shall, at his own expense and cost, satisfactorily dispose of or remove from the vicinity of the work all plants, buildings, rubbish, unused materials, concrete forms, and other equipment and materials belonging to him or used under his direction during the construction, and in the event of his failure to do so, the same may be removed and disposed of by the City at the Contractor's expense.

1.07 TRAFFIC CONTROL

A. CONTROL EQUIPMENT AND DEVICES: Provide traffic warning signs, barricades, flagmen, and other control devices as required to maintain two-way traffic, over roadways in project work area.

B. AGENCY REQUIREMENTS: Investigate and adhere to traffic control and equipment of various agencies having jurisdiction over the right-of-way in the work area.

C. COMPLIANCE: Costs for compliance with all traffic control provisions shall be considered as included in the bid unit price for various items, and no other compensation shall be made therefor.

1.08 ACCESS TO ADJACENT PROPERTIES

A. PROPERTY ACCESS REQUIREMENTS:
1. Provide access to the properties in the work area at all times during construction.
2. Notify City in advance of any necessary closure to adjacent property and provide 24 hours notice to that affected properties.
3. Provide temporary structures as required for reasonable access to the adjacent properties.
4. At least one (1) lane on cross streets shall be available at all times for use of vehicles and emergency equipment.

B. COMPLIANCE: Costs for compliance with all traffic control provisions shall be considered as included in the bid unit price for various items, and no other compensation shall be made therefor.

END OF SECTION 01510

SECTION 01530
PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 GENERAL:

A. The Contractor shall protect all existing utilities, piping and improvements not designated for removal and shall restore damaged or temporarily relocated utilities, piping and improvements to a condition equal to or better than they were prior to such damage or temporary relocation.

B. The Contractor shall verify the exact locations and depths of all underground piping and utilities shown and not shown and shall make exploratory excavations of all piping and utilities that may interfere with the Work. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities, piping 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.

C. Maintaining in Service: All pipelines, electrical, power, telephone, communication cables, gas and water mains shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the Owner. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement the Contractor, after necessary scheduling and approval, 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, the Work shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement to a new condition meeting the specification requirements.

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

1.02 RIGHTS-OF-WAY:

A. The Contractor shall not do any work or enter upon the rights-of-way of any oil, gas, sewer or water pipeline; any telephone or electric transmission line; any fence; or any other structure, until notified by the Engineer that the Owner has secured authority to do so. After authority

has been obtained, the Contractor shall give the governing utility proper advanced notice of its intention to begin work.

1.03 RESTORATION OF PAVEMENT AND SIDEWALKS:

A. All paved areas and sidewalks not designated for replacement, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas unless otherwise noted. All sidewalks and pavements which are subject to partial removal shall be neatly saw cut in straight lines.

1.04 UNDERGROUND UTILITIES NOT SHOWN OR INDICATED:

A. If the Contractor damages existing utilities, piping or improvements that are not shown or the location of which was not made known to the Contractor prior to excavation and the damage was not due to failure of the Contractor to exercise reasonable care the Contractor shall immediately notify the Engineer. If directed by the Engineer repairs shall be made by the Contractor under the provisions for changes and extra work contained in Articles 13, 14, and 15 of the General Conditions.

1.05 NOTIFICATION BY THE CONTRACTOR:

A. Prior to any excavation in the vicinity of any existing underground facilities, including water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications or telecommunication 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 not less than three (3) working days prior to excavation so that a representative can be present during such work if they are required to do so.

END OF SECTION 01530

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

This section details requirements and provisions to be performed by the Contractor and for the City prior to final acceptance of the project and closing out the Contract. The requirements specified in the Conditions of the Contract, Special Provisions, and the Detailed Technical Specifications apply to this section as fully as if repeated herein.

1.02 FIELD TESTING AND OPERATIONAL DEMONSTRATION

A. PROCEDURES: Submit schedule and complete procedures and informational data to Engineer for review and approval in accordance with Special Provisions and Section 15064.

B. FIELD TESTING: Conduct field start-up, testing and operational demonstration in accordance with Special Provisions and Section 15064.

C. SUBMITTALS: Provide all final submittals to Engineer for review and approval in accordance with all applicable sections of Divisions 15 and 16.

1.03 REQUIREMENT PREPATORY TO FINAL INSPECTION

A. TEMPORARY FACILITIES: Remove all temporary facilities from site.

B. CLEANING: Clean the entire project site(s) of all debris, Contractor materials, etc. as approved by Inspector. The pump building shall also be thoroughly cleaned prior to the Final Inspection.

C. PUNCH LIST: Complete all preliminary punch list items as approved by Inspector.

D. TESTING: Complete all field testing requirements per the Specifications.

E. RECORD DRAWINGS: Submit record (as-built) drawings to City. Drawings shall be complete and signed by the Contractor.

F. OPERATING AND MAINTENANCE MANUAL: Submit preliminary copies to Engineer for review and approval in accordance with the Special Requirements. Final, approved submittals will be required in advance of the filing of the "Notice of Completion."

G. TOOLS, KEYS AND MISCELLANEOUS EQUIPMENT: Deliver all tools which are a permanent part of the equipment installation in the work

to the City. Also deliver touch-up paint, spare parts, all keys (properly identified), etc.

H. PERMITS: Obtain final approvals from all agencies issuing permits and/or having involvement in the project such as Fire Department, Flood Control District, various City Departments, etc.

I. FINAL QUANTITIES: See Paragraph 1.06 herein.

1.04 SPECIAL SYSTEM OPERATING AND MAINTENANCE INSTRUCTIONS

A. OPERATING INSTRUCTIONS: Separate from the required Operating and Maintenance Manual, submit typewritten instructions covering operation of the entire system as installed (not duplicating manufacturer's instruction for operating components). Include schematic flow and control diagrams as appropriate and show and list system valves, control elements, and equipment components using identification symbols and numbers. Show proper settings for valves, controls and switches.

B. MAINTENANCE INSTRUCTIONS: Separate from the Operating and Maintenance Manual, and not duplicating manufacturer's detailed instructions, submit typewritten instructions covering routine maintenance of the system. List each item of equipment requiring inspection, lubrication, or service and briefly describe such maintenance, including types of lubricants and frequency of service. Give name, address and phone number of nearest firm authorized and/or qualified to service equipment or provide parts.

C. WALL MOUNTED DATA: Frame one set of the approved typewritten instructions and diagrams described under paragraph 1.04 A and 1.04 B above, covered with glass and mounted in locations as directed by City.

1.05 MANUFACTURERS' WARRANTIES

Deliver all manufacturers' warranties required by the Contract Documents, with City named as the beneficiary. In addition, for all equipment and machinery, or components thereof, bearing a manufacturers' warranty that extends for a longer time period than the Contractor's warranty, secure and deliver the manufacturers' warranties in the same manner.

Written warranties, except manufacturers' standard printed warranties, shall be on the Contractor's, subcontractor's, material suppliers', or manufacturer's own letterhead, or a form approved by City. Submit all warranties in duplicate. All warranties shall be collected and assembled into a bound booklet form, and delivered to the City for final review and approval.

1.06 FINAL QUANTITIES AND PAY ESTIMATE

The Contractor's superintendent shall coordinate with the project inspector, prior to the final inspection, for purposes of reviewing and resolving all final as-built quantities for payment purposes. Once the tabulation of final quantities is completed and approved by the Inspector, the final pay estimate may be submitted. Final quantities are subject to approval of the City. Payment of retention will not be approved until after final inspection and acceptance of project. Refer to General Provisions for additional information.

1.07 FINAL INSPECTION

If the Work has been completed in accordance with the Contract Documents, and no further corrective measures are required, the City will accept the Work, finalize the payment processing, obtain the "Release" from the Contractor, and file for the Notice of Completion.

If the Work has not been completed in accordance with the Contract Documents, and several corrective measures are still required, the City will not accept the Work or file for the Notice of Completion. Instead, a final punch list shall be prepared by the City, based on the information gathered from the final inspection. The Contractor will be required to complete or correct the items listed on this punch list to the satisfaction of the Inspector, and then call for another final inspection, following the procedure outlined above.

Upon acceptance of the Work by the City, Contractor shall submit his request for acceptance and final payment. Final payment will not be made by the City, however, until 35 days after filing for the Notice of Completion.

END OF SECTION 01700

DIVISION 2

SITE WORK

DIVISION 2
TABLE OF CONTENTS

SECTION 02140

DEWATERING

PART 1 - GENERAL

1.01 APPLICATION

A. Control of subsurface groundwater shall conform to this section. Control of site-surface water is specified in Section 02200.

1.02 SUBMITTALS

A. In the event groundwater is encountered, the Contractor shall submit to the Engineer, for approval, a complete and detailed plan and description of the dewatering system he proposes to use for dewatering.

B. All decisions in regard to acceptability of groundwater exclusion methods will be made by the Engineer and all such decisions shall be final.

1.03 QUALITY ASSURANCE

A. The discharge of water or drilling waste products shall be in accordance with the requirements of the federal, state, or local agencies having jurisdiction. The Contractor shall be responsible for determining the responsible authority and complying with its regulations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall maintain safe and stable excavations. Further, the Contractor shall be prepared to handle perched water conditions in localized areas.

B. The dewatering system shall be effective to such depth that, where excavations for foundations extend within 5 feet of the water table, the water table shall be lowered in advance of excavation and maintained at least 5 feet below the bottom of excavation or top of backfill at all times.

C. Except for shutdowns for maintenance of dewatering equipment, no interruption in the approved dewatering procedures will be permitted

during excavation and construction operations. Full time surveillance (24 hours a day) and maintenance of the equipment shall be provided by the Contractor to avoid breakdowns.

D. The system installed to lower the groundwater shall be capable of providing continuous and reliable draw throughout the construction period. The Contractor shall be responsible for the design construction and maintenance of the dewatering system.

E. The Contractor shall keep a daily log of the flow rate. The information shall be transmitted to Metropolitan on a monthly basis.

3.02 EARTHWORK

A. During placement and compaction of fill materials, the lowered level of groundwater shall be maintained at every point until the compacted material is 10 feet higher than normal static groundwater level or until final grade is reached.

B. Dewatering shall not affect the bearing capacity of the subgrade soils at the proposed bottom of excavation.

C. Flotation of pipelines and structures shall be prevented by maintaining a positive and continuous removal of water until the construction is completed to the design grades.

END OF SECTION 02140

SECTION 02200

EARTHWORK AND SITE PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in Conditions of the Contract and Division 1 form a part of this Section. Provide labor, equipment, tools, materials, and services needed to accomplish all site preparation, earthwork and incidental appurtenant work as described herein or shown on the Drawings.

Work Included in This Section: Principal items are –

1. Site preparation, clearing and grubbing.
2. Preparation of fill areas.
3. Excavation and controlled fill construction.
4. Structural excavation, and backfills.
5. Pavement subgrade.
6. Disposal of surplus and/or unsuitable materials.
7. Dust control and drainage control.
8. Clean-up.

1.02 RELATED SECTIONS

A. TRENCHING, BACKFILLING AND COMPACTION: Section 02221

B. SHEETING, WALING, SHORING: Section 02415

1.03 DEFINITIONS

A. SITE: The property owned by, or under the jurisdiction of the Owner within the boundaries shown on the Drawings, easements and/or rights-of-way roads, drainage facilities, and pipelines, and the Contractor's working and storage areas adjacent to the facilities.

B. CONTROLLED FILL: Compacted suitable fill material in all areas of the site requiring filling to grade as shown on the Drawings.

C. CONTROL DENSITY FILL: One-sack cement slurry used to backfill areas where pipeline undercrossing make it difficult to mechanically compact fill materials.

D. STRUCTURAL FILL: Compacted suitable fill material which will support a structure or some part of a structure.

E. STRUCTURAL BACKFILL: Compacted suitable material placed between the wall of a structure and construction excavation slope up to finished grade.

F. SUITABLE MATERIAL: As specified herein shall be any material imported or excavated from the cut areas that is, in the opinion of the Owner, suitable for use in constructing fills.

G. WASTE EXCAVATION: Material from project excavations which is not suitable for use in backfill or compacted fills or is in excess of that required to be used for backfill or to construct fills.

1.04 SITE INVESTIGATION

A. SOIL INVESTIGATION REPORT: A specific geotechnical report was not prepared for this project.

B. CONTRACTOR'S RESPONSIBILITY: The Contractor shall carefully examine the site and make all inspections necessary in order to determine the full extent of the work required to make the completed Work conform to the Drawings and Specifications. The Contractor shall satisfy himself as to the nature and location of the Work, conditions, the conformation and conditions of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the Work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the Drawings, or between the Drawings and Specifications must be brought to the Owner's attention in order to clarify the exact nature of the Work to be performed.

C. EXISTING ELEVATIONS: All existing elevations shown on the plans are approximate only. The Contractor shall recognize and acknowledge the condition that the bid lump sum price shall include all earthwork activities irrespective of the possible localized difference in contour elevations and actual ground; and that there will be no additional compensation from the Owner for earthwork changes, engineering, or field staking in this regard.

1.05 SAFETY

The Contractor shall familiarize himself with, and shall at all times conform to, the regulations of the "OSHA General Industry Occupational Safety and Health Standards", and "OSHA Safety and Health Regulations for Construction Safety Orders" and "Trench Construction Safety Orders" of the State of California, Department of Industrial Relations, Division of Occupational Health and Safety." A copy of these documents shall be kept on the job site.

1.06 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

The Contractor shall comply with regulations in force at all times to prevent pollution of air and water.

1.07 QUALITY ASSURANCE

A. BY CONTRACTOR: Exercise due care to assure procurement, storage and placement of materials from site or offsite sources which shall comply with the requirements, Specifications and standards set out herein. The Contractor may have, at his discretion, such tests and inspections as he may desire performed by qualified personnel or independent testing services, for his guidance and control of the Work.

B. BY OWNER: The Owner through its project representative(s), will be the onsite arbiter and judge of the acceptability of the Work done, based on such observations and tests he may require or perform.

The Owner may provide inspection and testing by its own representatives or by independent testing services, engaged and paid for by the Owner. In this regard, a Soils Engineer may be engaged by the Owner, who shall act as the direct representative of the Owner in soils work, to perform inspection of the removal and replacement of unsuitable materials, all excavations, and the placement and compaction of all fills and backfills within the limits of earthwork on this Project. Costs for all such inspections and tests will be paid by the Owner, except Contractor shall bear the cost of retest and reinspection of reworked faulty work.

C. APPLICABLE CRITERIA, TESTS AND STANDARDS:

1. For Site Earthwork - Rough graded surface ready to receive top soil, sod, or seed, crushed rock, or aggregate base shall be graded to + or - 0.1 feet of the Plan elevation, except where meeting curbs, walks, or building entrances, grade to + or - 0.05 feet of Plan. However, the acceptance of such irregularities shall not be construed to reduce the thickness of topsoil, sod or pavement.

Permanent surface water courses shall be constructed to average Plan grades and shall drain completely throughout their length. Finish surfaces shall be + or - 0.05 feet of the Plan elevation, and all areas shall be finished so as to drain readily.

2. For Earthwork for Structures - The Owner will provide the services of a qualified Soils Engineer to make tests of prepared subgrade and compacted fill. Testing will be at the discretion of the Soils Engineer. The Contractor shall give the Soils Engineer twenty-four (24) hours notice of the schedule commencement or subgrade preparation.

3. For Waste - Rubbish, debris, junk, material deemed unsuitable by the Owner from tests or visual inspection, and all material delivered to fill or embankment, which cannot be satisfactorily compacted, shall be removed from the project site and wasted in an area, provided by Contractor, that is acceptable to local authorities. Disposal of such materials shall be in accordance with all applicable laws, regulations, permits, and approvals from Owner of property upon which the material will be disposed.

4. For Clean-Up - Removal of all rubbish, debris, junk, temporary materials, and undesirable plants within the construction limits, restoration of staging areas and obliteration of temporary roads and stockpiles, and removal of trees damaged by the Contractor's operations shall be performed by the Contractor, to the satisfaction of the Owner as determined by visual inspection and is a condition for acceptance and final payment.

5. Standards for Soil Classification, Properties and Tests

   (a) <u>Earthwork and Embankment (excluding roads):</u>

      1. Classification - ASTM D-2487.
      2. Physical Properties - ASTM D854, D-2216
      3. Compaction - Modified Proctor ASTM D1557-91

   (b) <u>Backfill for Trench:</u>

      1. Classification - ASTM D2487
      2. Compaction - Modified Proctor ASTM D1557-91
      3. Field Density Test - ASTM 1556-82
         D2937-83, D2922-81 (As approved by Owner)

(c) Structural Fill and Backfill:

1. Classification - ASTM D2487
2. Atterberg Limits - Plasticity Index and - Liquid Limit ASTM D4318
3. Compaction - Modified Proctor ASTM D1557-91
4. Physical Properties - ASTM D854, D2216
5. Field Density Test - ASTM D1556-82 D2937-83, D2922-81 (As approved by Owner)

(d) Controlled Fills:

1. Classification - ASTM D2487
2. Physical properties - ASTM D854, D2216
3. Compaction - Modified Proctor ASTM D1557-91
4. CBR - ASTM D1883 (R-Value - ASTM 2844)
5. Field Density Test - ASTM D1556-82 D2937-83, D2922-81 (As approved by Owner)

(e) Road Embankment:

1. Classification - ASTM D2487
2. Physical properties - ASTM D854, D2216
3. Compaction - Modified Proctor ASTM D1557-91
4. CBR - ASTM D-1883
5. Field Density Test - ASTM D1556-82 D2937-83, D2922-81 (As approved by Owner)

(f) Borrow:

1. Classification - ASTM D2487.
2. Other properties - as determined by requirements at point of use.

1.08 COMPACTION

The maximum dry density, optimum moisture content and field density of each soil type used in the controlled compacted fill shall be determined as stated above.

1.09 INSPECTION

Observation and compaction tests shall be made by the Owner during the filling and compacting operations.

During the grading operation, continuous inspection may be made to assure that grading is performed in accordance with specified requirements. Should testing indicate

unsatisfactory compaction, additional compactive effort shall be applied with the adjustment of moisture content until satisfactory compaction is obtained.

1.10 GUARANTEE

Work done under this Section shall in all respects come under the terms of the guarantee stated in the Conditions of the Contract.

PART 2 - PRODUCTS

2.01 MATERIALS

A. CONTROLLED FILL MATERIAL: Materials for controlled fill shall consist of any material imported or excavated from the cut areas that, in the opinion of the Owner, is suit-able for use in constructing fills. The material shall contain no rocks or hard lumps greater than 12 inches in size and shall contain at least 40 percent of material smaller than 3/4 inch in size. Materials greater than 6 inches in size shall be placed by the Contractor in windrows on a clean, over-excavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (sand equivalent greater than 30) shall be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversize material should be staggered so that successive strata of over-sized material are not in the same vertical plane. No nesting or rocks shall be permitted. No material of a perishable, spongy, or otherwise of an improper nature shall be used in filling.

Material placed within 24 inches of rough grade shall be select material that contains no rocks or hard lumps greater than 6 inches in size and that swells less than 3 percent when compacted as hereinafter specified for compacted fill and when subjected to an axial pressure of 160 psf.

Representative samples of material to be used for fill shall be tested in the laboratory by the Soil Engineer in order to determine the maximum density, optimum moisture content and classification of the soil. In addition, the Soil Engineer shall determine the approximate bearing value of a recompacted saturated sample by direct shear tests or other tests applicable to the particular soil.

During grading operations, soil types other than those analyzed in the report of the soil investigation may be encountered by the Contractor. The Soil Engineer shall be consulted to determine the suitability of these soils.

B. STRUCTURAL FILL MATERIAL: Materials shall consist of crushed aggregate base, either imported or manufactured from excavated onsite rocky material.

The crushed aggregate base shall be uniformly graded and shall conform to State of California Standard Specifications Aggregate Base Class 2 with the following gradations:

AGGREGATE GRADING REQUIREMENTS
Percentage Passing
(California Test 202)

			3/4 Maximum Individual Test Results	Moving Average
1"	-	-	100	100
3/4"	45-90	50-85	87-100	90-100
No. 4	20-50	25-45	30-60	35-55
No. 30	6-29	10-25	5-35	10-30
No. 200	0-12	2-9	0-12	2-9

QUALITY REQUIREMENTS

Tests	California Test	Individual Test Result	Moving Average
Resistance (R-value) [1]	301	78 Min.	-
Sand Equivalent	217	28 Min.	31 Min.
Durability Index	229	35 Min.	-

[1] R-value testing may be waived if:
(1) a previous sample of the aggregate being supplied met the R-value requirements and had a Sand Equivalent value of 33 or more;
(2) the Sand Equivalent value of the sample being tested is not more than 5 points lower than the Sand Equivalent value of the sample that met the R-value requirements; and
(3) the aggregate has not been treated with lime, cement, or other chemical material.

All rock materials shall be clean, hard, sound, durable, uniform in quality, free of any detrimental quantity of soft, friable, thin, elongated or laminated pieces, disintegrated material, organic matter, oil, alkali or deleterious substance.

C. STRUCTURAL BACKFILL MATERIAL: Materials for structural backfill shall be as material used for controlled fill, 2.1.1, except the material shall contain no rocks or hard lumps greater than 12 inches in size.

Only non-expansive materials shall be used.

D. GRANULAR MATERIAL: Materials for granular material shall consist of a coarse mortar and conforming to ASTM C144.

E. SPECIAL CRUSHED ROCK BEDDING AND STRUCTURE FOUNDATION: When groundwater is encountered in the excavation and/or where indicated on the Contract Drawings, the material in the bottom of the trench or excavation shall be removed to a depth directed by the Owner and replaced with 3/4 inch maximum crushed rock bedding. The crushed rock bedding shall be installed and compacted per these specifications. The 3/4 inch maximum crushed rock material shall be approved by the Owner before use.

Crushed rock shall be the product of crushing rock or gravel. Fifty percent of the particles by weight 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 waterworn particles. Gravel shall not be added to crushed rock. Crushed rock (3/4") shall have the following gradation:

Sieve Sizes	3/4-inch Max. Crushed Rock % Passing
1"	100
3/4"	90-100
1/2"	30-60
3/8"	0-20
No. 4	0-5
No. 8	-

For specified 3" crushed rock, Contractor shall submit gradation to Owner for review and approval.

Special Crushed rock Bedding or foundation material, where ordered by the Owner, shall be paid as indicated in the Bid Schedule and set forth in the Special Requirements.

PART 3 - EXECUTION

3.01 GENERAL

The Work performed under this Specification shall be constructed to the lines, grades, elevations, slopes and cross sections indicated on the Drawings, specified herein, and/or directed by the Owner. Slopes, graded surfaces, and drainage features shall present a neat uniform appearance upon completion of the Work.

It shall be the Contractor's responsibility (1) to maintain adequate safety measures and working conditions; and (2) to take all measures necessary during the performance of the Work to protect the entire project area and adjacent properties which would be affected by this Work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the Owner. It shall be the Contractor's responsibility to maintain completed areas until the entire project area is in satisfactory compliance with the job specification.

Utility lines and structures indicated on the Drawings which are to remain in service shall be protected by the Contractor from any damage as a result of his operations. Where utility lines or structures not shown on the Drawings are encountered, the Contractor shall report them to the Owner before proceeding with the Work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by his operations.

3.02 REMOVALS, CLEARING AND GRUBBING

A. CLEARING: Clearing consists of the complete removal of objectionable materials and obstructions above and below the ground surface including tree stumps, brush, grass, vegetative matter and other objectionable materials within the project limits. All brush and organic material shall be removed before placing any earth fills. It shall be the Contractor's responsibility to save and protect all trees that lie outside the construction area. No trees shall be removed unless approved by the Owner.

B. GRUBBING: Grubbing consists of the complete removal of stumps, including tap roots or lateral roots 1-1/2 inches or more in diameter, and the removal of brush, grass or weeds to depths below the natural ground as specified herein. Stumps shall be grubbed to a depth of 3 feet and grass or weeds shall be grubbed to a depth of 6 inches below the natural ground surface, or to the depths as determined in the field by the Soil Engineer at the time of construction.

C. PROTECTION: Existing items not designated to be demolished or removed shall be protected from damage. Any such item damaged by the Contractor shall be restored or replaced immediately at the Contractor's expense.

D. DEBRIS AND WASTE MATERIAL: All debris and waste material resulting from demolition, clearing, and grubbing shall be removed from the site and disposed of by the Contractor.

3.03 DUST CONTROL

The Contractor shall take all steps possible to prevent and reduce dust arising from the construction activity. He shall have adequate water trucks on the site at all times and water, as necessary, the areas where dust may arise. He shall cooperate fully with the Owner and water immediately when instructed to do so.

3.04 CARE OF DRAINAGE WATER

Contractor shall take care of drainage water from the construction operations, and of storm water and/or wastewater reaching the construction area from any source, so that no damage will be done to the excavation, pipe or structures. The Contractor shall be responsible for any damages to persons or property on or off the construction site due to such drainage water or to the interruption or diversion of such storm water or wastewater on account of his operations.

Such grading shall be done as may be necessary to prevent surface water from flowing into excavations, and any water accumulating therein shall be removed by pumping or by other reviewed methods.

Protection of the site during the construction shall be the responsibility of the Contractor. Completion of a portion of the project shall not preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete.

3.05 EXCAVATION

A. GENERAL: The Contractor shall perform all excavation necessary or required as shown on the Drawings. The excavation shall include the removal and disposal of all earth materials of whatever nature encountered, which shall include both rock excavation and common excavation when both are present, and shall include the furnishing, placing, and maintaining of shoring and bracing necessary to safely support the sides of the excavations. The Work shall also include all pumping, ditching and other required measures for the removal or exclusion of water.

B. EXCAVATION FOR STRUCTURES: Structure excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the Work. The removal of such materials shall conform

to the lines and grades shown on the Drawings and/or herein specified. Temporary structure excavations shall at all times conform to the Requirements of the State of California, Division of Occupational Health and Safety, and pertinent requirements contained in referenced Geotechnical Investigation Report and Specification Section 02415, Sheeting, Waling and Shoring.

Continuous wall and isolated footings shall be underlain by a minimum compacted controlled fill thickness equal to 1.5 times the footing width or greater if indicated in the referenced Geotechnical Investigation Report. This zone of over-excavation, scarification and recompaction shall extend a minimum of five feet beyond the footing lines. Exposed surface shall be scarified, and brought to optimum moisture content and compacted to a minimum of 95 percent relative compaction.

All surfaces to receive concrete slabs-on-grade shall be underlain by a minimum compacted controlled fill thickness of 18 inches or greater if indicated in the referenced Geotechnical Investigation Report. This shall be accomplished by combination of over-excavation and recompaction to 95% relative compaction.

Contingent upon locations, all surfaces to receive compacted fill shall be scarified, brought to near optimum moisture content and compacted to required percentage of relative compaction as specified herein.

Rough grade excavations for structures and footings will be inspected by the Owner to verify that the excavations extend into satisfactory soils and are free of loose and disturbed materials.

Foundation for tanks, pump vaults or subsurface chambers shall have structural fill material extending 12 inches, minimum, below the structural base slab to native material, which has been scarified and compacted to 95% relative compaction.

3.06 STRUCTURAL BACKFILL

A. PLACEMENT OF STRUCTURE BACKFILL: Before beginning back-filling, all foreign material, including water, shall be removed from the space to be backfilled and the area to be backfilled shall be inspected and approved by the Owner. Sloping sides of the excavated space shall be stepped to prevent wedging action of the backfill against the structure. No backfill shall be placed around or upon any structure until it is proven that the concrete has attained satisfactory strength in accordance with Section 03300 and that the structure as a whole is adequate to receive backfill.

The compressive strength shall be determined by tests on representative cylinders cured under conditions similar to those prevailing at the site.

Backfill shall be placed in uniform layers on opposite sides of structures and walls before compaction. The Contractor shall inform the Owner of the sequence of backfilling to be followed around each structure and this sequence shall be reviewed by the Owner before any backfilling is placed.

B. COMPACTION OF STRUCTURE BACKFILL: Structure backfill shall be placed in horizontal layers of such depths compatible to the type of compaction equipment being used, but in no case shall the lifts exceed eight (8) inches. Each layer shall be evenly spread, the moisture content brought to near optimum conditions and then compacted. The density shall be as follows:

STRUCTURAL FILL COMPACTION

Type of Fill	Percent of Maximum Density of Optimum Moisture
Structural Fill Material	95
Structural Backfill Material	90

Backfill shall be mechanically compacted by equipment of a size and type reviewed by the Owner. Permission to use specified compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment shall not result in damage to adjacent ground, existing improvements, or improvements installed under the Contract.

Flooding, jetting or ponding shall not be permitted for the compaction of any structure backfill.

3.07 CONTROLLED FILL

A. GENERAL: Unless otherwise specified, fill material shall be compacted by the Contractor while at a moisture content near the optimum moisture content and to a density that is not less than 90 percent of the maximum density at optimum moisture.

Potentially expansive soils may be used in fills below a depth of 24 inches and shall be compacted at moisture content greater than the optimum moisture content for the material.

Slopes shall be 2:1 unless otherwise shown on the Plans. No slopes shall be constructed steeper than 2:1. Areas to receive fill shall be prepared as

shown on the Plans and approved in writing by the Owner prior to placement.

B. PREPARING AREAS TO BE FILLED: All vegetable matter and objectionable material shall be removed by the Contractor from the surface upon which the fill is to be placed and any loose and porous soils shall be removed or compacted to a depth specified by the Soil Engineer. The surface shall then be plowed or scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches shall be excavated into the adjacent slope area. Keying and benching shall be sufficient to provide at least 6-foot wide benches and a minimum of 4 feet vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill shall be placed in an area subsequent to keying and benching until the area has been reviewed by the Soils Engineer. Material generated by the benching operation shall be moved sufficiently away from the bench area to allow for the review of the horizontal bench prior to placement of fill. Typical keying and benching details shall be as shown on the Drawings.

After the foundation for the fill has been cleared, plowed or scarified, it shall be disced or bladed by the Contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted as specified.

C. PLACING, SPREADING, AND COMPACTING FILL MATERIAL: The fill material shall be placed by the Contractor in thin layers that when compacted shall not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Soils Engineer, water shall be added by the Contractor until the moisture content is as required for the specified compaction.

When the moisture content of the fill material is above that required by the Soils Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density.

Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet. If the desired compaction is not achieved, the existing slope shall be over-excavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent water courses.

3.08 PAVEMENT SUBGRADE

All base course and AC pavement shall be underlain by a minimum 12 inch thickness of controlled compacted fill. In areas where less than 12 inches of fill or no filling is proposed, the existing grade shall be scarified and the moisture content adjusted to obtain optimum moisture content and recompacted to a depth of at least 18 inches. Compaction shall be a minimum of 95 percent of relative compaction.

3.09 CLEAN-UP

Upon completion of Work in this Section, all rubbish and debris shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition.

3.10 DISPOSAL OF SURPLUS AND/OR UNSUITABLE MATERIALS

Excavated materials which are determined by the Soil Engineer to be unsuitable for use in controlled fill, structural fill or structural backfill shall be disposed of, offsite, by the Contractor or in an area pre-approved by the Owner.

3.11 IMPORTATION OF SUITABLE FILL MATERIALS

In the event that sufficient quantities of excavated material are not available at the Contract work site, Contractor shall provide suitable material for controlled fills from an alternate source, as approved by Owner's Geotechnical Engineer. Include all associated costs in items provided on Bidding Sheet.

END OF SECTION 02200

SECTION 02221
TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in Conditions of Contract and Division 1 form a part of this Section. The Work of this Section includes all labor, machinery, construction equipment, and appliances to perform in a good workmanlike manner all trench excavation and backfill work shown on the Drawings and herein specified.

A. WORK INCLUDED IN THIS SECTION: Principal items included:
   1. Trench excavation, backfill and compaction.

B. RELATED WORK NOT INCLUDED IN THIS SECTION:

Item		Section
1.	Earthwork & Site Preparation	02200
2.	Sheeting, Waling & Shoring	02415
3.	Piping & Conduit Work specified in other Sections.	

1.02 GENERAL REQUIREMENTS

Requirements of Section 02200 apply to this Section.

1.03 SAFETY

The Contractor shall familiarize himself with, and shall at all times conform to all applicable regulations of "Excavations, Trenching, and Shoring" of OSHA Safety and Health Regulations for Construction, "General Construction Safety Orders" and "Trench Construction Safety Orders" of the State of California, Department of Industrial Relations, Division of Occupational Health and Safety, and pertinent requirements of Soils Investigations Report referenced in Specification Section 02200 (if applicable) and applicable requirements specified in Section 02415.

1.04 INSPECTION AND CONTROL

A Soils Engineer may be engaged by the City, who shall act as the direct representative of the City in soils work, to perform inspection of the removal and replacement of unsuitable materials, and the placement and compaction of all fills and backfills within the limits of earthwork on this project. All work shall be done in accordance with these Specifications and as directed by the City. Costs for all such inspections and tests will be paid by the City. If retesting is required because the Contractor did not meet the Specification, the Contractor shall pay for all retesting.

1.05 REQUIREMENTS

A. GENERAL:

1. The Work performed under this Specification shall be constructed to the lines, grades, elevations, slopes and cross sections indicated on the Drawings, specified herein, and/or directed by the City in writing. Slopes, graded surfaces, and drainage features shall present a neat, uniform appearance upon completion of the Work.
2. It shall be the Contractor's responsibility (1) to maintain adequate safety measures and working conditions; and (2) to take all measures necessary during the performance of the Work to protect the entire project area and adjacent properties which would be affected by this Work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the City. It shall be the Contractor's responsibility to maintain completed areas until the entire project area is in satisfactory compliance with the project Specifications.
3. Contractor shall be responsible for the excavation and disposition of unsuitable or surplus material by approved means of conveyance away from the working area.

B. UTILITY PROTECTION: Utility lines and structures indicated on the Drawings which are to remain in service shall be protected by the Contractor from any damage as a result of his operations. Where utility lines or structures not shown on the Drawings are encountered, the Contractor shall report them to the City before proceeding with the Work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by his operations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. SELECT GRANULAR MATERIAL: Select granular material shall conform to the size gradation listed below. The use of other material shall be reviewed by the City prior to use. The City may require certification that the material meets the following gradation.

SELECT GRANULAR MATERIAL

Sieve Size	Percent Passing	
	Min.	Max.
3/4 inch	100	-
3/8 inch	80	90
No. 4	10	15
No. 8	0	5

B. SELECT BACKFILL MATERIAL: Select backfill material shall be material excavated from the trench. The material shall be free of rubbish, broken pavement, debris, stones greater than 4 inches in greatest dimension, organic mulch, or other deleterious materials. If the excavated trench material is unsuitable for backfill, other imported material shall be used, provided the material is reviewed by the City prior to import or placement. The imported material shall be select earth, sand, or gravel, conforming to the requirements for the material excavated from the trench and used for backfill.

C. CONCRETE: 3,000 psi compressive strength, minimum, as specified in Section 03300.

D. PIPELINES: Use materials shown on the Drawings and as specified in other pertinent Sections of this Specification.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

A. EXCAVATION FOR TRENCHES: Shall include the removal of all material of any nature for the installation of the pipe or facility and shall include the construction of trench shoring and stabilization measures, timbering and all necessary installations for dewatering.

B. MINIMUM WIDTH OF TRENCH: The minimum width of pipe trenches, measured at the crown of the pipe, shall not be less than 12 inches greater than the exterior diameter of the pipe, exclusive of bells and the minimum base width of such trench shall be not less than 12 inches greater than the exterior diameter of the pipe, exclusive of special structures or connections, and such minimum width shall be exclusive of all trench supports.

C. MAXIMUM WIDTH OF TRENCH: The maximum allowable width of trench for all pipelines measured at the top of the pipe shall be the outside diameter of the pipe (exclusive of bells or collars) plus 16 inches, and such maximum shall be inclusive of all timbers. A trench wider than the outside diameter plus 16 inches may be used without special bedding if the Contractor, at his expense, furnishes pipe of the required strength to carry the additional trench load. Such modifications shall be submitted for the City's review. Whenever such maximum allowable width of trench is exceeded for any reason, except as provided for on the Plans or in the Specifications, or by the written direction of the City, the City may, at its discretion, require that the Contractor, at his own expense for all labor and

materials, cradle the pipe in 2500 psi compressive strength concrete, or other approved pipe bedding.

D. MAXIMUM LENGTH OF OPEN TRENCH: Except by special permission by the City only that amount of open trench shall be permitted, which shall allow for that amount of pipeline construction, including excavation, construction of pipeline, and backfill in any one location, which can be completed in one day; however, maximum length of open trench shall never exceed 600 feet. This length includes open excavation, pipe laying and appurtenant construction and backfill which has not been temporarily resurfaced.

E. TRENCH SIDE SLOPES:
1. Temporary trench excavations shall at all times conform to the safety requirements hereinbefore specified in Paragraph entitled "Safety".
2. Loose cobbles or boulders shall be removed from the sides of the trenches before allowing workmen into the excavation, or the trench slopes must be protected with screening or other methods. Trench side slopes shall be kept moist during construction to prevent local sloughing and raveling. Surcharge loads due to construction equipment shall not be permitted within 8 feet of the top of any excavated slope.
3. If the Contractor elects to shore or otherwise stabilize the trench sides, he shall file with the City copies of drawings for same prepared and signed by a Civil Engineer duly registered in the State of California before commencing excavation.

F. EXCESS TRENCH EXCAVATION: If any trench, through the neglect of the Contractor, is excavated below the bottom grade required, it shall be refilled to the bottom grade, at the Contractor's expense for all labor and material, with select granular material compacted to a firm stable foundation.

3.02 BRACING TRENCHES

The sides of the trenches shall be supported with plank sheeting and bracing in such a manner as to prevent caving of the sides of the trench. Space left by withdrawal of sheeting or shoring shall be filled completely with dry granular material blown or rammed in place. All trenches deeper than 5 feet shall be shored unless cut to the angle of repose of the excavated soils.

3.03 PIPING BEDDING

The Contractor shall excavate to 4 inches below the bells or couplings for the full width of the trench and shall place four (4) inches of select granular material upon which the pipe is to be laid. In cases, as determined by the City where trench material is suitable for

use as bedding, the trench may be excavated to a point above the invert grade, and the trench bottom hand-shaped so that the bottom segment of the pipe is firmly supported on undisturbed material.

At pipe subgrade, if foundation soil in trench is soft, wet, spongy, unstable or does not afford solid foundation for pipe, the Contractor shall excavate as directed by the City and provide stable base by excavating any unsuitable material 24" minimum below the subgrade base or as the City decides is necessary for placement of pipe bedding.

Where rock is encountered in the trench, the Contractor shall excavate to a minimum 18 inch depth below subgrade or as the City decides is necessary, and shall construct a base by placing select granular material upon which a subgrade can be prepared.

Before any pipe is lowered in place, the trench bottom shall be prepared so that each pipe shall be supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of one-half of the pipe OD, and a width equal to the trench width. All adjustments in line and grade shall be made by scraping away or filling and tamping in under the barrel of the pipe. Wedging or blocking is not permitted.

The pipe bedding shall be compacted to a minimum of 90 percent relative compaction as herein after specified.

3.04 BACKFILLING PIPE TRENCHES

A. BACKFILLING PIPE ZONE: Backfill material for the pipe zone shall consist of select granular material as specified in paragraph 2.01.1. Place material in the trench simultaneously on each side of the pipe for the full width of the trench and the depth of the pipe zone in layers 6 inches in depth. Each layer shall be thoroughly compacted by tamping. In all cases, backfilling of the pipe zone must be done by hand. Particular attention shall be given to underside of the pipe and fittings to provide a firm support along the full length of the pipe. The pipe zone shall be considered to extend 12 inches above the top of the pipe, and shall be compacted in the trench to a relative compaction of not less than 90 percent as herein after specified. Care shall be taken not to damage pipe or special coatings on the pipe.

1. Use of Material other than those specified shall be reviewed by the City prior to use. The Contractor shall bear all cost of removal of rejected material, its hauling to an authorized disposal site, and cost of providing required material to complete the bedding and backfilling.

B. BACKFILLING PIPE TRENCH: After the pipe has been laid in the trench and has been inspected and approved, and backfilling in the pipe zone is complete and compacted, the remainder of the trench may be

backfilled. The backfill material shall be select backfill material as specified in paragraph 2.1.2. Care shall be taken to ensure that no voids remain under, around or near the pipe.

1. Whenever imported borrow for backfill is required, the Contractor shall furnish this borrow material and dispose of the excess trench excavation and shall include the expense of this work in his bid.

C. COMPACTION: The maximum dry density and optimum moisture content of each soil type used in the controlled compacted fill shall be determined by ASTM D-1557-91. Field density tests shall be determined in accordance with ASTM D1556-82, ASTM D2937-83, D2922-81.

D. PLACEMENT AND COMPACTION OF TRENCH BACKFILL: The placement and compaction of all trench backfill shall conform to one of the following methods subject to the qualification specified therein:

1. Mechanically Compacted Backfill: With review of City backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers to 90 percent relative compaction except that backfill compaction for trenches above the pipe zone shall be to a minimum 95 percent in areas under buildings and pavements. Where the backfill soil has a clay-like behavior and has a plasticity index of at least 12, only the upper 3 feet of material placed shall require minimum compaction of 95 percent. Impact-type pavement breakers (stompers) shall not be permitted over any pipe. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the Contract. The Contractor shall make his own determination in this regard. Mechanically compacted backfill shall be placed in horizontal layers not exceeding eight inches. Each layer shall be evenly spread, the moisture content brought to near optimum condition and then tamped or rolled until the specific relative compaction has been attained.

3.05 CENTRAL PIPELINE INSTALLATION REQUIREMENTS

A. DEPTH OF PIPE: Unless otherwise shown on the Plans, all pipelines shall have a coverage of at least 36 inches between the top of the pipe and the finished surface. All gravity line invert elevations and locations shown are intended to be exact and any change in alignment and grade may only be made with the review of the City. All force and gravity mains shall have 1 foot vertical clearance between themselves and all other utilities.

At all water main crossings, both gravity and force mains shall have 20 linear feet of concrete encasement centered at the crossing.

B. CHANGES IN LINE AND GRADE: In the event obstructions not shown on the Plans are encountered during the progress of the Work which will require alterations to the Plans, the City will issue the necessary changes to the Plans and order the necessary deviation from the line or grade. The Contractor shall not make any deviation from the specified line and grade without prior review by the City. Should any deviations in line and grade be permitted by the City in order to reduce the amount of rock excavation or for other similar convenience to the Contractor, any additional costs for thrust blocks, valves, air and vacuum valve assemblies, blow-off assemblies, extra pipe footage, concrete, sewer structures, or other additional costs shall be borne by the Contractor.

1. Contractor shall include in his Bid provisions to cover any deviation from the invert grade shown on the Plans to facilitate extra depth required to eliminate possible conflicts between culverts and other utilities with the force and sewer mains.

C. INSTALLING PIPE: Contractor shall, after excavating the trench and preparing the proper bedding for the pipe, furnish all necessary facilities for properly lowering and placing sections of the pipe in the trench without damage and shall properly install the pipe. The section of pipe shall be fitted together correctly and shall be laid true to line and grade bedding material, but if the pipe has a projecting bell, suitable excavation shall be made to receive the bell which shall not bear on the subgrade. The requirements for closely fitting the bottom of the pipe to the bedding material for the width shown on the Drawings shall be strictly enforced.

1. Pipe shall be laid up grade. Any pipe which is not in true alignment, both vertical and horizontal, or shows any undue settlement after laying shall be replaced when so ordered by the City. No pipe shall be laid which is damaged, cracked, checked or spalled or has any other defect deemed by the City to make it unacceptable, and all such sections shall be permanently removed from the Work.
2. At all times when the Work of installing pipe is not in progress, all openings into the ends of the pipelines shall be kept tightly closed with suitable plywood or sheet metal bulkheads to prevent the entrance of animals and foreign materials and to prevent water from entering the pipe.
3. Keep the pipe trench free from water at all times and take all necessary precautions to prevent the pipe from floating due to water entering the trench from any sources. Any damage is the Contractor's full responsibility. Restore and replace the pipe to its specified conditions and grade if it is displaced due to floating.

4. All pipelines adjoining concrete structures (including manholes) shall have a flexible joint within 36 inches from the face of such concrete structures. Flexible joints shall be installed on all pipe 4" and larger whether a flexible joint is shown on the Drawings or not. Where the flexible joint is shown on the Drawings, install the joint at the location shown.

3.06 CLEANUP

Immediately upon completion of Work of this Section, all rubbish and debris shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition.

END OF SECTION 02221

SECTION 02250
SEWER BYPASS SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. During rehabilitation of the manholes, Contractor may determine that the existing sewer flows need to be bypassed or contained through the manhole. Conveyance of sewage shall not be interrupted by project construction. The Contractor shall be responsible for necessary bypassing of the existing sewers and bear all costs for same.

B. Once normal operation of the existing sewer is interrupted, the sewer shall be considered bypassed and the responsibility of maintaining sewage conveyance by pumping shall be the Contractor's. Contractor shall remain solely responsible for the operation of the bypass facilities until such time as the existing manhole is rehabilitated and ready for service.

C. Contractor shall have adequate number of pumper trucks available to haul away sewer flows where required. Manholes shall be kept active or dry of sewer flow with the use of Flow-Thru plugs and hoses.

D. Bypass facilities shall be located in a manner so as to minimize the impact on adjacent properties, traffic, and potential for sewage spill.

E. This article covers furnishing all labor, supervision, materials and equipment and performing all operations necessary to installing and maintaining sewer bypass systems.

F. This item shall include all equipment, maintenance and operations necessary to bypass the sewer for the construction of the sanitary sewer gravity main and force main relocation and replacement as shown on the project plans.

G. The provisions of Section 7-8.5 “Sanitary Sewers” and Section 306-5 “Dewatering” of the Standard Specifications for Public Works Construction (SSPWC) and all other applicable provisions of these specifications shall apply except as modified and supplemented below.

H. The Contractor shall construct, operate, maintain and remove, without damage to existing structures, all temporary sewage handling facilities. The Contractor shall supply the pumps, conduits, power, labor and other

equipment to divert the flow of sewage around the areas where work is to be performed. The bypass system shall be of sufficient capacity to handle existing flow and, if required by the Contract Documents, additional flow during a rainstorm. The Contractor shall have on-site a 100% backup of the by-pass systems and capable of pumping 150% of the existing flow. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility through the duration of the project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Division 9 - Finishes

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. All Work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following publications to the extent that the provisions thereof are not in conflict with other provisions of these Specifications.

B. Comply with the applicable editions of the following codes, regulations and standards.

1. City of Imperial Detail Drawings for the Construction of Sanitary Sewer Systems

2. Industry Standards:

SSPWC "Green Book", Standard Specifications for Public Works latest edition.

C. Comply with the applicable reference Specifications as directed in the General Conditions, other applicable parts of the Contract Documents, and specified herein.

1.04 SUBMITTALS

A. Complete fabrication, assembly, and installation drawings, together with details and data governing materials used and other accessories furnished, shall be submitted for approval in accordance with General Conditions,

other applicable parts of the Contract Documents, and as specified herein. Data shall include, but not be limited to, the following items.

A. The Contractor shall submit four copies of the drawings of material and equipment; it may be the brochures of catalog sheets of manufacturer, showing in sufficient details the dimensions and manufacturer's tolerances. In addition, Contractor shall submit a complete bypass plan that includes scheduling.

B. Qualifications of the person preparing the plan.

C. Flow Monitoring Plan.

D. Bypass plan per requirements of this section. Specify when the plan is required to be submitted. Allow time, at least 30 days, for review and approval. City must receive notification one week in advance before bypassing starts and bypass plan must be approved at the time notification of bypass activities is sent.

E. Written Spill prevention and emergency response plan. The plan shall identify waterways, channels, stormwater drains to be protected, emergency contacts, notification procedures.

F. Traffic Control Specification – include reference to that section if applicable.

PART 2 – PRODUCTS

2.01 GENERAL

A. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The bypass system shall, at a minimum, meet the requirements and include the equipment as specified herein.

2.02 ANTICIPATED FLOWS

A. Pump and motor system rated at a capacity sufficient to convey the upstream peak flows as required by the Contract Documents. Provide all temporary high lines, line stops, thrust restraints, etc. as required.

B. Peak flows for each manhole location is provided on Sheet 2 of the Project Plans.

2.03 GENERAL SYSTEM REQUIREMENTS

A. The bypass systems are to be monitored 24-hours a day, 7 days a week for the entire duration of work by personnel on-site duly qualified to maintain and operate the sewer bypass system.

B. Pump starter and control panel which includes the following:

1. Hand-off-auto selector
2. Run indication light
3. Fail indication light
4. High level indication light

C. Float control system which includes the following:

1. Low level float (pump stop)
2. High level float (pump start)
3. High level float (high level alarm)

D. An alarm system which will notify Contractor personnel in the event of an alarm (pump fail and high level).

E. Sound attenuated enclosure for all engine drivers and/or power generating equipment.

F. 100% standby capacity shall be installed as part of any bypass system such that, in the event of a failure of the primary bypass equipment, stand-by equipment may immediately be placed into service.

G. Backup power.

H. Flow monitoring of upstream and downstream flows.

2.04 PUMPS

A. All pump(s) drivers shall have noise suppresser exhaust systems to mitigate the noise levels to less than 50 dB or 10 dB above ambient noise level when measured at the property lines closest to the noise source.

B. The Contractor shall be responsible for furnishing the necessary pump(s) and back- up pumps to adequately convey 150% of the stated flows in

Article entitled “Anticipated Flows” of this Specification.

C. Contractor shall account for the suction lift and the pressures at the force mains and shall provide for all requirements, equipment, etc. to accommodate these hydrological parameters.

PART 3 – EXECUTION

3.01 BYPASS PUMPING

A. All pump(s) drivers shall have noise suppresser exhaust systems to mitigate the noise levels to less than 50 dB or 10 dB above ambient noise levels when measured at the property lines closest to the noise source.

B. Under no circumstances shall sewage or solids be deposited onto the ground surface, or into ditches, catch basins or storm drains or natural drainage ways. Sewage shall be handled in a manner so as not to create a public nuisance of health hazard.

C. The Contractor shall be responsible for any waste solids and shall property handle, transport, and dispose of said solids in accordance with the requirements of all codes and regulatory agencies having jurisdiction. Contractor shall be responsible for preventing, containing, recovery, and legal disposal of sewer overflows and spills. Contractor shall be responsible for handling penalties, liability, and claims for causing or allowing wastewater spills.

D. The sewage flow from the sewer main(s) shall be maintained during construction and handled in a manner so as not to create a public nuisance or health hazard during the execution of the work to be performed under this Contract. In the event that sewage backup occurs and enters dwellings or other structures the Contractor shall be responsible for cleanup, repair property damage costs and all claims arising therefrom. All spills shall be contained and returned to the sanitary sewer system.

E. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing systems. The bypass systems are to be monitored 24-hours a day, 7 days a week for the entire duration of work by personnel on-site duly qualified to maintain and operate the sewer bypass system.

F. The Contractor shall provide reliable sewer service to the users of the sanitary sewer at all times, so as to prevent backup and/or overflow into

adjacent streets, ditches, storm sewers and waterways during construction of the sewer pipes and to allow for manhole connections, construction and reconstruction.

3.02 DESIGN REQUIREMENTS

A. The Contractor shall have adequate standby equipment with 100% standby capacity available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

B. Bypass pumping system shall be capable of bypassing the flow around the work area without interrupting, causing operational issues, or sewer overflows in the City's sanitary sewer system and of releasing any amount of flow up to full available flow in the work area as necessary for satisfactory performance of work.

3.03 PERFORMANCE REQUIREMENTS

A. It is essential to the operation of the existing sewage system that there is no interruption in the flow of sewage throughout the duration of the project. To this end, the Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor, tools and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work.

B. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

C. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.

D. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

E. The Contractor shall protect water resources, wetlands and other natural resources.

3.04 BYPASS PUMPING AND FLOW CONTROL PLAN

A. The Contractor shall be responsible to prepare and submit a bypass pumping and flow control plan in conformance with the requirements of Section 306-6 of the Public Works Specifications, and these Specifications. A bypass pumping and flow control plan is to be submitted **10 Calendar Days** after Notice to Proceed (allow 20 days for review). Contractor shall notify the City in writing 2 weeks in advance before bypassing activities. Notice to start any bypassing activities shall be given only after the bypass plan has been approved.

B. The Contractor shall submit detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, interception of sewer/discharge locations, elevations (water levels, street, sewer line, bypass line, point of discharge), capacities of equipment, materials and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the City.

C. The plans shall include but not be limited to details of the following:

1. Bypass start and end dates;
2. Name and phone of who is responsible for daily operation;
3. 24-hour contact information in case of operational emergency;
4. A Spill Response Plan Should be included as part of this bypass pumping plan;
5. A flow monitoring plan (to verify bypassing system can handle the flows) should be included as part of this bypass pumping plan.
6. Staging area for pumps;
7. Traffic control measures to accommodate bypass equipment and staging area;

8. Sewer plugging method and types of plugs;
9. Number, size, material, location and method of installation of suction piping; and
10. Number, size, material method of installation and location of installation of discharge piping;
11. Bypass pump sizes, capacity, number of each size to be on site and power requirements;
12. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted);
13. Standby power generator size, location;
14. Downstream discharge plan specifying how bypassing sewer will be handled or directed.
15. Method of protecting discharge manholes or structures from erosion and damage;
16. Thrust and restrain block sizes and locations;
17. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill;
18. Method of noise control for each pump and/or power generator;
19. Any temporary pipe supports and anchoring required;
20. Design plans and computation for access to bypass pumping locations indicated on the drawings;
21. Calculations for selection of bypass pumping pipe size;
22. Schedule for installation of and maintenance of bypass pumping lines;
23. Plan indicating selection location of bypass pumping line locations;
24. Sequence for bypass removal and sewer main system cleaning.

3.05 SERVICE INTERRUPTION

A. The Contractor shall maintain sewer service to all upstream users. Any service interruption will require prior City approval and coordination with City staff.

3.06 MEASUREMENT AND PAYMENT

A. Measurement

1. The sewer bypass system shall not be measured for payment.

B. Payment

1. Payment for the sewer bypass system shall be paid at the Lump Sum Contract Unit Price stated in the appropriate Bid Item(s). Payment shall constitute full compensation for furnishing the installing of material, labors, pumps, construction staking and surveying, traffic controls, continual monitoring, back- up systems, system removal, pipeline jetting, surface restoration (including pavement replacement), sound attenuation, permitting, and all other incidentals necessary to complete the work per the satisfaction of the City. Payment will occur upon satisfactory completion of the task. No additional compensation will be allowed thereof.

END OF SECTION 02250

SECTION 02415
SHEETING, WALING AND SHORING

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in the Conditions of the Contract and Division 1 form a part of this Section. Provide protective installation consisting of shores, wales, braces, posts, piling, sheeting, anchorages and fastenings, both temporary and permanent, for accomplishment and protection of Work.

A. WORK INCLUDED IN THIS SECTION: Principal items included:
   1. Shoring and sheeting for structure excavation.
   2. Temporary sheeting and bracing for pipeline work as required.
   3. Materials for permanent sheet and bracing.

1.02 QUALITY ASSURANCE

A. MATERIAL STANDARDS: Furnish lumber for shores, wales, and sheeting of grading required by the American Lumber Standards for the particular application.

1.03 SUBMITTALS

Contractor shall submit complete calculations of the sheeting system including sizing of sheeting wales, rakers, anchor system, struts, earth anchors, anchor piles, tie rods or any other components pertinent to the design prior to the start of any Work involving sheeting and bracing. All designs submitted shall be signed by an engineer duly registered in the State of California.

1.04 JOB CONDITIONS

Buried debris may be found at some locations. Federal and local requirements for safety of job personnel and public will apply to work under the Section.

1.05 ALTERNATIVES

The use of application of alternative methods and materials, and the employment of proprietary systems under lease or franchise in lieu of that specified herein, may be allowed. Demonstration of suitability and compliance with these Specifications will be required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. LUMBER:

1. Temporary Shores, Wales and Sheeting: Furnish structural grade planks, beams, and posts as defined and specified for stress-grade lumber in the American Lumber Standards. Lumber may be rough, untreated, in random lengths, and shall be of standard dimensions.
2. Permanent Sheeting: When permanent sheeting is called for on the Drawings, provide and install planks, beams, posts and timbers of unseasoned, rough, new southern yellow pine or Douglas Fir meeting the requirements of ASTM Standard D25, Class "C". In lieu of the above, lumber dressed to standard dimensions, dried and treated in accordance with Standard T-3 of the American Wood Preservers' Association may be utilized.

B. FASTENINGS: Provide fastenings for permanent sheeting as recommended in the National Design Specification for stress-grade lumber and its fastening.

PART 3 - EXECUTION

3.01 INSTALLATION

Install sheeting and bracing for trench and structure excavation progressively as the removal of excavated material requires. Butt planks to exclude groundwater and fines, preventing the erosion of voids outside sheeting. In soft, wet ground drive sheeting to a lower level as excavation progresses to that sheeting is embedded in undisturbed earth. Bracing of sheet piling may be permitted to penetrate the structural concrete only as directed by the City. Refer to Section 03300. Install wales and struts at close intervals so as to prevent displacement of the surrounding earth and to maintain safe conditions in the Work area. Any damage proven to result from improper installations shall be the responsibility of the Contractor. Temporary sheeting for trench and structure excavation may be removed and reused. Withdraw individual planks alternately as the backfill is raised, maintaining sufficient sheeting and bracing to protect the Work and workmen. Remove bracing completely. Where unstable conditions occur in the underlying strata from any cause, and withdrawal of sheeting will endanger the Work, a portion of the sheeting, including bracing, may be left in place with approval of the City. Remove all wood within a zone extending four (4) feet below finished grade. Leaving such material in place shall not be cause for an increase in Contract price.

END OF SECTION 02415

SECTION 02510

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in Conditions of the Contract and Division 1 form a part of this Section. Provide labor, equipment, tools and materials to accomplish asphalt concrete paving as indicated on the Drawings and/or on the Bidding Sheet.

1.02 REFERENCE SPECIFICATION

Asphalt concrete paving work shall be in accordance with State of California, Department of Transportation Standard Specifications, Current Edition.

1.03 PAVEMENT REMOVAL AND REPLACEMENT

A. GENERAL: Pavement removal and replacement for all public roads, including aggregate base and temporary paving where required, shall comply with all the requirements of the agency issuing the Encroachment Permit. In roads established under formation of a special road Owner, the specifications of the Encroachment Permit shall apply. Any private roads and streets, including driveways and facilities in which the surface is removed or damaged, shall be restored to the original grade and crown or as shown on the grading plans by the Contractor in accordance with the paving requirements described herein. Removed or damaged sections shall be restored with the type of improvements (or better) conforming to that which existed at the time the Contractor entered upon the work.

It shall be the responsibility of the bidder to satisfy him as to the existing pavement sections prior to submitting his bid.

B. PAVEMENT CUTTING: Pavement shall be cut to a straight edge parallel to the pipe alignment prior to excavation. Method of pavement cutting shall be as specified by the agency having jurisdiction or as approved by the Engineer. Under no circumstances shall excavation be started prior to scoring of pavement. If the adjacent pavement is disturbed during the Contractor's operation, the pavement shall be recut on a straight line to remove the damaged pavement before resurfacing. Portland cement concrete pavement and sidewalk shall be saw cut.

C. ASPHALT CONCRETE CAP: Where required by the agency issuing the Encroachment permit or other agency having jurisdiction, and where specified in the Contract Documents, an asphalt concrete cap shall be placed along the length of the trench. The installation of the asphalt concrete cap shall be in accordance with the specifications and policies of the agency having jurisdiction. Where the asphalt concrete cap is not specifically stated in the applicable permit or on the drawings, and when directed by the Engineer, the minimum cap shall be a feathered 1-inch thick, 12-foot wide section centered over the center of the trench or the traveled way, and pulled with a "Barber Greene" or equivalent.

PART 2 - PRODUCTS

2.01 ASPHALT CONCRETE PAVING

A. MIX: PG 70-10 per Caltrans Section 39.

B. THICKNESS: Per plans.

C. AGGREGATE SIZE: 1/2" maximum, medium per Caltrans Section 39.

D. ASPHALT CONTENT: 5% to 8% by weight.

E. PRIME COAT: Per Caltrans Section 39-4.02.

2.02 ASPHALT CONCRETE CAP

A. MIX: PG 70-10 per Caltrans Section 39.

B. THICKNESS: Per plans.

C. AGGREGATE SIZE: 3/8" maximum, fine.

2.03 BITUMINOUS SEAL

A. SPECIFICATION: Caltrans Section 37.

B. MATERIAL: Slow setting, mixing type asphaltic emulsion per Caltrans Section 94.

PART 3 - EXECUTION

3.01 ASPHALT CONCRETE PAVING

A. APPLICATION: Mixing transporting and placing of asphalt concrete shall be in accordance with all applicable provisions of Caltrans Section 39.

B. REDWOOD HEADERS: Provide 2"x4" redwood headers for all pavement edges.

C. REPAIRS: Deficient paving and/or low areas with inadequate drainage; and damaged paving due to subgrade failure, inadequate trench compaction, etc. shall be repaired by the Contractor at no additional cost to the Owner.

3.02 BITUMINOUS SEAL

A. APPLICATION: Apply bituminous seal at a rate of 0.05 gallons per square yard of surface area.

3.03 PAVING SCHEDULE

Unless otherwise approved by the Engineer, all permanent paving shall commence only after construction of all other contract work is completed.

END OF SECTION 02510

SECTION 02535

TRAFFIC STRIPES, PAVEMENT MARKINGS AND PAVEMENT MARKERS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS:

B. PAVEMENT MARKERS:

1.02 RELATED SECTIONS

A. Section 02510 – Asphalt Concrete Paving.

1.03 REFERENCES

Standard Specifications for Public works Construction (SSPWC), 2000 edition, Section 310-5.6 "Painting Traffic Striping, Pavement Markings, and Curb Markings", Section 210-1 "Paint".

Standard Specifications of the State of California Department of Transportation (State Standard Specifications), current edition, Section 91, "Paint"; Section 84, "Traffic Stripes and Pavement Markings"; Section 85, "Pavement Markers".

1.04 SUBMITTALS

A. MANUFACTURER DATA: Contractor shall submit manufacturer information detailing material and dimensional data for the following:

1. Paint

2. Glass Beads

3. Thermoplastic Traffic Stripe or Pavement Marking Material

4. Markers

B. TEMPORARY DELINEATION PLAN: Contractor shall provide a temporary Delineation Plan as part of the Traffic Control Plan and shall be submitted per General Conditions 6.23.

PART 2 – PRODUCTS

2.01 PAINT

Painted Traffic Striping and Pavement Marking Paint shall conform to Section 84-3.02 of the State Standard Specifications and shall be Rapid Dry Water Borne.

2.02 GLASS BEADS

Glass Beads shall conform to Section 84-3.02 of the State Standard Specifications.

2.03 PAVEMENT MARKERS

Pavement markers shall conform to Section 85 of the State Standard Specifications.

2.04 PAVEMENT MARKER ADHESIVE

Adhesive for use in cementing pavement markers to the pavement shall be of the Rapid Set type or the Standard Set type in accordance with Section 85-1.06 of the State Standard Specifications.

PART 3 – EXECUTION

3.01 ALIGNMENT AND LAYOUT OF TRAFFIC STRIPES, PAVEMENT MARKINGS, AND PAVEMENT MARKERS

Traffic Striping, Pavement Markings, and Pavement Markers shall be applied to replace existing striping, markings, and markers; as shown on the Contract Drawings; or as directed by the Engineer.

Layout of all traffic striping, pavement markings and pavement markers shall be the responsibility of the Contractor.

The Contractor shall perform all surveying as necessary to establish adequate control for alignment and layout of all striping, markings, and markers.

The initial layout of all striping, markings, and markers shall be marked by the Contractor using cat tracks or dribble lines. Prior to final striping, the Engineer shall review the alignment marked out and shall make adjustment as necessary. Adjustment of the initial layout by the Engineer shall not entitle the Contractor to additional compensation.

Alignment of striping, markings, and markers intended to replace existing striping, markings, and markers shall match existing alignment and layout except as directed by the Engineer.

3.02 TRAFFIC CONTROL

Contractor shall be responsible for maintaining safe traffic operation through the work area prior to and during application of permanent traffic striping, and pavement markings, and pavement markers.

Contractor shall submit a plan for traffic control during striping operations and a plan for temporary delineation prior to application of permanent delineation for review by the Engineer prior to any striping work.

Temporary delineation shall be applied to finished pavement surfaces prior to being returned or opened to free flowing traffic.

3.03 APPLICATION OF TRAFFIC STRIPES, PAVEMENT MARKINGS, AND PAVEMENT MARKERS

Traffic striping, pavement markings, and pavement markers shall be applied within 48 hours of installation of finished pavement.

Traffic striping and pavement markings shall be applied in two coat and shall conform to Section 84-3.03, 84.04 and 84-3.05 of the State Standard Specifications. The first coat shall be applied following completion of the rolling and application of the fog seal. Second coat shall be completed no later than 4 PM of the following day.

Traffic stripes and pavement markings shall conform to the Standard of the State of California, Department of Transportation.

Pavement markers shall be placed in conformance with Section 85 of the State Standard Specification.

END OF SECTION 02535

SECTION 02620
EXISTING UNDERGROUND UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in conditions of the Contract and Division 1, 2 and 15 form a part of this Section. Provide work related to existing underground utilities as set forth herein.

A. WORK INCLUDED IN THIS SECTION: Principal items are:
   1. Exposure of existing utilities.
   2. Advance notification of utility agencies.
   3. Crossing, protection and/or relocation of utilities.
   4. Protection of other existing facilities.

B. RELATED WORK NOT INCLUDED IN THIS SECTION: Site Utilities, Section 02610.

1.02 EXPOSURE OF UTILITIES IN ADVANCE OF WORK

A. DETERMINATION OF LOCATION AND DEPTH:
   1. Determine the true location and depth of all utilities and service connections; including the type, material, and condition of any utility which may be affected by or affect the work.
   2. Coordinate with all utility companies field locate all underground lines before start of construction.

B. EXPOSURE IN ADVANCE OF TRENCHING:
   1. Expose all utility mains that must be crossed or closely paralleled at least 1500' in advance of construction.
   2. Contractor shall immediately after field location, provide the location and depth of the "potholed" utilities to the Engineer.
   3. Expose all service connections before excavation in the area.
   4. All cost incurred in exposing utilities shall be borne by the Contractor.

C. RIGHTS TO MINOR ADJUSTMENTS IN DESIGN: The City reserves the right to make minor adjustments in pipeline alignment and grade, all at no additional cost to the City.

D. COMPLIANCE: Failure of the Contractor to comply with the provisions described herein will result in an order to suspend work until these provisions are complied with, and no additional compensation will be allowed as a result of such suspension.

1.03 ADVANCE NOTIFICATION OF UTILITY AGENCIES

1. Determine and notify those agencies requiring advance notification for inspection or other purposes before beginning construction in any area of concern to said agency.
2. Provide agencies with 48 hours minimum advance notice.

1.04 CROSSING PROTECTION AND/OR RELOCATION OF UTILITIES

A. GENERAL: Utilities for the purpose of these specifications shall be considered as including, but not limited to, and irrespective of ownership; Pipelines (including irrigation mains), conduits, transmission lines, and appurtenances of Public Utilities" (as defined in the Public Utilities Act of the State of California) and those of private industry, business, or individuals solely for their own use or for use of their tenants; and storm drains, sanitary sewer, street lighting, traffic signal systems, duct banks, telephone cable, transmission cables, and completely buried structures.

B. UTILITIES INDICATED ON DRAWINGS:

1. Indicated utilities are based upon the information provided by the utility company to the Engineer; and the accuracy and completeness of the utilities shown is not guaranteed.
2. The depth indicated in profile, unless a specific elevation is shown, is based on general practice and is not guaranteed at any specific location.
3. No service connections are shown on the Drawings. Contractor to determine the exact location of all utilities and their service connections. All costs to be included in bid items provided on Bidding Sheet, and no additional compaction will be made.

C. FIELD LOCATING:

1. Contractor shall have utility companies field locate their utilities prior to construction.
2. Where required, field location by Contractor forces shall be included in the contract price for which such work is appurtenant to and no additional allowance will be made therefor.
3. The Contractor shall make his own investigation as to the location and type of existing utilities and their appurtenances and service connections which may be affected by the contract work, and shall notify the City as to any utility located by him which has been incorrectly shown or omitted from the drawings.

D. UTILITIES ON PLANS AND NOT IN CONFLICT:

1. Where utilities cross or parallel the pipeline trench but do not conflict with the permanent work to be constructed, the Contractor shall protect the utility in place unless otherwise indicated on the plans.
2. Unless otherwise provided in the specifications, full compensation for crossing or paralleling of utilities shown on the plans shall be included in the contract unit price for which such work is appurtenant thereto and no additional allowance will be made therefor.

E. SPECIAL WATER/SEWER CROSSINGS:

1. At the locations shown on the plans or if the vertical separation between the outside of the sewer pipe and the outside of existing water pipes at crossings is less than one (1) foot, and when directed by the City, the Contractor shall provide the construction required per the detail shown on the plans and per the State Health Department Water/Sewer Special Construction Requirements. The special construction will be deleted at locations shown if the vertical separation is 1 foot or greater.
2. The City hereby reserves the right to increase or decrease this item from the quantity shown on the Proposal forms without altering the unit price bid per each. Payment will be made in accordance with the unit bid price provided on the Bidding Sheet; in the event no item for said special construction work is designated on the Bidding Sheet, Contractor shall be paid under the "Extra Work" provisions of the Contract Appendix.

F. RELOCATION OF UTILITIES BY THE CONTRACTOR FOR HIS OWN CONVENIENCE: The temporary relocation or the alteration of any utility desired by the Contractor solely for his own convenience in the performance of the contract work, to a position or condition other than that provided for in the specifications or shown on the drawings, shall be the Contractor's own responsibility, and he shall make all arrangements with the property owners regarding such work. Any costs of such work for the Contractor's own convenience shall be absorbed in the unit prices or included in the lump sum amounts bid for the various contract items.

G. UTILITY CONFLICTS WITH PROPOSED IMPROVEMENTS

1. If a utility, whether shown on the plans or not, should intersect the proposed improvement at grade anywhere along the line of the improvement, the Contractor shall immediately notify the City.
2. Contractor shall notify the City in writing, stating the nature of the conflict, location by schedule, sheet number, name of the street or location of easement and the station at which the conflict occurred.

The City will, within a reasonable time, make the necessary arrangements to resolve the conflict.

3. Completion of any required "gap" after the resolution of a conflict shall not be just cause for additional compensation. Such completion of the "gap" shall be started within 72 hours after the Contractor has been notified of resolution of the conflict and completed in a workmanlike manner within reasonable time thereafter.
4. When directed or approved by the City, changes in line or grade of any structure being built may be made in order to avoid utilities. Any additional costs because of such changes will be paid for as "Extra Work".
5. When a utility shown on the plans conflicts with the proposed improvements, the City will arrange for the relocation or alteration of said utility or require the Contractor to do same as 'Extra Work". Work required in connection with unknown utilities will be performed and paid for as specified in the following paragraphs.

H. UNKNOWN UTILITIES DISCLOSED DURING CONTRACT WORK: In the event that a utility is disclosed or installed subsequent to the award of contract, such utility not being indicated on the drawings, the alteration, relocation or proper support and protection shall be done and paid for as follows:

1. When said utility is found to occupy the space required to be occupied by a part of the permanent works to be constructed under the Contract, the City will arrange for the relocation or alteration of said utility, or require the Contractor to do same as "Extra Work".
2. When the said utility is found to lie parallel to the permanent work and within the trench prism defined by the minimum allowable trench excavation consistent with safety and the rules, orders and regulations of local, State and Federal agencies having jurisdiction; the City will arrange for the relocation, protection or alteration of said utility, or require the Contractor to do same as "Extra Work".
3. When said utility is more or less parallel with, and any portion of it does not lie within the trench prism specified hereinabove, the Contractor shall advise the City thereof, and in cooperation with the City of the utility, provide and place the necessary support, if any, for proper protection to ensure continuous and safe operation of the utility. All costs of such work shall be borne by the Contractor.
4. Utilities found to cross the excavation but not intercepting the permanent works to be constructed, then the Contractor will be required to protect the existing facility in place and construct the proposed facility under the unknown utility.

Compensation for such crossings will be at a unit price per each in accordance with the proposal therefor. The number of such crossings is estimated and the City hereby expressly reserves the right to add to the number shown or decrease from the number shown or to totally delete the item for unknown utility crossings at no change in the unit price per each. The time extension for such crossings shall be determined by the City and shall be added t o the total time for completion allowed and for which no liquidated damages will be assessed.

5. Upon disclosing a utility in the course of excavation that was not indicated on the drawings or marked in the field, the Contractor shall protect it in place. However, he shall immediately investigate if it is abandoned. The Contractor will be compensated at the bid unit price for unknown utility crossings only for the initial crossing of abandoned lines; and only if he did protect the abandoned utility in place.

I. RESPONSIBILITY OF THE CONTRACTOR:

1. The Contractor shall be responsible for all costs for the repair of any and all damage to the contract work or to any utility (whether previously known or disclosed during the work), as may be caused by his operations.
2. Utilities not shown on the drawings to be relocated or altered by others, shall be maintained in place by the Contractor.
3. At the completion of the contract work, the Contractor will leave all utilities and appurtenances in a condition satisfactory to the utility owners and the City.

1.05 PROTECTION OF FACILITIES OTHER THAN UTILITIES

Contractor shall protect in place or remove and replace to original condition all existing facilities.

It shall be the Contractor's responsibility to familiarize himself with the conditions of proposed work and to identify by field investigation those features, whether or not shown on the plans, which require removal and replacement or protection in place These features include, but are not limited to, fences, cross gutters, roads, sidewalks, driveways, curbs and gutters, power poles, signs, drainage structures, trees, landscaping, etc.

END OF SECTION 02620

SECTION 02622
POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install and test polyvinyl chloride (PVC) water pipe and fittings, complete as shown on the Drawings and as specified herein.

B. Pipe or piping refers to all pipe, fittings, material and appurtenances required to construct PVC water pipe complete, in place.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Trenching, backfilling and compacting is included in Section 02221.

C. Granular fill material is included in Section 02230.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300 Submittals, and within 30 days of the Effective Date of the Agreement, the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. Also, include information on local representative for each manufacturer, if product is sold through a distributor.

B. Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, methods and location of supports, anchorage, gasket material, grade of material and all other pertinent technical information for all items to be furnished.

C. Prior to each shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and AWWA Standards specified herein shall be submitted.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds.

2. ASTM D2241 - Standard Specification for Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series).

3. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

4. ASTM F477 - Standard Specification for Elastomeric Seals for Joining Plastic Pipe.

B. American Water Works Association (AWWA)

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3” through 48” (75mm through 1219mm) for Water.

2. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

3. AWWA C600 - Installation of Ductile-Iron Water Mains and their Appurtenances.

4. AWWA C-605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

5. AWWA C651 - Disinfecting Water Mains.

6. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-in through 12-in for Water Distribution.

7. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings 14-in through 48-in for Water Transmission and Distribution.

8. AWWA M-23 – Manual of Water Supply Practices PVC Pipe, Design and Installation.

C. National Sanitation Foundation (NSF)

1. Standard No. 14 - Plastic Piping Components and Related Materials.

2. Standard No. 61 - Drinking Water System Components - Health Effects.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All PVC water and sewer pipe shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034 and NSF Standard No. 14 as applicable. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections.

B. Inspections of the pipe may also be made by the Engineer or other representatives of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.06 SYSTEM DESCRIPTION

A. The equipment and materials specified herein are intended to be of standard types for use in transporting potable water and reclaimed water.

B. Note information in pipe schedule on Drawings, if any and in this Section, especially concerning pressures, minimum thickness, etc. In case of a conflict, information given in the pipe schedule shall govern.

C. Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

D. Unless otherwise noted, PVC pipe systems shall be designed for the following condition(s).

1. Class: 150

2. System: Water

3. Pressure:

   a. Operating: 110
   b. Testing: 150

4. Temperature Range: 40-80 Degrees F

1.07 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.

C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

D. Any gouges or scratches that extend 10 percent or more into the pipe wall shall be cause for rejection of that pipe. The undamaged portion may cut off and used. Rejected materials shall be clearly marked as rejected, segregated and removed from the site.

E. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than that given in the following table:

Pipe Diameter (inches)	Max. No. of Rows Stacked
8 or less	5
12 to 21	4
24 to 30	3
33 to 48	2

F. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight or delivered to the site so that no pipe is exposed to sunlight for more than 60 days. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.

G. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the Contractor, at the Contractor's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing.

H. In handling the items, use special devices and methods as required to achieve the results specified herein. No un-cushioned devices shall be used in handling the item.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC pressure pipe sized 4 through 12-in shall conform to the requirements of AWWA C900. All piping shall be Class 165 with a Dimension Ratio of 18 or class 200 with a Dimension Ratio of 14 as indicated on the drawings. The pipe shall be PVC 1120 made from PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, pressure class, AWWA designation number and seal of test agency that verified pipe material for potable water service.

B. PVC pressure pipe sizes 14 through 48-in shall conform to the requirements of AWWA C905 PVC pressure pipe sizes 14 through 36-in shall conform to the requirements of ASTM D2241. The pipe shall be made from PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, pressure class, AWWA reference and seal of test agency that verified pipe material for potable water service.

C. PVC pipe and fittings shall have bell and spigot push-on joints. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. Installation of elastomeric gasketed joints and performance of the joint shall conform to ASTM F477, ASTM D3139. Joint lubricants shall be as recommended by the manufacturer and meet all requirements of NSF61.

D. All fittings and accessories for waterlines and sewers shall have bell and/or spigot configurations compatible with the pipe.

E. All fittings for water mains shall be cast or ductile iron conforming to AWWA C110 or AWWA C153 for mechanical joints. All adaptors, fittings and transition gaskets necessary to connect cast or ductile iron fittings to PVC shall be furnished. Ductile iron fittings shall be cement mortar lined.

F. PVC fittings shall meet the requirements of AWWA C900 and be of the same (or higher) pressure rating as the pipeline.

G. Force mains shall be green in color. Water lines shall be blue in color. Reclaimed water shall be purple in color.

I. Use AWG No. 8 stranded copper wire with high molecular weight polyethylene (HMW/PE) insulation specifically designed for direct burial in corrosive soil or water. Polyethylene insulation shall conform to ASTM D 1248, Type 1, Class C. Wires with cut or damaged insulation are not acceptable and replacement of the entire wire which has been damaged will be required at the Contractor's expense.

J. Where restrained joints are shown on the Drawings restraining glands shall be installed. Restraining glands for PVC pipe shall conform to AWWA C111 and be Megalug Series 2200 PV by EBAA Iron Sales Inc or equal.

PART 3 EXECUTION

3.01 INSTALLATION OF PVC PIPE AND FITTINGS

A. No single piece of pipe shall be laid unless it is straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-in per foot of length. If a piece of pipe fails to meet this requirement, check for
straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. PVC pipe and fittings shall be installed in accordance with requirements of the manufacturer, ASTM D2321 and AWWA C605 or as otherwise provided herein.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Bedding shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the

initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All piping shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the Drawings, shall be provided, if required, in crossing utilities that may be encountered upon opening the trench.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end and a reference mark made at the same distance from the pipe end as measured from a factory marked end from the same manufacturer.

F. The Engineer may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

G. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

H. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

I. Precautions shall be taken to prevent flotation of the pipe in the trench.

J. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring or plates have been installed below the top of pipe, they shall be moved slowly taking care not to disturb pipe, bedding or backfill. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

K. Restrained joints shall be installed where shown on the Drawings.

3.02 JOINTING PVC PIPE (Push on type)

A. Joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe and the joint surfaces cleaned and an approved lubricant applied in accordance with the manufacturer's recommendations. The plain end of the pipe to be installed shall then be inserted into the bell of the pipe to which it is to be joined and when in alignment pushed home with a come-along or by other means. Check that the reference mark on the spigot end is flush with the end of the bell.

3.03 JOINTING MECHANICAL JOINT FITTINGS

A. Mechanical joints at valves, fittings and where designated shall be in accordance with the AWWA C111 and the instructions of the manufacturer. PVC water pipe and fittings shall be jointed in accordance with the recommendations of the latest ASTM Standards and detailed instructions of the manufacturer. Suitable PVC to cast iron adaptors shall be installed prior to installing fittings. PVC beveled spigot shall be cut flush prior to insertion in mechanical joint pipe. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tight to the specified torques. Under no condition shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.

3.04 JOINTING POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS

A. The pipe manufacturer shall furnish information and supervise the installation of at least the first five joints. The pipe manufacturer shall be available on site for 1 day to supervise and inspect installation.

3.05 FILLING AND TESTING

A. After installation, the pipe shall be tested for compliance as specified herein. Furnish all necessary equipment and labor for the hydrostatic pressure test on the pipelines.

B. Submit detailed test procedures and method for Engineer's review. In general, testing shall be conducted in accordance with AWWA C605. The method and procedures for performing the hydrostatic pressure test shall be approved by the Engineer. Submit the plan for testing to the Engineer at least 10 days before starting a test.

C. Pressure pipelines shall be subjected to a hydrostatic pressure of 150 psig. This test pressure shall be maintained for a minimum of 2 hours. The hydrostatic

testing allowances shall not exceed those indicated in AWWA C605. Provide suitable restrained bulkheads as required to complete the hydrostatic testing specified.

D. Contractor shall make any taps and furnish all necessary caps, plugs etc, as may be required in conjunction with performing the testing.

E. Gravity pipelines shall be subjected to hydrostatic pressure test as specified in AWWA C605.

F. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting air.

G. Hydrostatic pressure tests shall conform to Section 7.3 of AWWA C605. Furnish gauges, meters, pressure pumps and other equipment needed to fill the line slowly and perform the required hydrostatic pressure tests.

H. The Owner will provide a source of supply from the existing potable water and reclaimed water distribution system for Contractor's use in filling the lines. An air break shall be maintained at all times between the Owner's distribution system and the Contractor's equipment to prevent cross-connection. The line shall be slowly filled with water and the specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the Contractor. Provide accurate means for measuring the quantity of makeup water required to maintain this pressure.

I. The Owner shall supply, at no cost to the Contractor, a maximum quantity of water equal to 110 percent of the volume of the pipelines for testing. Additional water required by the Contractor will be provided at standard billing rates for the volume required. The line shall be slowly filled with water and the specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the Contractor. Provide accurate means for measuring the quantity of makeup water required to maintain this pressure.

J. Duration of pressure test shall not be less than 2 hours. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced.

3.06 FLUSHING AND CHLORINATION OF PIPELINES

A. Before being placed in service and prior to hydrostatic testing, all new water pipelines shall be chlorinated in accordance with AWWA C651. The procedure shall be approved by the Engineer in advance.

B. The location of the chlorination and sampling points will be determined by the Engineer in the field. Taps for chlorination and sampling shall be installed by the Contractor. Uncover and backfill the taps as required.

C. The general procedure for chlorination shall be first to flush all dirty or discolored water from the pipeline. The flushing velocity shall be a minimum of 3 ft/sec and continue until at least three changes of water have passed through the segment being flushed. Flushing operations shall be conducted without causing erosion, damage, nuisance or interruption of traffic and comply with all regulatory requirements. Then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The concentration and residence time of the chlorine solution in the pipeline will depend on the type of disinfection method used, as described in AWWA 651.

D. Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system. All treated water flushed from the lines shall be disposed by discharging to the nearest sanitary sewer or other approved means. No discharge to any storm sewer or natural water courses will be allowed. Bacteriological sampling and analysis of the replacement water may then be made by the Engineer in full accordance with AWWA C651. Rechlorination will be required, if necessary and the line shall not be placed in service until the requirements of the State and Local Public Health Department are met.

E. Special disinfecting procedures shall be used in connections to existing mains and where the method outlined above is not practical.

3.07 TRACER WIRE

A. Prior to backfill, install tracer wire on top of pipe and secure in place with 2-inch wide plastic adhesive tape at maximum 10-foot intervals. Run tracer wire continuously along pipe and terminate in adjacent valve boxes for buried assemblies or buried valves. Where buried splices occur, use an electrical splicing kit consisting of a split bolt connector, mold, and two-part encapsulating epoxy resin such as Scotchcast, or Owner approved equal. Provide 24 inches of coiled wire at access points for attachment of pipe locating equipment. Each installed run of pipe shall be capable of being located using the tracer wire. Protect wire insulation from damage during installation and backfilling. Wire insulation that is broken, cut, or damaged shall be replaced at the Contractor's expense.

END OF SECTION 02622

DIVISION 3

CONCRETE

DIVISION 3
TABLE OF CONTENTS

SECTION 03110

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SCOPE

The work includes the furnishing, installing and removing of forms for all cast-in-place concrete work as shown and noted on the drawings and specified herein.

1.02 CODES AND STANDARDS

Except as modified by the requirements specified herein and/or the details on the drawings, all work included in this section shall conform to, and comply with, the applicable provisions of the latest edition of following codes and standards; which shall form a part of this specification to the extent indicated by the references thereto:

A. BUILDING CODE

1. California Building Code, latest adopted edition, Chapter 19, Concrete.

B. AMERICAN CONCRETE INSTITUTE (ACI):

1. ACI-301: "Specifications for Structural Concrete"
2. ACI-SP-4: "Formwork for Concrete"
3. ACI-117: "Standard Tolerance for Concrete Construction and Materials"
4. ACI-318: "Building Code Requirements for Reinforced Concrete"
5. ACI-347: "Guide to Formwork for Concrete"

C. AMERICAN PLYWOOD ASSOCIATION (APA):

1. APA Grade – Trademark
2. Concrete Forming, V345

D. AMERICAN WOOD COUNCIL (AWS):

1. National Design Specification for Wood Construction (NDS), latest edition.

E. WEST COAST LUMBER INSPECTION BUREAU:

1. Standard Grading and Dressing Rule No. 16

F. U.S. DEPARTMENT OF PRODUCT STANDARDS:

1. PS-1 for Construction and Industrial Plywood, latest edition

1.03 RELATED SECTIONS

A. SECTION 02200: Earthwork and Site Preparation
B. SECTION 03210: Concrete Reinforcement
C. SECTION 03300: Cast-in-Place Concrete

1.04 SUBMITTALS

A. GENERAL: Shop drawings and submittals shall be in accordance with Section 01340.

B. LISTING OF REQUIRED SUBMITTALS: Submittals shall be in accordance with the latest edition of ACI 301, Section 2 including but not limited to:

1. Form facing materials

2. Construction and contraction joints (including location and detail)

3. Concrete strength testing for formwork removal
Reshoring and backshoring procedure (signed and sealed by a registered engineer)

4. Placement access window layout

5. Formwork release agent

6. Shop drawings (signed and sealed by a registered engineer)
Calculations for formwork, shoring, reshoring and backshoring (signed and sealed by a registered engineer)

7. Form ties manufacturer’s data sheet

8. Expansion joints manufacturer’s data sheet

9. Waterstops manufacturer’s data sheet

C. ADDITIONAL FORMWORK SUBMITTAL REQUIREMENTS:

1. Information on the Contractor's proposed forming system shall be submitted in detail to the Engineer for review and approval.

2. Only forming systems by manufacturers with a minimum of five years' experience shall be considered, such as PERI, DOKA, or Engineer approved equal, with plywood or UHMWPE panels. (Ultra High Molecular Weight Polyethylene)

1.05 ARRANGEMENT

Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete. Form system shall include appropriate number, spacing, and size windows for placing and vibrating concrete.

1.06 INSPECTION NOTIFICATION

Before placing concrete, and after placing reinforcing steel in forms, notify the Engineer and Inspector. Make notification at least two working days in advance of placing concrete to permit arrangements for inspection.

1.07 TOLERANCES

Variation from plumb in lines and surfaces of columns, walls, etc…, shall not exceed 1/8" in 10 feet.

Variation in linear building lines from established position in plan and related position of columns, piers, or walls shall not exceed 1/2" in any bay of 20 feet.

1.08 REJECTION OF DEFECTIVE WORK DUE TO IMPROPER FORMS

Any movement or bellying of forms during construction or variations in excess of the tolerances specified will be considered just cause for the removal of such forms and, in addition, the concrete work so affected. Reconstruction of forms and new concrete to proper line and grade (including disposal of rejected materials) shall be furnished at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

Earth forms may be used for footings only where the soil is firm and stable and the concrete will not be exposed. Where earth forms are to be used, excavations shall be cut neat and accurate to size for placing of concrete directly against the excavation.

Boards for unexposed concrete, not otherwise scheduled or specified, shall be Douglas Fir, conforming to the "Standard Grading and Dressing Rules No. 16", latest edition, of the West Coast Lumber Inspection Bureau. Boards shall be S4S. Contractor at his option may use plywood for forms in lieu of boards. Plywood, if used, shall be "B-B Plyform Class I Exterior" grade, conforming to U.S. Product Standards PS 1-83, 3/4" minimum thickness. Plywood used for exposed concrete shall be a high density overlay type especially manufactured for form work.

A. FORM TIES AND SPREADERS: Standard metal form clamp assembly, of type acting as spreaders and leaving no metal within 1" of concrete face. Inner tie rod shall be left in concrete when forms are removed. Submit samples and manufacturer's specifications to Engineer for review and approval by the Owner before using. Wire ties or wood spreaders will not be permitted.

B. FORM COATING: Non-grain raising and non-staining type that will not leave residual matter on surface of concrete or adversely affect proper bonding of subsequent application of other material applied to concrete surface. Diesel fuel and/or coatings containing mineral oils or other nondrying ingredients are not being permitted. Acceptable products include, but are not limited to the following:

Non-Crete Company; Nox-Crete Form Coating
Arcal Chemical Corp.; Arcal 80
Industrial Synthetics Co.; Synthex

C. EXPANSION JOINT FILLER: Premolded expansion joint filler shall conform to ASTM D994, D1751 or D1752.

D. CONSTRUCTION, EXPANSION, AND CONTRACTION JOINTS:

1. Unless otherwise specified or permitted, locate and detail construction joints to following requirements:

a. Locate construction joints within middle third of spans of slabs, beams, and girders. When a beam intersects a girder within this region, offset joint in girder a distance equal to or greater than twice width of beam;

b. Locate joints in walls and columns at underside of slabs, beams, or girders and at tops of footings or slabs; and

c. Make joints perpendicular to main reinforcement.

2. Provide keyways where indicated in the Drawings. Unless otherwise specified, longitudinal keyways indicated in the Drawings shall be a minimum of 1-1/2 in. deep in joints in walls and between walls and slabs or footings.

3. Provide construction, expansion, and contraction joints where indicated in the Drawings. Submit for acceptance details and locations of construction, expansion, and contraction joints differing from those indicated in the Drawings.

4. Design formwork to accommodate waterstop materials. Locate waterstop in construction joints where indicated in the Drawings. Use waterstop with a maximum practical length to create minimum number of splices.

PART 3 - EXECUTION

3.01 GENERAL

The engineering and construction of all formwork, shoring and bracing shall be carried out by and under the direction of the Contractor, who shall be responsible for the engineering, construction, maintenance, and safety of all formwork during the entire construction period.

The design of all concrete forms, falsework, and shoring shall be the responsibility of the Contractor and the design and installation of these items shall comply with all local, State, and Federal regulations.

The formwork shall be designed for the loads and lateral pressure outlined in Chapter 2 of ACI 347, Latest Edition.

3.02 FORMS AND ACCESSORIES

A. GENERAL: Forms shall be so constructed that the finished concrete will conform to the shapes, lines, grades, and dimensions indicated on the Drawings. It is intended that the surface of the concrete after stripping shall present a smooth, hard, and dense finish that will require a minimum amount of finishing. Sufficient number of forms shall be provided so that the work may be prosecuted rapidly and present a uniform appearance in form patterns and finish. Forms shall be clean and free from all dirt, debris, concrete, etc. and shall be coated with an acceptable form release agent if required, prior to use or reuse.

B. BUILT-UP PLYWOOD FORMS:

1. Built-up plywood forms may be substituted for a prefabricated forming system subject to the following minimum requirements: full sized (4 foot by

8 foot) plywood sheets must be used except where smaller pieces will cover an entire area.

2. Plywood sheets shall be 5-ply, 3/4 inch nominal, made with 100 percent waterproof adhesive, and the finish surface shall be coated or overlaid with a surface which is impervious to water and the alkaline calcium and sodium hydroxide of cement.
3. Studding shall be not less than 2 inch by 4 inch lumber spaced at 16 inches or 24 inches on center.

    a. Closer spacing may be required depending upon the strength requirements of the forms, in order to prevent any bulging surfaces on the faces of finished concrete work.

    b. Studs shall not impede the proper access to the required form windows for placing and vibrating the concrete.

4. Wales shall be formed of double 2 inch by 4 inch lumber as a minimum.

5. Studding and wales shall contain no loose knots and shall be free of warps, cups, and bows.

6. The number of reuses of forms will depend upon the durability of the surface coating or overlay used, and the Contractor's ability to maintain the forms in a condition which will produce a flat, smooth, hard, dense finish on the concrete when stripped.

7. Alternate combination of plywood thickness and stud spacing may be submitted to the Engineer for review and acceptance.

C. STEEL OR STEEL FRAMED FORMS:

1. Steel forms shall be rigidly constructed and adequately braced for minimum deflection of the finish surface. The finish surface shall be flat without bows, cups, or dents.

2. Steel framed plywood forms shall be rigidly constructed and braced with joints fitting closely and smoothly.

    a. Plywood paneling shall be 5-ply, 3/4 inch nominal; made with 100 percent waterproof adhesive and the finish surface shall be coated or overlaid with a surface which is impervious to water and the alkaline calcium and sodium hydroxide of cement.

b. The number of reuses will depend upon the durability of the surface coating or overlay used.

3. Built-up plywood forms, as specified herein, may be used in conjunction with steel forms or steel framed plywood forms for special forming conditions such as corbels and forming around items which will project through the forms.

D. PLACEMENT ACCESS WINDOWS: Concrete formwork for walls, whether set vertically or sloped, shall include an adequate number and size of placement windows to provide sufficient access to place and vibrate concrete to avoid areas of incomplete consolidation. The window layout shall be submitted to the Owner for review and approval.

E. INCIDENTALS

1. Where not otherwise indicated on the Drawings, all external angles of walkways, slabs, walls, beams, columns, and openings shall have a 3/4 inch bevel formed by utilizing a true dimensioned wood or solid plastic chamfer strip and external angles of walkways, walls, and slabs at expansion, contraction, and construction joints shall be a 1/2 inch bevel formed by utilizing a true dimensioned wood or solid plastic chamfer strip.

a. Reentrant angles may be left square.

b. Level strips shall be installed at the top of all wall concrete placements to maintain a true line at all horizontal construction joints.

2. Keyways shall be constructed as indicated on the Drawings. Material for keyways shall be steel, plastic, or lumber treated with form coating, applied according to label directions.

3. Pipes, anchor bolts, steps, reglets, castings, and other inserts, as indicated on the Drawings or as required, shall be encased in the concrete. Dovetail anchors or ties shall be used in conjunction with the slots or inserts for the various materials as specified under their respective sections and as may be necessary for the required work.

4. All exposed corners shall be chamfered 3/4", unless shown otherwise on drawings. Provide molding in forms for all chamfering required.

F. BRACING AND ALIGNMENT OF FORMS

1. It shall be the Contractor's responsibility to provide alignment of forms which will permit installation, at proper location, of all structural embedded items or mechanical and electrical equipment and piping.

2. All formwork shall be securely braced, supported, tied down, or otherwise held in place to prevent any movement of formwork. Adequate provisions shall be made for uplift pressure, lateral bulging of forms, and deflection of forms for slabs and beams.

3. When a second lift is placed on hardened concrete, special precautions shall be taken in the form work at the top of the old lift and bottom of the new lift to prevent spreading, vertical or horizontal displacement of forms; and to prevent grout "bleeding" on finished concrete surfaces. Pipe stubs, anchor bolts, and other embedded items shall be set in the forms where required.

4. No concrete shall be placed until all forms have been thoroughly checked by the Contractor for alignment, level, strength, and to assure accurate location of all mechanical and electrical inserts or other embedded items. All cracks, openings, or offsets at joints in the formwork which are 1/16 inch or larger shall be closed by tightening the forms or by filling with an acceptable crack filler.

G. FORM TIES

1. Form ties for the forming system selected shall be the cone-snap tie or flat bar type as manufactured by a recognized manufacturer of concrete forming equipment.

2. Forms shall be tied together at not less than 2 foot centers vertically and horizontally.

3. Wire ties or wood spreaders of any form shall <u>not</u> be used. Ties shall be of a type that will accurately tie, lock, and spread the forms.

4. Forms and ties shall be designed to withstand concrete pressures without, spreading or lifting of the forms.

5. The form tie shall be of such design that when the forms are removed, no metals shall be within 3/4 inch of any surface.

H. REMOVAL OF FORMS: Framing shall remain in place for the minimum time(s) indicated herein.

1. Vertical forms shall remain in place a minimum of 24 hours after the concrete is placed. If, after 24 hours, the concrete has sufficient strength and hardness to resist surface or other damage, the vertical forms may be removed.

2. Other forms supporting concrete and shoring shall remain in place as follows:

a. Sides of footings	24 hours minimum
b. Vertical sides of beams, girders, and similar members	48 hours minimum
c. Slabs, beams, and girders	until concrete strength reaches the specified strength or until shoring is installed
d. Shoring for slabs, beams, and girders	until concrete strength reaches the specified strength
e. Wall bracing	until concrete strength of the beams and slabs laterally supporting the wall reaches the specified strength.

3. Forms shall not be removed from concrete which has been placed with outside ambient air temperature below 50 degrees F until the concrete has attained the specified strength (75% of 28-day compressive strength requirement or 3,000 psi minimum, whichever is greater) as determined by test cylinders stored in the field under equivalent conditions as the concrete structure. No heavy loading on green concrete will be permitted. Green concrete shall be defined as concrete with less than the specified strength. Immediately after forms are removed, the surface of the concrete shall be carefully examined, and any irregularities in the surface shall be repaired and finished or removed and replaced as determined by the Engineer as specified hereinafter.

END OF SECTION 03110

SECTION 03210

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE

The work includes the furnishing and installing of reinforcing steel for all cast-in-place concrete as shown and noted on the drawings and specified herein.

1.02 RELATED SECTIONS

A. SECTION 02200: EARTHWORK AND SITE PREPARATION
B. SECTION 03110: CONCRETE FORMWORK
C. SECTION 03300: CAST-IN-PLACE CONCRETE

1.03 CODES AND STANDARDS

Except as modified by the requirements specified herein and/or the details on the drawings, all work included in this section shall conform to the applicable provisions of the following codes and standards:

A. CALIFORNIA BUILDING CODE, latest adopted edition, Chapter 19, Concrete.

B. AMERICAN CONCRETE INSTITUTE (ACI), latest edition of:

1. ACI-301: “Specifications for Structural Concrete”
2. ACI-318: “Building Code Requirements for Structural Concrete”
3. ACI-315: “Details and Detailing Concrete Reinforcement”
4. ACI SP-66: “ACI Detailing Manual”

C. CONCRETE REINFORCING STEEL INSTITUTE (CRSI): "Recommended Practice for Placing Reinforcing Bars", latest edition.

D. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM): The specifications and standards hereinafter referred to, latest edition.

1.04 SUBMITTALS

A. GENERAL: Shop drawings and submittals should be in accordance with Section 01340

B. LISTING OF REQUIRED SUBMITTALS: Submittals shall be in accordance with the latest edition of ACI 301, Section 3 including but not limited to:

1. Reinforcement manufacturer's certified test report

2. Placing Drawings

3. Splices (and request to use splices not indicated in the drawings)

4. Mechanical Splices (and request to use mechanical splices not indicated in the drawings)

5. Request and procedure to field bend or straighten reinforcing bars partially embedded in concrete

6. Current CRSI Plant Certification

7. Welding (including locations, procedure and AWS welder certification)

8. Material storage and handling

C. ADDITIONAL REINFORCING STEEL SUBMITTAL REQUIREMENTS:

1. Mill affidavits, stating the grades and physical and chemical properties of the reinforcing steel, and conformance with ASTM Specifications, shall be submitted to the Engineer for review and approval by the Owner before delivery of the steel to the job site.

2. Samples of the actual bars used for fabrication shall be delivered with the fabricated steel bars to the site for testing (minimum 48" long).

1.05 STORAGE

Reinforcing steel shall be transported to the building site, stored and covered in a manner which will insure that no damage shall occur to it from moisture, dirt, grease, or any other cause that might impair bond to concrete.

A sufficient supply of approved fabricated reinforcing steel shall be stored on the building site at all times to insure that there will be no delay of the work. Identification of steel shall be maintained after bundles are broken.

1.06 CHECK FOR EMBEDDED ITEMS

Contractor shall check project or contract architectural, structural, mechanical, and electrical drawings for anchors, inserts, conduits, sleeves, and any other items which are required to be cast in concrete, and shall make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.

PART 2 - PRODUCTS

2.01 MATERIALS

A. REINFORCING BARS: New, deformed, billet steel bars conforming to ASTM A615 Grade 60 unless otherwise indicated. Deliver bars new and free from rust and mill scale in original bundles with mill tags intact.

B. WELDED WIRE FABRIC: New, welded steel wire fabric, conforming to ASTM A185. Gauge and center-to-center spacing shall be as noted on drawings.

C. ACCESSORIES: Reinforcement accessories, consisting of spacers, chairs, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place. All metal accessories shall be galvanized steel or approved plastic accessories, conforming to the applicable requirements of the CRSI Standards specified herein.

D. TIE WIRE: Tie wire for reinforcement shall be plain wire 16 gauge or heavier, where indicated or specified, black or galvanized steel wire, conforming to ASTM A82.

E. FIBROUS REINFORCING: Per Section 03240 where specified.

PART 3 - EXECUTION

3.01 FABRICATION

Fabrication of steel reinforcement shall be in accordance with the details shown on the drawings. Where specific details are not shown or noted, comply with the applicable requirements of the "Codes and Standards" hereinbefore specified.

Bars shall be accurately bent, cut, and placed as indicated on the drawings. Bars shall be bent cold; heating of bars will not be permitted. Bars shall not be bent or straightened in any manner that will injure the material.
Bars bent incorrectly shall be discarded and replaced with new bars. Incorrectly bent bars shall not be corrected and used.

3.02 PLACING

A. GENERAL: Place reinforcing steel as indicated and in accordance with the applicable requirements of referenced specified. Install reinforcement accurately and secure against movement, particularly under the weight of workmen and placement of concrete.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials which may reduce or destroy bond with concrete.

B. REINFORCING SUPPORTS: Support reinforcing bars above earth and on forms by concrete blocks or other approved non-corrodible supports. Support legs of accessories in forms without embedding in form surface. Space chairs and accessories to conform with CRSI's "Recommended Practice for Placing Bar Supports". No wood will be permitted inside forms.

C. PLACING AND TYING: Set reinforcing in place, and rigidly and securely tie or wire with 16 gauge steel tie wire in the position indicated, or as directed. Point ends of wire away from forms.

D. WELDED WIRE FABRIC: Welded wire fabric shall be set and attached to approved concrete blocks or other preapproved supports prior to placing concrete. The practice of laying the welded wire fabric on the ground surface, placing concrete, then pulling welded wire fabric up into concrete will not be allowed.

E. SPACING: Minimum clear spacing distance between parallel bars shall be in accordance with the details on the drawings or, where not shown, the clear spacing shall be 2 times the bar diameter but in no case less than 2" nor less than 1-1/3 times the maximum size aggregate.

F. SPLICES: Laps of splices, where shown or noted on drawings, shall be adequate to transfer stress by bond. Wherever possible, splices of adjacent bars shall be staggered. Reinforcing bars marked continuous shall be spliced with a minimum lap of (40) bar diameters in masonry and (30) bar diameters in concrete.

G. DOWELS: Dowels shall be tied securely in place before concrete is deposited. In the event there are no bars in position to which dowels may be tied, No. 3 minimum bars shall be added to provide proper support and anchorage. Bending of dowels after placement of concrete will not be permitted.

H. CLEANING: Reinforcement, at time of pour, shall be free of all coatings that would impair bond to concrete.

3.03 INSPECTION

A. NOTIFICATION: Contractor shall notify Engineer at least 2 working days ahead of each concrete pour, and no concrete shall be placed until all reinforcing steel has been installed, inspected and approved by the Inspector.

B. DEFECTIVE WORK: The following reinforcing steel work will be considered defective and shall be removed and replaced at no additional cost to the Owner.

1. Bars with kinks or bends not shown on drawings.
2. Bars injured due to bending or straightening.
3. Bars heated for bending.
4. Reinforcement not placed in accordance with the drawings and/or specifications.

END OF SECTION 03210

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE

The work includes the furnishing and installing of cast-in-place concrete work as shown and noted on the drawings and specified herein.

Except as otherwise specified, concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, and water so proportioned and mixed as to produce a plastic, workable mixture in accordance with all requirements of these Specifications, including water tightness where indicated, and suitable to the specific conditions of placement. The portions of materials shall be such as to secure the lowest water-cement ratio which is consistent with good workability, a plastic, cohesive mixture, and one which is within the specified slump range. The proportion of fine and coarse aggregate shall be such as not to produce harshness in placing nor honeycombing in the structures.

1.02 RELATED SECTIONS

A. SECTION 02200: Earthwork and Site Preparation
B. SECTION 03110: Concrete Formwork
C. SECTION 03210: Concrete Reinforcement
E. SECTION 07900: Joint Sealers

1.03 CODES AND STANDARDS

Except as modified by the requirements specified herein and/or the details on the drawings, all work included in this section shall conform to, and comply with, the applicable provisions of the latest edition of following codes and standards; which shall form a part of this specification to the extent indicated by the references thereto:

A. BUILDING CODE

1. California Building Code, Latest Adopted Edition, Chapter 19, Concrete.

B. AMERICAN CONCRETE INSTITUTE (ACI):

1. ACI-117: “Specifications for Tolerances for Concrete Construction Materials”.

2. ACI-301: “Specification for Structural Concrete.”

3. ACI-305R: “Hot Weather Concreting”.

4. ACI-306: “Cold Weather Concreting”.

5. ACI-308: “Guide to Curing Concrete”.

6. ACI-309R: “Guide for Consolidation of Concrete”.

7. ACI-318: "Building Code Requirements for Reinforced Concrete."

8. ACI 232.2R: “Use of Fly Ash in Concrete”.

9. ACI-350: “Code Requirements for Environmental Concrete Structures”

10. American Concrete Institute and International Concrete Repair Institute (ICRI): “Concrete Repair Manual”, Third Edition.

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. C31: “Making and Curing Concrete Test Specimens in the Field”.

2. C33: “Specification for Concrete Aggregate”.

3. C39: “Compressive Strength of Cylindrical Concrete Specimens”.

4. C42: “Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete”.

5. C94: “Standard Specifications for Ready Mixed Concrete”.

6. C136: “Method for Sieve Analysis to Fine and Coarse Aggregate”.

7. C143: “Slump of Portland Cement Concrete”.

8. C150: “Standard Specification for Portland Cement”.

9. C172: “Standard Practice for Sampling Freshly Mixed Concrete”.

10. C173: “Air Content of Freshly Mixed Concrete by the Volumetric Method”.

11. C231: “Air Content of Freshly Mixed Concrete by the Pressure

Method".

12. C233: "Standard Method of Testing Air Entraining Admixtures for Concrete".

13. C260: "Standard Specifications for Air Entraining Admixtures for Concrete".

14. C494: "Standard Specifications for Chemical Admixtures for Concrete".

15. C683: "Compressive and Flexural Strength of Concrete Under Field Conditions".

16. D395: "Standard Test Methods for Rubber Property – Compression Set".

17. D412: "Standard Test Methods for Rubber Properties in Tension".

18. D471: "Standard Test Method for Rubber Property – Effect of Liquids".

19. D2240: "Standard Test Method for Rubber Property – Durometer Hardness".

1.04 MIX DESIGNS

A. GENERAL: Designs of concrete mixes, including recommended amounts of admixture and water to be used in the mixes, shall be obtained by the Contractor from a recognized independent testing laboratory.

B. CONTRACTOR RESPONSIBILITY: Costs of obtaining the mix designs shall be paid for by the Contractor. Contractor shall be responsible for incorporating into the structure, concrete of at least the minimum strengths specified.

C. MIX DESIGN SUBMITTALS: The Contractor shall submit mix designs for each class of concrete for the Engineer's review.

1. Concrete mix designs shall bear the signatures and seal of a California Registered Civil Engineer.

2. The exact proportions of the mix, including amounts of admixture (if any) and water, shall be determined by the Testing Laboratory or Mill, based upon cement and aggregate submitted by the Contractor.

3. Admixtures shall be specifically noted in the mix design submittal for approval.

1.05 SUBMITTALS

A. GENERAL: Shop drawings and submittals shall be in accordance with Section 01340.

B. LISTING OF REQUIRED SUBMITTALS: Submittals shall be in accordance with the latest edition of ACI 301, Section 4 including but not limited to:

1. Mixture proportions and characteristics

2. For cementitious materials: Types, manufacturing locations, shipping locations, and certificates showing compliance with ASTM Standards as specified in Part 2.0 hereon.

3. For aggregates: Types, pit or quarry locations, producer's names, gradings and specific gravities.

4. For admixtures: Types, brand names, producer's names, quantities, manufacturer's technical data sheets, and certificate showing compliance with ASTM Standards per Part 2.0 hereon.

5. Formwork submittals in accordance with Section 03110, 1.04.

6. Reinforcement submittals in accordance with Section 03210, 1.04 hereon.
7. Proposed construction joints location not indicated in the Drawings.

8. Strength history for the submitted mix design together with "Three Point Curve" plotting water-cement ratio versus compressive strength.

9. Mill Tests: Certified copies in triplicate of mill tests representative of each shipment of aggregate and cement shall be furnished to the Engineer for verification of compliance with these Specifications. Mill tests on cement shall include a report on alkali content.

1.06 CLASSES OF CONCRETE

A. GENERAL: Concrete shall be of five classes, herein referred to as Classes A, B, C, D, and CE which shall be as specified herein and which shall be used where specified or indicated on the Drawings. These classes of

concrete shall have a minimum weight of 140 pounds per cubic foot. Class B concrete may be used for reinforced concrete such as encasements, slabs on grade, etc.; only where Class A is not specified or indicated on the drawings. Class C concrete may be used as fill for unauthorized excavation, for thrust blocks and ground anchors for piping, for bedding of pipe, and where indicated on the Drawings. Class D concrete shall be used for precast concrete items and where indicated on the plans. Class CE shall be used for electrical encasements. All other concrete, unless specified or **otherwise indicated on the Drawings, shall be Class A concrete.**

TABLE A
CLASSES of CONCRETE

Class	Specified Compressive Strength f'_c At 28-Days (psi)	Max. Net Water To Cement Ratio By Weight	Min. Cement Per Cubic Yard Of Concrete[(1)] (Pounds)	Slump Range[(2)] (Inches)
A	5,000	0.48	611	4
A1[(3)]	4,000	0.48	611	4
B	3,500	0.53	564	4
C	2,500	0.71	423	4
CE	2500	0.71	564	4
D***	4,500	0.45	658	4

Notes:

[(1)]Flyash may be used as a substitute for minimum cement content up to a maximum of 15.0% of the total. *Increase cement content as necessary for "pump mix" design.*

[(2)]At the point of delivery and without the addition of a high-range water reducing admixture. When a high-range water reducing admixture is permitted to be used, the slump shall be 2 to 4 in. before the admixture is added; and a maximum of 8 in. at the point of delivery after the admixture is added.

[(3)]Using Type III low alkali cement.

[(4)]Class D concrete may or may not be used for freezing and thawing resistance; when used for such purpose, Class D concrete provides the minimum requirement for ACI-318 Freezing and Thawing Exposure Category F1 through F3. Refer to ACI-318 Table 4.2.2.7.b.2 for additional requirements only for F3 Exposure category. For the other exposure categories, refer to Par. 2.01.E hereon for additional requirements regarding freezing and thawing resistance.

B. PUMPED CONCRETE:

1. Concrete that is pumped shall meet all the requirements of these Specifications.

2. Concrete with a slump outside the limits indicated in Table A shall not be placed unless otherwise approved by the Owner.

C. TYPES OF CEMENT:

1. Classes A, B, C, D, and CE concrete shall be made with Type II low alkali cement.

2. Class A1 concrete shall be made with Type III low alkali cement.

3. Class D concrete shall be made with Type V low alkali cement for wastewater applications (wet wells, sewage manholes, etc…), and, unless otherwise designated, Type II low alkali cement for non-wastewater applications.

1.07 TOLERANCES

A. GENERAL: It is the intent that the finished concrete conforms to the shapes, lines, grades, and dimensions indicated on the Drawings.

B. ALLOWABLE TOLERANCES: It shall be the responsibility of the Contractor to comply with the intent of these Specifications, but it is also recognized that there will be occasions when some deviation will occur or be required. It shall therefore be agreed that the maximum deviation from true line and grade shall not exceed the tolerances listed below at the time of acceptance of the project.

1. In general, all tolerances shall comply with ACI-117 Latest Edition, except as modified in the following. All slabs shall be uniformly sloped to drain when a slope is indicated. Slabs shall have a maximum deviation of 1/8 inch in 10 feet without any apparent changes in grade. All concrete finished surfaces having grades of 2% or less shall be considered a “Class A” surface per ACI-117, unless otherwise indicated.

2. On circular tank walls, the Contractor may deviate from the finish line indicated on the Drawings by the use of forms with chord lengths not to exceed 2 feet.

3. All inserts shall be set to the tolerances required for the proper installation and operation of the equipment or systems to which the embedded insert pertains. The following shall be considered maximum tolerances.

Item	Max. Tolerance, Inches
Sleeves and inserts	plus 1/8 minus 1/8
Projected ends of anchor bolts	plus 1/4 minus 0.0
Anchor bolt setting	plus 1/16 minus 1/16

1.08 WATERTIGHTNESS OF CONCRETE WORK

A. GENERAL: It is the intent of this Specification to secure for every part of the Work, concrete and grout of homogeneous structure, which when hardened will have the required strength, water tightness, lack of voids and resistance to weathering. "Water tightness" as defined herein shall mean concrete that is impermeable to water throughout the structure. Class A, Class B and Class D concrete shall be watertight.

B. SURFACE HAIRLINE CRACKS: It is recognized that some surface hairline cracks and crazing will develop in the concrete surfaces. "Hairline cracks" as defined herein shall mean barely visible surface cracks less than 0.004" in width. Hairline cracks showing no sign of moisture leakage will not require remedial repair. Walls or slabs that are found to be not watertight as previously defined due to cracks too small for successful pressure grouting (less than 0.004") shall be sealed by coatings of an approved sealant system as specified elsewhere in these Technical Specifications. Contractor shall submit details of the remedial sealant repair system to Owner for review and approval prior to use. Remedial repair sealant work shall be performed by the Contractor at his sole expense to the satisfaction of the Owner.

C. VISIBLE CRACKS: Visible surface cracks showing no signs of leakage (other than hairline cracks and crazing) as defined herein shall mean cracks up to, but not exceeding, 0.0625 (1/16") inch. These cracks shall be repaired per the referenced "Concrete Repair Manual" with an approved low viscosity injection epoxy. Contractor shall submit details of the remedial repair system to Owner for review and approval prior to use. Repair work shall be performed by the Contractor at his sole expense to the satisfaction of the Owner.

D. VISIBLE CRACKS SHOWING LEAKAGE: Visible cracks, as defined in Paragraph 1.08.C above, showing leakage shall be repaired per a detailed repair plan submitted by the Contractor and approved by the Engineer; except for defective concrete per Paragraph 1.08E.

E. DEFECTIVE CONCRETE:

1. General: Contractor shall bear all costs of correcting rejected work, including the cost of the Owner's additional services thereby made necessary.

2. Defective Concrete: The following conditions of the Work shall be considered defective concrete ***and promptly removed from the site***:

   a. Concrete containing any cracks greater than 1/16" in width.

   b. Concrete containing any voids, honeycombs or damaged locations.

   c. Concrete containing cold joints (unplanned joint or discontinuity resulting from a delay in placement of sufficient time to preclude a union of the material in two successive lifts).

   d. Concrete that was not formed as indicated, and not true to intended alignment, is not plumb or level where so intended, or is not true to intended grades and levels.

   e. Concrete that contains any inclusions of embedded debris.

   f. Any concrete that is determined to be unsound or otherwise not meeting Specification requirements.

3. Repair of Defective Concrete: If concrete is determined to be defective by the Owner, the following conditions for repair shall apply:

   a. Defective concrete shall be cut out and repaired to the limits determined by testing in accordance with the methods outlined in the referenced "Concrete Repair Manual" and as determined and approved by the Owner. Contractor shall submit details of the remedial repair system to Owner for review and approval prior to undertaking the repair work. Repair work shall be performed by the Contractor at his sole expense to the satisfaction of the Owner.

   b. All repair work, when completed, shall be watertight as per the original specification.

   c. Permission to repair or attempt the correction shall not be construed to be a waiver of the Owner's right to ***require complete removal of the defective work***.

   d. In the event that the Contractor's attempts to repair the defective concrete are unsuccessful, the Owner reserves the right to either require complete

removal, as previously stated, or to require specialized methods of repair to ensure a watertight structure; all at the Contractor's expense with no additional cost to the Owner.

1.09 TESTING OF CONCRETE

A. GENERAL: During the progress of construction, the Owner will have tests made to determine whether the concrete, as being produced, complies with the requirements specified herein. These tests shall be made in accordance with ASTM C 31, ASTM C 39, and ASTM C 172. Test cylinders will be made and cured on site under the specified conditions then delivered to the laboratory by the Engineer and the testing expense will be borne by the Owner.

Not less than three cylinder specimens, 6 inch diameter by 12 inch long, will be tested for each 40 cubic yards of each class of concrete with a minimum of three specimens for each class of concrete placed and not less than three specimens for each half day's placement. One cylinder will be broken at 7 days and two at 28 days, unless otherwise determined by Owner.

Tests of the slump of concrete shall be made using a slump cone in accordance with the requirements of ASTM C 143. Concrete that does not meet the Specification requirements as to slump shall not be used and, shall be removed from the job. The slump of the concrete shall be tested at least once in every 40 cubic yards placed, or as often as necessary to keep the slump within the specified range; and when requested to do so by the Engineer.

The Contractor shall make provisions for and furnish all concrete for the test specimens, and provide manual assistance to the Engineer in preparing said specimens. The Contractor shall be responsible for the care of, and providing curing conditions for the test specimens in accordance with ASTM C 31.

B. CONCRETE CYLINDER TEST ACCEPTANCE CRITERIA: The average value of concrete strength tests shall be equal to or greater than the specified 28-day strength. No test shall be less than 90 percent of the specified 28-day strength. Additionally, unless otherwise approved by the Owner, no 7-day cylinder break test shall be less than 70 percent of the specified 28-day strength.

C. INSUFFICIENT COMPRESSIVE STRENGTH: If the 28-day strength tests fail to meet the specified minimum compressive strength, the concrete will be assumed to be defective and one set of three cores from each area may be taken as selected by the Owner and in accordance with ASTM C 42.

If the average compressive strength of the set of three concrete cores fails to equal 90 percent of the specified minimum compressive strength or if any single core is less than 75 percent of the minimum compressive strength, the concrete will be considered defective. The Owner may require additional coring, nondestructive load testing, or complete removal and replacement of defective concrete. Costs of coring, testing of cores, load testing, and required replacement pertaining thereto shall be paid by the Contractor at no extra cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. PORTLAND CEMENT: ASTM C150, Type I or II. Type II cement shall meet the strength requirements of Type I cement. Use only one brand of cement throughout the project.

B. FINE AGGREGATE: ASTM C33, graded from 1/4" to fine.

C. COARSE AGGREGATE: ASTM C33, graded from 1/4" to a maximum size in accordance with ACI-318 Section 3.3 and approved submittals.

D. WORKABILITY ADMIXTURE: Chemical admixtures shall be in accordance with ASTM C-494 of the type that increase workability and reduce water demand, but will not increase shrinkage. Admixture shall be submitted to the Engineer for review and approval.

1. Water reducing additives, which do not affect the ultimate performance of any steel in any way, may be added to maintain the maximum water content below that specified herein. Water reducing additives shall conform to ASTM C494, type A or D.

2. The use of water reducing additives shall not permit a reduction in the minimum specified cement content or in the specified amount of air entrainment.

3. Admixtures shall contain no calcium chloride and triethanolamine.

4. High range water reducing admixtures (“Superplasticizers”), unless noted otherwise, shall conform to ASTM C494 Type F or G, batch plant added using second or third generation only. **Only “superplasticizers” capable of holding a slump above 8-inches for more than two (2) hours will be acceptable.** Provide written verification on submittals.

E. AIR ENTRAINING ADMIXTURE: All concrete shall contain entrained air of evenly dispersed air bubbles at the time of placement. The minimum air content for concrete not providing freezing and thawing resistance shall be 2.0%. Air entrainment admixture shall be submitted to the Engineer for review and approval.

1. The air entraining agent shall conform to ASTM C260.

2. The air entraining agent shall be added to the mixing water prior to water being added to batch.

3. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.

4. Air content of the concrete shall be measured at the point of delivery (before placement) in accordance with ASTM C173 or ASTM C231.

5. The maximum total volumetric air content shall be in accordance with ACI-301 Section 4.2.2 and will vary depending on the Exposure Category "F" and the maximum aggregate size. The Exposure Category "F" for freezing and thawing resistance shall be in accordance with ACI-318 Table 4.2.1.

6. The maximum water cement ratio for freezing and thawing resistance shall be 0.45. The minimum compressive strength for freezing and thawing resistance shall be 4,500 psi.

7. Tolerance on air content as delivered shall be ±1.5%.

8. Acceptable products include, but are not limited to, PROTEX "AES", GRACE "DAREX AEA", MASTER BUILDERS "MB AE10", or SIKA CHEMICAL "AER".

F. SHRINKAGE REDUCING ADMIXTURE: For Classes A, A1 and D concrete, provide shrinkage-reducing admixture, BASF Tetraguard AS20, or approved equal, with mixing and dosage per manufacturer's recommendation and approved mix design, at the plant.

G. OTHER ADMIXTURES: Contractor may propose and submit other compatible admixtures for special cases, or circumstances or conditions for consideration by the Owner.

H. ADMIXTURE COMPATIBILITY: All admixtures shall be furnished by the same manufacturer or submit written verification of compatibility from the admixture manufacturers. All admixture products shall be of domestic manufacture.

I. TREATMENT VESSEL CONCRETE FILLS: The concrete mix design for the treatment pressure vessel concrete fill, when specified, shall meet the following requirements:

1. Class A (4000 psi) concrete in accordance with this Par. 2.01.

2. Include Sikacrete 950DP densified dry powder microsilica admixture per ASTM C-1240. Dosage rate at 5 – 15% by weight of cement; and mixing per manufacturer's recommendations. Perform trial batches using materials in order to determine optimum dosage for project requirements.

J. WATER: Clean and potable, free of impurities detrimental to concrete.

K. CURING-SEALER: Curing and sealing for floor shall be one of the following acrylate resin compounds or equal.

- AC Horn, Inc. "Horn Clear Seal 300"

- Sonneborn-Contech "Kure-N-Seal 0800"

L. EXPANSION JOINT FILLER: Premolded, of sizes and thicknesses shown on drawings, conforming to ASTM D1751.

M. EXPANSION JOINT SEALING COMPOUND: Joint sealant and backerod shall be a traffic grade polyurethane. Use submerged type sealant for water-carrying structures and related potentially wet areas and traffic grade polyurethane in traffic areas. Refer to Section 07900, Paragraph 2.1.3.

N. CLEAR SEALER HARDENER: Sonneborn "Lapidolith", Protex Industries "Lithoplate" or approved equal.

2.02 WATERSTOPS

A. GENERAL: Waterstops shall be installed in all concrete joints in a multi-pour structure, all concrete joints where indicated on the Drawings and in all water bearing structures. Waterstop shall be rubber or polyvinyl chloride.

Waterstops in the walls shall be carried into lower slabs and shall join the waterstops in the slabs with appropriate types of fittings. All joints in water bearing structures shall have waterstops, whether indicated on the drawings or not. All waterstops shall be continuous. Waterstops shall be set accurately to the position and line indicated on the Drawings. Edges shall be held and securely fixed in position at intervals of not more than 12 inches so that they will not move during the placing of concrete. No nails shall be driven through waterstops in the vicinity of construction joints. Wires at not more than 12 inches on centers near the outer bulbs shall be used to tie the waterstops into position. Special clips may be used in

lieu of wires, at the Contractor's option. Waterstops shall be terminated 3 inches from the top of finished surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.

Waterstops shall be manufactured by Burke Concrete Accessories Inc.; Greenstreak Plastic Products Division of Western Textile Products Company, Kirkhill Rubber Company; Williams Products Inc.; or equal.

B. RUBBER WATERSTOPS: Unless otherwise specified or indicated on the Drawings, rubber waterstops shall be 6 inch ribbed centerbulb type, centered, at construction and contraction joints; and 9 inch wide ribbed centerbulb type, centered, at expansion joints. Rubber waterstops shall be as manufactured by JP Specialties of Temecula, California or approved equal and shall meet the following requirements.

		Test Method
Hardness – Shore A durometer	90 ± 3	ASTM D 2240
Elongation – not less than	530 percent	ASTM D 412
Tensile strength – not less than	2,300 psi	ASTM D 412
Water absorption after two days at 158 degrees F	5 percent	ASTM D 471
Compression set, 77 degrees F	29 percent	ASTM D 395
Specific Gravity	0.96	ASTM D 792

The Contractor shall submit samples, prints, and complete physical property data covering the waterstop for approval.

Rubber waterstop shall be manufactured to insure an integral cross section which will be dense, homogeneous, and free from porosity and other imperfections. Minor surface defects such as surface peel covering less than 1 square inch and surface cavities or bumps less than 1/4 inch in longest lateral dimension and less than 1/16 inch deep, will be acceptable.

All waterstops shall be installed so that all joints are watertight. All joints for rubber waterstops shall be made by the use of factory-made fittings and unions, some of which may be special. Fittings and unions shall be cemented in place using clamps over the entire area of splice until the cement is bonded permanently. Welding of the waterstop without the use of factory-made unions and fittings, will not be permitted. Split type waterstop will not be permitted except where specifically indicated on the Drawings.

Bonding cement shall be as recommended by the manufacturer of the waterstop, and field cementing or solvent welding shall be in accordance with the

manufacturer's printed directions. For potable water applications, water stops shall be certified per NSF 61.

2.03 SYNTHETIC SPONGE RUBBER FILLER

A. SYNTHETIC SPONGE RUBBER FILLER (SSRF): Synthetic sponge rubber filler shall be an expanded closed-cell sponge rubber backer rod manufactured from a synthetic polymer neoprene base; or a resilient closed-cell polyethylene foam backer rod. The synthetic sponge rubber filler shall have characteristics suitable for the application intended, including the following:

1. Necessary strength for supporting the sealing compound during application.

2. Sufficient resiliency to prevent significant load transfer across the joint.

3. Resistance to the environmental conditions of the installation.

4. No bonding to the sealing compound.

5. A cellular structure that shall prevent wicking or absorption of water.

6. Compatibility with other materials in the joint, and acceptance by the manufacturer of the sealing compound.

B. SIZE OF SSRF: The size of the synthetic sponge rubber filler shall be 25 percent greater than the nominal joint width.

C. ACCEPTABLE PRODUCTS: Acceptable products include No. 750.3 Ropax Rod Stock manufactured by the Presstite Division of Interchemical Corporation; Rubatex-Cord manufactured by the Rubatex Corporation; or approved equal.

D. SURFACE PREPARATION AND INSTALLATION: Surface preparation and installation of the synthetic sponge rubber filler shall be as recommended by the manufacturer in published instructions. The synthetic sponge rubber filler shall not be stretched beyond its normal length during installation.

PART 3 - EXECUTION

3.01 WORKMANSHIP AND METHODS

Concrete work, including detailing of reinforcing, shall be in accordance with the best standard practices and as set forth in the ACI Building Code, Manuals, and Recommended Practices and submitted to engineer for review.

All concrete materials shall be so delivered, stored, and handled as to prevent damage to the materials and the inclusion of foreign substances. Packaged materials shall be delivered and stored in original containers until ready for use. Material containers or materials showing evidence of water or other damage shall be rejected.

3.02 CONCRETE POURING PROCEDURE

Provide the Owner's Representative with a copy of the sequence of placement. Concrete pouring procedure and sequence shall be approved by Owner no less than two working days prior to beginning of pour. Coordinate in advance of the concrete placement the sequence of placement to assure that **construction joints will occur only as designed** and that the approximate number, size and placement of access windows are included in the forming.

3.03 MIXING

Use ready-mixed concrete mixed and delivered in accordance with the requirements of "Specifications for Ready-Mixed Concrete" ASTM C94, and "California Building Code", latest adopted Edition, Section 1905. In the event concrete is mixed at a central batching plant, arrange delivery so intervals between batches are kept at a minimum, and in any event not more than 30 minutes. **No water shall be added** during transit or at the Project site without the Inspector's specific approval. Except for mix designs containing high range water reducing admixtures, place concrete within 90 minutes after cement has been mixed or before 300 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates.

Trucks shall be in first-class condition and kept in constant rotation during delivery. Trucks shall arrive at jobsite with a <u>full</u> water tank.

3.04 CONVEYING AND PLACING CONCRETE

A. GENERAL: The Contractor shall submit a proposed sequence of placing concrete showing proposed beginning and ending of individual placements. After acceptance, this sequence shall be adhered to except when specific changes are requested by the Contractor in writing and accepted by the Engineer in writing prior to commencement.

B. NOTIFICATION: After rebar placement has been approved, notify the Inspector at least two working days in advance of the placing of any concrete.

C. APPROVALS: Obtain approval of soil bottoms for footings and slabs from the Soils Engineer before placing reinforcing steel.

D. FIELD DOCUMENTATION:

1. **Any concrete load will be rejected** without the following documentation:

    a. Weights of all mix constituents
    b. All admixtures used with quantities listed
    c. Water added at jobsite (if allowed by inspector)
    d. Water added after ticket signed by weigh master/deputy
    e. Slump
    f. Fiber reinforcement volume/quantity (if applicable)
    g. Delivery times
    h. Number of revolutions on drum for delivered load.

2. Truck revolution counter shall be re-set for each load and indicated on load ticket.

3. Load tickets must be signed by Weigh Master, and Batch Plant Deputy Inspector where applicable.

4. Provide vendor's "Certificate of Compliance" for State of California DOT as required.

E. FORMS: Before placing concrete, forms shall be thoroughly inspected. All wood chips, dirt, etc., shall be removed, all temporary bracing and cleats taken out, all openings for pipes, etc., properly boxed, all forms properly secured in their correct position and made tight, all reinforcement, anchors, and embedded items secured in their proper places. Concrete which may be on the forms or reinforcement and which is set and dry, shall be cleaned off and the forms and steel washed off before proceeding.

F. PREPARATION: Sprinkle semi-porous sub-grades with water sufficiently to eliminate suction.

G. HANDLING AND DEPOSITING:

1. Complete concreting, once started, in continuous operations until the section of approved size and shape is completed.

2. Handle concrete as rapidly as practical from the mixer to place of final deposit by methods which prevent the separation or loss of ingredients. Deposit in its final position to avoid re-handling or re-flowing.

3. Do not drop concrete freely where reinforcing will cause segregation, nor more than 4 feet. Deposit concrete to maintain a plastic surface approximately horizontal.

4. Do not deposit concrete that has partially hardened.

5. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause formation of cold joints, unless construction joint requirements of Par. 3.04.H are met.

6. Do not place concrete that contains foreign material.
7. When temporary spreaders are used in the forms, remove the spreaders as the concrete is placed. Spreaders made of metal or concrete may be left in place if prior acceptance is obtained.

8. Do not subject concrete to procedures that will cause segregation.

9. When underwater placement is required or permitted, place concrete by an acceptable method. Deposit fresh concrete so concrete enters the mass of previously placed concrete from within, displacing water with minimum disturbance of the concrete surface.

H. CONSTRUCTION JOINTS: Locate construction joints as indicated in Contract Documents or as approved in the submittals. Formed construction joints shall meet requirements of Section 03110 Par. 2.01.D. Remove laitance and thoroughly clean and dampen construction joints before placement of fresh concrete. When bond is required, use one of the following methods:

1. Use an acceptable bonding agent applied in accordance with the manufacturer's recommendations;

2. Use an acceptable surface retarder in accordance with manufacturer's recommendations;

3. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened aggregate particles, or damaged concrete at the surface; and

4. Use portland-cement grout of the same proportions as the mortar in the concrete in an acceptable manner.

I. CONSOLIDATING: Unless otherwise specified, consolidate concrete by vibration. Consolidate concrete around reinforcement, embedded items and into corners of forms to eliminate honeycombing or planes of weakness due to air voids and stone pockets.

Unless otherwise specified, use the largest and most powerful internal vibrators to consolidate the concrete. Use immersion-type vibrators with nonmetallic heads when consolidating concrete around epoxy-coated reinforcement.

Workers shall be experienced in the use of vibrators. Do not use vibrators to move concrete within the forms. Spacing of immersion vibrator insertions shall not exceed 1-1/2 times the vibrator's radius of action in the concrete being consolidated.

Vibrate close to the forms but do not continue at one spot to the extent that large areas of grout are formed or heavier aggregates are caused to settle. Take care not to disturb concrete which has taken its initial set.

Vibrators shall be 14,000 vibrations per minute (minimum).

J. TEMPERATURE REQUIREMENTS: Maximum placing temperature of concrete, when deposited, shall be 90 degrees F. If the weather causes the placing temperature to exceed 90 degrees F, cool the mix by wetting aggregate at batch plant or other appropriate methods at the batch plant as specified in American Concrete Institute "Specification for Hot Weather Concreting" ACI 305R, Latest Edition; a copy of which shall be kept at the job site at all times.

3.05 EVALUATION AFTER REMOVAL OF FORMS

Immediately after stripping forms, and before any concrete is thoroughly dry, immediately submit method of repair to Owner for approval for any minor defects, tie holes or honeycombed areas. Refer to Paragraph 1.08 for additional information.

3.06 CONCRETE SLAB FINISHES (AT GRADE)

A. STEEL TROWEL FINISH: Screed, wood float, and steel trowel surfaces. Provide a smooth, hard, dense, impervious surface, free of defects. Finishers shall work from knee boards laid flat upon the surface. Mechanical troweling machines may be used if the desired finish and level tolerances can be obtained by their use.

B. BROOM FINISH: After concrete has been troweled and joints have been formed, use a soft bristled broom to provide a light, uniformly straight scored surface at right angles to the general flow of traffic.

C. SLAB LEVELS: Finish surfaces true to 1/8 inch in 10 feet on a straight-edge in any direction with maximum high and low variance occurring in not less than 20 feet and with 1/16 inch maximum tolerance in any one running foot. Take care to finish troweling around the edges of the slabs so finish surface edges will be at same elevations as the rest of the top surface of the slab. Use temporary screeds set level at the proper elevations.

D. MARK-OFF LINES: Form mark-off lines with curved edging tool, neat and true to line, uniform throughout. Conform to markings indicated.

E. WEAKENED PLANE JOINTS: Provide saw cut joints to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

3.07 CURING AND SEALING

A. PROTECTION: Protect concrete from injurious action of the elements and defacement of any nature during construction operations.

B. MAINTAINING MOISTURE: Keep concrete in a thoroughly moist condition from the time it is placed until it has cured for at least 7 days. Keep all forms sufficiently wet to prevent drying out of the concrete. Allow no slabs to become dry at any time until curing operations are complete.

C. INTERIOR FLOOR SLABS: Cure interior floor slabs with curing-sealing compound. Apply by method and at rates recommended by manufacturer.

1. Just prior to completion of project, apply a second coat of curing-sealer to entire floor slab surface, at a rate recommended by manufacturer.

3.08 EXPANSION JOINTS

Provide pre-molded expansion joints to full depth of slabs, where indicated on the drawings. Install with top edge 1/2" below the surface and tool adjacent concrete edges to a 1/8" radius. Use steel pins to hold material in place during placing and floating of concrete. After a minimum of 28 days after slabs have been placed and finished, fill tops of expansion joints with a traffic grade self-leveling sealer to 1/8" below surface of slabs. No traffic shall be permitted to travel over sealed joints until sealer is thoroughly dry.

3.09 WATER STOPS

Provide water stops for all potentially submerged construction joints in structures. Install per manufacturer’s recommendations.

3.10 DEFECTIVE WORK

All concrete work determined by the Owner to be “defective”, shall be immediately removed and replaced solely at the Contractor's expense to the satisfaction of the Owner. Also refer to Paragraph 1.08 for criteria and provisions when water tightness of concrete is applicable.

END OF SECTION 03300

SECTION 03480

PRECAST CONCRETE VAULTS AND MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

This section covers the requirements for furnishing and installing precast vaults and manholes as indicated on the Contract Drawings. Under these specifications, a company regularly engaged in the manufacturing of precast vaults and manholes, as approved by the Owner, shall be required to furnish, deliver and properly set in place the specified precast concrete products.

1.02 RELATED SECTIONS

A. SECTION 01340: Shop Drawings and Submittals
B. SECTION 02200: Earthwork and Site Preparation
C. SECTION 03300: Cast-In-Place Concrete
D. SECTION 09872: Geopolymer Manhole Liner System

1.03 MANUFACTURER'S WARRANTY

The precast vault/manhole manufacturer shall guarantee all materials and workmanship of items furnished under these specifications shall be free from defects for a period of one year after final completion and acceptance of the contract work. All defective materials or workmanship found to be deficient with respect to any provisions of these specifications or referenced standards shall be repaired or replaced as approved by Owner, at no additional cost to the Owner. Submit, for the Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not a limitation of, other rights the Owner may have under the Contract Documents.

1.04 REFERENCE STANDARDS

A. GENERAL: Except as modified or supplemented herein, all precast concrete vaults and manholes shall conform to the applicable requirements of the ASTM and ACI Standards.

B. INDUSTRY STANDARDS:

1. Reference Specifications and Standards: Contractor shall comply with the recommendations of the Precast Concrete Institute (PCI), unless otherwise indicated in this Section.

2. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

1.05 SUBMITTALS

A. GENERAL: Submit shop drawings, including related details and data in accordance with Section 01340.

B. CALCULATIONS: Submit design calculations and complete drawings signed and stamped by a Civil or Structural Engineer registered in the State of California.

C. JOINT SEALANTS: Submit joint sealing compound for watertight joints.

D. INTERIOR COATING: Submit per Section 09875 (wastewater applications only).

E. CONCRETE: Submit concrete mix design.

F. INSTALLATION PROCEDURES: Submit manufacturer's recommended installation procedures.

G. COVERS AND HATCHES: Submit covers and hatches as indicated on the Contract Drawings.

H. EXTERIOR WATERPROOFING MATERIALS: Submit product data per Part 2.

I. EMBEDMENTS: Submit any embedments or inserts into pre-cast concrete.

J. CERTIFICATION: A statement shall be submitted giving the qualifications of the precast concrete fabricator, and evidence that the manufacturer is PCI certified.

K. WARRANTY: Provide manufacturer’s warranty prior to project close-out.

1.06 PLANT REQUIREMENTS AND QUALITY ASSURANCE

A. GENERAL: All precast concrete vault and manhole sections, including top slab and base slab (if applicable), shall be manufactured in a plant especially designed for that purpose. All units shall conform to the design shown on the Contract Drawings, and all work shall be conducted under strict controlled supervision.

B. PLANT INSPECTION: Plant manufacturer shall provide certification that all units conform to the applicable requirements, provisions and tolerances set forth in the applicable ASTM Standards and the provisions described herein. The Owner reserves the right to have its Engineer or Engineer's representative present prior to and during the concrete pour for the precast products. Contractor shall notify the Owner two (2) working days in advance of concrete pour for all precast products to be furnished under these Contract Documents.

1.07 DESIGN LOADS

A. GENERAL: 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 on the structure.

B. WATER TABLE: For purposes of design, the water table shall be assumed at a level of four (4) feet below the top of the precast vault or manhole.

C. LIVE LOADS: Live loads shall be for H-20 and/or H-20-S16 per AASHTO Standard Specifications for highway bridges with revisions. Design wheel load shall be 16 kips. The live load shall be that loading which produces the maximum shears and bending moments in the structure. No live loads shall be considered when analyzing the vault or manhole for uplift caused by the specified water table level.

D. EARTH LOADS: Soil weight, allowable bearing pressure, active soil pressure and passive soil pressure shall be in accordance with the soils report. If no soils report is available, use Uniform Building Code values.

1.08 DELIVERY, STORAGE AND HANDLING

A. LIFTING AND SUPPORTING: Precast units shall be lifted and supported from design incorporated support points based on design calculations and provided with strong backs and other devices as required. Lifting equipment shall be capable of handling units during manufacture, storage, transportation, erection, and fastening.

B. BLOCKING AND SUPPORTS:

Blocking and supports, lateral restraints and protective materials during transport and storage shall be clean, nonstaining, causing no harm to exposed surfaces. Lateral restraints shall be provided to prevent undesirable horizontal movement. Edges and exposed faces of units shall be protected to prevent straining, chipping, or spalling of concrete.

C. STORAGE: Precast units shall be stored off the ground in a manner to prevent warpage and shall be protected from weather, marring, and overload.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

Approved manufacturer's are:

1. Oldcastle Precast, Inc.

2. Jensen Precast

2.02 MATERIALS

A. CONCRETE: Concrete shall be 5,000 psi (minimum) compressive strength at 28 days in accordance with Section 03300. Cement shall be low alkali. Use Type V cement for wastewater applications and Type II cement for non-wastewater applications.

B. REINFORCING STEEL: All reinforcing steel shall be intermediate or hard grade billet steel conforming to ASTM A-615/Grade 60. Bars other than 1/4" round, or smaller, shall be deformed in accordance with ASTM A305.

C. COVERS AND HATCHES: Provide traffic rated or parkway rated spring-assisted, hinged covers and hatches as indicated on the Contract Drawings.

D. WATERPROOFING: Refer to Section 07120 (“Fluid Applied Water Proofing”). NOT APPLICABLE TO THIS PROJECT.

E. INTERIOR COATING: For wastewater applications, field applied coating shall be in accordance with Section 09872 (Geopolymer Manhole Liner Systems).

2.03 FORMS

A. GENERAL: Forms shall be manufacturer's standard forms with smooth, hard, dense, and rigid casting surface; without bow and warpage, oil canning, or other imperfections.

B. FORM RELEASE AGENT: Form release agent shall be manufacturer's standard release agent, nonstaining, nonpetroleum based and shall be compatible with concrete surface sealer.

2.04 ACCESSORIES

Accessories shall be as indicated on the Contract Drawings. Plates, angles, anchors, and studs shall comply with ASTM A 666, Type 316L stainless steel. Ladders if applicable, shall be in accordance with the plans.

2.05 FABRICATION

Precast concrete units shall be fabricated in accordance with ACI 318 and PCI MNL-116. Plant records and quality control program shall be maintained during production of precast units and furnished to the Owner at the time of delivery.

PART 3 – EXECUTION

3.01 HANDLING AND ERECTION

A. GENERAL: Before erecting, all relevant project site conditions shall be checked insofar as they affect the installation of precast elements.

Elements shall be erected in accordance with the referenced standards, drawings, Specifications, and Owner approved submittals, using competent craftspersons under the continuous supervision of the fabricator. Elements shall be accurately set in the positions assigned to them on the reviewed installation or erection drawings and securely anchored in final positions. All joints shall be sealed in strict conformity with detail drawings.

B. WORKMANSHIP: All field setting and installation shall be performed in a neat and workmanlike manner per the manufacturer's recommendations. Defective workmanship and/or materials shall be subject to rejection.

All cracked, damaged, or otherwise defective precast elements, not feasible to repair, shall be replaced until acceptable to the Owner without additional cost to the Owner.

C. JOINTS: Precast sections and base slab shall be joined with an approved joint seal compound for a watertight joint.

1. Precast sections below the specified potential water table shall be securely fastened and restrained to prevent sections from pulling apart.

D. CAST-IN-PLACE CONCRETE BASES: Unless otherwise approved by Owner, cast-in-place concrete bases shall cure a minimum of seven (7) days prior to setting of the precast vault or manhole sections.

E. PRECAST CONCRETE SECTIONS: Unless otherwise approved by the Owner, all precast sections below the top 18" of the structure shall be comprised of section heights equal to, or greater than, 30 inches. The top 18" of the structures shall contain grade rings or sections 6 inches to 12 inches in height.

F. EMBEDMENTS: Vault manufacturer and Contractor shall coordinate for delivery and installation of all specified embedments (such as davit arm receptacles) prior to pouring of the pre-cast concrete top sections.

3.02 WATERPROOFING

All buried exterior surfaces of concrete walls, including vaults and manholes, shall be protected from moisture with below-grade waterproofing system. Refer to Contract Drawings and Section 07120 (“Fluid Applied Waterproofing”) of the Technical Specifications.

3.03 TOLERANCES

Tolerances shall be in accordance with requirements of PCI MNL-117 and as follows:

A. VARIATION FROM PLANE OF LOCATION: 1/4-inch in 10 feet maximum.

B. OFFSET FROM TRUE ALIGNMENT BETWEEN TWO CONNECTING MEMBERS: 1/4-inch maximum.

END OF SECTION 03480

DIVISION 7

THERMAL AND MOISTURE PROTECTION

DIVISION 7
TABLE OF CONTENTS

SECTION 07120

FLUID APPLIED WATERPROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. ELASTO-DECK B.T.: A black, liquid-applied, single-component, moisture-cured polyurethane system, designed to form a tough rubber membrane impervious to moisture.

1. Type I: For horizontal surfaces.

2. Type II: For vertical surfaces.

3. Elasto-Thane 500: For cracks, voids and other surface irregularities.

1.02 WORK INCLUDED

A. The work to be completed under this section shall include the furnishing of all materials, labor, tools and equipment for the complete installation of PACIFIC POLYMERS INTERNATIONAL, INC. Elasto-Deck B.T. System where indicated on the drawings and as specified herein:

1. 90 Mils Thickness (Rough Surfaces)

a. Concrete block, below grade

b. Pre-cast and cast-in-place concrete structures

1.03 QUALITY ASSURANCE

A. APPLICATORS

1. A licensed contractor approved by the manufacturer, PACIFIC POLYMERS INTERNATIONAL, INC., or equal.

2. Be a licensed specialty contractor in the business of applying elastomeric membrane roofing and waterproofing for a minimum of five years.

B. MANUFACTURER:

1. Certify in writing that applicator is approved for this type and size or project.

2. Before starting work, visit the site to inspect substrates and related work by others. Manufacturer shall be notified in writing 5 days prior to inspection.

3. Review the job from time to time during the progress of the waterproofing work and verify that products are being properly installed. Manufacturer should make note of any exceptions.

4. When the waterproofing is complete, deliver a letter from the manufacturer to the architect indicating compliance with the above.

1.04 SUBMITTALS

A. MANUFACTURER'S PRODUCT DATA: Submit copies of manufacturer's product literature and installation instructions to the Engineer for review and approval.

B. SAMPLES: Submit samples of elastomeric membrane waterproofing on flat plywood board, approximately 2 ½" x 4".

1.05 PRODUCT DELIVERY AND STORAGE

Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material name, date of manufacture and batch number.

1.06 JOB CONDITIONS

The Contractor shall examine the surfaces before any commencement of work. Concrete shall be properly dried and the surfaces shall be in proper condition to receive the coating system. If the Contractor considers any surface unsuitable for proper finish of any work, he shall not apply any material until the unsuitable surfaces have been made satisfactory.

1.07 GUARANTEE

All PACIFIC POLYMERS INTERNATIONAL, INC. products specified above shall be guaranteed against defects in manufacture for a period of three (3) years.

Guarantee shall include responsibility for ruptures caused by cracking in the substrate up to 1/8" in width.

This guarantee shall remain in effect only if an approved licensed applicator has installed the system according to Manufacturer's specifications and the standard maintenance procedures are followed.

Extend, joint manufacturer/applicator warranties are available for specific projects.

PART 2 - PRODUCTS

2.01 GENERAL

Components shall be manufactured by PACIFIC POLYMERS INTERNATIONAL, INC. or shall be approved as compatible with materials manufactured by PACIFIC POLYMERS INTERNATIONAL, INC., or equal.

2.02 ELASTOMERIC MEMBRANE WATERPROOFING SYSTEM

A. The system shall be PACIFIC POLYMERS INTERNATIONAL, INC. Elasto-Deck B.T. System or equal.

1. 90 mils thick – Rough surfaces

B. MATERIAL TYPES:

1. Type II: For vertical surfaces.

2. Elasto-Thane 500: For cracks, voids and other surface irregularities.

2.03 RELATED MATERIALS

A. SEALANTS: ELASTO-THANE 500.

B. BACKER ROD: Closed-cell Polyethylene rod, such as Ethafoam by Dow chemical.

C. FLASHING TAPE: Woven glass cloth tape.

D. PROTECTION COURSE: Minimum 1/8" thick APOC Protection Panel by Asphalt Products Oil Corp., or Amocor PB4 protection board or equal.

E. CLEANING MATERIALS: Elasto-Deck solvent or Xylene.

F. ELASTO-POXY PRIMER

G. METAL PRIMER

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. All surfaces must be clean and free of any oil, dirt, grease and other contaminants which will interfere with adhesion of the coatings. Surfaces shall be left broom lean.

3.02 PREPARATION

A. All surfaces must be clean and free of any oil, dirt, grease, and other contaminants which will interfere with adhesion of the coatings.

B. CONCRETE: All surfaces to receive elastomeric waterproofing system shall be completely cleaned by sandblasting or acid etching. If acid etching is used, a 10% to 15% muriatic acid solution applied by mop or broom, shall be allowed to remain on the surface approximately 10 minutes or until bubbling ceases. Surfaces shall then be thoroughly washed with clean water to remove all residue and shall be allowed to dry.

C. CRACKS AND CONTROL JOINTS:

1. Except for non-moving shrinkage cracks, all other cracks and joints must be sealed with Elasto-Thane 500, a single-component, moisture-cured sealant manufactured by PACIFIC POLYMERS INTERNATIONAL, INC.

2. Large cracks, 1/16" and over, shall be routed out as required by the manufacturer and sealed with Elasto-Thane 500. Apply sealant to inside area of cracks only. Do not apply to concrete deck surfaces.

3. Seal secondary control and expansion joints with Elasto-Thane 500 sealant and backer rod.

3.03 APPLICATION

A. Apply elastomeric waterproofing system in accordance with the following specifications for PACIFIC POLYMERS INTERNATIONAL, INC. Elasto-Deck B.T. System or equal.

B. PACIFIC POLYMERS INTERNATIONAL, INC. Elasto-Deck B.T. System (90 Mils thickness) or equal.

1. All cracks 1/16" and over must be routed or saw cut and filled with Elasto-Thane 50.

2. At intersections of membrane and vertical walls, columns, pipes and other penetrations, caulk a ¾" fillet bead at the meeting angle using Elasto-Thane 500. Elasto-Thane 500 need not be cured before applying Elasto-Deck B.T. since they are completely compatible.

3. Apply by airless spray, roller brush or squeegee. The first coat of Elasto-Deck B.T. at a rate of 28.4 square feet per gallon.

4. After a 24 hour cure, apply a second coat of Elasto-Deck B.T. at the same 28.4 square feet per gallon to achieve a total dry film thickness of 90 mils.

3.04 INSPECTION

A. The wet film thickness of each coat shall be checked during application by averaging numerous measurements taken with a film gauge and thickness shall be sufficient that when cured the dry film thickness will be as specified herein.

B. All surfaces coated shall be visibly checked to insure area has not been missed and all holidays in the film are repaired.

C. All coating work shall be subject to inspection at any time to insure strict compliance with the manufacturer's recommendations. Test areas shall be cut whenever requested by the architect to verify conformance to the specifications. Any unsatisfactory area shall be remedied by the applicator.

D. After the completed system is allowed to cure for 48 hours, pond testing may be performed. Set temporary dams and plug drains as required, and pond test all horizontal membranes with a minimum 3" depth of water for not less than 72 hours. Correct leakage and repeat test until water tight.

3.05 PROTECTION COURSE

A. Install protection board on cured membrane, after testing, without delay, so that the period of exposure shall be minimized.

3.08 CLEAN-UP

A. At completion of construction work, remove all temporary protection and barricades from the work.

B. Clean all items of work. Examine all work and repair all damage. In the event damage is irreparable, remove and replace such items at no additional

cost. Do all required touch-up to marred or abraded surfaces. Leave entire work in condition acceptable to District.

C. The Contractor shall at all times keep the project area free of excessive waste, materials and rubbish. Prior to completion of work, the Contractor shall remove all such waste, equipment, other property and tools from the project area.

END OF SECTION 07120

DIVISION 9

FINISHES

DIVISION 9
TABLE OF CONTENTS

SECTION 09872
CURED-IN-PLACE MANHOLE LINER SYSTEM

PART 1 - GENERAL

1.1 GENERAL

A. This section covers the cleaning and lining and rehabilitation of sanitary sewer manholes where shown on the Drawings with the use of cured-in-place manhole (CIPM) liners.

B. Where a CIPM liner can not be used due to existing drop pipes that cannot be removed from the manhole wall, an epoxy system shall be utilized at the approval of the City. Epoxy system shall be Epoxy-Structure Guard or approved equal. Contractor shall determine the need for an epoxy system prior to bidding the project and shall include the necessary costs in his/her bid.

1.2 DESCRIPTION OF WORK

A. Design and install CIPM liner so that it completely seals the manhole, shelf, pipe inlet, and outlets and the lid ring frame in a monolithic method, and that no holes, cracks, or seams in the liner are left unsealed which would allow gases or fluids to flow behind the CIPM liner.

B. Furnish all labor, materials, equipment, and incidentals required to design, supply and install a protective CIPM liner as specified herein.

C. The CIPM liner shall be designed and installed to protect concrete, brick, and other interior manhole surfaces from corrosion. The CIPM liner product shall be designed to stop infiltration, root intrusion, and further deterioration in the manhole. The interior surfaces to be protected shall include the walls, shelves, pipe junctions and the lid ring frame.

D. Omission of a specific item or component obviously necessary for the proper installation and functioning of the system shall not relieve the CONTRACTOR from the responsibility of supplying that specific item or component at no additional cost to the City.

1.3 SUBMITTALS

A. Submit the following:

1. A copy of liner manufacturer's certified licensed installer certification for the applicator of the liners.

2. An affidavit from the manufacturer of the CIPM lining material attesting to a minimum period of 20 years' successful use of its materials as a lining for concrete structures in wastewater conditions recognized as corrosive or otherwise detrimental to concrete. Successful use is defined as no defects in materials and workmanship, no deterioration of the lined surfaces by sewer gas induced corrosion, no root intrusion through the lined surfaces, and no

infiltration of ground water into the collection system through the lined surfaces for a minimum period of 20 years.

3. A copy of the manufacturer's 20-year written guarantee for all materials furnished under this section.

4. A copy of the installer's 20-year written warranty for materials and labor to repair or replace any failing conditions related to the installation of the liner in the structure.

5. A copy of the liner material manufacturer's third-party independent test lab report that documents the CIPM cured liners minimum physical properties on factory manufactured test samples tested per ASTM F 790 exceeding 1,000,000 psi.

6. A copy of the CONTRACTOR's experience and qualifications demonstrating conformance to the qualification requirements specified herein. The list shall include the agency, contact name, and contact information.

7. Copies of the initial manhole designs based on the technical requirements noted herein as well as the name and relevant experience of the engineer licensed to practice in the State of California who will seal the final designs.

B. Submit results of manhole field measurements and inspections before ordering materials. Submit proposed liner design meeting the minimum design requirements noted herein and sealed by an engineer licensed to practice in the State of California to the ENGINEER before ordering materials. Each form shall include the physical location of each manhole.

C. Submit complete detailed shop drawings and schedule for all materials furnished under this section. Including factory written certification that the installed liner meets the design requirements of this specification.

D. Submit the manufacturer's third-party certifications of testing, with the accompanying test date, showing epoxy resin bonding strength of over 7,000 psi when tested with 10,000-psi concrete test cylinders in a butted resin-bonding test. That testing must demonstrate no epoxy bonding detachment prior to the failure of the concrete.

E. A written test lab report that documents the cured liners minimum physical properties of factory manufactured test samples tested per ASTM F 790 by a certified independent test laboratory exceeding 1,000,000 psi. Demonstrate that the as-installed liner has an elongation sufficient to bridge up to a 1/4-inch settling crack.

F. Confined space entry certifications.

1.4 STANDARDS

A. The CIPM liner system shall be manufactured and installed to be in compliance with the minimum value recommended by the manufacturer's standards and shall comply with the latest version of the following ASTM testing requirements:

1. ASTM D 638 Tensile Strength and Tensile Modulus
2. ASTM D 695 Compressive Strength
3. ASTM D 790 Flexural Strength and Flexural Modulus
4. ASTM D 2240 Hardness
5. ASTM D2990 Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
6. ASTM F3033 Standard Practice for Installation of a Single-Sized, Cured-In-Place Liner Utilizing an Inflatable Bladder for Resurfacing Manhole Walls of Various Shapes and Sizes

B. The following standards shall also be applicable to the installation of CIPM liner systems:

1. International Concrete Repair Institute - Technical Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.
2. National Association of Corrosion Engineers - No 6. / SSPC SP 13 Surface Preparation of Concrete.

1.5 QUALIIFICATIONS

A. The CIPM Lining Installer shall have performed a minimum of ten (10) installations within the last 5 years.

B. CIPM Lining Installers shall be trained and certified by the CIP lining manufacturer.

C. CONTRACTOR's or Subcontractor's staff at the Project site shall be trained in confined space rescue and have all necessary rescue equipment onsite during the duration of the manhole rehabilitation Work.

1.6 WARRANTY

A. Manufacturer shall warrant the performance of the CIPM liner for 20 years.

B. At the completion of the Work, the installer shall issue the City a 20-year installer warranty certificate covering all materials used, installation and structural strength, smooth hydraulic transition, an assurance against any visible deformation during the warranty period. The warranty certification is to state that during the installer warranty period the CONTRACTOR (Installer) shall repair all above listed defects at the CONTRACTOR's expense.

1.7 DESIGN BASIS AND MINIMUM DESIGN REQUIREMENTS

A. The CIPM liner system shall be designed and installed to:

1. Fit integrally in the existing manhole structure with a close-fit sufficient to facilitate composite interaction with the host manhole structure.

2. The host manhole shall be inspected prior to finalizing design and be confirmed to be devoid of structural fractures or other defects that would readily transfer loads other than hydrostatic loads from groundwater to the CIPM lining system. Based on confirmation of same, the CIPM shall be designed to structurally resist all hydrostatic loads based on an assumed maximum groundwater surface at ground level as well as all handling loads to facilitate installation and routine maintenance as specified herein.

3. The CIPM system may be designed as unbonded system such that the CIPM structure itself is adequate to resist all hydrostatic and other loads.

4. The structural design shall account for the effects of creep in the CIPM based on 50 years of continuous exposure to the applied stress level as determined in an ASTM D2990 test to establish flexural modulus creep for the specific resin-composite system proposed for use. The ASTM D2990 test should be carried out at stress levels equal to 25% of the short-term flexural yield strength of the material. The long-term factor of safety for buckling of the CIPM shall be a minimum of 2.0.

5. Irrespective of the lack of reliance on bond, the receiving substrate of the manhole shall be prepared in such a manner to preclude any deleterious interaction between the CIPM and substrate surface and maximize the degree of mechanical interlock between the substrate and CIPM.

6. Provide adequate chemical resistance to meet the exposure conditions noted herein, including protection against corrosion and typical chemicals found in domestic sewage and sewer gas.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The cured-in-place manhole (CIPM) shall include four or more layers of resin-impregnated fiberglass, and non-porous PVC membrane. The non-porous PVC membrane shall be shielded by the fiberglass layer to be resistant to damage after installation.

B. The liner system shall be either of the following, or equal:

1. CIPM Liner System, as manufactured by Alternative Liner Technologies

2. Triplex Liner System, as manufactured by McNeil Technologies.

2.2 LINER BAG

A. The liner bag shall be composed of four or more layers composed of E glass fiberglass, polyester felt, and a flexible nonporous PVC water and gas shield membrane. The flexible non-porous PVC water and gas shield shall be embedded between the structural layers of epoxy-fiberglass to guard against nicks, tears, and damage to the gas protection membrane.

B. The design of the liner bag shall be determined by the liner manufacturer and authorized installer to structurally resist hydrostatic loads, installation forces, and other loads that will be encountered during the life of the liner, as well as meet all specified design criteria. The liner manufacturer and authorized installer shall account for any unusual conditions identified in the structure during the pre-manufacturing measurement and inspection. Designs for liner thickness shall be accepted by the ENGINEER. Acceptance by the ENGINEER of the liner thickness shall not affect the warranty requirement.

2.3 REINFORCED ANGLE POINT BETWEEN THE MAINTENANCE HOLE WALL AND BASE

A. The angle point between the maintenance hole wall and the base shall be reinforced with at least two extra layers of fiberglass and shall have a minimum completed composite thickness of six layers of fiberglass each with a minimum weight as required by the installation conditions.

2.4 EPOXY RESIN

A. The modified epoxy resin shall be two component 100% solids no VOC resin. The resin and catalyst shall be pre-measured at the factory and shipped in separate color-coded part A and B pails. The resin shall bond to the existing manhole brick or concrete substrate and each layer of the fiberglass, polyester felt, and flexible PVC inner liner.

PART 3 - EXECUTION

3.1 MAINTAINING WASTEWATER FLOWS

A. The Contractor shall be fully responsible for restricting the normal sewage flow through the manhole where the specified rehabilitation work demands such flow restriction or where a force main is entering a manhole in accordance with Section 02250. The Contractor will plan his work in order to maintain flows and not interrupt sewer service. This may include night work. The cost of any night work required will be included in the contract price of the applicable item. The Contractor shall not perform work to manholes until plans for bypass pumping or flow restriction have been submitted and accepted by the City. Additionally, no plugging of existing Utility System Gravity Mains will be made without the approval of the City.

B. Unlined flow channel. Install a bridge or flow through tube and cut the liner bottom near the flow line in the channel to expose the flow channel and give access to the pipes.

3.2 FIELD MEASUREMENT AND INSPECTION OF MANHOLES

A. Manhole flow channel shall be protected at all times during the cleaning process and during the rehabilitation work by the Contractor. A temporary subfloor shall be constructed to keep debris from entering the flow channel.

B. Waterblast, field measure, and inspect the manholes before ordering materials.

3.3 SURFACE PREPARATION

A. The Contractor shall remove all the existing manhole steps. The metal portion of all steps shall be removed to within ½" of the manhole interior wall surface. The remaining protruding metal portion of the step shall be covered with a cementitious material to provide a smooth surface on and around the protrusion for the liner to bond to.

B. Clean with high pressure water the manhole walls and base prior to the installation of the liner. Cleaning shall comply with SSPWC Section 502-3 Cleaning.

C. Surface preparation of the substrate shall be sufficient to achieve a concrete surface profile CSP 2 or higher as defined in the ICRI Guideline No. 03732.

D. All active structure infiltration shall be eliminated completely prior to liner application, using chemical grouting or other appropriate method, per NASSCO specifications. All active water leakage shall be stopped for a minimum of 30 minutes prior to installation to allow time to insert and pressurize the Liner. This prevents resin washout and allows proper curing and bonding. Leaks may be stopped with fast setting cement or chemical grout injection.

E. Remove and dispose off-site all debris produced during the rehabilitation process. Comply with all federal, state, and local regulations regarding disposal of debris. debris shall not be allowed to enter the pipeline.

3.4 CONCRETE AND EPOXY MORTAR REPLACEMENT

A. Contractor shall repair all manhole benches using fast setting concrete (Speed Plug by Euclid Chemical or approved equal). Bench shall be sloped so that water will flow back into the channel.

B. All open joints, voids, holes, cracks, and missing bricks larger than 3 inches in diameter or equivalent shall be patched with a cementitious material to provide a smooth surface for the liner to bond. All loose, cracked or disintegrated material shall be removed from the area to be patched exposing a sound substrate. The cementitious patch material (Speed Plug by Euclid Chemical or approved equal) shall be allowed to cure according to the manufacturer's specifications before continuing with the Liner installation process.

3.5 INSTALLATION AND FIELD INSPECTION:

A. Installation shall be in accordance with ASTM F3033 and in strict compliance with the Manufacturer's recommendations.

B. For Liner installation that does not include the channel, a temporary subfloor shall be constructed to keep the liner from inflating into the channel and to allow the sewer to flow unobstructed or A flow control device shall be installed to maintain the normal flow and isolate the bottom of the liner from the flow during installation of the liner.

C. Plywood and protective plastic shall be used around the maintenance hole to isolate the street surface from the resin. Good housekeeping measures shall be employed, and any spilled resin shall be immediately cleaned up at the CONTRACTOR's expense.

D. Inspect each dry liner bag before installation to verify that the inspection tag, installation address, and the liner materials comply with Table 1. Similarly, epoxy, urethane and other products shall be inspected, to confirm they match the approved submittals.

E. Both the inside and outside layers of the dry fiberglass liner shall be wet out separately with 100% solids, non-VOC, modified epoxy. There shall be no dry spots in either of the fiberglass liners.

F. The wet outliner, bottom, and six-layer reinforced angle section shall be installed per the manufacturer's standards and this section.

G. The wet outliner shall be inflated, heat cured with steam, and cooled with air per the liner manufacturer's standards.

H. The cured liner shall be cut out over the pipe channel leaving a slight flared edge. The top of the liner shall be cut off even with the top of the riser ring. Any fins in the liner at the top of the rings shall be cut in a tapered fashion to allow a full 24-inch access to the manhole.

I. The top and bottom of the cuts shall be sealed with Sika Dur 31, or equal.

J. A cured flat sample of the liner and six-layer reinforced angle section shall be provided to the ENGINEER for each installation.

3.6 TESTING AND QUALITY CONTROL

A. Perform a spark test on each installed liner at a minimum of 15,000 volts per SSPWC Section 502-6.2.

B. The cured sample will be visually inspected by the ENGINEER to confirm that the PVC barrier was installed between the layers of fiberglass and that a minimum of four layers of fiberglass was installed and cured at the bottom angle of the manhole.

END OF SECTION 09872

SECTION 09875

EPOXY COATING FOR EXISTING CONCRETE WASTEWATER STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

This section covers all workmanship, materials and quality requirements for providing and applying a high-build epoxy coating for protecting concrete wastewater structures and manholes in order to eliminate infiltration and provide corrosion protection. This specification covers both epoxy coating for new structures and epoxy coating for repair of existing structures.

1.02 RELATED SECTIONS

A. BENTONITE WATERPROOFING: Section 07130.

B. JOINT SEALERS: Section 07900

C. SURFACE PREPARATION FOR STEEL AND CONCRETE SUBSTRUCTURES: Section 09879

1.03 SCAQMD COMPLIANCE

All coatings shall be in compliance with all South Coast Air Quality Management Owner requirements including volatile organic compounds (VOC).

1.04 REFERENCES

A. GENERAL: The references indicated herein are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the most stringent of the requirements shall govern.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of receipt of bid proposals. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.

Referenced publications found within this specification shall be the latest revision unless otherwise specified; and applicable parts of the referenced publications shall become a part of this specification as if fully included.

B. REFERENCE STANDARDS:

A. ASTM D638 - Tensile Properties of Plastics.

B. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.

C. ASTM D695 - Compressive Properties of Rigid Plastics.

D. ASTM D4541 - Pull-off Strength of Coatings Using a Portable Adhesion Tester.

E. ASTM D2584 - Volatile Matter Content.

F. ASTM D22409 - Durometer Hardness, Type D.

G. ASTM D543 - Resistance of Plastics to Chemical Reagents.

H. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.

I. ASTM C396 - Compressive Strength of Cement Mortars.

J. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of shotcrete.

K. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.

L. ASTM - The published standards of the American Society for Testing and Materials, West Conshohocken, PA.

M. NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

N. NACE - RP0892-92 – Standard Recommended Practice, "Lining Over Concrete in Immersion Service".

O. SSPC - The published standards of the Society of Protective Coatings, Pittsburgh, PA.

1.05 QUALITY ASSURANCE

A. GENERAL: Quality assurance procedures and practices shall be used to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be used provided they meet recognized and acceptable professional standards and are approved by the Owner.

B. INSPECTION BY OWNER OR OWNER: All materials furnished and all work accomplished under the Contract shall be subject to inspection by the Owner. The Contractor shall be held strictly to the true intent of the Specifications in regard to quality of materials, workmanship, and diligent execution of the requirements of the Contract.

Except as otherwise provided herein, the cost of inspection will be paid by the Owner.

C. FIELD TESTS: The Owner will make, or have made, such tests as he deems necessary to assure the work is being accomplished in accordance with the requirements of the Contract. Unless otherwise specified in the Special Requirements, the cost of such testing will be borne by the Owner. In the event such tests reveal non-compliance with the requirements of the Contact, the Contractor shall bear the cost of such corrective measures deemed necessary by the Owner, as well as the cost of subsequent retesting. It is understood and agreed the making of tests shall not constitute an acceptance of any portion of the work, nor relieve the contractor from compliance with the terms of the Contract.

D. OTHER QUALITY ASSURANCE REQUIREMENTS:

1. Do not use or retain contaminated, outdated, or diluted materials for resurfacing. Do not use materials from previously opened containers.

2. Use only products of the approved Manufacturer. Use products of one manufacturer in any one resurfacing system with compatible materials. Provide same material product for touch-up as for original material.

3. If any requirements of this specification conflict with a referenced standard, the more stringent requirement shall apply.

4. Make available all locations and phases of the work for access by the Owner or other personnel designated by the Owner. The Contractor shall provide ventilation and egress to safely access the coating work areas for inspection.

5. Conduct work so that the resurfacing system is installed as specified herein. Inspect work continually to ensure that the resurfacing system is installed as specified herein. The Contractor shall inspect the work to determine conformance with the specifications and referenced documents. The Contractor shall inform the Owner of the progress and the quality of the work through daily reports as specified below. Any nonconforming coating system work shall be corrected as specified herein or as recommended by the Manufacturer.

6. Summarize test data, work progress, areas covered, ambient conditions, quality control inspection test findings, and other information pertinent to the resurfacing system installation in daily reports to be submitted to the Owner or the Owner's Representative.

7. The methods of construction shall be in accordance with all requirements of this specification.

8. Employ only trades people who have at least **three years** of experience performing resurfacing work of similar size and complexity as the work specified in this Section. Submittals to verify these qualifications are to be made within thirty (30) days of the Notice-to-Proceed and are subject to approval by the Owner.

9. The Specified System is the minimum standard of quality for this project. Submissions of alternative manufacturers shall be in accordance with provisions stated in the Special Requirements.

1.06 PRE-COATING CONFERENCE

A. A Pre-Coating Conference shall be scheduled prior to start of project. The Owner, Contractor, Coating Manufacturer's representative and Owner shall be present. A schedule of work to be accomplished and a list of labor, material and equipment rates for additional work will be established and maintained throughout the project. Contractor shall furnish submittal data per Section 01340. Resumes of personnel to be used on the project shall be submitted.

B. The Contractor shall submit, prior to the Pre-Coating Conference, manufacturers' literature and Material Safety Data Sheets on all materials to be used in coating and painting operations, including, but not limited to coatings, paints, thinners, solvents and cleaning fluids per Section 01340. Contractor shall maintain copies of submittal data at jobsite at all times.

1.07 SUBMITTALS

A. GENERAL: Submit shop drawings, coating data and related information in accordance with Section 01340.

B. TECHNICAL DATA SHEETS: Submit technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.

C. MSDS: Submit Material Safety Data Sheets (MSDS) for each product used.

D. GUIDELINES: Project specific guidelines and recommendations.

E. APPLICATOR QUALIFICATIONS:

1. Manufacturer certification that Applicator has been trained and approved in the handling, mixing and application of the products to be used.

2. Certification by the protective coating manufacturer that the equipment to be used for applying the products has been approved and Applicator personnel have been trained and certified for proper use of the equipment.

3. Five (5) recent references of Applicator (projects of similar size and scope) indicating successful application of a high-build solvent-free epoxy coating by spray application.

4. Proof of any necessary federal, state or local permits or licenses necessary for the project.

5. Submit applicator's certification that resurfacing materials comply with Federal, State, and Local regulations for VOC (Volatile Organic Compounds).

6. Submit daily reports that contain the following information: substrate conditions, ambient conditions, application procedures, work completed and location thereof. Mark-up drawings that show location of work.

7. Submit letter(s) with associated product data signed by Manufacturer certifying that submitted products are suitable for application on the surfaces to be resurfaced and for the service conditions.

F. DESIGN DETAILS: Submit design details for any additional ancillary systems and equipment to be used in site and surface preparation, application and testing.

1.08 DELIVERY AND STORAGE

A. GENERAL: Materials shall be stored in accordance with Manufacturer's recommendations in enclosed structures and shall be protected from weather and adverse temperature conditions. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site.

B. STORAGE: Store all materials only in area or areas designated by the Owner solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of materials-related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the temperature is maintained between 50^{o}F and 90^{o}F.

C. MIXING: Mix all resurfacing materials in an enclosed mixing area designated by the Owner. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area.

D. DISPOSAL: Contractor shall be responsible for legal disposal of materials. Do not use floor drains, dikes or storm drains for disposal of resurfacing system materials.

E. PRECAUTIONS AGAINST HAZARDS: The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with the resurfacing system materials as described on the pertinent Material Safety Data Sheets or container labels.

E. DELIVERED MATERIALS: Deliver all materials to the jobsite in their original, unopened containers. Each container shall bear the Manufacturer's name and label.

1. Labels on all material containers must show the following information:

a. Name or title of product.
b. Federal Specification Number if applicable.
c. Manufacturer's batch number and date of manufacture.
d. Manufacturer's name.

e. Generic type of material.
f. Application and mixing instructions.
g. Hazardous material identification label.
h. Shelf life date.
i. Storage requirements.

2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.

3. All materials shall be handled and stored to prevent damage or loss of label.

4. Resurfacing material storage and mixing areas shall be designated by the Owner.

5. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.

1.09 SAFETY

A. COMPLIANCE WITH STANDARDS: The Contractor's work forces should comply with the provisions outlined in the following documents:

1. SSPC-PA-3 "A Guide to Safety in Paint Application"
2. NACE Pub. "A Manual for Painter Safety"
3. OSHA 1915.35 Standards – 29CFR – Painting Safety

B. SAFETY EQUIPMENT: The Contractor shall provide personnel with all safety equipment necessary to protect them during any phase of the work. This shall include, but not be limited to, safety glasses, goggles, earplugs, hard hats, steel toed work shoes, appropriate personal protective clothing, gloves, and plant approved escape respirators (where required).

C. FLAMMABLE MATERIALS: Keep any flammable materials such as cleaning solvents, thinners, or resurfacing materials away from open flames, sparks or temperatures higher than 150^{o}F. Drums containing flammable materials will be grounded. No solvent in any quantity shall be allowed inside containment enclosures or permitted confined spaces at any time during resurfacing work.

D. POWER TOOLS: Power tools are to be in good working order to avoid open sparking. No spark producing tools shall be utilized in restricted areas as indicated herein.

E. FIRE PROOFING: The Contractor shall fireproof all work areas by maintaining a clean work area and having Underwriter's Laboratories approved fire extinguishers on-hand. The Contractor shall furnish these fire extinguishers.

F. ABRASIVE BLASTING: Workers doing abrasive blasting operations shall wear a fresh air supplied protective helmet and hood and personal protective clothing acceptable to industry standards and all government regulations.

G. DISPOSAL OF RAGS: Dispose of rags used for wiping up resurfacing materials, solvents, and thinners by drenching them with water and placing in a metal container with a tight fitting metal cover. Complete this disposal process at the end of each day. Final disposal of these materials is the Contractor's responsibility.

H. FLAMES AND SPARK REQUIREMENTS: Matches, smoking, flames, or sparks resulting from any source including welding, must be remote from the work area during coating work. Smoking is permitted only in designated areas of the plant.

1.10 WARRANTY

A. NEW STRUCTURES: The coating shall carry an extended warranty for a two-year period from the date of acceptance. All warranties shall be turned into the Owner prior to project acceptance. Contractor shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said two (2) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

B. EXISTING STRUCTURES: The coating shall carry a warranty for a one-year period from the date of acceptance. All warranties shall be handed over to the Owner prior to project acceptance. Contractor shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said one (1) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. APPROVED MANUFACTURERS: New or Existing Structures

1. Raven Lining Systems.

2. Quadex Structure Guard.

2.02 MATERIALS

A. EPOXY LINING SYSTEM: The epoxy lining system shall be a high-build, 100% solids, solvent-free epoxy system.

B. MATERIALS TESTING REQUIREMENTS: Materials specified shall have been tested in a Severe Accelerated Wastewater Test. Submit evidence of successful test results to Owner.

C. SEALANTS: Refer to Section 07920.

D. ABRASIVE BLAST MEDIA: If dry or wet abrasive blast cleaning is the selected method of surface preparation, provide slag grit of a sieve size, gradation, and quality necessary to produce the degree of cleanliness and surface profile required herein (ICRI Guideline 03732, CSP-5 or greater and SSPC-SP13/NACE No. 6).

E. REPAIR MATERIALS: Repair materials shall be used to fill voids, structurally reinforce and/or rebuild surfaces, etc. as determined necessary by the Owner and protective coating applicator. Repair materials must be compatible with the specified epoxy coating and shall be applied in accordance with the manufacturer's recommendations.

PART 3 – EXECUTION

3.01 GENERAL

A. HOISTING, SCAFFOLDING, STAGING, AND PLANKING:

1. Provide, set-up, and maintain all required hoists, scaffolds, and staging and planking, and perform all access related hoisting work required to complete the work of this section as indicated and specified.

2. Scaffolds shall have solid backs and floors to prevent dropping materials from there to the floors or ground below.

B. ENVIRONMENTAL REQUIREMENTS:

1. Comply with the Manufacturer's recommendations as to environmental conditions under which resurfacing system materials can be applied.

2. Do not apply resurfacing system materials when dust is in work site.

3. The Contractor shall provide all temporary lighting during the work.

C. PROTECTION:

1. Cover or otherwise protect finish work or other surfaces not being resurfaced.

2. Erect and maintain protective tarps, enclosures and/or maskings to contain debris (such as dust or airborne particles resulting from surface preparation) generated during any and all work activities. This includes, but is not limited to, the use of dust/debris collection apparatus as required.

D. INITIAL INSPECTION OF SURFACES TO BE COATED: It is the responsibility of the Contractor to inspect and report unacceptable concrete substrate surface conditions to the Owner prior to the commencement of surface preparation activities. Unacceptable surface conditions are defined as the presence of cracked surfaces or concrete deteriorated to a depth of greater than 1” or otherwise unable to withstand surface preparation as specified herein.

E. THINNERS AND SOLVENTS: The Contractor shall use only solvents and thinners as recommended by the Manufacturer.

3.02 ACCEPTABLE APPLICATORS

A. TRAINING: Applicators shall be trained to properly apply the coating according to manufacturer's recommendations.

B. APPLICATOR CERTIFICATION: Protective coating must be applied by a Certified applicator of the protective coating manufacturer and according to manufacturer specifications.

3.03 CURING OF NEW CONCRETE

Portland cement or new concrete must be well cured (28 days minimum) prior to application of the protective coating. Contractor shall account for this curing time in his bid proposal, and no additional Contract Time extension will be allowed therefore.

3.04 SURFACE PREPARATION REQUIREMENTS

A. GENERAL: The following general requirements shall apply to all surface preparation:

1. Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. Applicator shall notify Owner of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the specified protective coating.

2. All contaminants including: oils, grease, unsound or incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.

3. All specified surface preparation shall be performed in accordance with the latest version of the SSPC, NACE, ICRI and other standards referenced in this section.

4. Concrete surfaces shall be abraded to produce a minimum surface profile as recommended by the coating manufacturer. This preparation will be followed by vacuum cleaning to remove all dust, dirt or friable substances leaving clean, dust free surfaces for resurfacing as detailed in SSPC-SP 13/NACE No. 6).

5. The air used for blast cleaning shall be free of oil and moisture to not cause contamination of the surfaces to be resurfaced.

6. Clean cloths and clean fluids shall be used in solvent cleaning.

7. Cleaning and resurfacing shall be scheduled so that dust and other contaminants from the cleaning process will not fall on wet, newly resurfaced areas.

8. Prepare concrete joint and install sealant following resurfacing material installation per Section 07920.

9. Verify dryness by testing for moisture in accordance with ASTM D4263 and ASTM F1869.

B. INITIAL CLEANING/DECONTAMINATION:

1. All existing areas to be repaired shall be pressure washed with alkaline –based detergent to remove all loose materials, acid constituents, grease, oil, and other contaminants.

2. Verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the Owner.

C. ABRASIVE BLAST CLEANING

1. Used or spent blast abrasive shall not be reused on work covered by this section.

2. The compressed air used for blast cleaning will be filtered free of condensed water or oil. Moisture traps will be cleaned at least once every four hours or more frequently as is appropriate.

3. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. Oil separators shall be cleaned at least once every four hours or more frequently as is appropriate.

4. A paper blotter test shall be performed by the Contractor when requested by the Owner or the Owner's representative to determine if the air is sufficiently free of oil and moisture (Reference ASTM D 4285).

5. Regulators, gauges, filters, and separators will be in good working order for all of the compressor air lines to blasting nozzles at all times during this work.

6. An air dryer or drying unit shall be installed which dries the compressed air prior to blast connections. This dryer shall be used and maintained for the duration of surface preparation work.

7. The quality, volume, and velocity of life support and ventilation air used during surface preparation shall be in accordance with applicable safety standards and as required to ensure adequate visibility and proper dissipation of volatiles without impacting the prepared surface or the health of the public or personnel working for the Contractor, Subcontractors, Owner, Owner's representatives, or anyone who may be affected by on-site maintenance coating work activities.

8. The abrasive blast nozzles used shall be the venturi or other high velocity type supplied with the minimum air pressure and the necessary volume to obtain the required specified degree of cleanliness.

9. The Contractor must provide adequate ventilation for airborne particulate evacuation and lighting (meeting all pertinent safety standards) to optimize visibility for both blast cleaning and observation of the substrate during surface preparation work.

10. All phases of surface preparation work specified herein must be inspected by the Owner before the Contractor proceeds with the subsequent phase of surface preparation.

11. If, between final surface preparation work and coating application, contamination of the prepared and cleaned substrate occurs, or if the prepared concrete's appearance darkens or changes color, reblasting will be required until the specified degree of cleanliness is established.

3.05 SPECIFIC SURFACE PREPARATION REQUIREMENTS

A. SPECIFIC REQUIREMENTS: In addition to the paragraph 3.04 requirements, the Contractor shall follow the requirements of this section.

B. TERMINATIONS: Where the coating is specified to be terminated, the Contractor shall prepare and apply materials per the Manufacturer's recommendations.

C. PENETRATIONS: For applications around penetrations and/or drains, the contractor shall prepare and apply coatings in accordance with Manufacturer's recommendations. All hardware mounting bolts or studs shall be in place and masked with the hardware removed for the coating process. The coating shall contact the mounting bolts/studs so no break in the coating will occur.

D. FLOOR PITCH: When the floor area is scheduled to receive a mortar application to pitch the floor, the walls above the floor shall be sawcut to a depth of 1/2 inch at a height from 0’-0” to 0’-6” above the floor. The cut shall be straight and level.

E. REPAIR WORK: All existing failing coating shall be removed by abrasive blasting, or by hand and power tools back to sound tight coating and substrate. Repair areas shall be uniform in shape and tapered into adjacent, intact and sound lining a minimum of three (3) inches. Sound lining is defined as a coating that cannot be lifted with a dull putty knife. Surrounding tight coating shall be scarified at overlap areas of the repair. Owner’s representative shall approve all surface preparation for repair work prior to application of the epoxy coatings.

F. NOTIFICATION TO OWNER: The Contractor shall notify the Owner should jobsite conditions prevent the above operations and/or applications.

3.06 APPLICATION REQUIREMENTS

A. GENERAL: The following general application requirements shall apply to the project:

1. Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.

2. When spray equipment is used, the spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials and shall be regularly maintained and in proper working order.

3. Areas not to be resurfaced shall be masked using duct tape or other protection materials to prevent these surfaces from being resurfaced.

4. Ensure straight, even termination of resurfacing/topcoat materials on wall edges and flush with embedded steel.

5. The Contractor must follow the minimum and maximum recoat limitation times and related temperature range restrictions between successive lifts for all products specified herein per Manufacturer's stated requirements.

6. All equipment and procedures used for resurfacing system application shall be as recommended by the Manufacturer.

7. Unless specified elsewhere herein, the Contractor shall comply with the Manufacturer's most recent written instructions with respect to the following:

a. Mixing of All Materials.
b. Protection and Handling of All Materials.
c. Recoat Limitation and Cure Times.
d. Minimum Ambient and Substrate Temperatures, Substrate's Degree of Dryness, Relative Humidity, and Dew Point of Air.
e. Application.
f. Final Curing.
g. Use of Proper Application Equipment.

8. Curing of Resurfacing System: The applied resurfacing system shall be protected from damage during curing and shall be cured as recommended by the Manufacturer. Ambient conditions shall be controlled by the Contractor during curing to ensure the minimum air temperature and minimum relative humidity as required by the Manufacturer is maintained.

B. CHEMICAL RESISTANT LINING: The following shall apply to the specified Tnemec Coating System:

1. General Note: The Contractor is advised that with all thick-film, quick curing materials applied to concrete surfaces, outgassing of the concrete may occur. Possible remedies include applying materials when the temperature of the concrete surfaces is descending, or applying a thin (1/16") layer of the specified surfacing material. Other remedies may exist, and may be submitted for the Owner's approval.

2. Fill all voids, bugholes and other surface imperfections with Tnemec Series 218 MortarClad as needed.

3. Apply Tnemec Series 434 Perma-Shield H_2S chemical resistant mortar to all floor areas and walls scheduled to be coated at a nominal thickness of 125 mils. Application shall be either by trowel or spray. If spray-applied, material shall be finish-troweled and finish-rolled (Reference manufacturers application guides for explicit instructions).

4. Series 435 Perma-Glaze shall be a minimum of 15.0 mils thick upon cure regardless of the number of coats required.

C. SAFETY AND VENTILATION REQUIREMENTS: Requirements for safety and ventilation shall be in accordance with SSPC Paint Application Guide No. 3.

3.07 SPECIFIED APPLICATION THICKNESS

All interior surfaces of the wet well, diversion structure and junction manhole shall be coated as specified with a nominal dry film thickness of 125 mils.

3.08 FIELD QUALITY CONTROL INSPECTION AND TESTING

A. INSPECTION BY OWNER: Inspection by the Owner or others does not limit the Contractor's responsibilities for quality control inspection and testing as specified herein or as required by the Manufacturer's instructions.

B. QUALITY CONTROL PROCEDURES: Perform the quality control procedures listed below in conjunction with the requirements of this Section.

1. Inspect all materials upon receipt to ensure that all are supplied by the Manufacturer.

2. Provide specified storage conditions for the resurfacing system materials, solvents, and abrasives.

3. Inspect and record findings for the degree of cleanliness of substrates used. The pH of the concrete substrate will be measured using pH indicating papers. pH testing is to be performed once every 50 sq. ft. Acceptable pH values shall be between 8.0 and 11.0 as measured by a full-range (1-12) color indicating pH paper with readable color calibrations and a scale at whole numbers (minimum). Use Hydrion Insta-Check Jumbo 0-13 or 1-12 or equal. The paper shall be touched to the surface once using moderate gloved finger pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.

4. Inspect and record substrate profile (anchor pattern). Surfaces shall be abraded, as a minimum, equal to the roughness of CSP-5 ICRI Guideline 03732.

5. Measure and record ambient air temperature once every two hours of each shift using a thermometer and measure and record substrate temperature once every two hours using a surface thermometer.

5. Measure and record relative humidity every two hours of each shift using a sling psychrometer in accordance with ASTM E337.

6. Provide correct mixing of resurfacing materials in accordance with the Manufacturer’s instructions.

8. Inspect and record that the "pot life" of resurfacing materials is not exceeded during installation.

9. Verify curing of the resurfacing materials in accordance with the Manufacturer's instructions.

10. Upon full cure, the installed lining system shall be checked by high voltage spark detection in accordance with NACE RP0188-90, and the manufacturer’s printed application guide to verify a pinhole-free

surface. Areas which do not pass the spark detection test shall be corrected at no cost to the Owner and rechecked

11. Upon completion of the lining system installation, the lined area shall be cleaned and prepared to permit close visual inspection by the Owner. Any and all deficiencies or defective work (not in compliance with this section or related sections) will be marked for repair or removal/replacement by the Contractor at no additional cost to the Owner.

C. TESTING: The following testing requirements shall apply as determined by the Owner.

1. During application a wet film thickness gage, such as those available through Paul N. Gardner Company, Inc. meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

2. After the protective coating has set hard to the touch it shall be inspected with high-voltage holiday detection equipment. Surfaces shall first be dried, an induced holiday shall then be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99). All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.

3. Measurement of bond strength of the protective coating to the substrate can be made at regular intervals and along different sections of the structure (i.e. crown of pipe, wall, invert – every 200 ft). Bond strength can be measured in accordance with ASTM D4541. Any areas detected to have inadequate bond strength shall be evaluated by the Owner. Further bond tests may be performed in that area to determine the extent of potentially deficient bonded area and repairs shall be made by Applicator in strict accordance with manufacturer's recommendations.

4. A final visual inspection shall be made by the Inspector and manufacturer's representative. Any deficiencies in the finished

coating shall be marked and repaired according to the procedures set forth herein by Applicator.

3.09 ACCEPTANCE CRITERIA

A. ACCEPTANCE CRITERIA FOR SURFACE PREPARATION WORK: All surfaces shall be prepared in accordance with the specification and referenced standards therein.

B. ACCEPTANCE CRITERIA FOR COATING SYSTEM APPLICATION WORK: The following acceptance criteria for applicant work shall apply:

1. Acceptable coating work will be based upon the following:

   a. No pock-marks, trowel marks, depressions, unconsolidated areas, waviness or ridges, pinholes or holidays in either size or frequency.
   b. No intercoat bond failures between lifts.
   c. Proper curing of coatings.

2. Resurfaced areas shall pitch to drains.

3. There shall be no areas that puddle when flood tested.

4. The Owner or Owner's representative shall, at their discretion, inspect the following:

   a. Profile and degree of cleanliness of substrate.
   b. Thickness of materials/coverage rate confirmation.
   c. Ambient temperature and humidity requirements and substrate temperature.
   d. Curing and recoat times.
   e. Proper curing of the resurfacing materials.

5. Rework required on any holidays or any other inadequacies found by the Owner or the Owner's representative in the quality of the coating work shall be marked. Such areas shall be recleaned and reworked by the Contractor according to these specifications and the manufacturer's recommendations at no additional cost to the Owner.

6. The Contractor is responsible for keeping the Owner informed of all progress so that inspection for quality can be achieved.

7. The Contractor is ultimately responsible for the quality performance of the applied materials and workmanship. Inspections by the Owner or the Owner's representative do not limit this responsibility.

3.10 FINAL INSPECTION

Perform a final inspection to determine whether the resurfacing system work meets the requirements of the specifications. The Owner, the Contractor and the Manufacturer's representative will conduct the final inspection.

3.11 CLEANUP

Upon completion of work, the Contractor shall remove surplus materials, equipment, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any work-related damage. The surrounding surface areas including roadways and all other surfaces shall be restored to their pre-project condition.

3.12 SERVICES OF MANUFACTURERS

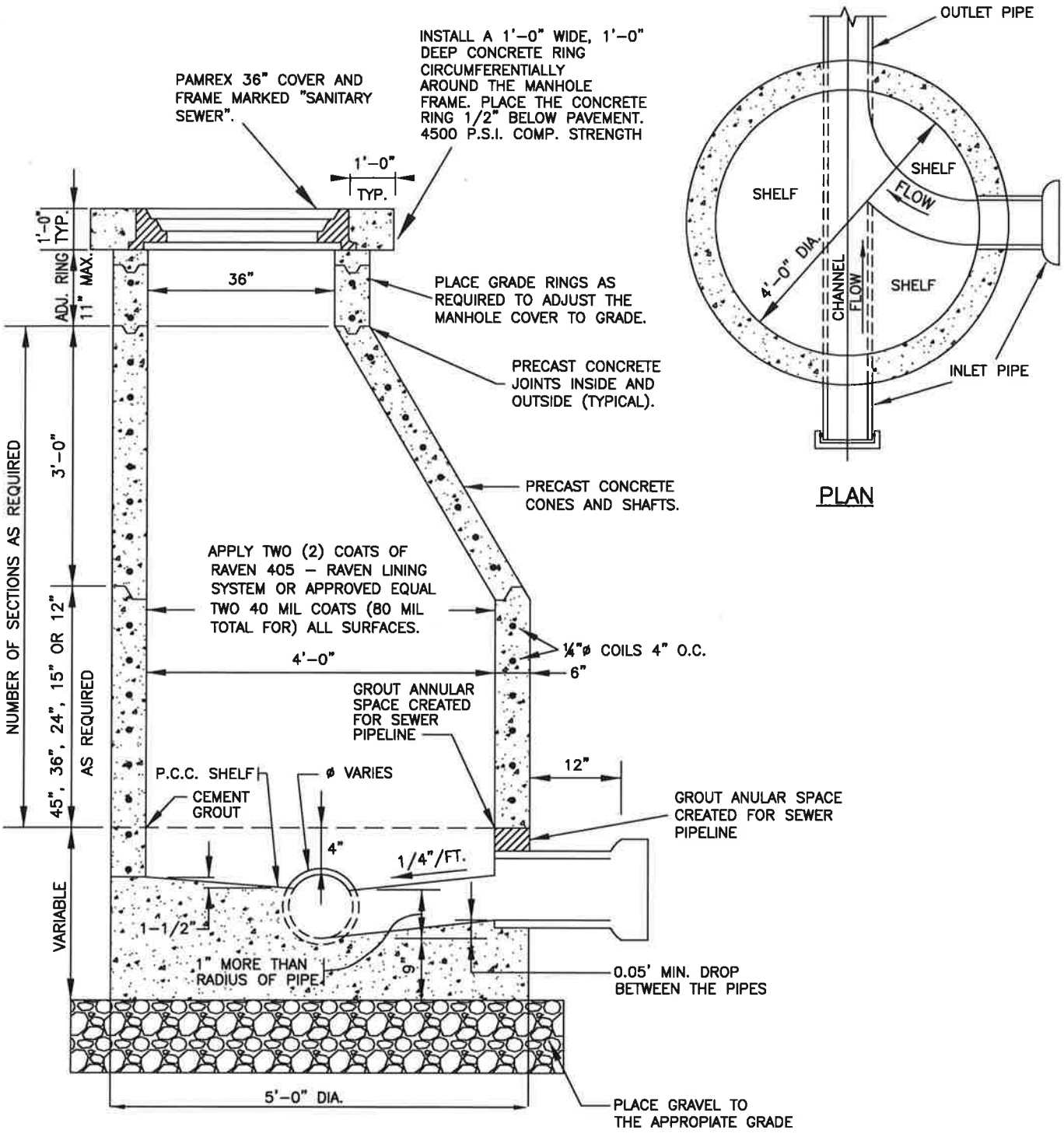
A. GENERAL: The services described herein are for the field observation, inspection assistance and quality control for the specified coating applications. For purposes of this paragraph, a work day is defined as an 8-hour period at the site, excluding travel time. The Owner may require that the Manufacturer's services described herein be furnished in twelve (12) separate trips. Four (4) hours or less at the jobsite will be considered as one-half (1/2) of a working day.

B. MANUFACTURER'S ATTENDANCE JOBSITE: The service representative(s) of the manufacturer shall be present at the site during all major phases of the work (surface preparation, surface application, inspection and testing, etc.), for each facility or structure receiving the specified coating. For purposes of this specification: 1) Eight (8) working days of manufacturer's attendance at the jobsite shall be required for epoxy coating of new structures, 2) Four (4) working days of manufacturer’s attendance at the jobsite shall be required for epoxy coating repairs to existing structures.

END OF SECTION 09875

Appendix A

City of Imperial
Public Works Department
Standard Detail No. 200



SECTION

PLAN

REGISTERED PROFESSIONAL ENGINEER
CARLOS CORRALES
No. 55432
EXP. 12-31-20
CIVIL
STATE OF CALIFORNIA

City of Imperial California

ECCENTRIC SEWER MANHOLE DETAIL

SHEET: 1
OF: 1

IN THE CITY OF IMPERIAL, CALIFORNIA		DATE: 10/10/19	DRAWN: A.A.
STD. DET. NO. 200	NOT TO SCALE	REVIEWED: J.V.	APPROVED: O.M.

Appendix B

City of Imperial
Public Works Department
Existing Manhole Information and Photographs

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #28 (Located at 3rd St and E Street intersection)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #28 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #42 (Located at 3rd St and G Street intersection)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #42 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #51 (Located at 3rd St and H Street intersection)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #51 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #54 (Located in South Imperial Avenue at 1st Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #54 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #55 (Located in South Imperial Avenue at 2nd Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #55 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #56 (Located in South Imperial Avenue at 3rd Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #56 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #CO-60 (Located in South Imperial Avenue at 4th Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within Manhole ID No. “CO-60” which includes a sewer cleanout located within a 4’ diameter brick sewer manhole. Brick manhole and cleanout are to be removed and replaced as a 48-inch diameter flow-through precast manhole per City of Imperial Std. Det. 200.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #58 (Located in South Imperial Avenue at 5th Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #58 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #59 (Located in South Imperial Avenue at 6th Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #59 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #60 (Located in South Imperial Avenue at 7th Street)
Diameter - 4 ft
Depth – 8 ft
8” diameter gravity sewer upstream flows

View within MH #60 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #348 (Located in South P Street between 3rd St and E Barioni Blvd)
Diameter - 4 ft
Depth – 8.5 ft
21” diameter gravity sewer upstream flows

View within MH #348 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #359 (Clark Road just north of Rosarito Drive)
Diameter - 4 ft
Depth – 5 ft
See Detail No. 1 on Sheet No. 3

Manhole #359 (located in foreground) and two unnumbered manholes to be removed. View north on the western side of Clark Road.

View within MH #359 to be removed and replaced with a 6’ diameter manhole per Detail No. 1 on Sheet No. 3 of the bid set plans.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #1022 (Worthington Blvd. and Nance Rd.)
Diameter - 4 ft
Depth – 13 ft
Force Main drop pipe from Ironwood Lift Station & 12” Gravity Sewer

Manhole #1022 cover looking north.

View within Manhole #1022 to be rehabilitated.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #1024 (Worthington/Barioni Blvd.)
Diameter - 4 ft
Depth – 13.5 ft
10” Gravity Sewer & Has Ladder Steps to be removed

View within MH #1024 to be removed/replaced as a new 4’ Diameter manhole.

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

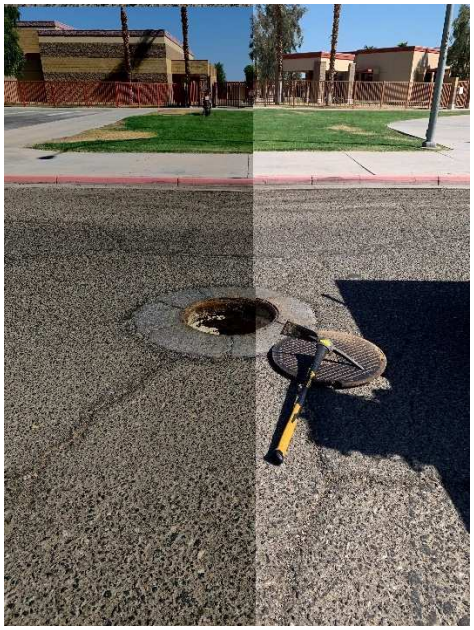
Manhole #1102 (Barioni Blvd. and B St.)
Diameter - 4 ft
Depth – 13 ft
No Force Main

View north within B Street of MH No. 1102

View north within MH No. 1102 (stairs to be cut/removed)

CITY OF IMPERIAL
MANHOLE AND LIFT STATION REHABILITATION AND NEW MANHOLE INSTALLATION
BID NO. 2025-01

Manhole #1142 (15th St and H St)
Diameter - 4 ft
Depth – 10 ft
12” Force Main entering from B Street Lift Station



View north of MH #1142

View within MH #1142 to be rehabilitated.