

**CROCKETT SANITARY DEPARTMENT
OF
CROCKETT COMMUNITY SERVICES DISTRICT
CONTRA COSTA COUNTY
CALIFORNIA**

ALEXANDER PARK SEWER PROJECT

Project No. CVSAN 2316

February 5, 2024

**CROCKETT SANITARY DEPARTMENT
P.O. BOX 578
CROCKETT, CA 94525**

www.town.crockett.ca.us

PHONE NO. (510) 787-2992
engineer@town.crockett.ca.us

CROCKETT SANITARY DEPARTMENT
ALEXANDER PARK SEWER PROJECT

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PART 1
BID DOCUMENTS

CROCKETT SANITARY DEPARTMENT
OF
CROCKETT COMMUNITY SERVICES DISTRICT
CONTRA COSTA COUNTY, CALIFORNIA

**NOTICE TO CONTRACTORS
INVITING SEALED PROPOSALS**

NOTICE IS HEREBY GIVEN that sealed proposals or bids will be received by the Crockett Sanitary Department at the District's office at 850 Pomona Avenue, Crockett, California 94525 **until 10:00 A.M. local time on March 8, 2024**, at which time they will be publicly opened and read aloud, for performing work as follows:

ALEXANDER PARK SEWER PROJECT

Bids may be delivered in advance of the bid date and time to the District Engineer at the District office at the above address between 8:00 A.M. and 5:00 P.M., Monday through Friday or mailed to Crockett Sanitary Department at P.O. Box 578, Crockett, California 94525.

Principle items of work are:

- **Mobilization to site, site setup of base of operation.**
- **Contractor to maintain pedestrian free work area, will install cones/tape to establish work zone.**
- **Contractor must maintain flow at all times. Contractor to install pumping and piping systems to for sewage to bypass the work area. Sewage handling should be sufficient to handle as much as dry weather flow of 100 GPM peak flow but as little as 10 GPM. Extreme wet weather flow may be as much as 475 GPM.**
- **Replace existing 12" VCP with 12" SDR 17 HDPE by pipe burst method, with exception of trenched sections. Pipe burst footage: approximately 707' total . All HDPE joints and connections to be made by thermal/electro fusion. This section consists of 5 contiguous segments, from the manhole known as S-00-01 to manhole known as S-00-06.**
- **Two locations to be replaced by open trench method(56 feet total). Trench, level and prepare for installation of 12" SDR 17 HDPE pipe. Due to existing offsets, open trench method is required in 2 segments, from Manhole S-00-05 upstream for approximately 30 feet, and the segment below manhole s-00-4 from 44 ft to 70 ft. Contractor to locate features.**
- **Replace existing manhole S-00-01 with new concrete drop manhole per drawings and Standard Specifications.**
- **Abandon manhole S-00-02, reconnect lateral by electrofusion saddle.**
- **Manhole known as S-00-03 is to be brought to finished grade of walkway per District instruction.**
- **Reconnection of all existing laterals by electrofusion saddle. Five laterals will tie to pipe,including another lateral currently attached to manhole S-00-02 that will be connected to pipe. A sixth lateral currently entering manhole known as S-00-04 to**

remain in current configuration. Contractor responsible for locating all existing laterals.

- **Replace walkway/patio pavers removed or damaged in course of work(not including those removed to access trench.**
- **Complete all site improvements, including sawcutting, restoration, removal and replacement of curb, gutter, and sidewalk, and street adjusting existing utilities, providing new driveway cuts, restoring existing water and gas laterals, and all other site improvements necessary to complete the work and not included in other bid items.**
- **Purchase and payment for encroachment permit.**
- **Sheeting is required to cover all holes when not under the immediate supervision the contractor.**
- **Shoring must be installed for any trench of depth or condition that makes shoring required. Any trench deeper than 5 feet will require shoring. Contractor is responsible for all design and installation of trenching plan and shoring.**
- **No steel tracks, cleats etc will be used on the pavers. Contractor is liable for damage to the pavers in the walkway area except where such pavers cover the area to be trenched. The contractor is not liable for resetting pavers that are moved to access trench, contractor is to stack pavers in vicinity.**

All work to be performed per specifications herein, and in conformance with Distric Code, and Standards & Specifications of the CCSD.

No bid will be received unless it is made on the proposal form furnished by the Owner in the bid documents. The contract, if awarded, will be awarded within ten (10) days from the opening of the bids.

No bidder may withdraw his proposal for a period of ten (10) days days after the date set for opening of proposals. All bids are to be compared on the basis of the District's estimate of the quantities of work to be done.

Bids must be accompanied by a proposal guaranty in the amount of ten (10) percent of the bid as described in the specifications. Such guaranty shall be in the form of a certified check, cashier's check, or bid bond executed on the prescribed form in the amount not less than ten (10) percent of the amount bid. Said guaranty shall be forfeited to the Owner in case the bidder depositing the same does not, within ten (10) days after written notice that the contract has been awarded to him, 1) enter into a contract with the District, and 2) furnish Performance and Labor and Materials Bonds and insurance certificates as described in the specifications.

The special attention of prospective bidders is called to the "Instructions to Bidders" of the specifications for full directions as to bidding and related matters.

The Owner reserves the right to reject any or all proposals or to waive any irregularities or informalities in any proposal or in the bidding.

A mandatory pre-bid meeting will be held at 10:00 AM, Friday February 16, 2024 at the District Office, 850 Pomona, in Crockett, followed by a tour of the project site. Attendance at the pre-bid meeting and site tour is mandatory. Any bid submitted by a contractor who did not attend the pre-bid meeting will be deemed to be non-responsive and shall be rejected.

The job is to be completed by Friday June 21, 2024 at 5:00pm . Furthermore, time to completion will also be additionally constrained to be more than 30 consecutive days from first groundbreaking. Work on weekends is not permitted; no work will be permitted on site from Friday afternoon at 7:00 pm until Monday morning at 7 pm.

The District has obtained the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of work needed to execute the contract, as published by the State of California, Department of Industrial Relations, Division of Labor Statistics and Research, a copy of which is on file in the office of the District and which shall be made available to any interested party on request.

It shall be mandatory upon the Contractor to whom the contract is awarded and upon any subcontractor working under his or her supervision to pay not less than the prevailing wage for each craft to all workers employed by them in the execution of the contract. The successful bidder shall post a copy of such determinations at each job site. The successful bidder intending to use a craft or classification not shown on the prevailing rate determinations may be required to pay the rate of the craft or classification most closely related to it.

The Contract Documents may be examined online at the Bay Area Builders Exchange:

<https://bayareabx.com>

and also at the District Office

Crockett Sanitary Department, 850 Pomona Avenue, Crockett, CA 94525
(510) 787-2992, engineer@town.crockett.ca.us, and online at www.town.crockett.ca.us

In accordance with the provisions of California Public Contract Code Section 3300, the Owner has determined that the Contractor shall possess a valid Class A license or either a Class C-34 (pipeline) or C-42 (sanitation systems) license at the time that the contract is awarded. Failure to possess the specified license shall render the bid as non-responsive and shall act as a bar to award of the contract to any bidder not possessing said license at the time of award.

DISTRICT'S ESTIMATE: \$ 425,000

Crockett Sanitary Department

Date:

Gaunt Murdock, District Engineer

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CROCKETT SANITARY DEPARTMENT
OF
CROCKETT COMMUNITY SERVICES DISTRICT
Contra Costa County, California

INSTRUCTION TO BIDDERS

1. Bidder's attention is directed to the conditions of the "General Conditions" for the requirements and conditions, which must be adhered to in the preparation of the proposal form and submission of this proposal.
2. Proposals shall be submitted in a sealed envelope, addressed to CROCKETT SANITARY DEPARTMENT. Each sealed envelope containing a Bid must be plainly marked on the outside as PROJECT NO. CVSAN-2016, ALEXANDER PARK SEWER PROJECT, and the envelope should bear the Bidder's address, and license number on the outside. If forwarded by mail, the sealed envelope containing the Bid must be addressed to CROCKETT SANITARY DEPARTMENT, P.O. Box 578, Crockett, California 94525. The District is not responsible for any delays in the U.S. Postal Service, or any other delays that may result in a mailed bid or any bid being received after the designated bid date and time.
3. Bidder's attention is directed to the requirements to complete and sign the following documents WHICH ARE TO BE SUBMITTED WITH THE BID:
 1. List of Subcontractors.
 2. Receipt of Addenda.
 3. Statement of Inspection of Sites.
 4. Bidder's Experience Statement.
 5. Personnel Experience Statement.
 6. Contractor's License Statement.
 7. Non-Collusion Affidavit.
 8. Security for Compensation Certification.
 9. Bid Bond.
 10. Certification Concerning State Labor Standards and Prevailing Wages.
 11. Non-Discrimination Clause.

The forms for the Performance, Labor and Material Bonds and the Contract are attached herein for information and reference only and are to be filled out by the successful bidder upon instructions by the Owner.

4. **BID FORMS:** All Bids shall be made on the required Bid forms supplied herein. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid forms must be fully completed and executed when submitted. Only one copy of each Bid form is required.
5. **BIDS:** The Crockett Sanitary Department (the OWNER) may waive any informalities or minor defects or reject any or all Bids. Any Bid may be withdrawn prior to the scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the Bidder.
6. **PRE-BID MEETING AND SITE INSPECTION:** Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid schedule by examination of the site and a review of the drawings and specifications including Addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work or of the nature of the work to be done or the existing site conditions.
7. **EXAMINATION OF CONTRACT DOCUMENTS:** The Contract Documents contain the conditions required for the construction of the Project. Information obtained from an officer, agent, or employee of

the OWNER or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the contract.

8. **BID GUARANTY:** Each Bid must be accompanied by a Proposal Guaranty payable to the OWNER in the amount of not less than ten (10) percent of the Bid. Said guaranty shall be in the form of a certified check, cashier's check, or bid bond executed on the prescribed form in the amount not less than ten (10) percent of the amount bid. As soon as the Bid prices have been compared and reported to the Owner, the Owner will return the Proposal Guaranties of all except the three lowest responsive, responsible Bidders. When the Contract is executed the Proposal Guaranties of the two remaining Bidders will be returned.
9. **BONDS:** A Performance Bond and a Labor and Material Bond each in the amount of one hundred (100) percent of the Contract Price, with an admitted surety approved by the OWNER will be required for the faithful performance of the contract. The bond forms provided in this document must be used. Attorneys-in-fact who sign Bid Bonds or Labor and Material Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their power of attorney.
10. **EXECUTION OF CONTRACT:** The party to whom the contract is awarded will be required to execute the Contract and provide the necessary insurance certifications within ten (10) calendar days from the date the Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Contract. In case of failure of the Bidder to execute the Contract, the OWNER may consider the Bidder in default, in which case the Proposal Guaranty accompanying the proposal shall become the property of the OWNER.
11. **NOTICE TO PROCEED:** The OWNER within ten (10) days of receipt of an acceptable Performance Bond, Labor and Material Bond and Contract signed by the party to whom the Contract was awarded, shall sign the Contract and return to such party an executed duplicate of the Contract along with a written notice to proceed. Should the OWNER not execute the Contract within such period, the Bidder may by Written Notice withdraw the signed Contract. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.
12. **QUALIFICATION OF BIDDER:** The OWNER may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. A Bidders prior history of unsatisfactory performance on work of any kind shall constitute grounds for disqualifying a Bidder.
13. **REJECTION OF BIDS:** The OWNER reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder fails to satisfy the OWNER that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.
14. **LIST OF SUBCONTRACTORS:** In accordance with Section 4104 of the California Public Contract Code, each bidder, in its Bid, shall set forth: (1) the name and location of the place of business of each subcontractor who will perform work or labor, render services to the contractor in or about the construction of the work, or improvement, in an amount in excess of one-half of one percent of the Contractor's total bid; and (2) the portion of the work which will be done by each such subcontractor. In accordance with Section 4107 of the California Public Contract Code, no Contractor whose bid is accepted shall without consent of the OWNER either: (1) substitute any person as a subcontractor in place of the subcontractor designated in the original bid, or (2) permit any such subcontract to be assigned or transferred, or allowed it to be performed by anyone other than the original subcontractor listed in the bid; or (3) sublet or subcontract any portion of the work in excess of one-half of one percent of the Contractor's total bid as to which his original bid did not designate a subcontractor. Penalties for failure to comply with the foregoing sections of the California Public Contract Code are set forth in Section's 4106, 4110 and 4111 of the Public Contract Code.
15. **LABOR STANDARDS:** Notice is hereby given that, pursuant to Section 1773 of the Labor Code of the State of California, the Owner has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holidays and overtime work

for each craft, classification, or type of worker required to execute the contract. A copy of said prevailing rate of per diem wages is on file in the principal office of the OWNER, to which reference is hereby made for further particulars. Said prevailing rate of per diem wages will be made available to any interested party upon request, and a copy thereof shall be posted at each job site.

Bid specifications and contracts and other procedures in connection with bids or contracts shall be subject to modification to comply with revisions in federal minimum wage schedules without the necessity of republication or duplication of other formal statutory requirements.

In accordance with Section 1775 of the California Labor Code, the Contractor shall as a penalty to the State or political subdivision on whose behalf a contract is made or awarded, forfeit no less than forty dollars (\$40.00) and no more than two hundred dollars (\$200) for each calendar day or portion thereof, for each worker paid less than the stipulated prevailing rates for any public work done under the Contract by the Contractor or by any subcontractor under the Contractor. The amount of the penalty shall be determined by the Labor Commissioner based on conditions stipulated in Section 1775 of the California Labor Code.

In accordance with Section 1813 of the California Labor Code, the Contractor shall as a penalty to the State or political subdivision on whose behalf the Contractor is made or awarded, forfeit twenty-five (\$25.00) dollars for each worker employed in the execution of the Contract by the Contractor or by any subcontractor for each calendar day during which said worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of Section's 1810-1817 of the California Labor Code.

As required by Section 1860 of the California Labor Code and in accordance with the provisions of Section 3700 of the Labor Code, every Contractor will be required to secure the payment of worker's compensation to its employee.

In accordance with Section 1861 of the California Labor Code, the Contractor shall furnish the Owner a notarized statement as follows: "I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's 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."

Contractor agrees to comply with Section's 1777.5, 1777.6 and 1777.7 (as amended) of the California Labor Code relating to the employment of apprentices. The responsibility for compliance with these provisions is fixed with the prime contractor for all apprenticeable occupations. Under these sections of the law, contractors and sub-contractors must employ apprentices in apprenticeable occupations, where journeymen in the craft are employed on the public work, in a ratio of not less than one hour of apprentice work for every five hours of labor performed by a journeyman (unless an exemption is granted in accordance with Section 1777.5) and contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public work solely on the ground of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in Section 3077 of the Labor Code. Only apprentices as defined in Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements, will be employed on public works in apprenticeable occupations.

16. **SPECIAL CONDITIONS:** The Bidders' attention is directed to Part III of the Specifications, "Special Conditions," associated with this project. The bidders shall review and understand the additional requirements of the project as described under this section.
17. Instructions to Bidders is hereby made a part of the contract document.

CALENDAR OF DEADLINES The calendar of deadlines shown below summarizes the applicable important dates of this project. In addition is a requirement that completion of work must fall within 30 days of first breaking ground.

Schedule of Dates and Deadlines Alexander Park Sewer Renovation Project		
Monday, February 6, 2024		Bid Documents Posted at BABX
Friday, February 23, 2024	10:00 AM	Mandatory sitewalk
Friday, March 8, 2024	10:00 AM	Bidding closes. "Hard stop" on time for submission of bid. Bids will be read aloud at 850 Pomona
Friday March 15, 2024		Notification of winning bidder
Friday, March 29, 2024		Deadline to enter contract. Deadline to post bond.
Friday, June 28, 2024		Latest date of completion

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BID PROPOSAL

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PROPOSAL FORM

CROCKETT SANITARY DEPARTMENT
OF
CROCKETT COMMUNITY SERVICES DISTRICT
CONTRA COSTA COUNTY, CALIFORNIA
FOR CONSTRUCTION OF

ALEXANDER PARK SEWER PROJECT

To the Honorable Sanitary Commissioners
Crockett Sanitary Commission
P.O. Box 578
Crockett, California 94525

Attention: Mr. Gaunt Murdock, District Engineer

Gentlemen:

Pursuant to the contract plans and specifications, the undersigned, as bidder, declares that he has carefully examined the location of the proposed work as evidenced by the attached executed statement of inspection of site, and the specifications pertaining thereto, and he proposes and agrees if this proposal is accepted that he will contract with the Crockett Community Services District to provide all the labor, materials, necessary machinery tools, apparatus, and other means of construction and do all the work specified in the contract in the manner and time herein set forth required for the completion construction of:

ALEXANDER PARK SEWER PROJECT

Construction shall be in strict conformity with the plans and specifications dated February 5, 2023 prepared by the Crockett Sanitary Department and on file at the District office at 850 Pomona Street, Crockett, CA 94525. Said plans and specifications are hereby made a part hereof.

The bidder proposes to contract with the Crockett Community Services District to perform all of the above work, including subsidiary obligations as defined in said specifications, for the following prices, to wit:

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BID SCHEDULE

BID SCHEDULE

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL AMOUNT
1.	1	LS.	MOBILIZATION, COMPLETE IN PLACE, FOR THE LUMP SUM OF		
2.	1		ESTABLISHMENT OF PERIMETER, SIGNAGE, AND PEDESTRIAN EXCLUSION ZONE FOR ALL AREAS WHERE WORK TAKES PLACE. LUMP SUM OF	\$ _____	\$ _____
3.	1		FURNISH AND ESTABLISH WORK AREA BYPASS PUMPING SYSTEMS TO MAINTAIN FLUID FLOWS. LUMP SUM OF	\$ _____	\$ _____
4.	707	LF	FURNISH AND INSTALL 12" Ø HDPE PIPE, SDR 17, VIA PIPE BURST METHOD, INCLUDING EXCAVATIONS, PROTECTION OF EXISTING UTILITIES AND STRUCTURES, LINE INSTALLATION, BEDDING, COVER, RECONNECTIONS, REHABILITATION OF MANHOLE AND SURFACE RESTORATION, COMPLETE IN PLACE, PER LINEAR FOOT AT	\$ _____	\$ _____
5.	1	EA	INSTALL NEW CONCRETE DROP MANHOLE (S-00-01) INCLUDING MODIFICATION AND CONNECTION TO SEWER AS NEEDED TO ENSURE FUNCTION, PIPE CONNECTION, EXCAVATION, BEDDING, WALL AND CHANNEL, BACKFILL, COMPACTING AND SURFACE RESTORATION. COMPLETE IN PLACE. DETAILS PER DRAWING LUMP SUM OF	\$ _____	\$ _____

6.	56	LF	TRENCH, COMPACT AND BED 6" DEEP WITH 3/4 INCH CRUSHED ROCK TO PROVIDE REQUIRED SLOPE AND NEGATE SAG. INSTALL 12" HDPE, SDR 17 BY TRENCH METHOD. INCLUDING EXCAVATIONS, PROTECTION OF EXISTING UTILITIES AND STRUCTURES, LINE INSTALLATION, COVER, RECONNECTIONS, AND SURFACE RESTORATION, COMPLETE IN PLACE, PER LINEAR FOOT (2 LOCATIONS) AT	\$ _____	\$ _____
7.	1	EA	REMOVE EXISTING MANHOLE (S-00-02) INCLUDING EXCAVATION, BEDDING, BACKFILL, COMPACTING, AND SURFACE RESTORATION, COMPLETE IN PLACE, ATTACH EXISTING LATERAL BY ELECTROFUSION SADDLE, LATERAL AT S-00-04 TO CONNECT TO NEW MANHOLE. LUMP SUM OF	\$ _____	\$ _____
8.	4	EA	RECONNECT ALL SEWER LATERALS TO NEW PIPE USING ELECTROFUSION SADDLE. AT	\$ _____	\$ _____
9.	1	LS	COMPLETE ALL SITE IMPROVEMENTS, INCLUDING SAWCUTTING, RESTORATION, REMOVAL AND REPLACEMENT OF CURB GUTTER SIDEWALK AND STREET THAT REQUIRES DISTURBANCE OR DEMOLITION, ADJUSTING EXISTING UTILITIES TO GRADE, PROVIDING NEW DRIVEWAY CUTS, RESTORING EXISTING WATER AND GAS LATERALS, AND ALL OTHER SIE IMPROVEMENTS NECESSARY TO COMPLETE THE WORK AND NOT INCLUDED IN OTHER BID ITEMS. LUMP SUM OF		
10.	1	LS	ALLOWANCE FOR ENCROACHMENT PERMIT		<u>\$ 1,300</u>
11.	1	LS	SHEETING AND SHORING, COMPLETE IN PLACE, FOR THE LUMP SUM OF	\$ _____	\$ _____
12.	1		REMAINING MISCELLANEOUS MATERIALS, ACTIVITY, AND EQUIPMENT REQUIRED TO COMPLETE WORK LUMP SUM OF	\$ _____	\$ _____

13.

TOTAL AMOUNT BID

\$ _____

(DOLLARS IN WORDS)

(\$ IN
FIGURES)

BASIS OF AWARD:

The basis of Award of Contract is the lowest Total Amount bid by a responsible Contractor. The Owner reserves the right to reject any and all proposals and to waive any informalities in any proposal or bid. A Bidder's prior history of unsatisfactory performance on work of any kind shall constitute grounds for disqualifying a Bidder.

The undersigned understands the estimate of construction items hereinbefore set forth is approximate only, being given as a basis for the comparison of bids and the Crockett Community Services District does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the extent of any item of the work or to omit items of the work as may be deemed necessary or expedient by the District and/or required by funding limitations.

The undersigned understands all bids will be compared on the basis of the District's estimate of the items of the work to be done.

The undersigned has checked carefully all of the above figures and understands that the Crockett Community Services District shall not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

In accordance with Section 4552 of the California Public Contract Code, the bidder agrees that if the bid is accepted, it will assign to the Owner 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. Section 15) or under the Cartwright Act (Chapter 2 (commencing Section 16700) of Part 2 of Division 7 of the California Business and Professions Code), arising from purchase of goods, materials, or services by the bidder for sale to the Owner pursuant to the bid. Such assignment shall be made and become effective at the time the Owner tenders final payment to the bidder.

It is agreed that this bid may not be withdrawn for a period of ninety (90) days from the opening thereof.

The terms and conditions of the final contract when executed shall control and supersede anything herein to the contrary or inconsistent with such contract.

Attached is the proposal guaranty bond form bound herewith, duly executed in the amount of at least ten (10) percent of the total amount of our proposal; or alternately there is attached a certified or cashier's check payable to the Owner in the amount of at least ten (10) percent of the amount of our proposal. If we choose to attach a proposal bond, we understand and agree that the Owner may reject our proposal if the surety does not meet the requirements of Section G2.09, or if Owner has cause to believe the surety is likely to be incapable of fulfilling its obligations under the bond.

In accordance with the specifications, the undersigned further agrees to so plan the work and to prosecute it with such diligence that said work shall be completed on or before the 21th day of June, 2024.

As part of this proposal the undersigned has filled out, executed and notarized where indicated the forms included herein and listed as follows:

1. List of Subcontractors
2. Receipt of Addenda.
3. Statement of Inspection of Site.
4. Bidder's Experience Statement.
5. Personnel Experience Statement.
6. Contractor's License Statement.
7. Non-Collusion Affidavit.
8. Security for Compensation Certification.
9. Bid Bond.
10. Certification Concerning State Labor Standards and Prevailing Wages.
11. Non-Discrimination Clause.

Name under which business is conducted _____

Business Address: _____ ZIP: _____
 Telephone No.: _____ Fax: _____
 Contractor's License No.: _____ Expir. Date: _____

NOTE: If bidder, or other interested person is a corporation, the legal name of the corporation shall be set forth together with the names of the president, secretary, treasurer, and manager thereof; also, signature of the officer or officers authorized to sign contracts on behalf of the corporation.

If the bidder is a partnership or a joint venture, state true name of firm or joint venture entities; also, names of all individual partners composing the firm and the signature of the partner or partners authorized to sign contracts on behalf of the partnership or joint venture entities.

If the bidder is an individual, state first and last name in full, together with signature.

IF SOLE OWNER, sign here:

I sign as sole owner of the business named above.

_____ Date: _____

IF PARTNERSHIP, sign here:

The undersigned certify that they sign the contract proposal with full and proper authorization so to do.
(One or more partners sign)

_____ Date: _____

_____ Date: _____

IF CORPORATION, execute here:

The undersigned certify that they sign this contract proposal with full and proper authorization so to do:

Corporate Name: _____

By: _____

Title: _____

By: _____

Title: _____

Incorporated under the laws of the State of _____

LIST OF SUBCONTRACTORS

In compliance with the provisions of Sections 4100-4107 of the Public Contract Code of the State of California and any amendments thereof, the name and location of the mill, shop or office of each Subcontractor who will perform work or labor or render services to the Contractor in or about the construction of the work or improvement to be performed under these specifications and which work will be in excess of 1/2 of 1 percent of the total proposal and the portion of the work which will be done by each Subcontractor are set forth below.

NAME AND PLACE OF BUSINESS OF SUBCONTRACTOR	DOLLAR VALUE OF WORK TO BE DONE
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Signature of Bidder

Company Name

Date

STATEMENT OF INSPECTION OF SITE

The undersigned, as bidder, states that he has inspected the site of the proposed work in order to satisfy himself, by personal examination, or by such other means as he prefers, of the location of the proposed work and as to the actual conditions of and at the site of the work, and has included the cost impacts of any surface variations from those shown on the plans in his bid for the Project.

Signature of Bidder

Company Name

Address

State of Incorporation (If Applicable)

CONTRACTOR'S LICENSE STATEMENT

Contractor: _____

Address: _____

Telephone No. (_____) _____

License No.: _____

Classification: _____

License Expiration Date: _____

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

Executed this _____ day of _____, 2019, at _____, California.

Signature of Contractor

NON-COLLUSION AFFIDAVIT

NON-COLLUSION AFFIDAVIT 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
(Name)

_____ of _____, the party making the foregoing bid, that
(Title) (Company name)

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

Signature of Contractor

Subscribed and sworn to before me this _____ day of _____, 2019.

Notary Public

SECURITY FOR COMPENSATION CERTIFICATE

TO: _____

I am aware of the provisions of Section 3700 of the Labor Code of the State of California which require every employer to be insured against liability for workman's 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.

(Signature of Bidder)

Business Address

Place of Residence

The successful bidder prior to the award of contract must execute this certificate. The bidder shall execute the certificate on this page at the time of submitting his bid proposal.

BID BOND
(10% of Contract Price)

KNOW ALL MEN BY THESE PRESENTS:

THAT _____, hereinafter called the Principal, and _____, hereinafter called the Surety, are jointly and severally held and firmly bound unto Crockett Community Services District, hereinafter call the Obligee, each in the penal sum of ten percent of the total amount of the bid proposal of the Principal for the work, this sum not to exceed _____dollars of lawful money of the United States for the payment whereof unto the Obligee the Principal and Surety jointly and severally bind themselves forever by these presents.

WHEREAS the Principal is herewith submitting its offer for the fulfillment of the Crockett Community Services District contract to construct the Alexander Park Sewer Project as provided for in the Contract Documents.

NOW THEREFORE, the condition of the obligation is such that if the Principal is awarded the contract, and if the Principal within the time specified in the proposal for such contract enters into, executes and delivers to the Obligee an agreement in the form provided herein complete with evidences of insurance, then this obligation shall be void; otherwise, the Principal and Surety will pay unto the Obligee the difference in money between the total amount of the proposal of the principal and the amount for which the Obligee legally contracts with another party to fulfill the contract if the latter amount be in excess of the former, but in no event shall the Surety's liability exceed the penal sum hereof.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable under this obligation as Principal and that nothing of any kind or nature whatsoever that will not discharge the Principal shall operate as a discharge or a release of liability of the Surety.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the Principal, the Surety and the Obligee and their respective heirs, executors, administrators, successors and assigns.

SIGNED AND SEALED THIS _____ day of _____, 2019.

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**CONTRACTOR'S/SUBCONTRACTOR'S CERTIFICATION
CONCERNING STATE LABOR STANDARDS AND PREVAILING WAGES**

All contractors and subcontractors shall give the following certifications to the Owner and forward this certification to the Owner within ten (10) days after the execution of any contract or subcontract.

- A. "I am aware of the provisions of Section 1720 et seq. of the California Labor Code which requires that the State prevailing wage rate shall be paid to employees where this rate exceeds the federal wage rate."
- B. "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."
- C. "Contractor stipulates and agrees to conform with all provisions of Labor Code, Sections 1810 through 1817, eight (8) hours labor shall constitute a legal day's work, and no worker shall be required or permitted to work more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week, except as provided for under Section 1815. Nothing in this provision shall be construed to relate to wage determination or in any way affect contractual provisions related to compensation.

Notwithstanding the Labor Code provision set forth above, pursuant to Labor Code, Section 1815, work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one (1) week shall be permitted provided that compensation shall be made for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

(Contractor/Subcontractor)

by: _____
(Signature)

(Typed Name and Title)

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BOND OF FAITHFUL PERFORMANCE

KNOW ALL MEN BY THESE PRESENTS that, WHEREAS Crockett Community Services District, P.O. Box 578 Crockett, California 94525 has awarded to _____ hereinafter designated as the "Principal," a contract for the Construction of the Alexander Park Sewer Project.

WHEREAS said Principal is required under the terms of said contract to furnish a bond for the faithful performance of said contract:

NOW, THEREFORE, WE the principal, and Crockett Community Services District as Surety, are held and firmly bound unto the Crockett Community Services District, State of California, in the penal sum of _____ dollars

(\$ _____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above bounden Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and faithfully perform the covenants, conditions and agreements in the said contract and any alterations made as therein provided, on his or their part, to be part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless Crockett Community Services District, its Directors, officers and agents as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and virtue and Principal and Surety, in the event suit is brought on this bond, will pay to Crockett Community Services District such reasonable attorney's fees as shall be fixed by the court.

As a condition precedent to the satisfactory completion of the said contract, the above obligation in said amount shall hold good for a period of one (1) year after the completion and acceptance of the said work, during which time if the above bounden Principal, his or its heirs, executors, administrators, successors or assigns shall fail to make full, complete and satisfactory repair and replacements or totally protect Crockett Community Services District from loss or damage made evident during said period of one (1) year from the date of acceptance of said work, and resulting from or caused by defective materials or faulty workmanships in the prosecution of the work done, the above obligation in the said sum shall remain in full force and effect. However, nothing in this paragraph to the contrary notwithstanding, the obligations of the Surety hereunder shall continue so long as any obligation of the Principal remains.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or to the specifications accompanying the same, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alternation or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF the bounden parties have executed this instrument under their seals this _____ day of _____, 2019, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Seal) By: _____
Principal

(Seal) By: _____

Surety

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LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS that, WHEREAS Crockett Community Services District, P.O. Box 578, Crockett, California 94525, has awarded to _____ hereinafter designated as the "Principal," a contract for the construction of the Alexander Park Sewer Project.

WHEREAS said Principal is required to furnish a bond in connection and with said contract, providing that if said Principal or any of his or its subcontractors, shall fail to pay for any materials provisions, provender, or other supplies or teams used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, the Surety of this bond will pay the same to the extent hereinafter set forth:

NOW, THEREFORE, WE the principal, and _____ as Surety, are held and firmly bound unto the Crockett Community Services District, State of California, in the penal sum of _____ dollars (\$ _____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his, or its heirs, executors, administrators, successors, or assigns, shall fail to pay for any materials, provisions, provender, or other supplies or teams used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind or for amount due under the Employment Act with respect to such work or labor, as required by the provisions of Chapter 7, Title XV, Part 4, Division III of the Civil Code of the State of California, and provided that the persons, companies or corporations so furnishing said materials, provisions, provender or other supplies, teams, appliances or power used, in, upon, of or about the performance of the work contracted to be executed or performed, or any person who supplies both work and materials thereto, shall have complied with the provisions of said Civil Code, then said Surety will pay the same in or to an amount not exceeding the amount hereinabove set forth, and also will pay in case suit is brought upon this bond, such reasonable attorney's fee to Crockett Community Services District as shall be fixed by the court.

The bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under said Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extensions of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF the bounden parties have executed this instrument under their seals this _____ day of _____, 2019, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Seal) By: _____
Principal

(Seal) By: _____

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NON-DISCRIMINATION CLAUSE

1. During the performance of this contract, contractor and its subcontractors shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, medical conditions, martial status, age (over 40) or sex. Contractors and subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code, Section 12900 et seq.) and the applicable regulations promulgated thereunder (California Administrative Code, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Chapter 5 of Division 4 of Title 2 of the California Administrative Code are incorporated into this contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
2. This contractor shall include the non-discrimination and compliance provisions of this clause in all subcontractors to perform work under the contract.

THE UNDERSIGNED CERTIFIES THAT THE CONTRACTOR WILL COMPLY WITH THE ABOVE REQUIREMENTS.

Contractor or
Subcontractor Name: _____

Certified By: _____
Name Title

Signature Date

STD. 17A (NEW 5-83)

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CONTRACT

THIS CONTRACT, made this _____ day of _____, 2019, by and between the Crockett Community Services District, P.O. Box 578, Crockett, California 94525, hereinafter called the "Owner" and _____ hereinafter called the "Contractor".

WITNESSETH:

WHEREAS the Owner has caused specifications, drawings and other contract documents to be prepared for certain work as described therein entitled Alexander Park Sewer Project, CVSan 2316.

WHEREAS the Contractor has offered to perform the proposed work in accordance with the terms of the contract documents.

NOW THEREFORE, in consideration of the mutual covenants and agreements of the parties herein contained and to be performed, the Contractor hereby agrees to complete the work described in the proposal at the price and on the terms and conditions herein contained, and the Owner agrees to pay the Contractor the contract price provided herein on a lump sum basis a total of:

_____ dollars.

The further terms, conditions and covenants of the contract are set forth in the following exhibits, each of which is attached hereto or referenced and made a part hereof:

- Notice Inviting Sealed Proposals
- Instruction to Bidders
- Bid Proposal
- General Conditions (Sections 1 through 9)
- Special Conditions
- Technical Conditions (Sections 1A through 2D)
- Drawings
- Issued Addenda to the Contract Documents

IN WITNESS WHEREOF, this agreement has been executed in quadruplicate this _____ day of _____, 2024.

Crockett Community Services District:

Attest: _____

Contractor:

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PART II

GENERAL CONDITIONS

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SECTION 1

DEFINITIONS AND TERMS

G1.01 GENERAL. Whenever the following abbreviations and terms, or pronouns in place of them, appear in the Contract Documents, the intent and meaning shall be interpreted as provided in this Section 1. Working titles having a masculine gender, such as "workman" and "flagman" and the pronoun "he," are utilized for the sake of brevity, and are intended to refer to persons of either sex.

G1.02 DEFINITIONS. As used herein, unless the context otherwise requires, the following terms have the following meaning:

Acceptance: The formal written acceptance by the Owner of an entire contract that has been completed in all respects in accordance with the Contract Documents.

Addenda: Written interpretations or revisions to any of the Contract Documents issued by the Owner before the bid opening.

As Approved: The words "as approved," unless otherwise qualified, shall be understood to be followed by the words "by the District Engineer for conformance with the Contract Documents."

As-Built Drawings: Contract Plans revised to reflect any modifications resulting during the construction phase.

As Shown and As Indicated: The words "as shown" and "as indicated" shall be understood to be followed by the words "Contract Documents" as appropriate.

Bidder: Any individual, firm, partnership, corporation or combination thereof, submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

CalTrans: The Department of Transportation, State of California.

Contract Change Order: An order authorized by the Owner and issued to the contractor amending the Contract Documents. An "approved Contract Change Order" is an order signed by the Engineer. An "executed Contract Change Order" is an order signed by the Engineer and the Contractor.

Contract: The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The Contract shall include the Contract Documents, and any and all supplemental agreements. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract and include contract change orders.

Contract Completion: The date the Owner accepts the entire work as being in compliance with the Contract Documents, or formally waives non-conforming work to the extent that non-conforming work does not adversely affect performance of the improvements, and issues the final payment in accordance with Section 9 of the General Conditions. "Contract completion" shall mean the occupation and beneficial use and enjoyment of the facility (excluding operation for testing) accompanied by a cessation of all labor, including punch list items, as well as acceptance of the work by the District.

Contract Documents: The Contract Documents consist of the Notice to Contractors; Instruction to Bidders; Bid Proposal; Contract; General Conditions; Special Conditions; Technical Conditions; Contract Drawings; Addenda; and Change Orders.

Contractor: The person or persons, firm, partnership, corporation or combination thereof, private or municipal, who enters into the Contract with the Owner.

Contract Drawings: The official plans, profiles, cross sections, elevations, details, and supplemental drawings furnished by the Engineer, which show the locations, character, dimensions and details of the work to be performed. Contract Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents regardless of the method of binding. Also referred to as "Contract Plans," "Plans," and "Drawings."

Days: Unless otherwise designated, "days" will be understood to mean calendar days.

District Engineer: The person or organization identified as such in the Contract Documents, acting directly for the Owner as the Owner's Representative, within the scope of the particular duties delegated to him..

Engineer: The person or organization identified as such in the Contract Documents, acting directly for the Owner as the Owner's Representative, within the scope of the particular duties delegated to him..

Engineer's Estimate: The list of estimated quantities of work to be performed as contained in the Proposal Form, also known as the District's Estimate.

Federal Agencies: Whenever, in the Specifications, reference is made to any Federal agency or officer, such reference shall be deemed made to any agency or officer succeeding, in accordance with law, to the powers, duties, jurisdiction and authority of the agency or officer mentioned.

Fixed Costs: Any necessary labor, material and equipment costs directly expended on the item or items under consideration which remain constant regardless of the quantity of the work done.

General Notes: The written instructions, provisions, conditions or other requirements appearing on the Contract Drawings, and so identified thereon, which pertain to the performance of the work.

Inspector/Construction Manager: The engineering or technical inspector(s) duly authorized or appointed by the General Manager or Owner, limited to the particular duties entrusted to him or them.

Legal Holidays: Those days designated as State holidays by the Public Contract Code or declared by the Owner.

Liquidated Damages: The amount prescribed in the Contract Documents to be paid to the Owner or to be deducted from any payments due or to become due the Contractor for each calendar day's delay in completing the whole, or any specified portion, of the work beyond the time allowed in the Contract Documents.

Notice to Proceed: A written notice given by the Owner to the Contractor fixing the date on which the Contract time will commence to run and on which the Contractor shall start to perform his obligation under the Contract Documents.

Or Equal: The term "or equal" shall mean that the "equal" product is the same or better than the product named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirements will be made by the District Engineer. Such equal products shall not be purchased or installed by the Contractor without written acknowledgment of the District Engineer.

Owner: As described in the Contract Documents, shall be the Crockett Sanitary Department or any person or persons to whom the power belonging to the Owner shall be duly delegated.

Plans: Refer to Contract Drawings.

Professional Engineer: An engineer licensed by the Board of Registration for Professional Engineers, State of California.

Proposal: The offer of the bidder for the work, when made out and submitted on the prescribed proposal form, properly signed and guaranteed, also referred to as the Bid.

Proposal Form: The approved form upon which the Owner requires formal bids be prepared and submitted for the work.

Proposal Guaranty: The cash, cashier's check, certified check or bid bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the Owner for the performance of the work, if the Contract is awarded to him.

Provide: The term "provide" shall be understood to mean "furnish and install, complete in place."

Record Drawings: Contract Plans revised to reflect any modifications resulting during the construction phase.

Responsive: A "responsive" Proposal is one that complies with the requirements prescribed herein and by California law for Proposals.

Special Conditions: The Special Conditions are specific clauses setting forth conditions or requirements of the work and supplementary to these General Conditions. Also referred to as "Supplementary Conditions."

Specifications: The term "Specifications" refers to those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the work and certain administrative details applicable thereto. Where standard specifications, such as those of ASTM, AASHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents. If referenced specifications conflict with Specifications contained herein, the requirements contained herein shall prevail.

Standard Details: The construction details included in PART V, DRAWINGS, (if any) plus the standard details being used by the Crockett Sanitary Department at the time of invitation to bidders: generally the Standard Specifications of the Crockett Community Services District.

State: The State of California.

Topsoil: Surface soil suitable for growing grass lawns, or amended soil products sold as "topsoil" for that purpose.

Work: The word "work" includes all material, labor, tools, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure.

Work site: The area of actual construction and the areas immediately adjacent thereto.

G1.03 ACRONYMS. As used herein, unless the context otherwise requires, the following acronyms have the following meanings:

AAMA	Architectural Aluminum Manufacturers' Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
APWA	American Public Works Association

API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASA	American Standards Association
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AT&T	American Telephone and Telegraph
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CS	Commercial Standards (US Department of Commerce)
CSI	Construction Specifications Institute
DOT	United States Department of Transportation
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
FGMA	Flat Glass Marketing Association
FHwA	Federal Highway Administration
FM	Factory Mutual
FS	Federal Specification
IAMPO	International Association of Mechanical and Plumbing Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFC	National Fire Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PEI	Porcelain Enamel Institute
PG&E	Pacific Gas and Electric Company
PS	Product Standard (US Department of Commerce)
PacBell	Pacific Bell
SAE	Society of Automotive Engineers
SCPO	Structural Clay Products Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TPI	Truss Plate Institute
UBC	Uniform Building Code
UL	Underwriters Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

SECTION 2

PROPOSAL REQUIREMENTS

G2.01 OBTAINING PROPOSAL FORMS. Proposal forms and other bid documents may be obtained from the Owner or District Engineer.

G2.02 ENGINEER'S ESTIMATE. If an Engineer's Estimate of quantities is given in the Proposal, the quantities are approximate only, being given as a basis for the comparison of bids. The Owner does not, expressly or by implication, agree that the actual amount of work will correspond to the estimate. The Owner reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work.

G2.03 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK. The bidder shall examine carefully the Contract Documents and the site of work and shall inform himself of the conditions relating to the execution of the work. Failure to do so will not relieve the successful bidder of his obligation to enter into a Contract and complete the work in strict accordance with the Contract Documents. "Conditions relating to the execution of the work" include the requirements of federal, state and local laws, statutes and ordinances relative to the execution of the work, including, but not limited to, applicable regulations concerning minimum wage rates, non-discrimination in the employment of labor, protection of public and employee health and safety, and environmental protection. The submission of a Proposal shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, the character, quality and scope of work to be performed, the quantities of materials to be furnished and the requirements of the Contract Documents.

G2.04 SURFACE TOPOGRAPHY; SUBSURFACE CONDITIONS DATA. Where an investigation of surface topography and/or subsurface conditions has been conducted in areas where work is to be performed, prospective bidders may inspect the records of such investigations at the Owner's office.

G2.05 EXPLANATIONS. Any explanation of the Contract Documents desired by a prospective bidder shall be requested in writing from the District Engineer, and delivered to Owner no less than 10 calendar days prior to the date for opening of proposals. Any explanation, instruction, or change to Contract Documents will be made by written addendum, which will be mailed or delivered to each firm receiving a set of the Contract Documents. Upon mailing or delivery, such addendum will become a part of Contract Documents and binding on all bidders. The receipt of the addendum by the bidder shall be acknowledged and so noted in the space provided on the Proposal Form. All addenda shall be attached to the Proposal. Only written explanations, instructions or changes so given by the Owner will be effective. Verbal explanations or instructions will not be binding on the Owner.

G2.06 PREPARATION OF PROPOSALS. The form of Proposal in this book, when filled out and executed by the bidder, shall be submitted as his bid. Bids not presented on such forms will be disregarded.

All blank spaces in the Proposal form must be filled in, as required, preferably in black ink. All price information shall be shown, clearly legible, in both words and figures, where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in the case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and extended totals, unit prices shall prevail.

The bid submitted must not contain any erasure, interlineations, or other corrections unless each correction is suitably authenticated by affixing in the margin immediately opposite the correction the signature or signatures of the person or persons submitting the bid.

The bidder shall sign his Proposal in the blank space provided therefor. If bidder is the sole owner, the owner shall sign the Proposal. If bidder is a corporation, the legal name of the corporation and its State of incorporation shall be set forth above and the Proposal shall be signed by the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, the true name of the firm shall be set forth above, the names and addresses of all partners shall be given and a partner in the firm shall sign the Proposal authorized to sign contracts on behalf of the partnership. If the bidder is a joint venture, the Proposal shall be signed by each participating company by officers or other individuals who have the full and proper authorization to do so. If the Proposal is signed by an

agent of the bidder other than an officer of a corporation or a member of a partnership, a notarized power-of-attorney must be on file with the Owner prior to opening of Proposals or must be submitted with the Proposal. If requested by the Owner, the bidder shall promptly submit evidence satisfactory to the Owner of the authority of the person signing the Proposal.

G2.07 SUBMISSION OF PROPOSALS. All Proposals must be submitted not later than the time prescribed, at the place, and in the manner set forth in the Notice to Contractors. Proposals may be made on the separate Proposal forms provided herewith. Any Proposal received after the prescribed time shall be rejected, regardless of whether or not Proposals are opened exactly at the prescribed time.

Each Proposal must be submitted in a sealed envelope. The envelope must be clearly marked to show the bidder's name and the Contract name, without being opened, and be addressed in conformance with the instructions in the Notice to Contractors.

G2.08 LIST OF SUBCONTRACTORS. Refer to "Instruction to Bidders" paragraph 14.

G2.09 PROPOSAL GUARANTY. The proposal shall be accompanied by a proposal guaranty bond duly completed on the form bound herewith, by a corporation which is listed in the latest Form 356 of the United States Treasury Department as being acceptable as surety on Federal bonds and is duly licensed and admitted by the State of California to be a surety insurer in the State, in the sum of at least 10 percent of the total bid amount as described in the bidding schedule and/or other parts of the contract documents; or alternatively there is attached a certified or cashier's check payable to the Owner in the amount of at least 10 percent of the total bid amount.

The amount payable to the Owner under the proposal guaranty bond, or the certified or the cashier's check and the amount thereof, as the case may be, shall be forfeited to the Owner as liquidated damages in case of a failure or neglect of the bidder to furnish, execute and deliver to the Owner the required performance bond, labor and material bond, evidence of insurance, and to enter into, execute and deliver to the Owner the Contract on the form provided herewith within 10 days after being notified in writing by the Owner that the award has been made and the Contract is ready for execution.

G2.10 WITHDRAWAL OF PROPOSALS. A bidder may withdraw his Proposal at any time prior to the time fixed in the Notice to Contractors for the opening of bids only by filing a written notice with the Owner. The notice shall be executed by the bidder in conformance with Section G2.06. A telegraphic notice of withdrawal is not effective. Withdrawal of a Proposal does not prejudice the right of a bidder to submit a new Proposal. No Proposal may be withdrawn after the time for opening of Proposals, unless and until the time specified in Section G3.02, Time of Award has elapsed.

G2.11 PUBLIC OPENING OF PROPOSALS. Proposals will be opened and read aloud publicly at the date, time and place designated in the Notice Inviting Sealed Proposals. Bidders and their authorized representatives are invited to be present.

G2.12 REJECTION OF PROPOSALS. Refer to "Instruction to Bidders" paragraph 13.

The OWNER reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder fails to satisfy the OWNER that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

The Owner reserves the right to reject any and all proposals and to waive any informality in any proposal or bid.

G2.13 LICENSING OF BIDDERS. Bidders and their proposed subcontractors shall hold such licenses as may be required by the laws of the State of California for the performance of the work specified in the Contract Documents. In addition, licensing requirements for Bidders are as set forth in Special Conditions, Section S1.06.

G2.14 ENGINEER OF WORK. (Reserved)

SECTION 3

AWARD AND EXECUTION OF CONTRACT

G3.01 AWARD OF CONTRACT. The Owner reserves, in its sole discretion, the right to reject any or all Proposals and to waive any informalities and irregularities in Proposals received, other conditions in the Contract Documents notwithstanding.

The Proposals will be compared on the basis of Contract Total Bid Price. The Total Bid Price is the sum of the lump sum bid items and, for unit price items, the sum of the products of the Engineer's Estimate of quantities shown in the Proposal multiplied by the unit bid price. In the event of a discrepancy between the unit bid price and the extension price, the unit price shall govern.

The award of the Contract, if awarded, will be made to the lowest responsible, responsive bidder or bidders.

G3.02 TIME OF AWARD. Within ninety (90) days after the opening of Proposals, the Owner will either reject all Proposals or award the Contract to the lowest responsible, responsive bidder. If the lowest responsible, responsive bidder refuses or fails to execute the Contract and provide an acceptable Performance Bond, Labor and Material Bond and insurance certificate(s), the Owner may award the Contract to the second lowest responsible, responsive bidder. Such award, if made, will be made within ninety (90) days after the opening of Proposals. If the second lowest responsible, responsive bidder refuses or fails to execute the Contract and provide an acceptable Performance Bond, Labor and Material Bond and insurance certificate(s), the Owner may award the Contract to the third lowest responsible, responsive bidder. Such award, if made, will be made within ninety (90) days after the opening of Proposals. The periods of time specified above within which an award of Contract may be made shall be subject to extension for such further period as may be agreed upon in writing by the Owner and the bidder or bidders concerned.

G3.03 EXECUTION OF CONTRACT. **(This section is modified by the Special Conditions.)** The successful bidder shall, within ten (10) days after having received notice that the Contract has been awarded, sign and deliver to the Owner a Contract in the form hereto attached together with the Contract Bonds and insurance certificates executed as required in the Contract Documents. Within 10 days after receiving the signed Contract with acceptable bonds and insurance certificates from the successful bidder, the Owner will sign the Contract.

G3.04 CONTRACT BONDS. The Contractor shall furnish two bonds each in the amount of 100 percent of the contract price, one as security for the faithful performance of the work, and the other as security for the faithful payment and satisfaction of all persons furnishing materials and performing labor on the work. The Contractor shall use the bond forms found at pages BP.19 and BP.21 of these contract specifications. However, the scope of the bonds or the bond forms prescribed in those pages shall in no way affect or alter the liabilities of the Contractor to the Owner under Section G7.21.

The bonds shall be issued by a corporation, which is duly licensed and admitted by the State of California to be a surety insurer in the State.

Notwithstanding the language of the preceding paragraph, Owner may disqualify the Contractor's proposed surety if the Owner has cause to believe the surety is likely to be incapable of fulfilling its obligations under the bonds.

The bonds shall remain in force throughout the period required to complete the work and thereafter for a period of 365 days after final completion and acceptance of the work by the Owner to cover any defects in workmanship, materials, or equipment which develop in that time.

G3.05 FAILURE TO EXECUTE CONTRACT. **(This section is modified by the Special Conditions.)** Failure of a bidder to whom the Contract is awarded to execute the Contract or furnish acceptable Contract bonds or furnish certificates of insurance within ten (10) days of delivery of Notice of Award to bidder shall be just cause for the annulment of the award and the forfeiture of such bidder's Proposal Guaranty. The Proposal Guaranty shall be retained by the Owner as liquidated damages and it is agreed that this sum is a fair estimate of the amount of

damages the Owner will sustain in case the successful bidder fails to enter into a Contract.

G3.06 RETURN OF PROPOSAL GUARANTY. Upon inspection and comparison of Bid prices by the Owner, the Owner will return the Proposal Guaranties of all except the three lowest responsive, responsible Bidders for the Contract. Retained Proposal Guaranties will be held until ninety (90) days after opening of Proposals or until the Contract has been executed, whichever occurs first, after which all Proposal Guaranties other than those that have been forfeited shall be returned. The Proposal Guaranty of the successful Bidder will be retained until the performance bond and labor and material bond have been executed and approved, after which it will be returned.

SECTION 4

SCOPE OF WORK

G4.01 INTENT OF CONTRACT DOCUMENTS. The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intent of the Contract Documents is to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. When the Contract Documents describe portions of the work in general terms, but not in complete detail, it is understood that the best general practice shall be followed and only materials and workmanship of the best standard quality shall be used. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied, whether or not specifically called for. The Contractor is responsible for providing all other materials, labor, and equipment as needed to complete the work, in addition to items specifically mentioned in this contract. When words, which have a well-known technical or trade meaning are used to describe work, materials or equipment, such words shall be interpreted in accordance with that meaning.

Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect on the first published date of the Notice to Contractors, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of Owner or Contractor, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, or any of Owner's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the other conditions of the Contract Documents.

The Contract Documents are divided into parts, divisions and sections for convenient organization and reference. Generally, there has been no attempt to divide the specification sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the project.

G4.02 EXAMINATION AND VERIFICATION OF CONTRACT DOCUMENTS. The Contractor shall thoroughly examine and become familiar with all of the various parts of these Contract Documents and determine the nature and location of the work, the general and local conditions, and all other matters that can in any way affect the work under this Contract. Failure to make an examination necessary for this determination shall not release the Contractor from the obligations of this Contract. No oral agreement or conversation with any officer, agent or employee of the Owner, or with the Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

G4.03 CHANGES; CONTRACT CHANGE ORDER. The Owner may, without notice to the sureties, and without invalidating the Contract, at any time make alterations, deviations, additions to or deletions from the Contract Documents, and may increase or decrease the quantity of any item or portion of the work, or delete any item or portion of the work, and may require extra work, as determined by the Owner to be necessary or advisable. All such work shall be performed under applicable conditions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered.

Any such changes will be set forth in a written Contract Change Order issued by the Owner. The Contract Change Order will specify: (1) the work to be done in connection with the change to be made; (2) the amount of the adjustment of the Contract price, if any, and the basis for compensation for the work ordered; and (3) the extent of the adjustment in the Contract time, if any. A Contract Change Order shall not become effective until the District Engineer has signed it; when signed by District Engineer it is an "approved Contract Change Order."

No changes or deviations from the Contract Documents shall be made without the authority of an approved Contract Change Order, except that in cases of emergency the District Engineer may direct a change in writing. Upon receipt of such written directive, the Contractor shall proceed with the ordered work and the District Engineer will prepare a written Contract Change Order for approval by the Owner and issuance to the Contractor as soon thereafter as

practicable. Compensation for Emergency Work shall be determined on a time and materials basis.

Upon receipt of an approved Contract Change Order, the Contractor shall sign approved Contract Change Order and promptly proceed with the ordered work, unless otherwise provided in the approved Contract Change Order.

When ordered by the District Engineer, the Contractor shall halt work in the area affected by a proposed change. Whenever it appears to the Contractor that a change is necessary, the Contractor shall immediately notify the District Engineer of the change he believes necessary and the reasons for such change; however, work in the area affected shall not be discontinued unless ordered by the District Engineer.

G4.04 REQUEST FOR QUOTATIONS FOR CHANGE IN WORK. Owner may request Contractor to provide quotations for performing proposed changes to the work. Such requests for quotations shall not be considered authorization to proceed with the change prior to issuance of an approved Contract Change Order, nor shall such request justify any delay in executing existing work. Contractor shall, upon such a request, provide quotations for increases or decreases in the Contract Price and the Contract time associated with performing the proposed change. Quotations shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, materials, rentals, services, overhead and profit. The cost of preparing such quotations is included in the Contract price and Contractor shall not be entitled to any additional compensation for preparing them.

G4.05 PROPOSED CONTRACT CHANGE ORDER. A Contract Change Order may be presented to the Contractor for his consideration prior to its having been signed by the Owner. If the Contractor accepts the terms and conditions of such proposed Contract Change Order, and if the Contract Change Order is thereafter signed by the Owner and issued to the Contractor, the Contract Change Order shall be considered to be an executed Contract Change Order for all purposes to the same extent as if the Contract Change Order had been initially issued to the Contractor as an approved Contract Change Order. The Owner need not present a proposed Contract Change Order to the Contractor for his review prior to issuing it as an approved Contract Change Order.

G4.06 EXECUTED CONTRACT CHANGE ORDER. An approved Contract Change Order, which has been signed by the Contractor, is an "executed Contract Change Order." Compensation paid pursuant to Contract Change Orders shall comprise the total compensation for the work described in the Contract Change Order. By signing the Contract Change Order, the Contractor agrees that the specified compensation constitutes full compensation for the work or change, including payment for interruption of schedules, extended overhead, delay or any other "impact" claim or "ripple effect" claim, and by signing, the Contractor specifically waives any reservation or claim for additional compensation in respect to the Contract Change Order.

G4.07 CONTRACT PRICE ADJUSTMENT. If a Contract Change Order provides for an adjustment to the Contract price, the increased payment to Contractor, or the deduction to the credit of the Owner, shall be determined by one of the following methods, or a combination thereof, as determined by the Owner and at its sole option:

- A. Unit Prices. The unit prices set forth in the Proposal shall be utilized where they are applicable. If the Contract Change Order increases or decreases the quantity of an item of work by more than twenty-five percent (25%), such that the application of unit prices in the Proposal will cause substantial inequity to the Owner or Contractor, unit prices will be adjusted by mutual agreement. Unit prices for new items included in the Contract Change Order shall be as mutually agreed upon.

Payment for any contract item of work which has a final total value of less than five percent of the total contract bid price will be made at the contract unit price regardless of increased or decreased quantities.

- B. Lump Sum. A total lump sum addition or deduction from the Contract Price as mutually agreed upon.

Lump sum quotations for changes to the work shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, materials, equipment rental, approved services, overhead and profit, all calculated as set forth in Section G9.03, "Force

Account Payment."

- C. Force Account Payment. Payment for the work will be made on a time and expense basis, that is, on an accounting of the Contractor's forces, materials, equipment and other items of cost as required to do the work.

If compensation for work done under a Contract Change Order is to be made on a force account basis, the compensation will be calculated as set forth in Section G9.03, "Force Account Payment." Contractor agrees that the markups provided in Section G9.03 are adequate.

In any case in which the method of payment cannot be agreed upon prior to the beginning of the work, the Owner may direct that the work be done on a force account basis.

G4.08 PROTEST PROCEDURE. If the Contractor disagrees with any terms or conditions set forth in an approved Contract Change Order, which he has not executed, he shall submit a written protest to the District Engineer within 15 days after receipt of such approved Contract Change Order. The protest shall state the points of disagreement, Contract Document references, and quantities and costs involved and shall propose a modification of the items with which he does not agree. If a written protest is not submitted within this 15-day period, payment will be made as set forth in the approved Contract Change Order. Approved Contract Change Orders which are not protested within 15 days will be considered as executed Contract Change Orders and such payment will constitute full compensation for all work included therein or required thereby.

When the protest of an approved Contract Change Order relates to compensation, the Contractor shall keep full and complete records of such work and shall permit the Owner and the Engineer to have access to all records relating to the protested Contract Change Order to determine the compensation payable. The Contractor shall cooperate with the District Engineer to reach agreement at the earliest practical date on the terms of compensation for the Contract Change Order. When agreement has been reached, a revised Contract Change Order may be approved by the Owner and issued to the Contractor for signature. Unless and until the Owner and Contractor agree upon other terms of compensation incorporated in a revised executed Contract Change Order, the compensation shall be as specified under the protested approved Contract Change Order.

When the protest of an approved Contract Change Order relates to the adjustment of Contract Time for the completion of the work, the time will be determined in accordance with the conditions of Section G8.12.

G4.09 CONTINUANCE OF CONSTRUCTION. Disagreement by the Contractor with the Owner's determination of the need for, or amount of, an adjustment in Contract price or Contract time associated with an approved Contract Change Order (or disagreement by the Contractor with the Owner's determination that a change has not occurred and no Contract Change Order is needed) shall not, under any circumstances, relieve the Contractor from its obligation to promptly begin and diligently prosecute the work, including the change, as described in the approved Contract Change Order.

G4.10 DETOURS. When required by the Special Conditions, Technical Conditions, or shown on the Contract Plans, or required by responsible public agencies, the Contractor shall construct, maintain and remove detours for the use of public traffic, without additional cost to the Owner, unless separate payment is specified in the Special Conditions or Technical Conditions.

The failure or refusal of the Contractor to construct and maintain detours at the proper time shall be sufficient cause for closing down the work until such detours are in satisfactory condition for use by public traffic.

G4.11 ARCHAEOLOGICAL DISCOVERIES. All articles of archaeological interest, which may be uncovered by the Contractor during the progress of the work, shall be reported immediately to the District Engineer. Progress of the Work with respect to said find shall be in accordance with the requirements of the Special Conditions to this Contract.

G4.12 PRESERVATION AND CLEANING. The Contractor shall clean up the work at intervals and at other times as directed by the District Engineer.

Before final inspection of the work, the Contractor shall clean the project site, material sites and all ground occupied by him in connection with the work, of all rubbish, excess materials, false work, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Full compensation for final cleaning up will be considered as included in the prices paid for the various Contract items of work and no separate payment will be made therefor.

G4.13 GUARANTY OF WORK. Notwithstanding inspections and acceptance by the Owner of work furnished under this Contract, the Contractor warrants to the Owner for a period of one (1) year from the date of Contract completion that all materials and equipment furnished under the Contract, including that provided pursuant to Change Orders, will be of good quality and new, that the work will be free from defects in material or workmanship, and that the work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

This warranty by the Contractor is in addition to any warranties or guarantees required by the Special Conditions or Technical Conditions for specified items of equipment or materials. This warranty shall be in effect notwithstanding any disclaimers, or limiting or conditional terms contained in such separate warranties furnished by manufacturers or suppliers.

G4.14 CORRECTION OF WORK DURING WARRANTY PERIOD. If, within the warranty period stated in the Performance Bond after the date of final acceptance of the work by the Owner, any of the work is found not to be in accordance with the Contract Documents, specifically including Section G4.13 ("Guaranty of Work") the Contractor shall correct it promptly after written notice from the Owner to do so, and pay for any damage to other property resulting from such non-conforming work. If the Contractor fails to make the repairs or replacements promptly, or in an emergency when delay could cause risk of damage or loss, the Owner may have the non-conforming work removed, replaced or corrected at the expense of the Contractor and his surety. Non-conforming work that is remedied under this Section shall be subject to an extended warranty obligation, identical in terms to that provided by Section G4.13 and this Section after the non-conforming work has been remedied.

Nothing contained in this Section G4.14 shall be construed to establish a period of limitation with respect to other obligations the Contractor may have under the Contract Documents. Establishment of the warranty period stated in the Performance Bond as described in this Section relates only to the specific obligation of the Contractor to correct the work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the work.

SECTION 5

CONTROL OF WORK

G5.01 AUTHORITY OF DISTRICT ENGINEER. The District Engineer shall decide all questions that may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which may arise as to the interpretation of the Contract Documents; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to compensation. The District Engineer shall have authority to reject work that does not conform to the Contract Documents. His decision shall be final and he shall have authority to enforce and make effective such decisions and orders which the Contractor fails to carry out promptly.

G5.02 CONTRACT DRAWINGS. Upon written request, the Owner will furnish to the Contractor for his use, at no expense to the Contractor, five (5) copies of all Contract Documents, including the Contract Drawings. Additional copies may be obtained at cost.

G5.03 SHOP DRAWINGS. **(This section is amended by the Special Conditions.)** The Contract Drawings shall be supplemented by shop drawings furnished by the Contractor. The District Engineer shall have reviewed shop drawings before any work involving such drawings is performed or equipment purchased. The Contractor shall make no change in any shop drawing after it has been reviewed by the District Engineer and stamped "No Exceptions Taken."

Shop drawing submittals shall contain adequate information to permit the District Engineer to evaluate each submission for conformance with the Contract Documents. Each submittal shall be complete; partial submittals will not be reviewed. All drawings shall include a graphical scale and indicate the amount of reduction used, if any. The quality of lettering and draftsmanship shall be such as to insure easily read reproductions by microfilming process.

Each shop drawing submitted by the Contractor shall bear the approval stamp of the Contractor, and shall be marked to indicate any deviation in the shop drawing from the requirements of the Contract Documents. By approving and submitting shop drawings, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, and that he has checked and coordinated each shop drawing with the requirements of the work and the Contract Documents. Where applicable, shop drawings will be certified for construction by the manufacturer.

Each submittal shall be accompanied by a transmittal letter from the Contractor stating the name of the material or equipment items as shown on the Contract Documents, a specification reference consisting of a section number, and any proposed deviations from the Contract Documents requested or shown on the submittal.

Review of shop drawings is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Review of the Contractor's shop drawings shall not relieve Contractor of any of his responsibility for the successful completion of the work in conformity with the requirements of the Contract Documents. The Contractor is responsible for conformance with all requirements of the Contract Documents, including, but not limited to, dimensions which shall be conformed and correlated at the job site, fabrication processes and techniques of construction, coordination of work with that of all others, and satisfactory performance of all work. Review of shop drawings shall not waive any requirement of the Contract Documents and defective work may be rejected notwithstanding such review.

It is the Contractor's responsibilities to submit shop drawings and other submittals so as to allow sufficient time for review, and for possible revisions and resubmits. Normal review time by the District Engineer shall be 30 calendar days; complex submittals may require up to 45 days. Contractor shall submit all shop drawings to the District Engineer within forty-five (45) days after date of Award of Contract.

Owner will make its best efforts to review submittals within the time period scheduled by the Contractor, provided it is consistent with the time period specified in the preceding paragraph, but the Owner's inability to do so shall not automatically entitle the Contractor to additional time to complete the Contract. If the District Engineer fails to

complete his review of shop drawing submittals within a reasonable time (not to be less than the time period specified in this section), and if the Contractor's controlling operation is delayed by reason of the delay in review, an extension of time commensurate with the delay in completion of the work thus caused will be granted pursuant to Section G8.12, but no additional compensation will be allowed for such delay.

Shop drawings reviewed by the District Engineer will be returned to the Contractor. The District Engineer's action on each submittal will consist of one of the following: "No Exceptions Taken," "Exceptions Taken as Noted," "Revise and Resubmit" or "Rejected." If the District Engineer takes exception to any drawings, the Contractor shall make the necessary revisions and resubmit them to the District Engineer for review. When shop drawings are required to be resubmitted, the revisions are to be clearly defined on the revised drawings. Resubmits will be reviewed in accordance with the provisions applicable to initial submittals and the time period for the District Engineer's review shall be equal to that for initial submittals.

Submittal and processing of shop drawings shall conform to the requirements of the Special Conditions and Technical Conditions.

Full compensation for furnishing all shop drawings shall be considered as included in the prices paid for the Contract items of work to which such drawings relate and no additional compensation will be allowed therefor.

When the shop drawings have been completed to the satisfaction of the District Engineer, the Contractor shall carry out the construction in strict accordance therewith. Any further changes will require a resubmits of the drawings.

Contractor shall be charged for the review of submittals for items that have been previously rejected by the District Engineer two or more times. Contractor shall be charged for the review of submittals as a result of a request for substitution by the Contractor. The basis for such charges shall be the cost actually incurred by the Owner for the review of the submittal.

G5.04 CONFORMITY WITH CONTRACT DOCUMENTS. Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on the Contract Drawings or indicated in the Specifications. Although measurement, sampling and testing may be considered evidence as to such conformity, the District Engineer shall be the sole judge as to whether the work or materials deviate from the Contract Drawings and Specifications, and his decision as to any allowable deviations therefrom shall be final.

G5.05 COORDINATION AND INTERPRETATION OF CONTRACT DOCUMENTS. The General Conditions, Special Conditions, Technical Conditions, Contract Drawings, Contract Change Orders and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete work.

If there is a conflict between Contract Documents, the document highest in precedence shall control. The precedence shall be:

1. Permit requirements of the other agencies.
2. Special Conditions.
3. Technical Conditions.
4. Plans.
5. General Conditions.
6. Standard Specifications.

Change Orders, Supplemental Agreements and approved revisions to Plans and Specifications will take precedence over Items 2 through 6 above.

The Contract Documents of the highest precedence shall in no way nullify non-conflicting portions of the Contract Documents of lower precedence.

In the event of inconsistencies between requirements in the Special Conditions and requirements in the General Conditions, the Special Conditions shall govern.

In case of differences between small and large-scale drawings, the large-scale drawings shall govern. Schedules or drawings shall take precedence over conflicting notations on drawings. In the event of discrepancy between any drawing and the figures written thereon, the figures, unless otherwise directed, will govern over scaled dimensions.

Should it appear that the work to be done or any of the matters relative thereto is not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply to the District Engineer for such further written explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, clarification shall be sought from the District Engineer, whose decision thereon shall be final.

G5.06 ORDER OF WORK. When required by the Special Conditions or Contract Drawings, the Contractor shall follow the sequence of operations as set forth therein.

Full compensation for conforming to such requirements will be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

G5.07 SUPERINTENDENCE. The Contractor shall supervise and direct the work using his best skill and attention and shall keep at the project site competent supervisory personnel at all times while work is in progress. The Contractor shall designate, in writing, before starting work, a project superintendent who shall be an employee of Contractor and shall have complete authority to represent and act for the Contractor. The Contractor shall notify the District Engineer in writing prior to any change in superintendent assignment.

The Contractor shall be solely responsible for and have control over construction means, methods, techniques and procedures for providing adequate safety precautions and coordinating all portions of the work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

G5.08 LINES AND GRADES. Only such primary control lines, monuments and bench marks will be set by the District Engineer as he determines to be necessary to control establishment of the lines and grades required for the completion of the work. In general, these will consist of the primary horizontal and vertical control points shown on the Contract Drawings. The Contractor shall notify District Engineer a minimum of ten (10) working days before such stakes or marks are needed.

The Contractor shall carefully preserve monuments, stakes and marks set by the District Engineer. If such monuments, stakes or marks are destroyed or damaged, the District Engineer at his earliest convenience will replace them. The Contractor shall be charged for the cost of replacing or restoring monuments, stakes and marks destroyed or damaged by reason of his operations. This charge will be deducted from any monies due or to become due the Contractor.

The Contractor shall temporarily suspend work at such points and for such reasonable times as the District Engineer may require for transferring or setting monuments, stakes or marks, and the Contractor shall not be entitled to any additional compensation or extension of time therefor.

All other stakes or marks required to establish the lines and grades required for the completion of the work shall be the responsibility of the Contractor. Payment for such work shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

Contractor shall take field measurements and verify field conditions consistent with prudent construction industry standards and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents before commencing construction activities on the work site. Errors, inconsistencies or omissions in the Contract Documents discovered by Contractor shall be reported to the District Engineer at once.

G5.09 INSPECTION. The District Engineer, and all authorized representatives of the Owner, shall at all times have safe access to the work during its construction, and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of the Contract

Documents. All work done and all materials furnished shall be subject to the District Engineer's on-site and off-site inspection.

The inspection and observation of the work or materials by the District Engineer shall not relieve the Contractor of any obligations to fulfill his Contract as prescribed. Work and materials not meeting such requirements shall be corrected, and unsuitable work or material may be rejected, notwithstanding that such work or materials have been previously inspected by the District Engineer, or that payment therefor has been included in a progress estimate.

The District Engineer may order re-examination of questioned work at any time before final acceptance. If so ordered, the Contractor shall uncover the work. If such work is found to be in accordance with the Contract Documents, the Owner will pay for the cost of uncovering; removal, recovering and replacing of the parts removed; but if such work so exposed or examined is not in accordance with the Contract Documents, the uncovering, removal, recovering and replacement shall be at the Contractor's expense. Work that has been covered prior to observation by the District Engineer does not qualify as re-examined work; the Owner may order it uncovered for observation without payment of costs.

The Contractor shall give due notice to the District Engineer before backfilling so that the District Engineer may observe the materials and installation.

The Contractor shall notify the District Engineer in advance as to those times when no construction activities will take place. Absent such notification, all costs incurred by the Owner as a result of attending to the project site at times when no construction is taking place will be charged to the Contractor.

Whenever the Contractor intends to perform work on Saturday, Sunday, or a legal holiday, he shall give notice to the District Engineer of such intention 24 hours prior to performing such work, or such longer period as may be specified, so that the District Engineer may make necessary arrangements.

The observations and inspections performed by the District Engineer shall not relieve the Contractor of his responsibility to conduct comprehensive inspections of the work and to furnish materials and perform work in conformance with the Contract Documents.

G5.10 DOCUMENTS ON JOB SITE. The Contractor shall keep one copy of all Contract Documents (including Change Orders), approved Shop Drawings and approved progress payments on the job site, in good order, available to the District Engineer and all authorized representatives of the Owner.

G5.11 CORRECTION, REMOVAL OF REJECTED WORK. The Contractor shall promptly correct work rejected by the District Engineer as failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed, so that it does comply with the Contract Documents. The Contractor shall bear the costs of correcting such rejected work, including additional testing, inspections and compensation for the Engineer's services and expenses made necessary thereby.

The Contractor shall remove, at his cost, from the site portions of the work which are not in accordance with the Contract Documents or which are not corrected by the Contractor.

The Contractor shall correct, at his cost, damaged or destroyed construction, whether completed or partially completed.

Any work done beyond the lines shown on the Contract Drawings or established by the District Engineer, and all extra work done without written authority, will be considered as unauthorized work. Upon order of the District Engineer, unauthorized work shall be remedied, removed or replaced at the Contractor's cost.

If the Contractor fails to promptly correct non-conforming or rejected work, or to comply promptly with any order of the District Engineer under this Section, the Owner may cause such work to be remedied, removed or replaced and the costs thereof will be deducted from any monies due or to become due the Contractor.

Failure on the part of the District Engineer to reject non-conforming work shall not be construed to imply acceptance of such work.

G5.12 EQUIPMENT AND PLANTS. The Contractor shall use or permit only equipment and plants suitable to produce the quality of work and materials required, and meeting all State and Federal safety requirements.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of materials needed to complete the work in accordance with the Contractor's schedule and the Contract time.

When ordered by the District Engineer, the Contractor shall remove unsuitable equipment from the work and discontinue the operations of unsafe or unsatisfactory plants.

All equipment used shall be selected such that construction loads do not exceed the bearing capacity of structures, highways, streets, and subsurface conduits. The Contractor's attention is directed to Section G7.08 of these General Conditions.

G5.13 CHARACTER OF WORKERS. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons nor persons unskilled in tasks assigned to them. District Engineer shall have the authority to require Contractor to remove undisciplined workers from the work.

G5.14 FINAL INSPECTION. When the work has been completed, the District Engineer will make the final inspection. The Contractor shall notify the District Engineer in writing when it considers the work complete and shall request a final inspection.

G5.15 SUBMITTAL OF AS-BUILT DATA. The Contractor shall submit to the District Engineer all information required by the District Engineer to verify as-built drawings for all permanent Contract work.

In order to provide for the timely submission of data, and avoid loss of information, the Contractor shall submit acceptable as-built data to the District Engineer on a monthly basis.

G5.16 EMERGENCIES. In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, without special instructions or authorization from the District Engineer, shall act at his discretion to prevent such threatened loss or injury. In such an emergency, the Contractor shall perform such additional work as is required. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with the conditions of Section G9.

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SECTION 6

CONTROL OF MATERIALS

G6.01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS. The Contractor shall furnish all materials required to complete the work, except materials that are designated in the Specifications to be furnished by the Owner and materials furnished by the Owner in accordance with force account work as described in Section G9.03. As used in this Section, the term "materials" shall mean materials and equipment furnished for incorporation in the work.

Notwithstanding any prior inspection, only materials conforming to the requirements of the Contract Documents shall be incorporated in the work.

The materials furnished and used shall be new, except as may specifically be provided elsewhere in the Contract Documents. The materials shall be manufactured, handled, and used in a workmanlike manner to ensure completed work in accordance with the Contract Documents.

Whenever it is provided that the Contractor shall furnish materials or manufactured articles, or shall do work, for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation; or if not ordinarily carried in stock, shall conform to the usual standards for first-class materials of the kind required, with due consideration for the use they are to be put to.

The Contractor shall submit to the District Engineer a list of his sources of materials and the locations at which such materials will be available for inspection. The list shall be submitted in sufficient time to permit proper inspection and testing of materials to be furnished from such listed sources in advance of their use. The Contractor shall assure that the District Engineer or his authorized representative has free access at all times to the material to be inspected, sampled or tested. The District Engineer may inspect, sample or test materials at the source of supply or other locations. It is understood that such inspections and tests in no way shall be considered as a guaranty of acceptance of such material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the Owner shall not relieve the Contractor or his suppliers of responsibility for quality control.

Manufacturers' warranties, guaranties, instruction sheets and parts lists, which are furnished with certain materials incorporated in the work, shall be delivered to the District Engineer before acceptance of the Contract.

Reports and records of inspections made and tests performed, when available at the site of the work, may be examined by the Contractor and the District Engineer.

G6.02 OWNER-FURNISHED MATERIALS. Materials furnished by the Owner will be available at locations designated in the Specifications, or if not designated in the Specifications, they will be available at the Owner's Office. The Contractor, at his own expense, including any necessary loading and unloading that may be involved shall haul them to the site of the work. The cost of handling and placing Owner-furnished material shall be considered as included in the price paid for the Contract item involving such Owner-furnished material.

The Contractor shall be held responsible for all materials furnished to him, and he shall pay all demurrage and storage charges. Owner-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor, at his expense. The Contractor will be liable to the Owner for the cost of replacing Owner-furnished material, and such costs may be deducted from any monies due or to become due the Contractor. All Owner-furnished materials that are not used on the work shall remain the property of the Owner and will be delivered to the Owner's corporation yard.

G6.03 STORAGE OF MATERIALS. Materials shall be stored by the Contractor in such a manner as to ensure the preservation of their quality and fitness for the work and to facilitate inspection.

G6.04 DEFECTIVE MATERIALS. All Contractor-furnished materials not conforming to the requirements of the Contract Documents may be rejected, whether in place or not. They shall be removed immediately from the site of the work unless otherwise permitted by the District Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the work unless approval in writing has been given by the District Engineer. Upon failure of the Contractor to comply promptly with any order of the District Engineer made under the conditions of this Section, the District Engineer may cause the removal and replacement of rejected material and deducts the cost thereof from any monies due or to become due the Contractor.

G6.05 MATERIAL AND EQUIPMENT SPECIFIED BY NAME. Whenever any material or equipment is specified by two patent or proprietary names or by the names of two manufacturers, such specifications shall be considered as used for the purpose of describing the material or equipment desired and shall be considered as if followed by the words "or acceptable equal", whether or not such words appear. The Contractor may offer material or equipment with equal or better qualities and performance in substitution for those specified that he considers would be in the District's interest to accept. No offers for substitution will be acknowledged or considered from suppliers, distributors, manufacturers or subcontractors. Any such offer shall be made in writing to the District Engineer for his consideration within thirty-five days after award of the contract. The Contractor shall include with his offer sufficient data which, together with any other data the District may require, will enable the District to assess the acceptability of the material or equipment. When the substitute equipment or material necessitates changes to or coordination with any other portion of the work, the data submitted shall include drawings and details showing all such changes, and the Contractor shall perform these changes as part of any acceptance of substitute material or equipment. The use of any material or equipment so offered will be permitted only after written acceptance of his offer by the District. Such acceptance by the District shall not relieve the Contractor from full responsibility for the efficiency, sufficiency and quality and performance of the substitute material or equipment, in the same manner and degree as the material and equipment specified by name.

Whenever any material or equipment is specified by only one patent or proprietary name or by the name of only one manufacturer, such material or equipment shall be so specified for the purpose of standardization with existing equipment or materials or has no known equal.

G6.06 PLANT INSPECTION. The District Engineer may inspect the production of material, or the manufacture of products, at the source of supply. Plant inspection, however, will not be undertaken until the District Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The District Engineer or his authorized representative shall have free entry at all times to such parts of the plant as concern the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The District Engineer assumes no obligation to inspect materials at the source of supply. The responsibility of incorporating satisfactory materials in the work rests entirely with the Contractor, notwithstanding any prior inspections or tests.

G6.07 PRODUCT AND REFERENCE STANDARDS. When descriptive catalog designations, including manufacturer's name, product brand name or model number are referred to in the Contract Documents, such designations shall be considered as being those found in industry publications in effect on the day the Notice to Contractors for the work is dated.

G6.08 SAMPLES. After the award of the Contract, the Contractor shall furnish to the District Engineer samples indicated in the Specifications or requested by the District Engineer. Samples shall be submitted without charge, with shipping charges prepaid. Materials for which samples are required shall not be used in the work until approved in writing by the District Engineer.

Each sample shall be submitted in duplicate unless otherwise directed, and shall be labeled with the following data: name of project; name of Contractor; material represented and location in the project including specification reference; and producer information including brand, model, place of origin, and other pertinent information.

The Contractor shall forward a transmittal letter to the District Engineer with each shipment of samples containing the information required in the previous paragraph. Approval of a sample shall be only for the characteristics and use named in the submittal and approval shall not be construed to change or modify any Contract requirement.

Before submitting samples, the Contractor shall assure himself that the materials or equipment will be available in the quantities required in the project, as no change or substitution will be permitted after a sample has been approved unless approved by the District Engineer in writing.

Samples of material from local sources shall be taken by or in the presence of the District Engineer if so required by the District Engineer; otherwise the samples will not be considered for testing.

Approved samples not damaged in testing may be incorporated in the finished work if marked for identification and approved by the District Engineer. Materials incorporated in the work shall match the approved samples.

Failure of any material to pass the specified tests will be sufficient cause for refusal to consider under this Contract any further samples of the same brand, make or source of that material. The District Engineer reserves the right to disapprove any material which has previously proven unsatisfactory in service.

Samples of material delivered on the site or in place may be taken by the District Engineer for testing. Failure of samples to meet Contract requirements will annul previous approvals of the item tested.

G6.09 TESTING OF MATERIALS OR WORK. Materials to be used in the work will be subject to inspection and tests by the District Engineer or his designated representative. The Contractor shall furnish, without charge, such samples as may be required.

Materials and work shall be tested in accordance with the methods in use by the State of California, Department of Transportation, or by nationally recognized testing organizations or as specified in the Contract Documents. The District Engineer will make or approve all testing. Unless otherwise noted in the Specifications, testing will be made at the expense of the Owner. In the event that any materials and work fail to pass tests, the cost of subsequent testing of similar materials and work as may be required by the District Engineer shall be borne by the Contractor.

Test methods developed by the State of California, Department of Transportation are identified by the prefix Calif., followed by the serial number. Copies of individual test methods are available at the Transportation Laboratory, Sacramento, California.

Whenever a reference is made in the Specifications to a test method by California number, it shall mean the test method in effect on the date of the Notice to Contractors for the work. Whenever a reference is made in the Specifications to a specification or test designation of the American Society for Testing and Materials, the American Association of State Highway Officials, Underwriters' Laboratories, Inc., or any other recognized national organization, and the number accompanying the test designation representing the year of adoption of the test has been omitted, the reference shall mean the test method in effect on the date of the Notice to Contractors for the work.

Whenever the Contract Documents provide an option between two or more test methods, the District Engineer will determine the test method to be used.

Whenever a specification, manual or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of such reports, identified as to the lot of material, shall be furnished to the District Engineer. The manufacturer's test report shall supplement the inspection, sampling and testing conditions of this Section and shall not constitute a waiver of the Owner's right to inspect. When material that cannot be identified with specific test reports is proposed for use, the District Engineer may, at his discretion, select random samples from the lot for testing. Testing specimens from the random samples, including those required for retest, shall be prepared in accordance with the referenced specification and furnished by the Contractor at his expense. The number of such samples and test specimens shall be entirely at the discretion of the District Engineer.

G6.10 CERTIFICATE OF COMPLIANCE. A Certificate of Compliance shall be furnished prior to the use of any materials for which the Special Conditions or Specifications require that such Certificate be furnished. In addition, the District Engineer may permit the use of certain materials prior to sampling and testing if accompanied by a Certificate of Compliance stating that the materials involved comply in all respects with the requirements of the

Specifications. The Certificate shall be signed by the manufacturer of the material. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lots so certified shall be clearly identified in the Certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the Contract Documents, and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The Owner reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as approved by the District Engineer.

SECTION 7

LEGAL RELATIONS AND RESPONSIBILITIES

G7.01 LAWS TO BE OBSERVED. The Contractor shall keep himself fully informed concerning all requirements of law, including but not limited to all State and Federal laws and county and municipal ordinances and regulations which in any manner affect those engaged or employed in the work, the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe, and shall cause all his agents and employees to observe, all such requirements of laws and shall protect, indemnify and hold harmless the Owner, the Engineer, and all of their respective officers, agents and employees against all claims and liabilities arising from or based on the violation of any such requirement of law whether by the Contractor or his employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the work in relation to any such requirements of laws, the Contractor shall immediately report the same to the District Engineer in writing. The Contract Documents shall be governed by the laws of the State of California.

G7.02 LABOR CODE REQUIREMENTS. Attention is directed to the following requirements of the Labor Code:

- A. Hours of Labor. Eight hours labor constitutes a legal day's work. The Contractor shall forfeit, as penalty to the Owner, twenty-five (\$25.00) for each workman employed in the performance of the Contract by the Contractor or by any subcontractor under him for each calendar day during which such workman is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any one calendar week in violation of the provisions of the California Labor Code and in particular, Sections 1810 to 1815 thereof, inclusive, except that work performed by employees of the Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one-and-one-half (1½) times the basic rate of pay, as provided in said Section 1815.
- B. Labor Non-Discrimination. Attention is directed to Section 1735 of the Labor Code which provides the Contractor shall not discriminate against any employee who is employed on the work because of race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, sex or age of such persons, except as provided in Section 12940 of the Government Code.
- C. Prevailing Wages. The Contractor shall comply with California Labor Code Sections 1770 to 1780, inclusive. In accordance with said Section 1775, the Contractor shall forfeit as a penalty to the Owner fifty (\$50.00) for each calendar day or portion thereof for each workman paid less than stipulated prevailing wage rates for such work or craft in which such worker is employed for any work done under the Contract by him or by any subcontractor under him in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

Pursuant to the provisions of Section 1773 of the Labor Code, the Owner has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work applicable to the work to be done from the Director of the Department of Industrial Relations. Copies of the prevailing rates are on file at the Owner Office and are available to any interested party on request. Such wage rates must be prominently posted at the construction site.

The Owner will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. The possibility of wage increases is one of the elements to be considered by the Contractor in

determining his bid, and will not under any circumstances be considered as the basis of a claim against the Owner on the Contract.

Attention is directed to the requirements of Section 1773 of the Labor Code. The Contractor shall make travel and subsistence payments to each worker needed to execute the work in accordance with the requirements of said Section 1773.

D. Payroll Records. The Contractor's attention is directed to the following provisions of Labor Code Section 1776. The Contractor shall be responsible for the compliance with these provisions by his subcontractors.

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

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

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

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

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the Owner, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (b)(2), herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractor and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.

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

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

(e) The Contractor shall inform the Owner of the location of records enumerated under subdivision (a), including the street address, city and county, and shall, within five (5) working days, provide a notice of a change of location and address.

(f) In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects the contractor must comply with this Section. Should noncompliance still be evident after the ten-day (10) period, the Contractor shall, as a penalty to the State or the Owner, forfeit twenty-

five (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. Responsibility for compliance with these Paragraphs (a) through (f) lies with the Contractor.

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

The Contractor and each subcontractor shall preserve their payroll records for a period of 3 years from the date of completion of the Contract.

- E. Apprentices. The Contractor shall fully comply with the requirements of Sections 1777.5, 1777.6 +and 1777.7 (as amended) of the California Labor Code and the regulations of the California Apprenticeship Council. In accordance with Section 1777.5, the Contractor shall secure the necessary certificates and shall contribute to the apprenticeship fund or funds, as provided for therein. The Contractor shall require each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work to comply fully with Sections 1777.5 and 1777.6 of the Labor Code. Information relative to apprenticeship standards, wage schedules and other requirements may be obtained from the State Division of Apprenticeship Standards and its branch offices.
- F. Worker's Compensation. Pursuant to the requirements of Section 1860 of the California Labor Code, the Contractor will be required to secure the payment of workers' compensation to his employees in accordance with the provisions of Section 3700 of the Labor code.

Prior to commencement of work, the Contractor shall sign and file with the Owner, a certification in the following form:

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

Said certification is included in the Contract, and signature and return of the Contract as provided in Section G3.03, "Execution of Contract," of the General Conditions, shall constitute signing and filing of the said certificate.

G7.03 CONTRACTORS' LICENSING LAWS. Attention is directed to the provisions of Chapter 9 of Division 3 of the California Business and Professions Code concerning the licensing of contractors. All bidders and contractors shall be licensed in accordance with the laws of the State of California and any bidder or contractor not so licensed is subject to the penalties imposed by such laws.

G7.04 AIR POLLUTION CONTROL. The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the Contract, including any air pollution control rules, regulations, ordinances and statutes specified in Section 11017 of the Government Code.

Material to be disposed of shall not be burned, either inside or outside the work site.

G7.05 WATER POLLUTION CONTROL. The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays and coastal waters from pollution with fuels, oils, bitumen, calcium chloride and other harmful materials and shall conduct and schedule his operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.

Water pollution control work is intended to provide prevention, control, and abatement of water pollution to streams,

waterways and other bodies of water, and shall consist of constructing those facilities which may be shown on the Plans, specified herein or in the Special Conditions, or directed by the District Engineer.

In order to provide effective and continuous control of water pollution it may be necessary for the Contractor to perform the Contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall provide temporary water pollution control measures, including but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of his operations. The Contractor shall coordinate water pollution control work with all other work done on the Contract.

Before starting any work on the project, the Contractor shall submit, for acceptance by the District Engineer, a program to control water pollution effectively during construction of the project. Such program shall show the schedule for the erosion control work and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of his operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the project, other than that specifically authorized in writing by the District Engineer, until such program has been accepted.

If the measures being taken by the Contractor are inadequate to control water pollution effectively, the District Engineer may direct the Contractor to revise his operations and his water pollution control program. Such directions will be in writing and will specify the items of work for which the Contractor's water pollution control measures are inadequate. No further work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised water pollution control program has been accepted.

The District Engineer will notify the Contractor of the acceptance or rejection of any submitted or revised water pollution control program in not more than 5 days.

The Owner will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised water pollution control program, nor for any delays to the work due to the Contractor's failure to submit an acceptable water pollution control program.

The Contractor may request the District Engineer to waive the requirement for submission of a written program for control of water pollution when the nature of the Contractor's operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other conditions of this Section. Waiver of the requirement for a written program for control of water pollution will not preclude requiring submittal of a written program at a later time if the District Engineer deems it necessary because of the effect of the Contractor's operations.

Where erosion that will cause water pollution is probable due to the nature of the material or the season of the year, the Contractor's operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.

Nothing in the terms of the Contract or in the conditions in this Section shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.

The Contractor shall also conform to the following conditions:

1. Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams, and during construction of such barriers, muddying of streams shall be held to a minimum.
2. Removal of material from beneath a flowing stream shall not be commenced until adequate means, such as a bypass channel, are provided to carry the stream free from mud or silt around the removal operations.
3. Should the Contractor's operations require transportation of materials across live streams, such operations shall be conducted without muddying the stream. Mechanized equipment shall not be operated in the stream channels of such live streams except as may be necessary to construct

crossings or barriers and fills at channel changes.

4. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration, or retention in a settling pond, or ponds, adequate to prevent muddy water from entering live streams.
5. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they will later enter a live stream.
6. Portland cement or fresh portland cement concrete shall not be allowed to enter flowing water of streams.
7. When operations are completed, the flow of streams shall be returned as nearly as possible to a meandering thread without creating possible future bank erosion and settling, pond sites shall be graded so they will drain and will blend in with the surrounding terrain.
8. Material derived from roadway work shall not be deposited in a live stream channel where it could be washed away by high stream flows.
9. Where there is possible migration of anadromous fish in streams affected by construction on the project, the Contractor shall conduct his operations so as to allow free passage of such migratory fish.

Compliance with the requirements of this Section shall in no way relieve the Contractor from his responsibility to comply with the other conditions of the Contract, in particular his responsibility for damage and for preservation of property.

Full compensation for conforming to the requirements of this Section shall be considered as included in the prices paid for the various items of work and no additional compensation will be allowed therefore.

G7.06 SOUND CONTROL REQUIREMENTS. The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances that apply to any work performed pursuant to the Contract.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

G7.07 USE OF PESTICIDES. The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies that govern the use of pesticides required in the performance of the work on the Contract.

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

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

G7.08 WEIGHT LIMITATIONS. Unless expressly permitted in the Technical Conditions, the Contractor shall not operate construction equipment or vehicles of any kind which, laden or unladen, exceed the maximum weight limits set forth in Division 15 of the Vehicle Code, over completed or existing base, surfacing, pavement or structures.

Contractor shall be responsible for any damage he may cause to bridges, culverts, and road structures. He shall determine in advance the allowable safe load for each structure and, if necessary, provide special shoring and support at his expense. Contractor shall seek approval from appropriate jurisdictions for use of designated routes for

access to and from the project site.

G7.09 PAYMENT OF TAXES. The Contract prices paid for the work shall include full compensation for all taxes that the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of any tax will be furnished to the Contractor by the Owner, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the Contract.

The Contractor shall withhold and pay any and all sales and use taxes, withholding taxes, whether State or Federal, Social Security taxes, State Unemployment Insurance charges and all other taxes which are now or hereafter may be required to be paid or withheld under any laws.

G7.10 PERMITS AND LICENSES. The Contractor shall procure all permits and licenses (except those procured or to be procured by the Owner which are listed in the Special Conditions or Specifications), pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.

The Environmental Quality Act (Public Resources Code, Section 21000 to 21177) may be applicable to permits, licenses and other authorizations which the Contractor must obtain from State or local agencies in connection with performing the work of the Contract. The Contractor shall comply with the provisions of that Act in obtaining such permits, licenses and other authorizations and they shall be obtained in sufficient time to prevent delays to the work.

The Contractor shall comply with permits obtained by the Owner for the work, which are listed in the Special Conditions or Specifications.

G7.11 SUBSURFACE EXCAVATIONS, NOTIFICATION. Attention is directed to Government Code Section 4216, which provides, in part:

"Except in an emergency, an excavator planning to conduct an excavation shall notify the appropriate regional notification center of the excavator's intent to excavate at least two working days, and not more than 14 calendar days, before beginning that excavation. The date of the notification shall not count as part of the two-working-day notice. If an excavator gives less notice than the legal excavation start date and time and the excavation is not an emergency, the regional notification center will take the information and provide a ticket, but an operator has until the legal excavation start date and time to respond. However, an excavator and an operator may mutually agree to a different notice and start date. The contact information for operators notified shall be available to the excavator."

"When the excavation is proposed within 10 feet of a high priority subsurface installation, the operator of the high priority subsurface installation shall notify the excavator of the existence of the high priority subsurface installation to set up an onsite meeting prior to the legal excavation start date and time or at a mutually agreed upon time to determine actions or activities required to verify the location and prevent damage to the high priority subsurface installation. As part of the meeting, the excavator shall discuss with the operator the method and tools that will be used during the excavation and the information the operator will provide to assist in verifying the location of the subsurface installation. The excavator shall not begin excavating until after the completion of the onsite meeting."

"The regional notification center shall provide a ticket to the person who contacts the center pursuant to this section and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation. A ticket shall be valid for 28 days from the date of issuance. If work continues beyond 28 days, the excavator shall renew the ticket either by accessing the center's Internet Web site or by calling "811" by the end of the 28th day"

"Unless an emergency exists, an excavator shall not begin excavation until the excavator receives a response from all known operators of subsurface installations within the delineated boundaries of the proposed area of excavation pursuant to subdivision (a) of Section 4216.3 and until the completion of any onsite meeting, if required by subdivision (c)."

The Contractor shall contact the regional notification center, "Underground Service Alert," and schedule the work to

allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities.

G7.12 PATENTS. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes, used on or incorporated in the work and shall indemnify and save harmless the Owner, the Engineer, and their duly authorized representatives from all suits at law, or actions of every nature for, or on account of, the use of patented materials, equipment, devices or processes. In case such materials, equipment, devices or processes are held to constitute an infringement and their use enjoined, the Contractor, at his expense, shall: (a) secure for the Owner the right to continue using said materials, equipment, devices or processes by suspension of the injunction or by procuring a license or licenses, or (b) replace such materials, equipment, devices or processes, or (c) modify them so that they become noninfringing or remove the enjoined materials, equipment, devices or processes and refund the sums paid therefor without prejudice to any other rights of the Owner or the Engineer.

The attention of the Contractor is also directed to Special Conditions, Section S1.01.

G7.13 SAFETY REQUIREMENTS. The Contractor shall promptly and fully comply with and carry out, and shall without separate charge therefor to the Owner, enforce compliance with the safety and first aid requirements prescribed by applicable State and Federal laws and regulations, rules and orders and as may be necessary to the end that work shall be done in a safe manner and that the safety and health of the employees and the people of local communities is safeguarded. Compliance with the conditions of this Section by subcontractors shall be the responsibility of the Contractor. All installed material, equipment and structures, without separate charge therefor to the Owner, shall fully conform with all applicable State and Federal safety laws, rules, regulations and orders and it shall be the Contractor's responsibility to furnish only such material, equipment and structures, notwithstanding any omission in the Contract Documents thereof or that a particular material, equipment or structure was indicated.

Upon the failure of the Contractor to comply with any of the requirements of this Section, the District Engineer shall have the authority, but not the duty, to stop any operations of the Contractor affected by such failure until such failure is remedied. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for increased costs or damages by the Contractor.

G7.14 TRENCH EXCAVATION SAFETY PLAN. Attention is directed to California Labor Code Section 6705. At least five days in advance of excavation of any trench five feet or more in depth, the Contractor shall submit to the District Engineer a detailed plan showing the design of shoring, bracing, sloping and other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards established by the State Construction Safety Orders, the plan shall be prepared and signed by a registered civil or structural engineer. Nothing in this Section shall be deemed to allow the use of a shoring, sloping or protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety. Nothing in this Section shall be construed to impose liability on the Owner, the Engineer or any of their employees.

G7.15 SANITARY PROVISIONS. The Contractor shall conform to the rules and regulations pertaining to sanitary provisions established by the State, and to County, City and municipal laws and ordinances as may be applicable. Toilets for use of employees on the work shall be furnished where needed and shall be maintained by the Contractor. Their use shall be strictly enforced. Owner sanitary facilities will not be available for use by the Contractor's employees, except where specifically designated in writing by the District Engineer.

G7.16 PUBLIC CONVENIENCE. The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

All public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible. The Contractor shall obtain approval of his plans for the routing and control of traffic from the appropriate city, county or State agency. Where the temporary rerouting or closing to traffic of any public street or highway is necessary, the Contractor shall make all necessary arrangements with the appropriate city, county or State agency.

All trucks coming to the site or leaving the site with materials or loose debris shall be loaded in a manner which will

prevent dropping of material or debris on public streets. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately at the Contractor's expense.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to owners of abutting property. Convenient access to driveways, houses and buildings along the line of work shall be maintained, and temporary approaches to roads or highways shall be provided and kept in good condition. Roadway excavations shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times.

For work in public right-of-way, the Contractor shall comply with the rules and regulations of the State, County or local agency that owns the right-of-way.

All costs of complying with public convenience requirements of the Owner or other agencies shall be included in the Contract price.

The District Engineer shall have the authority, but not the duty, to stop the Contractor from beginning new work until the conditions of this Section have been met.

G7.17 PUBLIC SAFETY. The Contractor shall assume all responsibility for public safety during construction, and all costs arising therefrom shall be included in the Contract amount. Whenever the Contractor's operations create a condition hazardous to traffic or to the public, he shall furnish, erect and maintain, at his expense, such fences, barricades, lights, signs and other devices and take such other protective measures as are necessary to prevent accidents or damage or injury to the public. The Contractor shall also furnish such flagmen as are necessary to give adequate warning to traffic or to the public of any dangerous conditions. For work in public right-of-way, the Contractor shall comply with the rules and regulations of the State, County or local agency that owns the right-of-way.

G7.18 PRESERVATION OF PROPERTY. Due care shall be exercised to avoid injury to existing improvements or facilities, utility facilities, adjacent property and trees, shrubs and other plants that are not to be removed without permission from the District Engineer.

Trees, shrubs and other plants that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipe lines, sewer and waterlines, highway facilities, and any other improvements or facilities, under or above ground, that are within or adjacent to the work limit line shall be protected from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced in like size, kind and quality or restored to previous condition at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the Specifications if any such objects are a part of the work being performed under the Contract. The District Engineer may make or cause to be made such temporary repairs as are necessary to restore to service any damaged facility. The cost of such repairs shall be borne by the Contractor and may be deducted from any monies due or to become due to the Contractor under the Contract.

The fact that any underground facility is not shown on the Contract Plans shall not relieve the Contractor of his responsibility under Section G8.15, "Existing Utilities," of the General Conditions. It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of such underground improvements or facilities that may be subject to damage by reason of his operations.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in protecting or repairing property as specified in this Section, shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

G7.19 RESPONSIBILITY FOR DAMAGE. The Owner and all Members of the Owner's governing body, officers, employees and authorized agents thereof connected with the work, including the Engineer, shall not be answerable or accountable in any manner: for any loss or damage that may happen to the work or any part thereof; for any loss or damage to any of the materials or other things used or employed in performing the work; for injury to or death of

any person (including but not limited to workers or the public) from any cause whatsoever; or damage to property from any cause whatsoever.

The Contractor shall be responsible for any liability imposed by law and for any injuries to or death of any person (including but not limited to workers and the public) and for damage to property resulting from defects or from obstructions or from any cause whatsoever during the progress of the work or at any time before its completion and final acceptance.

To the maximum extent permitted by law, the Contractor shall indemnify and save harmless the Owner and all members of the governing body, officers, employees and authorized agents thereof, including the Engineer, from all claims, suits or actions of every name, kind and description, brought for, or on account of, injuries to or death of any person (including but not limited to employees of Contractor, of subcontractors, or of any other person, firm or entity and the public) or damage to property arising from any cause whatsoever during the progress of the work or at any time before its final completion and acceptance. The duty of the Contractor to indemnify and save harmless includes the duties to defend (by legal counsel satisfactory to the indemnities) as set forth in Section 2778 of the Civil Code and to pay attorney's fees and litigation costs required by such defense.

With respect to third party claims against Contractor, the Contractor waives any and all rights to any type of express or implied indemnity against the Owner, members of its governing body, officers, employees or authorized agents, and the Engineer. It is the intent of the parties that the Contractor shall indemnify and hold harmless the Owner, members of its governing body, officers, employees and authorized agents, including the Engineer from any and all claims, suits, or actions arising from any cause whatsoever as set forth above regardless of the existence or degree of fault or negligence on the part of the Owner, the Engineer, the Contractor, a subcontractor or employee of any of these, other than the active negligence of the Owner or its Directors, officers, employees or authorized agents, and the Engineer.

G7.20 RESPONSIBILITY FOR WORK AND MATERIALS. Until the acceptance of the Contract, the Contractor shall have the charge and care of the work and of the materials to be used therein, including materials for which he has received partial payment, and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the work. The Owner will not grant relief from maintenance and responsibility for a portion of the total work. The Contractor shall rebuild, repair or restore all injuries, losses or damages to any portion of the work and materials occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary, the Contractor shall, at his expense, provide suitable drainage and erect such temporary structures as are necessary to protect the work and materials from damage. The suspension of the work from any causes whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified. The Contractor shall properly store materials that have been partially paid for by the Owner. Such storage by the Contractor shall be on behalf of the Owner and the Owner shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored except on written authorization from the District Engineer.

G7.21 LIABILITY OF CONTRACTOR. Contractor hereby agrees to indemnify and save harmless Owner and the Engineer and their respective Boards, officers, agents and employees of and from any and all claims, suits or actions of every name, kind and description which may be brought against their respective Boards, officers, agents or employees by reason of any injury to or death of any person or property damage suffered or sustained by any person or corporation caused by, or alleged to have been caused by, any act or omission, negligent or otherwise, of Contractor, his officers, agents or employees in the performance of any work required of the Contractor by this Contract. The Owner shall not be deemed to have waived rights it may have against Contractor because of the acceptance by Owner of any of the insurance policies described in this Contract.

The duty of Contractor to indemnify and save harmless, as set forth herein, shall include a duty to defend as set forth in Section 2778 of the California Civil Code; provided, however, that nothing herein shall be construed to require Contractor to indemnify Owner and the Engineer and their respective Boards, officers, agents and employees against any responsibility or liability in contravention of Section 2782 of the California Civil Code.

G7.22 PUBLIC LIABILITY INSURANCE. The Contractor shall procure and maintain Broad Form Comprehensive

General Liability or Commercial General Liability Insurance, and Code 1 or "Any Auto" Business Automobile Liability Insurance policies in amounts for each policy of not less than:

1. General Liability: One Million Dollars (\$1,000,000.00) per occurrence for bodily injury, personal injury and property damage, and subject to that limitation for the injury to or death of one person of not less than Three Million Dollars (\$3,000,000.00) for injury to or death of two or more persons as a result of any one accident or occurrence, with personal or bodily injury aggregate in an amount not less than Three Million Dollars (\$3,000,000.00). If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project or the general aggregate limit shall be three times the required occurrence limit.
2. Automobile Liability: One Million Dollar (\$1,000,000.00) per accident for bodily injury, personal injury and property damage, and subject to that limitation for the injury to or death of one person, not less than Three Million Dollars (\$3,000,000.00) for injury to or death of two or more persons as a result or any one accident or occurrence, with personal or bodily injury aggregate in an amount not less than Three Million Dollars (\$3,000,000.00).

Policies shall provide coverage for property damages, personal injuries, bodily injuries or death suffered or alleged to have been suffered by any person or persons by reason of or in the course of operations under the contract, whether occurring by reason of acts or omissions of the Contractor or any subcontractor or both. Coverage shall be at least as broad as Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001) for general liability insurance and Insurance Services Office form number CA 0001 (Ed. 1/87) for automobile liability insurance. Such insurance shall be maintained until final acceptance of the work by the Owner and shall continue of a period of 365 days after acceptance of the work by the Owner. The general liability insurance policy required by this Section shall include explosion, collapse, underground excavation or removal of lateral support.

The general liability insurance policies shall also cover the Owner, its Board, officers, agents, employees, and servants of the Contractor, the Contractor's subcontractors, County of Contra Costa, and the District's Engineer as insureds.

The general liability insurance policies required under this Section, shall contain, or be endorsed to contain, the following other conditions:

1. The Contractor's insurance coverage shall be primary insurance. Any insurance or self-insurance maintained by the Owner, its Board, officers, agents, employees and servants of the Contractor, the Contractor's subcontractor's, County of Contra Costa, and the District's Engineer shall be excess of Contractor's insurance and shall not contribute with it.
2. The Contractor's insurance coverage shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the limits of the insurer's liability.
3. The Owner, its Board, officers, agents, employees and servants, the Contractor, the Contractor's subcontractors, County of Contra Costa, and the District's Engineer are to be covered as insureds with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the Contractor; and with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts or equipment furnished in connection with such work or operations.
4. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Owner, its Board, officers, agents, employees, and servants of the Contractor, the Contractor's subcontractors, County of Contra Costa, and the District's Engineer.
5. The Contractor's liability insurance coverage shall not be suspended, voided, canceled, reduced in coverage or in limits except after forty-five (45) days' prior written notice by certified mail, return receipt requested, has been given to the Owner.

The contractor shall require all subcontractors, whether primary or secondary, if any, to take out and maintain General Liability and Business Automobile Liability in the amounts set out in this Section.

At least ten (10) days prior to commencing work there under, Contractor shall furnish the Owner certificates of each policy of insurance required here under, in form and substance satisfactory to Owner. Such certificates shall show the type, amount, class of operations covered, effective dates and date of expiration of policies.

G7.23 WORKER'S COMPENSATION INSURANCE. The Contractor and all subcontractors shall cover or insure under the applicable laws relating to worker's compensation or employer's liability insurance, all of their employees working on or about the construction site, regardless of whether such coverage or insurance is mandatory or merely elective under the law, and the Contractor shall defend, protect and save harmless the Owner from and against all claims, suits and actions arising from any failure of the Contractor or any such subcontractor to maintain such insurance. The Contractor shall maintain Employer's Liability Insurance with minimum limits of One Million Dollars (\$1,000,000.00) per accident for bodily injury or disease.

G7.24 PROPERTY INSURANCE. Unless otherwise provided in the Special Conditions, the Contractor will purchase and maintain, in a company or companies lawfully authorized to do business in California, and acceptable to the Owner, property insurance upon the entire work, in the amount of fifty percent (50%) the Contract price. Such property insurance shall be maintained until final payment has been made.

Property insurance shall be on an all-risk policy form (commonly known as "Builder's Risk-All Risk") and shall insure against the perils of earthquake, landslide, flood, collapse, loss due to the result of faulty workmanship or design, and all other risks and shall cover reasonable compensation for Engineer's services and expenses required as a result of such insured loss. This insurance shall insure the interests of the Owner, the Contractor, and subcontractors in the work. Contractor and Owner will be named as additional insureds on the policy.

The property insurance may contain deductibles not to exceed the amounts specified in the Special Conditions. If no amounts are specified, the insurance shall be written without deductibles. The Contractor shall pay costs not covered because of such deductibles.

Complete copies of each policy of insurance and certificates of each policy, in form and substance satisfactory to Owner, shall be filed with Owner prior to the commencement of work. The policies and certificates shall provide:

1. That Owner is included as a named insured;
2. That losses shall be payable to Contractor and Owner as their interests appear; and
3. The policy will not be canceled, nor coverage materially altered, without 30 days, prior written notice to Owner.

G7.25 DEDUCTIBLES AND SELF-INSURED RETENTIONS. Any deductibles or self-insured retentions must be declared to and approved by the District. At the option of the District, either: the insurer shall reduce or eliminate such deductibles or self-insured retention's as respects the District, its Board, officers, agents, employees and servants, County of Contra Costa, and the District's Engineer, or the Contractor shall provide a financial guarantee satisfactory to the District guaranteeing payment of losses and related investigations, claim administration and defense expenses.

G7.26 EVIDENCES AND CANCELLATION OF INSURANCE AND INSURER QUALIFICATIONS. Prior to execution of the contract, the Contractor shall file with the District evidences of insurance from the insurer certifying to the coverage of all insurance required herein. All evidences of insurance shall be certified by a properly authorized officer, agents, general agent or qualified representative of the insurer and shall certify the names of the insured, the type and amount of the insurance, the location and operations to which the insurance applies, the expiration date, and that the insurer will give, by registered mail, notice to the District at least 45 days prior to the effective date of any cancellation, lapse or material change in the policy.

The Contractor shall deliver to the Owner all such policy or policies of insurance, endorsements and the receipt for payment of premiums thereon; and should the Contractor neglect to obtain and maintain in force any such insurance or deliver such policy or policies, endorsements and receipts to the Owner, then it shall be lawful for the Owner to obtain and maintain such insurance, and the Contractor hereby appoints the Owner his true and lawful attorney to do all things necessary for this purpose. All money expended by the Owner for insurance premiums under the conditions of this Section shall be charged to the Contractor. The Contractor shall use the Owner approved endorsement forms provided in the proposal section of these specifications to comply with this Section.

All insurance required by this contract shall be placed with insurers qualified by the State of California to do business in California as insurers, and all of the insurers shall have a current A.M. Best's Rating of no less than A: VII.

Notwithstanding the language of the preceding paragraph, Owner may disqualify an insurer proposed to provide insurance coverage required by these contract specifications if the Owner has cause to believe the insurer is likely to be incapable of providing that insurance coverage.

G7.27 DISPOSAL OF MATERIAL OUTSIDE THE WORK SITE. Unless otherwise specified in the Specifications, the Contractor shall make his own arrangements for disposing of materials outside the work site and he shall pay all costs involved.

When any material is to be disposed of outside the work site, the Contractor shall first obtain a written permit from the property owner on whose property the disposal is to be made and he shall file with the District Engineer said permit or a certified copy thereof, together with a written release from the property owner absolving the Owner from any and all responsibility in connection with the disposal of material on said property, and before any material is disposed of on said property, the Contractor shall obtain written permission from the District Engineer to dispose of the material at the location designated in said permit.

When material is disposed of as above provided and the disposal location is visible from a highway, the Contractor shall dispose of the material in a neat and uniform manner to the satisfaction of the District Engineer.

G7.28 COOPERATION. Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified, or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site at any time, by the use of other forces.

When two or more contractors are employed on related or adjacent Owner work, each shall conduct his operations in such a manner as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by his operations, and for loss caused to the other due to his unnecessary delays or failure to finish the work within the time specified for completion.

G7.29 OCCUPANCY PRIOR TO ACCEPTANCE. The Owner reserves the right to occupy all or any part of the project prior to completion of the entire Contract, upon written order therefor. In such event, the Contractor will be relieved of responsibility for any injury or damage to such part as results from such occupancy and use by the Owner.

If the Contractor carries insurance against damage to such premises or against liability to third persons covering the premises so used and occupied by the Owner, and if such occupancy results in increased premiums for such insurance, the Owner will pay to the Contractor the added cost for such insurance during the period of occupancy.

Such occupancy does not constitute acceptance by the Owner either of the complete work or of any portion thereof, nor will it relieve the Contractor of full responsibility for correcting defective work or materials found at any time before the formal written acceptance of the entire Contract by the Owner or during the full guarantee period after such acceptance.

G7.30 ACCEPTANCE OF THE WORK. When the District Engineer has made the final inspection as provided in

Section G5.14 and determines that the work has been completed in all respects in accordance with the Contract Documents, he will recommend that the Owner formally accept the work. Immediately upon and after such formal written acceptance by the Owner, the Contractor will be relieved of the duty of maintaining the work as a whole, and he will not be required to perform any further work thereon except as provided in Sections G4.13, "GUARANTY OF WORK" and G4.14, "CORRECTION OF WORK DURING WARRANTY PERIOD."

G7.31 PROPERTY RIGHTS IN MATERIALS. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or soil or after partial payment has been made for material delivered on the ground or stored subject to or under the control of the Owner and unused. All such material shall become the property of the Owner upon being so attached or affixed or upon payment for materials delivered on the ground or stored subject to or under the control of the Owner and unused, as provided in Section 9.

G7.32 RIGHTS IN LAND AND IMPROVEMENTS. The Contractor shall make no arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the work, for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the Owner and any owner, former owner or tenant of such land, structure or buildings. The Contractor shall not occupy Owner-owned property outside the limit of the work as shown on the Contract Drawings unless he obtains prior approval.

G7.33 ANTITRUST CLAIMS. The Contractor's attention is directed to the following provision of Public Contract Code Section 7103.5(2)(b), which shall be applicable to the Contractor and his subcontractors:

"In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all right, 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."

G7.34 ACCESS TO THE WORK. The Contractor shall satisfy himself that the jurisdictions through which his operations and haul routes pass will permit such operations with respect to type of vehicle, laden weights, frequency and dimensions of loads, hours of operation and required traffic control. All necessary permits, licenses or bonds shall be obtained and paid for by the Contractor.

G7.35 PERSONAL LIABILITY. Neither the Owner's governing body, its Officers, Agents, Representatives, Employees nor Engineer shall be personally responsible for any liability arising under or by virtue of this Contract.

G7.36 THIRD PARTY RIGHTS. Nothing in the Contract is intended to create the public or any member thereof a third party beneficiary here under.

G7.37 INDEPENDENT CONTRACTOR STATUS. The Contractor shall independently perform all work under this Contract and shall not be considered as an agent or employee of the Owner, nor shall the Contractor's subcontractors or employees be considered as subagents of the Owner.

G7.38 ATTORNEY'S FEES. (Reserved)

SECTION 8

PROSECUTION AND PROGRESS

G8.01 SUBCONTRACTING. The Contractor shall give his personal attention to the fulfillment of the Contract and shall keep the work under his control.

No subcontractor will be recognized as such and nothing in the Contract Documents shall create any contractual relationship between the Owner and any subcontractor. The Contractor is as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

Attention is directed to the requirements of Sections 4100 to 4113, inclusive, of the California Public Contract Code which are applicable to this Contract. Each bidder shall list in his Bid the name and business address of each subcontractor to whom the bidder proposes to subcontract a portion of the work, and shall list each subcontractor, licensed by the State of California, proposed by the bidder to specially fabricate and install a portion of the work. Said list shall include a description of the portion of the work that shall be done by each subcontractor. The bidder shall execute and submit with his Bid the "List of Subcontractors" on the form included in this book. Additional forms may be obtained from the District Engineer. The Contractor shall not, without the consent of the Owner, either substitute any person as subcontractor in place of the subcontractor designated in the original List of Subcontractors, or sublet or subcontract any portion of the work in excess of one-half of one percent of the total amount of his proposal for which he did not originally designate a subcontractor.

When a portion of the work that has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the Owner, the subcontractor shall be removed immediately on the request of the Owner, and shall not again be employed on the work.

The on-site production of materials produced by other than the Contractor's forces shall be considered as subcontracted. The erection, establishment or reopening of on-site plants for production of materials and the operation thereof in the production of materials for use on the work, shall conform to the requirements relating to labor set forth in the Contract Documents.

The Contractor shall require, by written agreement, each subcontractor to be bound to the Contractor by terms of the Contract Documents and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract Documents, assumes toward the Owner, to the extent of the work to be performed by the subcontractor. Each subcontract agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the work to be performed by the subcontractor, so that subcontracting will not prejudice such rights.

G8.02 ASSIGNMENT. The Owner and the Contractor, respectively, bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to the partners, successors, assigns, and legal representatives of such other party with respect to all covenants, agreements, and obligation contained in the Contract Documents. The performance of the Contract may not be assigned except upon the written consent of the Owner. Consent will not be given to any proposed assignment that would relieve the original Contractor or his surety of their responsibilities under the Contract nor will the Owner consent to any assignment of a part of the work under the Contract.

The Contractor may assign monies due or to become due him under the Contract and such assignment will be recognized by the Owner, if given proper notice thereof, to the extent permitted by law, but any assignment of monies shall be subject to all proper set-off in favor of the Owner and to all deductions provided for in the Contract, and particularly all money withheld, whether assigned or not, shall be subject to being used by the Owner for the completion of the work in the event that the Contractor should be in default therein.

G8.03 NOTICE TO PROCEED. **(This section is amended by the Special Conditions.)** As soon as practicable after execution of the Contract by the Owner, approval by the Owner of Contract Bonds and all other documents

listed in the Contract, and after receipt of acceptable insurance certificates by the Owner, a written Notice to Proceed will be mailed to the Contractor. The effective date of the Notice to Proceed will be the date stated as such in the Notice to Proceed, provided that the effective date will not be earlier than the day following the issuance of the Notice to Proceed.

G8.04 BEGINNING OF WORK. **(This section is amended by the Special Conditions.)** The Contractor is not authorized to perform any work until he has received a Notice to Proceed from the Owner. Within ten (10) days after the effective date of such Notice to Proceed, the Contractor shall commence work and shall diligently prosecute the same to completion within the time limit provided in the Special Conditions. The Contractor shall notify the District Engineer, in writing, of his intent to begin **work at least 96 hours before work is begun** and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.

Should the Contractor begin work in advance of receiving the Notice to Proceed and providing notice to the District Engineer, any work performed by him in advance of such notice shall be considered as having been done by him at his own risk and as a volunteer.

G8.05 SCHEDULES AND PROGRESS REPORTS. **(This section is amended by the Special Conditions.)** The Contractor shall, within ten (10) days after the effective date of the Notice to Proceed, submit to the District Engineer three copies of a construction schedule covering his operations for the work. The construction schedule shall be in the form of a bar chart or arrow diagram, unless a critical path method analysis is required by the Special Conditions or Specifications. The schedule shall show the order in which the Contractor proposes to carry out the work and the dates on which he expects to start and finish each part or division of the work (including procurement of materials, plant and equipment). The construction schedule shall be consistent with the time and order of work requirements of the Contract Documents and shall provide for expeditious and practicable execution of the work. If the Contractor desires to revise his construction schedule, or if it becomes necessary to revise it due to major changes, he shall submit three copies of the revised schedule for review and comment by the District Engineer.

The Contractor shall, **within ten (10) days after the effective date of the Notice to Proceed**, also submit to the District Engineer three copies of a schedule of submittals which is coordinated with the Contractor's construction schedule and with the review time provided in the Contract Documents.

The Contractor shall submit to the District Engineer, at the time of submittal of the invoice for work completed (See Section G9.08), a schedule summary report in a form and of sufficient detail and character as approved by the District Engineer. The schedule summary report shall include the updated current construction schedule and shall specify whether the project is on schedule and, if not, the reasons therefor. The monthly schedule summary report shall also indicate the delivery status of major and critical items of purchased equipment and material, the status of shop drawings and field fabricated work.

G8.06 SITE MEETINGS. The Contractor shall schedule meetings with the District Engineer and each active subcontractor at the work site weekly, or at such other frequency as is acceptable to District Engineer. Each subcontractor shall have presented a competent representative to report the conditions of his work and to discuss problems.

G8.07 TIME OF COMPLETION. The Contractor shall complete all or any designated portion of the work called for under the Contract in all parts and requirements within the time set forth in the Special Conditions.

G8.08 ADDITIONAL SHIFT WORK. The time limits specified for the completion of the work contemplated may be insufficient to permit completion of the work by the Contractor working a normal number of hours per day or week on a single shift basis. Where additional shifts or premium time pay are necessary to ensure that the work will be completed within the time limits specified, any resulting additional costs will be considered to be included in the price paid for the various Contract items of work and no additional compensation will be allowed therefore.

If the Contractor desires to carry on work at night or outside regular working hours, he shall give timely notice to the District Engineer to allow satisfactory arrangements to be made for observing the work in progress. In general, the Contractor shall confine site work to daytime hours from 7:00 AM to 5:00 PM so as to avoid disturbing area

residents. No work is to be carried on during the weekend (Saturday & Sunday) or on any Federal Holiday.

G8.09 UNUSUAL MATERIALS IN EXCAVATIONS. While digging trenches or excavating, the Contractor pursuant to Public Contract Code Section 7104 shall promptly, and before the following conditions are disturbed, notify the District Engineer and the Engineer, in writing, of any:

1. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II or Class III disposal site in accordance with provisions of existing law.
2. Subsurface or latent physical conditions at the site differing from those indicated.
3. Unknown physical conditions at the site, of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

The Owner shall promptly investigate the conditions, and if he finds that the conditions do materially so differ, or do involve hazardous waste, or 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 Section G4.03.

In the event that a dispute arises between the Owner 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 contracting parties as described in Section G4.08.

G8.10 OWNER'S RIGHT TO STOP THE WORK. If the Contractor fails to promptly correct work which is not in accordance with the requirements of the Contract Documents or persistently fails to carry out work in accordance with the Contract Documents, the Engineer may, in writing, order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated. The Contractor shall immediately comply with a written order of the District Engineer to stop the work. The work stopped shall be resumed as and when ordered by the District Engineer.

G8.11 LIQUIDATED DAMAGES. It is agreed by the parties to the Contract that in case all the work called for under the Contract in all parts and requirements is not completed within the number of days as set forth in the Special Conditions, damage will be sustained by the Owner and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the Owner will sustain in the event of and by reason of such delay; and it is therefore agreed that the Contractor shall pay to the Owner (as liquidated damages for delay and not as a penalty) the sum set forth in the Special Conditions per day for each and every calendar day's delay in finishing the work in excess of the number of days prescribed; and the Contractor agrees to pay said liquidated damages herein provided for, and further agrees that the Owner may deduct the amount thereof from any monies due or that may become due the Contractor under the Contract. For purposes of this paragraph, "completed" means "contract completion" as defined in Section G1.02.

In addition, the Owner shall have the right to charge to the contractor and to deduct from the final payment for the work the actual cost to the Owner of engineering, inspection, administration and other overhead expenses which are directly chargeable to the contract and which accrue during the period of such delay, except that the cost of final surveys and preparation of the final estimate shall not be included in such charges.

G8.12 DELAYS AND EXTENSIONS OF TIME. The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time set forth in the Special Conditions caused by unforeseeable causes beyond the control and without the fault or negligence of the Contractor or subcontractor. Examples of such causes include acts of God or of the public enemy, fire, floods, storms, epidemics, quarantine restrictions, strikes and other work stoppages caused by a labor dispute, shortage of materials and freight embargoes, changes made under Section

G4.03 ("Changes") or acts or neglect of the Owner or Engineer not contemplated by the Contract Documents. In all cases, any extension of time is conditional on the following: (1) that the cause is not due to the fault of the Contractor or subcontractor and the Contractor has taken reasonable precautions to prevent delays due to such cause and (2) that the Contractor notifies the Engineer in writing within 15 days from the beginning of such delay specifying the nature of the delay, the number of days actually delayed and the measures taken to prevent or minimize the delay. Failure to submit written notice within this time shall constitute an absolute waiver of any claim for a time extension; failure to submit the required information will be sufficient cause for denial of the request for a time extension.

No extension of time will be granted for a delay caused by a shortage of materials, unless the Contractor furnishes to the District Engineer documentary proof that he has diligently made every effort to obtain such materials from all known sources within reasonable reach of the work and further proof, in the form of schedule data as required in Section G8.05, that the inability to obtain such materials when originally planned did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. Only the physical shortage of material will be considered as a cause for extension of time, and no consideration will be given to any claim that material could not be obtained at a reasonable, practical or economical cost or price, unless it is shown to the satisfaction of the District Engineer that such material could have been obtained only at exorbitant prices entirely out of line with current rates, taking into account the quantities involved and the usual practices in obtaining such quantities.

The term "shortage of materials," as used in this Section, shall apply only to materials, articles, parts or equipment which are standard items and shall not apply to materials, parts, articles or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract.

No extension of time will be granted for storms or adverse weather conditions which may reasonably be anticipated for the area in which the work is being performed, based on official records of monthly precipitation and other historical data.

No extensions of time will be granted for delays that have no measurable impact on the completion of the total work under the Contract. When extensions of time are granted, they will be limited to the period equivalent to the actual number of days lost on the critical path or controlling operation of construction, taking into account the extent to which that delay could be decreased by reasonable mitigation measures by the Contractor or its subcontractor.

Within a reasonable period of time after the Contractor submits the notice and information required by this Section, the District Engineer will present his written opinion to the Owner as to whether an extension of time is justified and, if so, his recommendation as to the number of days for the extension. The Owner will make the final decision on all requirements for extension of time.

The Contractor shall have no claim for damage or compensation for any delay or hindrance and shall be fully compensated by an extension of time provided as set forth in this Section. Notwithstanding the preceding sentence, the Contractor may submit a claim for delay caused by acts or omissions of the Owner but only if such acts or omissions (1) cause delay which is unreasonable in the circumstances and (2) are not such as to be within the contemplation of the parties. It is expressly agreed that delays by the Owner in providing access to the work site are not within the contemplation of the parties but that delays by the Owner in reviewing shop drawings and submittals and the risk of delays due to errors or omissions in the Contract Drawings are within the contemplation of the parties as expectable events in the construction process.

G8.13 TERMINATION OF RIGHT TO PROCEED. If the Contractor should appear to the District Engineer to be in default and the Contractor fails to remedy his default within 10 days after receipt from the District Engineer of notice of such default, the Owner may terminate the Contractor's right to proceed with the work or that portion which the District Engineer determines is most directly affected by the default.

The term "default" for purposes of this Section includes, but is not limited to, the performance of work in violation of the terms of the Contract; abandonment, assignment or subletting of the Contract without approval of the Owner; bankruptcy or appointment of a receiver for Contractor's property; refusal or failure properly to prosecute the work; use of materials, supplies, plant or equipment of improper quality or quantity; refusal or failure to use an adequate

number of properly skilled workers; failure to provide proper workmanship; failure to take effective steps to end a prolonged labor dispute; and the performance of the Contract in bad faith.

Upon the Owner's termination of the Contractor's right to proceed with the work, or a portion of it, the Owner shall have the right to complete the work, or the portion involved, by whatever means and methods it deems expedient, including the hiring of others on such terms as the Owner deems advisable. The Owner shall have the right to take possession of the Contractor's materials, plant, tools, equipment and property of any kind provided by or on behalf of the Contractor for the purpose of the work, or a portion of them, without being responsible to the Contractor for fair wear and tear. The Contractor shall have no rights in such property during its use by the Owner. The Owner shall not be required to obtain the lowest prices for completing the work or a portion of it but shall make such expenditures as, in the Owner's sole judgment, best accomplish such completion.

The expense of completing such work or portion thereof, together with a reasonable charge for engineering, managerial and administrative services, as certified by the Owner, shall be charged to the Contractor, and the expense so charged shall be deducted by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor. In case such expense is more than the sum which otherwise would have been payable to the Contractor under the Contract, then the Contractor or his surety or sureties shall promptly pay the amount of such excess so due. The Owner may, in its sole discretion, withhold all or any part of any progress payments otherwise due the Contractor until completion and final settlement of the work covered by such notice of default.

G8.14 TERMINATION OF CONTRACT. The Owner may terminate the Contract if the Contractor:

1. Persistently or repeatedly fails or refuses to supply enough properly skilled workers or proper materials;
2. Fails to make payment to subcontractors for materials or labor in accordance with the respective agreements between the Contractor and subcontractor;
3. Persistently disregards laws, ordinances or rules, regulations or orders of a public authority having jurisdiction; or
4. Otherwise is guilty of a substantial breach of a provision of the Contract Documents. A "default" as defined in Section G8.12 shall constitute a substantial breach of the Contract Documents.

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner under this Contract or otherwise, upon 10 days, written notice, terminate the Contract and may:

1. Take possession of the site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor;
2. Finish the work by whatever means the Owner deems expedient.

When the Owner terminates the Contract under this Section, the Contractor shall not be entitled to receive any further payments until the work is completed and accepted by the Owner.

The conditions of the last two paragraphs of Section G8.13 shall apply if the Owner terminates the Contract.

The Owner will issue the Contractor a written notice specifying that the Contract is to be terminated. Upon receipt of said written notice and, except as otherwise directed in writing by the District Engineer, the Contractor shall:

1. Stop all work under the Contract except that specifically directed to be completed prior to acceptance;
2. Perform work the District Engineer deems necessary to secure the project for termination;

3. Remove equipment from the site of work;
4. Take such action as is necessary to protect materials from damage;
5. Notify all subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the District Engineer;
6. Provide the District Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the work and not yet used in the work, including its storage location, and such other information as the District Engineer may request;
7. Dispose of materials not used in the work as directed by the District Engineer. It shall be the Contractor's responsibility to provide the Owner with good title to all materials purchased by the Owner here under, including materials for which partial payment has been made as provided in Section G9.10, "Partial Payments," of these General Conditions and with bills of sale or other documents of title for such materials;
8. Subject to the prior written approval of the District Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated here under. To the extent directed by the District Engineer, the Contractor shall assign to the Owner all the right, title and interest of the Contractor under subcontracts or orders for materials terminated here under;
9. Furnish the District Engineer with the documentation required to be furnished by the Contractor under the conditions of the Contract including, on projects as to which federal funds are involved, all documentation required under the federal requirements included in the Contract;
10. Take such other actions as the District Engineer may direct.

G8.15 EXISTING UTILITIES. In general, the location of existing utilities, whether aboveground or underground, are indicated on the drawings. This information has been obtained from utility maps and from verbal descriptions provided by the various agencies involved. The Owner does not guarantee the accuracy or completeness of this information and it is to be understood that the other aboveground or underground facilities not shown on the drawings may be encountered during the course of the work.

The Contractor shall call the Underground Services Alert Agency and notify the underground utility companies of his intention to work in the vicinity of their service and shall enlist their help to pinpoint the exact location, both in plan and elevation, of their utility. Except as otherwise provided in this Article any required relocation of existing underground utility or special construction techniques required in order to avoid existing utilities shall be performed by the Contractor at no increase in cost to the Owner.

Pursuant to California Government Code Section 4215 the Owner shall assume the responsibility for the timely removal, relocation, or protection of the existing main or trunkline utility facilities located on the construction site if such utilities are not identified by the Owner in the Plans and specifications. The Owner shall compensate the Contractor for the costs of locating such utility facilities, 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 the cost of equipment necessarily idled. However, the Contractor shall make all reasonable efforts to minimize and or mitigate the costs he or she incurs in locating utility facilities not identified by the Owner or for equipment necessarily idled. The Contractor shall not be assessed liquidated damages for delay in completion of the work when such delay was caused by the failure of the Owner or the owner of the utility to provide for removal or relocation of such utility facilities.

Owner is not responsible for indicating the presence of existing service laterals or appurtenances whenever the presence of such utilities can be inferred from the presence of visible facilities, such as buildings, meter and junction

boxes, on or adjacent to the construction site.

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

Existing aboveground utilities, including but not limited to, power transmission and distribution, telegraph, telephone and traffic control systems, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor with the least possible interference with the use of such facilities at no increase in cost to the Owner.

The right is reserved by the owners of utilities and franchises to enter upon any street, right-of-way or easement for the purpose of maintaining their property and for making necessary repairs or changes caused by the work. The Contractor shall pay all costs thus incurred.

G8.16 TEMPORARY UTILITIES. The Contractor shall make his own arrangements with utility companies for any services he may require in performance of the work of this Contract and shall pay all costs of these services directly to these utility organizations.

G8.17 OFFICE OF CONTRACTOR AT SITE. During the performance of the Contract, Contractor shall maintain a suitable office at the site of work which shall be the headquarters of a representative authorized to receive drawings, instructions or other communications from the Owner or Owner's agents; any such thing given to said representative or delivered at the Contractor's office at the site of work in his absence shall be deemed to have been given to the Contractor. Contractor shall maintain a complete set of Plans and specifications at the site office whenever work is in progress.

G8.18 PRESERVATION OF STAKES AND MARKS. Contractor shall preserve carefully bench marks, reference points, and stakes; in case of willful or careless destruction, he will be charged with the resulting expense of replacement and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

G8.19 SUGGESTIONS TO CONTRACTOR. Any plan or method of work suggested by the District Engineer to the Contractor, but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor, and the District Engineer and the Owner shall assume no responsibility thereof.

G8.20 USE OF EXPLOSIVES. When the use of explosives is necessary for the work, Contractor shall use the utmost care not to endanger life or property. Before blasting operations are undertaken, at least twenty-four (24) hours written notice must be given to the Owner and District Engineer. Contractor will be responsible for obtaining permits from appropriate authority.

No explosive material shall be transported to, stored or utilized on the site without written permission of District Engineer. Only qualified persons who possess a valid permit shall do all blasting work and handling of explosives on the site.

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SECTION 9

MEASUREMENT AND PAYMENT

G9.01 MEASUREMENT OF QUANTITIES. All work to be paid for at a Contract price per unit of measurement will be measured by the District Engineer in accordance with United States Standard Measures. Pipelines shall be measured horizontally.

G9.02 SCOPE OF PAYMENT. The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment and incidentals necessary to the completed work and for performing all work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the Owner; and for all risks of every description connected with the prosecution of the work, also for all expense incurred in consequence of the suspension or discontinuance of the work as herein specified; and for completing the work according to the Contract Documents. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or materials.

No compensation will be made in any case for loss of anticipated profits.

Except as specifically provided otherwise, no separate payment will be made for work covered in any of these General Conditions and the cost thereof will be considered as included in the prices paid for the various Contract items included in the Bid.

If the "payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured nor paid for under any other pay item which may appear elsewhere in the Contract Documents.

G9.03 FORCE ACCOUNT PAYMENT. When extra work or other work done pursuant to a Change Order is to be paid for on a force account basis, materials and equipment used in the performance of such work shall be subject to the approval of the District Engineer and compensation will be determined as set forth below in this Section.

- A. Work Performed by Contractor. The Contractor will be paid the direct costs for labor, materials and equipment used in performing the work determined as hereafter provided.

To the total of the direct costs computed as provided in Sections 9.03.A(1), "Labor," 9.03.A(2), "Materials" and 9.03.A(3), "Equipment Rental," **there will be added a markup of 24 percent to the cost of labor, 11 percent to labor surcharge, 15 percent to the cost of materials, and 15 percent to the equipment rental.**

The above markups shall constitute full compensation, covering the cost of general supervision, overhead, profit and any other general expense not specifically designated as cost or equipment rental in Sections 9.03.A(1), (2) and (3). The total payment made as provided above (i.e., direct cost plus applicable markups) shall be deemed to be the actual cost of such work and shall constitute full compensation therefor.

When work paid for on a force account basis is performed by forces other than the Contractor's organization, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the Owner for such work. No additional payment therefor will be made by the Owner by reason of the performance of the work by a subcontractor or other forces.

- (1) Labor. The Contractor will be paid the cost of labor for the workmen (including foremen when authorized by the Engineer), used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, subcontractor or

other forces, will be the sum of the following:

(1a) Actual wages. The actual wages paid shall include any employer payments to or on behalf of the workmen for health and welfare, pension, vacation and similar purposes.

(1b) Labor surcharge. To the actual wages, as defined in Section 9.03A(1a), will be added a labor surcharge set forth in the California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract. Said labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workmen, other than actual wages as defined in Section 9.03A(1a) and subsistence and travel allowance as specified in Section 9.03A(1c).

(1c) Subsistence and Travel Allowance. The actual subsistence and travel allowance paid to such workmen.

(2) Materials. The Owner reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no claims for costs and markup on such materials.

Only materials furnished by the Contractor and necessarily used in the performance of the work will be paid for. The cost of such materials will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof, except as the following are applicable:

(2a) If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the Owner notwithstanding the fact that such discount may not have been taken.

(2b) If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual supplier as determined by the District Engineer plus the actual costs, if any, incurred in the handling of such materials.

(2c) If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of such materials shall not exceed the price paid by the purchaser for similar materials furnished from said source on Contract items or the current wholesale price for such materials delivered to the job site, less any discounts as provided in Section 9.03A(2a).

(2d) If the cost of such materials is, in the opinion of the District Engineer, excessive, then the cost of such material shall be deemed to be the lowest current wholesale price at which such materials were available in the quantities concerned delivered to the job site, less any discounts as provided in Section 9.03A(2a).

(2e) If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof within 60 days after the date of delivery of the materials or within 15 days after acceptance of the Contract, whichever occurs first, the Owner reserves the right to establish the cost of such materials at the lowest current wholesale prices at which such materials were available in the quantities concerned delivered to the location of the work, less

any discounts as provided in Section 9.03A(2a).

(3) Equipment Rental. The Contractor will be paid for the use of equipment at the rental rates listed for such equipment in the California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract, regardless of ownership and any rental or other agreement, if such may exist, for the use of such equipment entered into by the Contractor. If it is deemed necessary by the District Engineer to use equipment not listed in said publication, the District Engineer will establish a suitable rental rate for such equipment. The Contractor may furnish any cost data that might assist the District Engineer in the establishment of such rental rate.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

Operators of rented equipment will be paid for as provided in Section 9.03A(1), "Labor."

All equipment shall, in the opinion of the District Engineer, be in good working condition and suitable for the purpose for which the equipment is to be used.

Individual pieces of equipment or tools not listed in said publication and having a replacement value of \$200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

- B. Work Performed by Special Forces or Other Special Services. When the District Engineer and the Contractor, by agreement, determine that a special service or an item of extra work cannot be performed by the forces of the Contractor or those of any of his subcontractors, such service or extra work item may be performed by a specialist. Invoices for such service or item of extra work on the basis of the current market price thereof may be accepted without complete itemization of labor, materials and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide such complete itemization.

In those instances wherein a contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the job site, the charges for that portion of the extra work performed in such facility may, by agreement, be accepted as a specialist billing.

To the specialist invoice price, less a credit to the Owner for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent in lieu of the percentages provided in Section 9.03A, "Work Performed by Contractor."

G9.04 RECORDS. The Contractor shall maintain his records in such a manner as to provide a clear distinction between the direct costs of work paid for on a force account basis and the costs of other operations.

From the above records, the Contractor shall furnish the District Engineer completed daily reports, on forms furnished by or acceptable to the Owner, for each day's work to be paid for on a force account basis. The daily reports shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces, except for charges described in Section G9.03.B, "Work Performed by Special Forces or Other Special Services," of the General Conditions. The daily reports shall provide names or identifications and classifications of workers, the hourly rate of pay and hours

worked, and also the size, type and identification number of equipment, and hours operated. Before presenting the daily reports to the District Engineer for payment, the Contractor shall compile the cost of the work to be paid for on a force account basis. The report number shall be left blank for completion by the District Engineer.

Material charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily reports, or if not available, they shall be submitted with subsequent daily reports. Should vendor's invoices not be submitted within sixty (60) days after the date of delivery of the materials or within fifteen (15) days after the acceptance of the Contract, whichever occurs first, the Owner reserves the right to establish the cost of such materials at the lowest current wholesale prices at which said materials are available in the quantities concerned delivered to the location of the work, less any discounts provided in Section G9.03.A.

The daily reports shall be signed by the Contractor or his authorized representative.

The District Engineer will compare his records with the completed daily reports furnished by the Contractor and make any necessary adjustments.

When the daily reports are agreed upon and signed by both parties, the reports shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on the later audit by the Owner.

G9.05 NOTICE OF POTENTIAL CLAIM. The Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the District Engineer (including the failure or refusal to issue a Change Order), or the happening of any event, thing or occurrence, unless he shall have given the District Engineer due written notice of potential claim as hereinafter specified, provided, however, that compliance with this Section shall not be a prerequisite as to matters within the scope of the Contract Change Order protest conditions in Section G4.08, "Protest Procedure," or the notice conditions in Section G8.12, "Delays and Extension of Time," nor to any claim which is based on differences in measurement or errors of computation as to correct quantities.

The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved and, insofar as possible, the amount of the potential claim. If based on an act or failure to act by the Engineer or the Owner, such notice shall be given to the District Engineer prior to the time that the Contractor has started performance of the work giving rise to the potential claim for additional compensation. In all other cases, notice shall be given within 15 days after the happening of the event or occurrence giving rise to the potential claim. With each individual claim filed with the District, the Contractor shall submit a signed declaration certifying full awareness of the False Claim Act, Gov't Code Section 12650 et seq.

It is the intention of this Section that differences between the parties arising under and by virtue of the Contract shall be brought to the attention of the District Engineer at the earliest possible time in order that such matters may be settled if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which a written notice of potential claim as herein required was not timely filed.

G9.06 STOP NOTICES. The Owner may, at its option and at any time, retain out of any amounts due the Contractor sums sufficient to cover claims filed pursuant to Section 8500 et seq. of the California Civil Code.

G9.07 PAYMENT SCHEDULES. The Contractor shall submit a Schedule of Anticipated Contract Payments and a Schedule of Pay Items for review and approval by the District Engineer prior to the initial partial payment to the Contractor. The Schedule of Pay Items shall be prepared by the Contractor in a format approved by the District Engineer and shall include such detail as directed by the District Engineer. The Schedule shall be sufficiently clear and detailed so as to facilitate an accurate and realistic appraisal of monthly progress for the purpose of making partial payments. The value for each bid item shall total the bid amount. The values in the Schedule will be used only for determining partial payments.

The Schedule of Anticipated Contract Payments shall be coordinated by the Contractor's construction schedule submitted pursuant to Section G8.05 and shall show the anticipated monthly Contract payments for each of the pay

items covered in the Schedule for Pay Items, the total of monthly payments and cumulative total of payments for each month. If the construction schedule is revised, the Schedule of Anticipated Contract Payments shall also be revised and resubmitted for the District Engineer's review and approval. No partial payment will be made until the District Engineer has approved the Schedules required by this Section.

G9.08 INVOICE FOR WORK COMPLETED. Once each month, at a time, place and location mutually agreeable, the Contractor and District Engineer shall meet to discuss the amount of work completed satisfactorily during the work period since the last invoice for partial payment was prepared. A draft invoice for work completed shall be prepared; the District Engineer's judgment will be final if disputes occur regarding the amount of work completed or its value. Following the meeting, the Contractor shall formally submit the invoice for work completed in a form acceptable to the District Engineer. The invoice will certify, and be supported by evidence if required by the District Engineer, that the work invoiced has been done and that the materials listed are at the storage places indicated. The invoice may include the amount and value of such acceptable material as has been furnished and delivered to the site or has been furnished and stored for use in the work, provided it is stored within the general work area and is designated for incorporation in the work.

G9.09 RETENTION. In addition to amounts, if any, withheld pursuant to any other provision of these General Conditions, including the Owner's right to withhold for the estimated or actual costs of correcting defective work and amounts claimed by the Owner as liquidated damages or other offsets, **the Owner will retain an amount equal to 10 percent of the estimated value of the work done and 10 percent of the value of materials** estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the Contract by the Contractor.

G9.10 PARTIAL PAYMENTS. Each acceptable Contractor's invoice will be paid within 30 days of the District Engineer's receipt of the invoice, after deducting all previous payments, retentions, and other sums as described in the Contract Documents. No such payment will be made when, in the judgment of the District Engineer, the work is not proceeding in accordance with the conditions of the Contract, or when the total value of the work done as shown on the invoice does not exceed five hundred dollars. Partial payments shall be made contingent on receipt of all submittals required by contract, e.g. all daily work reports after each month; updated work schedules; Form UR334 if required; prevailing wage certifications from each sub-contractor.

No such invoice or payment will be construed to be an acceptance of any work or materials.

G9.11 PAYMENT OF WITHHELD FUNDS. Upon the Contractor's request, the Owner will make payment of funds withheld from progress payments as described in Section G9.09, pursuant to the requirements of Public Contract Code Section 22300, if the Contractor deposits in escrow with the Owner or with a bank acceptable to the Owner, securities eligible for investment under Government Code Section 16430, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner, upon the following conditions:

- a. The Contractor shall bear the expense of the Owner and the escrow agent in connection with the escrow deposit made.
- b. Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this section.
- c. The Contractor shall enter into an escrow agreement satisfactory to the Owner, which agreement shall be substantially similar to the form provided in Public Contract Code Section 22300.
- d. The Contractor shall obtain the written consent of the surety to such agreement.

G9.12 FINAL PAYMENT AND CLAIMS. After the work has been accepted by the Owner, as provided in Section G7.30, "Acceptance of Work," payment will be made to the Contractor in accordance with the conditions of this Section. Upon acceptance, the Owner will record a Notice of Completion covering the project.

Within 30 days after acceptance by the Owner, the Contractor shall prepare and submit a proposed final invoice in

writing, prepared in a form acceptable to the District Engineer. The proposed final invoice will show the proposed total amount of compensation payable to the Contractor, including an itemization of that amount segregated as to Contract item quantities, extra work and other bases for payment. The proposed final invoice will also show all deductions made or to be made for prior payments and amounts to be kept or retained under the Contract.

The Contractor shall also submit, at the same time as the proposed final invoice is submitted, a statement of all claims he has arising under or by virtue of the Contract, or a statement that he does not intend to file any such claims. No claim for which a notice of potential claim or protest is required under Section G9.05, "Notice of Potential Claim," Section G4.08, "Protest Procedure," or Section G8.12, "Delays and Extension of Time," will be considered unless the Contractor has fully complied with the notice or protest requirements in said sections.

Claims filed by the Contractor shall be in sufficient detail to enable the District Engineer to ascertain the basis and amount of said claims. The Engineer will consider and determine the Contractor's claims and it will be the responsibility of the Contractor to furnish within a reasonable time such further information and details as may be required by the Engineer to determine the facts or contentions involved in the claims. **Failure to submit such information and details will be sufficient cause for denying the claims.**

The District Engineer will review the proposed final invoice and claims and will submit his recommendation to the Owner as to the final estimate of the amount due the Contractor and the disposition of all claims. All prior invoices and payments are subject to correction in connection with review of the proposed final invoice.

The Owner will submit any changes or corrections to the proposed final invoice to the Contractor for his consideration. Within 10 days thereafter, the Contractor shall submit a final invoice, in a form acceptable to the District Engineer, incorporating any changes or corrections made by the Owner, together with any additional claims resulting therefrom. Upon approval by the Owner, this will become the approved final invoice. The Contractor shall submit with the final invoice, certificates of any insurance required to be maintained after acceptance of the work.

If the Contractor files no claims within 30 days after acceptance of the work by the Owner, and agreement is reached on all questions regarding the final invoice, the Owner will pay the entire sum found due upon the final invoice, except that the Owner will withhold sums sufficient to pay all unsettled claims for which stop notices have been filed pursuant to Section 3081 et seq. of the California Civil Code, together with the costs of administering such claims.

If the Contractor does file claims within 30 days after acceptance of the work by the Owner, then upon final determination of all the Contractor's claims, the Owner will pay the entire sum found due upon the final invoice, including the amount, if any, allowed on claims, except that the Owner will withhold sums sufficient to pay all unsettled claims for which stop notices have been filed pursuant to Section 3081 et seq. of the California Civil Code, together with the costs of administering such claims.

Final payment will be made within 30 days after receipt of an approved final invoice and determination of all Contractor's claims, or 60 days after acceptance of the work by the Owner, whichever is later, provided, however, that if an approved final invoice has not been submitted within 60 days after acceptance of the work by the Owner, the Owner may elect to make payment of sums not in dispute without prejudice to the right of either the Owner or the Contractor in connection with such disputed sums.

The acceptance by the Contractor of final payment shall constitute a waiver and release of all claims by the Contractor against the Owner related to the work, except for claims previously made in writing and identified as unsettled by the Contractor at the time of submission of the final invoice. The making of final payment, however, shall not operate to release the Contractor or his sureties from obligations arising under this Contract, the Contract bonds and warranties as herein provided. Specifically, the making of final payment shall not constitute a waiver and release of claims by the Owner arising from (a) unsettled or future liens, (b) failure of the work to comply with the requirements of the Contract Documents, (c) the terms of any warranties required by or contained in the Contract Documents, (d) the right to any insurance proceeds or the right to make any insurance or bond claims, (e) any claims with respect to Contractor's obligation of indemnity provided for in the Contract Documents, or (f) any latent defects or fraud.

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PART III

SPECIAL CONDITIONS

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PART III
SPECIAL CONDITIONS

S1.01 PATENTS, ROYALTIES, LICENSING (ADDITIONAL CONDITIONS). In addition to the requirements regarding patents outlined in the General Conditions and Technical Conditions, specific attention of the Contractor is directed to the following information:

1. A portion of the pipe replacement work called for on this project will require the Contractor to use a trenchless method of construction.
2. Some forms of trenchless pipe replacement construction are referred to as “pipe bursting” or “pipe cracking”.
3. The District has heard that British Gas, 100 Thames Valley Park Drive, Reading, Berkshire, RG6 1PT, Great Britain, holds U.S. Patent No. 4738565, which British Gas contends covers pipe bursting or pipe cracking methodologies.
4. The District is unable to determine whether any form of trenchless pipe replacement which may be permitted by these project Specifications would be covered by the British Gas patent or by any other patent or intellectual property right claim. However, pursuant to the provisions of the General Conditions, Section G7.12, it is the obligation of the Contractor to take whatever measures, including the acquisition of licenses or other rights of use, which are required with respect to any such patents or intellectual property right claims and to defend, indemnify and hold the District harmless from any such patents or claims without any cost or expense to the District.

S1.02 TIME OF COMPLETION. The Contractor shall start the work promptly and prosecute the work so that all portions of the project are complete and ready for full use by end of day June 21, 2024.

S1.03 STORAGE OF MATERIALS. Construction materials shall not be stored within the public right-of-ways, or in such a manner as to impede the flow of public traffic nor create an unsafe condition, nor shall they be stored within fifteen feet (15’) of a fire hydrant or in such a manner so as to impede access or visibility of any emergency facilities.

The Contractor shall be responsible for making whatever arrangements are necessary with private property owners to stockpile materials on private property if storage outside of easements is desired by the Contractor.

S1.04 SURVEY STAKES. The Contractor shall provide any staking or marking for line and grade of the sewer line. Full compensation for this work shall be considered as included in the unit price paid for all other items and no additional payment will be made therefore.

S1.05 PERMITS AND ASSOCIATED COSTS.

Encroachment permits required for work in the public rights-of-way include, but are not limited to, the following:

- County of Contra Costa: contact the Permit Engineer at the Department of Public Works, Telephone: (925) 646-1607.

Any costs for County permits that the Contractor is required to obtain in connection with this project shall be paid as follows:

- The Contractor shall pay the cost of any County encroachment permit up to a maximum of \$1,300, as set forth in the bid schedule.
- Owner shall pay directly to Contra Costa County, upon successful completion of Project, that portion of the total encroachment permit charges above \$1,300.

Work of the Project to be conducted in the California Department of Transportation (CalTrans) right-of-way requires a special permit from CalTrans with additional requirements. Contractor shall conform his field operations to the additional requirements of Caltrans for traffic control, trenching and utility protection. Costs of permitting and any special or added requirements of the permitting and utility agencies shall be borne and paid for by the Owner.

S1.06 LICENSING OF BIDDERS. General Conditions, Section G2-13, Licensing of Bidders. Add the following paragraph to this section: “All Bidders shall possess a valid Class A (General) California Contractor’s License or either a Class C-34 (Pipeline) or C-42 (Sanitation System) California Contractor’s Licenses. Failure to possess the specified license shall be sufficient basis to consider Bidder’s Proposal non-responsive.”

S1.07 ARCHEOLOGICAL DISCOVERIES. General Conditions, Section G4.11, Archaeological Discoveries. Add the following paragraphs to this section:

In accordance with the National Preservation Act of 1966, (16 U.S.C. 470) and PRM 75-27, the following procedures are implemented to insure historic preservation and fair compensation to the Contractor for delays attendant to cultural resources investigations.

In the event potential Historical, Architectural, Archeological, or Cultural Resources (herein after cultural resources) are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The Engineer shall issue a “Stop Work Order” directing the Contractor to cease all construction operations at the location of such potential cultural resources find.
2. Such “Stop Work Order” shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the Owner. Any “Stop Work Order” shall contain the following:
 - a. A clear description of the work to be suspended;
 - b. Any instructions regarding issuance of further orders by the Contractor for material services;
 - c. Guidance as to action to be taken on subcontracts;
 - d. Any suggestions to the Contractor as to minimization of his costs;
 - e. Estimated duration of the temporary suspension.

If the archeologist determines that the potential find is a bonified cultural resource, the Engineer shall extend the duration of the “Stop Work Order” in writing, and the Contractor shall suspend work at the location of the find.

Equitable adjustment of the construction contract shall be made in the following manner:

- A. Time Extension. If the work temporarily suspended is on the “critical path”, to total number of days for which the suspension is in effect shall be added to the number of allowable contract days.

If a portion of work at the time of such suspension is not on the ‘critical path”, but subsequently becomes work on the critical path, the allowable contract time will be computed from the date such work is classified as on the critical path.

- B. Additional Compensation. If, as a result of a suspension of the work, the contractor sustains a loss which could not have been avoided by his judicious handling of forces, and equipment, or redirection of forces or equipment to perform other work on the contract, there shall be paid to the Contractor an amount as determined by the Engineer to be fair and reasonable compensation for the Contractor’s actual loss in accordance with the following:

- C. Idle Time of Equipment. Compensation for idle time of workers will be determined on a force account (time and materials) basis, and shall include the cost of extra moving of equipment and rental loss. The right-of-way delay factor for each classification of equipment shown in the California Department of

Transportation publication entitled, "Equipment Rental Rates and the General Prevailing Wage Rates", will be applied to any equipment rental rates.

D. Idle Time of Labor. Compensation for idle time of workers will be determined by the Engineer as "Labor" less any actual productivity factor of this portion of the work force.

E. Increased Costs of Labor and Materials. Increased costs of labor and materials will be compensated only to the extent such increase was in fact caused by the suspension, as determined by the Engineer.

Compensation for actual loss due to idle time of either equipment or labor shall not include markup for profit.

The hours for which compensation will be paid will be the actual normal working time during which such delay conditions exists, but will in no case exceed eight (8) hours in any one day.

The days for which compensation shall be paid shall be full or partial calendar days, excluding Saturdays, Sundays, and legal holidays, during the existence of such delay.

S1.08 OCCUPANCY PRIOR TO ACCEPTANCE. General Conditions, Section G7.29, Occupancy Prior to Acceptance. Add the following sentence to this section of the General Conditions: "Use of newly constructed sanitary sewers to carry sewage flow prior to project completion shall not constitute occupancy by the Owner. Occupancy shall not apply to newly constructed sanitary sewers unless they have been televised and passed the final inspection of the Engineer.

S1.09 LIQUIDATED DAMAGES. General Conditions, Section G8.11, Liquidated Damages. Liquidated damages for avoidable delays set forth in Article G8.11 of the General Conditions shall be in the amount of **five hundred dollars (\$500.00) per day.**

S1.10 PRESERVATION OF PROPERTY AND CLEANING. General Conditions, Section G4.12, Preservation and Cleaning. Each day and as directed by the District Engineer, the Contractor shall keep the project site and work areas clean and free of litter, rubbish, excess materials, false work, temporary structures, and equipment, not directly involved in the work.

All parts of the work shall be left in a neat and presentable condition at the completion of each workday. Barricades shall be placed around construction materials and equipment left on public rights-of-way. Loose backfill materials shall be removed from traveled areas.

The contractor shall, **at least two times per week and at the end of each work week**, cleanup streets, easements, and public rights-of-way by sweeping or by other methods. If cleanup is not satisfactory, the District Engineer will notify the Contractor who shall remedy the situation. If the Contractor fails to remedy the cleanup deficiencies immediately, the Owner, at its discretion, can arrange cleanup to be done by others at the Contractor's expense.

The Contractor shall be responsible for preserving all properties adjacent to or directly involved in the work.

Attention is directed to the following related sections of these Specifications:

- General Conditions
 - G5.13 Character of Workers
 - G6.03 Storage of Materials
 - G7.13 Safety
 - G7.16 Public Convenience
 - G7.17 Public Safety
 - G7.18 Preservation of Property
- Special Conditions
 - All sections
- Technical Conditions

Section 2A.11 Dust Control

Before final inspection of the work, the Contractor shall clean the project site, material sites, storage sites, and all other areas occupied by it and restore these sites or properties to their original condition. The contractor shall obtain written releases from private property owners stating they are satisfied with their property's restoration. Full compensation for cleanup and restoration will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefore.

The attention of the Contractor is directed to General Conditions, Section G7.18 and to Drawings, Sheet D-2. The fact that a surface element on the property may not be shown on the Contract Plans shall not relieve the Contractor of his responsibility under Section G7.18, "Preservation of Property," of the General Conditions of under these Special Conditions.

S1.11 SUBMITTAL OF MONTHLY SCHEDULE OF WORK, ACCESSING PRIVATE PROPERTY. Contractor shall submit a monthly schedule of work to Owner at the start of each month noting the properties being impacted by construction. The Owner shall use the contractor's monthly schedule of work to provide notice to affected property owners of the impending construction activity.

Prior to the start of work on any line segments located on private property, the contractor's representative and the Engineer shall contact the individual tenants to explain the construction activity, when it is to occur, where on the property the work is to occur, the materials and equipment to be used, and the obligation of the Contractor to protect, preserve and restore the property to its original condition after construction. The tenants will be presented with business cards having phone numbers for the Engineer and the Contractor.

In easement areas, the Contractor shall provide special notice and arrangements with property owners whose property is to be used for pipe access or pulling pits.

Any area or private property accessed by the Contractor for his operations, shall first be videotaped or photographed by the District with a station to station view all along the area of the easement and of any area where equipment, materials or workmen may traverse the private property. On completion of construction and surface restoration of easement and other areas disturbed by the Contractor's operations, the Contractor shall re-videotape the same areas of the property as originally taped for comparison pictures. Still photos shall also be taken along the same route of the video taping with copies to the homeowner and the District.

S1.12 SOILS REPORT. All excavations are being performed in existing trench backfill sections. No geotechnical investigations were conducted for the work. No responsibility is assumed by the Owner for subsoil quality or conditions.

S1.13 DEBRIS REMOVAL FROM PIPELINE CONSTRUCTION OPERATIONS. The Contractor shall provide adequate means to protect the sanitary sewer line from the entry of loose soil, rock, debris and broken bits of pipe disturbed during the repair, rehabilitation or reconnection work on the sanitary sewer lines. The Contractor shall provide and install the mechanisms to trap all loose debris at the downstream manhole. On completion of the repair and/or reconnections on each line segment, the Contractor shall remove the accumulated debris, flush the upstream line segment with water; remove debris again, then remove the downstream trap. A detail of a successful trap installation is available at the District Office.

S1.14 DISTRICT FURNISHED MATERIALS. (Reserved)

S1.15 REPLACED OR REHABILITATED MANHOLES. The Contractor shall replace manhole structures that are located at angle points in the alignment or at junctions with other sewer lines of the District. Payment for manhole replacement shall be at the unit prices bid for the work.

The Contractor shall rehabilitate manhole structures as per Section 2B-17 (Rehabilitation of Manholes) of these specifications. Manhole structure rehabilitation is limited to those manhole structures where the pulled liner pipe passes straight through the structure. Payment for manhole rehabilitation shall be at the unit prices bid for the work.

S1.16 WORK WITHIN EASEMENTS. The right for the Contractor to enter within sewer easement areas will be granted in writing by the District to the Contractor in the Notice to Proceed. Whenever the Contractor removes, cuts or otherwise opens an existing fence or gate in such manner that any domestic animals or livestock within the property then have access to the area of the Contractor's activities or to areas outside of the area formerly enclosed by the fence, the Contractor shall erect and maintain temporary fencing or gates to contain the domestic animals or livestock within the property until the Contractor has completed his activities and the original fencing or gates are repositioned.

S1.17 SAFETY. Attention is directed to Section G7.13 of the General Conditions. In connection with said sections, CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs. In addition, CONTRACTOR shall prepare, implement, and maintain a safety and health program and plan.

S1.18 MAINTAINING TRAFFIC. Attention is directed to Sections G7.16 and G7.17 of the General Conditions. In connection with said sections, it is understood that all lights, signs, barricades, flagmen or other necessary devices for road traffic safety shall be furnished and maintained by the Contractor at his own expense. In connection with railroad traffic, if applicable, Contractor shall arrange with Union Pacific RR for the provision of railroad flagmen during the Project, as needed. Owner shall pay directly to Union Pacific RR, upon successful completion of Project, the costs for railroad flagmen.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners; convenient access to any driveways, houses, buildings, public buildings and stores along the line of work shall be maintained. No driveway shall be closed for a period exceeding 6 hours unless such requirement is waived in writing by the District Engineer.

Lane closures shall conform to the provisions set forth in the Manual of Traffic Controls of the State of California Department of Transportation. No other Caltrans standards or specifications shall apply to this ALEXANDER PARK SEWER PROJECT unless specifically incorporated into this Contract.

The Contractor shall provide a detailed Traffic Control Plan, including schedule, for any portion of the work that requires closure of any part of a thru-street to traffic. The Traffic Control Plan shall be submitted to the Contra Costa County Public Works Department for review and approval. Work shall not commence without an approved Traffic Control Plan in areas that require closure to any part of any street. After securing approval of the Traffic Control Plan, the Contractor shall notify the Contra Costa County Sheriff's Department and the Crockett-Carquinez Fire Department.

Contractor shall provide a copy of the approved Traffic Control Plan for any work on affected bus routes to WestCAT, 601 Walter Ave, Pinole, CA 94564, (510) 724-3331, at least 72 hours prior to work in said area.

The Contractor shall cooperate with all local authorities in maintaining traffic control. Local residents, as well as fire, school district, postal service, solid waste collectors and sheriff authorities, shall be notified at least 24 hours in advance of any street closures as may be allowed by this technical condition. Making arrangements for clearing of cars parked along the line of construction shall be the responsibility of the Contractor. Property owners shall be notified by the Contractor at least 48 hours in advance of work adjacent to their property on a standard form prepared by the Contractor and approved by the District Engineer. Should the Contractor appear to be neglectful in performing such notifications, the District Engineer will cause such work to be performed and shall deduct the cost of carrying out this work from payments otherwise due the Contractor.

Whenever the Contractor's operations create a condition hazardous to traffic, or to the public, the Contractor shall take the necessary precautions and provide adequate means to protect those who must pass through or over the work. If the Contractor appears to be neglectful or negligent in providing such warning or protective measures, the District Engineer may direct attention to the existence of a hazard, and require that necessary barricades, warning signs, lights or flagmen be installed by the Contractor; the entire cost of such protective measures will be considered as being included in the prices paid for the various items of work, and no additional allowance shall be made therefore.

Any action by the District Engineer as provided herein shall not relieve the Contractor from responsibility for public safety.

The Contractor shall furnish flagmen for the purpose of expediting the passage of public traffic through the work under one-way controls. Full compensation for this work shall be considered as included in the unit price paid for all other items and no additional payment will be made therefore.

S1.19 VITRIFIED CLAY PIPE SANITARY SEWERS. Where noted on the Plans as “VCP,” new replacement sewer pipeline materials used shall be high strength vitrified clay pipe. Extra strength pipe shall not be accepted.

S1.20 HDPE GRAVITY SANITARY SEWERS. High-Density Polyethylene (HDPE) pipe may be substituted for vitrified clay pipe. Where HDPE material is used in replacement of a section of pipe, it shall follow Section 18 of the District Standard Specifications.

S1.21 JOINTS. Notwithstanding other conditions in this document including Technical Conditions, vitrified clay pipe joints shall be flexible compression bell and spigot joints. All joints on HDPE pipe shall be fuse welded in accordance with the pipe manufacturer recommendations. Manhole connections and intermediate point repairs shall be joined and installed as per the contract drawings and details.

S1.22 SEWAGE BYPASSING. The Contractor shall be responsible for containing all sanitary sewage flows within the sewage collection system. If construction activities require that the upstream flow be interrupted, a sewage bypass system shall be implemented to divert rather than stop the flow in the system.

The bypass shall be made by temporarily plugging the existing upstream manhole and pumping the sewage into a downstream manhole or adjacent system. The pump and bypass lines shall be adequate capacity and size to handle the flow volume and avoid sewage backup damage that can be created in the upstream system when the line is plugged. Any costs associated with providing and maintaining the temporary bypass facilities by the Contractor shall be included in the unit prices bid for the work and no additional costs will be allowed therefore.

Under no circumstances will the dumping of raw sewage on private property, in the city streets or in any location other than an approved sanitary sewer be allowed.

S1.23 TURF REPLACEMENT: Damaged or excavated areas of grass shall be fully restored to green and level condition by installing commercial sod over 12” of topsoil as defined in Section G1.02. Damaged irrigation piping and fitting shall be repaired or replaced by contractor.

S1.24 MEASUREMENT AND PAYMENT: General Conditions, Section G9.02, Scope of Payment. Add the following paragraphs to this section.

- A. All bid items shall include all miscellaneous items of work as shown and specified, but not otherwise specifically included in any other bid item in this contract.
- B. This bid shall be considered a lump sum bid, to include all of the items required to satisfactorily complete the job to the standards of this contract and the District code that is by extension part of this agreement.

PART IV

TECHNICAL CONDITIONS

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SECTION 14

PRESERVATION OF PROPERTY

14-01 PRESERVATION OF PROPERTY

Due care shall be exercised to avoid damage to existing improvements, utility facilities, and adjacent property. When any railroad, street, highway, private or public utility is crossed, all precautionary construction measures required by the owner of said crossing shall be followed by the Contractor. The Contractor shall obtain and pay for all necessary permits, licenses, bonds, and fees required for the crossing and give all notices necessary and incident to the work.

Trees and shrubbery adjacent to the sewer trench, pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipe line under or above ground, sewer and water lines, all highway facilities and any other improvements or facilities within or adjacent to the sewer work shall be protected from injury or damage, and if ordered by the Engineer, the Contractor shall provide and install, without cost to the District, suitable safeguards to protect such objects from injury or damage.

The Contractor shall not remove trees or shrubs adjacent to the sewer trench line without authorization of the Engineer. Serious injuries to trees shall be avoided. No major roots or branches crossing the trench shall be cut if such cutting would seriously injure or imperil the safety of the tree or trench. All limbs, roots or branches that are cut or broken shall be cleanly trimmed. If other objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to the condition in which they were in at the time the Contractor entered upon the site.

In case it shall be necessary to remove any telephone, telegraph, or electric power transmission poles, gas pipes, water pipes, electrical conduits or underground structures of any character, or any portion thereof, the Contractor shall notify the District and the owner of the structure. The Contractor shall not interfere with said utility facilities or structures until disposition of the obstruction to the work has been determined and/or notice to relocate or remove has been given by the Engineer or authorized agent of the owner of the facility so affected. In case water or gas service pipes crossing the line of the sewer trench are cut by the Contractor, such connection shall be restored without delay, after the passing of the trenching machine. Such cutting and restoration of service connections shall be done at such times and manner as to ensure the least inconvenience to the users.

The Contractor shall examine all roadbeds, bridges, culverts and other structures on or near the work, over which it will move its materials and equipment, and before using them, it shall properly strengthen such roads and structures, where necessary. The Contractor will be held responsible for any and all injury or damage to such roads and structures caused by reason of its operations.

14-02 RESPONSIBILITY FOR DAMAGE

The District, or any of its officers, or employees, or the Engineer shall not be answerable or accountable in any manner, for any loss or damage that may happen to the work or any part thereof; or for any of the materials or other things used or employed in performing the work; or for injury to any person or persons, either worker or the public; or for damage to property from any cause which might have been prevented by the Contractor, or its workers, or anyone employed by it; against all of which injuries or damages to persons and property the Contractor having control over such work must properly guard. The Contractor shall be responsible for any liability imposed by law upon the District, its officers, employees, or the Engineer for any damage to any person or property occurring or arising in the execution of a contract, agreement or permit or performance of the work, or occurring or arising out of the improper execution of a contract, agreement or permit or performance of the work, including such resulting from failure to abide by all applicable laws and regulations, or resulting from work or materials which are defective, unsatisfactory, or imperfect or whose defective, unsatisfactory, or imperfect nature is discovered during any guarantee period, and shall indemnify, defend, and save harmless the District, its officers and employees, and the Engineer from all suits, actions, claims and demands of every name and description, brought for, or on account of any such injuries or damages.

The Contractor shall be responsible for any liability imposed by law or for any damage to any person or property and shall indemnify, defend, and save harmless the county or incorporated city, its officers and employees, within the limits of the county or incorporated city work is being performed hereunder, all in the same manner and to the same extent as provided above for the protection of the District, its officers and employees, and the Engineer.

14-03 UTILITY FACILITIES

A particular effort has been made to locate and indicate on the Plans all aboveground and/or underground utilities and/or other facilities that may conflict with, cross or lie close to the work (See Section 5-05.E). While the locations shown are believed to be reasonably correct, neither the Job Engineer nor the District can guarantee the accuracy or adequacy of this information.

Prior to any excavation work, the Contractor shall contact Underground Services Alert, telephone number **(800) 227-2600**. The Contractor shall also arrange for all necessary suspension of service and make arrangements to physically locate and avoid interference with all existing facilities. The Contractor may make arrangements for alterations for its sole convenience (not actually required to complete the sewer installation); such alterations shall be made at the expense of the Contractor.

Where existing utilities and/or other facilities, aboveground and/or underground, are encountered during construction, they shall not be displaced or modified unless necessary. If it is necessary to relocate a facility, or if a facility is disturbed or accidentally damaged in the prosecution of the work, the Contractor shall notify the

District and the owner or proper authority and shall abide with the requirements of and cooperate with such owner or authority (who may enter upon the work at any time) while protecting, repairing, replacing or relocating such facilities. All abandoned pipelines that are severed during the work shall be immediately plugged by the Contractor with material specified in Section 23-01, unless otherwise authorized by the Engineer.

All utility and other facility arrangements, agreements, fees, locating, protection, repair, replacement, suspension of service, temporary relocations and all other work in connection with utilities and other facilities, shall be at no cost to the District. Necessary permanent relocation of utilities and other facilities to accommodate the sewer construction shall be at no cost to the District.

14-04 PRESERVING, REMOVING AND SALVAGING SEWERS AND OTHER IMPROVEMENTS

Existing improvements shall include all sewer lines, structures, monuments, fences, landscaping, trees, bushes, drainage facilities and structures of all kinds.

When an existing sewer line is cracked, broken, displaced or exposed, the District shall be immediately notified and the sewer line shall not be covered until the repair is made. No one, including contractors, utility companies and other public agencies, but District forces shall attempt to make necessary repairs to existing sewer lines unless otherwise ordered by the Engineer.

Unless otherwise specified or shown on the Plans or ordered by the Engineer, existing improvements along the alignment of the work, whether above or below ground, which are shown on the Plans or specified or designated by the Engineer to be removed and not salvaged, shall be removed and disposed of by the Contractor at its expense. Trenches or pits caused by the removal of existing improvements shall be backfilled with suitable material designated by the Engineer.

Existing improvements shown on the Plans or required by the Specifications or designated by the Engineer to be salvaged shall be carefully removed and stockpiled as directed by the Engineer.

14-05 SURVEY MONUMENTS

Various survey monuments consisting of nails, railroad spikes, iron pipe, concrete box with cast iron cover, concrete, wood, etc., are located along the centerlines of streets, at intersections, points of beginning and ending of curves, property corners, and other points. Where the installation of the sewers or other work of the contract may cause these monuments to be destroyed or disturbed, the Contractor shall notify the Job Engineer and the Contractor shall not disturb any monument or property corner that must be removed in the performance of his work until he has been advised by the Job Engineer that it has been properly referenced out for resetting. Should the Contractor disturb or remove any monuments or property corners due to its neglect, it shall be held responsible for the expense of their resetting by the Job Engineer.

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SECTION 15

CLEARING, GRUBBING AND DEMOLITION

15-01 DESCRIPTION

Clearing, grubbing, and demolition shall consist of removing all objectionable material from the sewer right-of-way, roadways, and areas through which work must be carried on. Clearing, grubbing, and demolition shall be performed in accordance with the requirements specified herein.

Where the construction is to be performed through orchard, vineyard, and other cultivated areas, the work shall be performed in a manner that will cause minimum damage.

Tree branches that have to be removed shall be cut off close to the boles in a workmanlike manner. If tree branches that extend over the work are removed, the Contractor shall remove other tree branches so that the tree will present a balanced appearance. Scars resulting from the removal of branches shall be treated with a heavy coat of tree seal.

Within sewer easements or rights-of-way, trees, shrubs, fences, and all other improvements that have to be removed to permit construction, shall be replaced (not including native trees under three (3) inches in diameter at the base and native brush) by the Contractor in kind and size or with substitutes acceptable to the property owner. Native trees larger than three (3) inches in diameter at the base shall not be removed without the Engineer's consent. The removal of any trees, shrubs, fences or other improvements outside of sewer easements or rights of way as deemed necessary by the Contractor, shall be arranged with the Owner, removed and replaced, if required, by the Contractor at its expense.

At locations shown on the Plans or where directed by the Engineer, portions of existing concrete pavement, curbs, gutters, sidewalks, foundations, and other concrete or mortared structures shall be removed to the lines and elevations specified or shown on the Plans or ordered by the Engineer.

Concrete removal operations in connection with the reconstruction of existing structures (Section 21-18) shall be performed without damage to any portion of the structure that is to remain in place. If damage occurs, the Contractor shall repair any such damage at its own expense, to the satisfaction of the Engineer. Where existing reinforcement is to be incorporated at new work, such reinforcement shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

Unless otherwise provided, material removed as above specified shall be broken into pieces not larger than two (2) feet in greatest dimension and disposed of in accordance

with these specifications.

15-02 REMOVAL AND DISPOSAL OF MATERIAL

Material removed as above specified shall be disposed of by the Contractor.

The right-of-way and adjacent areas shall be left with a neat and finished appearance. All slashings and other debris shall be disposed of and no accumulation of flammable material shall remain on or adjacent to the right-of-way.

Tree limbs and trunks (not including roots) over four (4) inches in diameter shall be cut into eight (8) foot maximum lengths and delivered to the property owner. If the property owner does not want the limbs, it shall be the Contractor's responsibility to properly dispose of them. Local fire ordinances prohibit burning of waste material. The disposal of all brush and other refuse shall be the Contractor's responsibility.

SECTION 16

EXCAVATION, BEDDING, AND BACKFILL

16-01 DESCRIPTION

Excavation and backfill shall consist of performing all operations necessary to excavate earth and rock from the trench or adjacent thereto when shown on the plans or ordered by the Engineer; to excavate all material, of whatever nature, necessary for the construction of foundations for structures, sewers, and drainage facilities; to place backfill around structures, sewers and drainage facilities, and over sewers, culverts, and drainage pipes; to backfill ditches, holes, pits and other depressions within the work area; to remove unsuitable material and replace with suitable material.

Water for compacting subgrades and for dust control caused by grading operations, excavation, backfill, and the passage of traffic through the work shall be applied by means that will ensure a uniform application of water. Dust resulting from the Contractor's operation shall be controlled and reduced to a minimum.

16-02 TRENCH EXCAVATION

Trench excavation shall consist of all excavation involved in the grading and construction of the sewer as herein specified, or as shown on the Plans.

- A. Excavation - Prior to any excavation and backfill work, the Contractor shall obtain and provide the Engineer with copies or other evidence of acquisition thereof, all required permits for the work, including but not limited to: permits to do work in County roads or right-of-way; any bonds that may be required by encroachment permits for the work; District work permit; COSHA permit.

Excavation for sewers shall be made only after pipe and other necessary materials are delivered on the site of the work. After such delivery, trench excavation shall proceed as rapidly as possible, and the pipe installed and the trench backfilled without undue delay. The Engineer shall have the authority to limit the amount of trench to be opened or left open at any one time. In public street areas, excavation and pipe laying shall be coordinated to the end that a minimum of interference with public traffic will result.

For all trenching in existing streets, excavation and pipe laying shall be coordinated so that no more than one hundred (100) linear feet of trench will be open ahead of pipe laying during the normal work day for the operation. Backfilling operations shall closely follow pipe laying and no trench shall remain overnight without backfill. In new subdivisions more than 100 feet of trench may be opened if all the open trench is properly shored.

Where trenching occurs in paved areas, the pavement shall be blade cut or

scored and broken ahead of the trenching operations, and shall be cut or trimmed to a neat edge after backfilling and prior to repaving (See Section 16-03.G.). The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately and on neat lines parallel to the trench. Any pavement damaged outside these lines shall be re-cut and restored prior to final paving.

Trenching for all pipes, unless otherwise specified, shall be open cut to the lines and grades shown on the plans except those sections specifically indicated on the Plans or designated by the Engineer to be tunneled.

When trenching occurs in natural or filled ground which is neither paved nor intended to be paved, and the slope of such surface equals or exceeds a horizontal to vertical ratio of one to one (1:1), check dams shall be installed in conformance with Section 4-03.H.

Major roots (four [4] inches or greater in diameter) encountered in the course of excavation shall be exposed but not severed, and they shall be wrapped in burlap as a protective measure while exposed. Roots two [2] to four [4] inches in diameter) that are severed in the course of excavation shall be neatly trimmed.

Major roots of smaller trees and certain species may require additional care when excavating around or under these trees. The Engineer may require the Contractor to consult with a qualified arborist to determine methods to be used to protect these trees.

The Contractor shall remove all water that may accumulate in the excavation during progress of the work so that all work can be done in a dry trench. Trenches or other excavations shall be kept free from water while the pipe or structures are being installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the work against possible flotation or leakage. Water shall be disposed of in such a manner as to cause no injury to public or private property or be a menace to the public health.

If the Contractor finds it necessary to employ the use of explosives, see Section 13-06. Excessive blasting will not be permitted, and any material outside the authorized cross-section that may be shattered or loosened by blasting shall be removed. The Engineer shall have authority to require the Contractor to discontinue any method of blasting which leads to overshooting or is dangerous to the public or destructive to property or to natural features. The hours of blasting shall be fixed by the Engineer, but will be during daylight. All loose material shall be removed from the bottom of the trench prior to placement of any bedding material.

- B. Trench Width - Trenches shall be excavated to the widths as shown below with full depth vertical sides where possible. Minimum vertical trench shall be from pipe flow line to a point two (2) feet above top of pipe. Any over-width trench

- C. whether by over excavation, cave-in, or by ground movement, will require special pipe and/or special backfill, as directed by the Engineer.
1. Trenches for sewer mains shall be sixteen (16) inches wider than the external diameter of the barrel of the pipe to be used in the trench.
 2. Trenches for side sewers up to three and one-half (3 1/2) feet in depth shall be eighteen (18) inches in width. Trenches for side sewers greater than three and one-half (3 1/2) feet in depth shall be twenty-four (24) inches in width.

Where shoring is required (see Section 16-02.C.) and sheathing is used, the width of the trench shall be increased only by the thickness of the sheathing.

- D. Shoring - The Contractor shall ensure that all shoring for open excavations conforms to the requirements herein and to the requirements of the State of California, Department of Industrial Relations, Division of Occupational Safety 'Construction Safety Orders' (latest edition thereof), which are hereby adopted by reference as part of these Specifications.

The Contractor shall be responsible for adequately shored and braced excavations so that the earth will not slide, move, or settle and so that all existing improvements of any kind will be fully protected from damage. The protection of adjacent structures from movement of the ground and the elimination of the element of danger to life, property, or to existing improvements is the purpose of shoring the trench. All trenches with depth of five (5) feet or over shall be properly shored at the time of excavation.

Removal of shoring shall only be accomplished during backfill operations and in such a manner as to prevent any movement of the ground or damage to the piping or other structures.

When the Engineer requires that sheet piling, lagging and bracing be left in place, such materials shall be cut off where designated and the upper part withdrawn.

Undisturbed material outside the planned excavation slopes, which is unstable in the opinion of the Engineer and constitutes a potential slide, and material which has already come into the excavation, shall be removed to the lines designated by the Engineer.

It shall be the Prime Contractor's responsibility to obtain, at its own expense, all permits for any excavations over five (5) feet in depth into which a person is required to descend or any excavation less than five (5) feet in depth in soils where hazardous ground movement may be expected and into which a person is required to descend. Permits for such excavations shall be obtained from COSHA. The District reserves the right to require the Contractor to file a copy of

said permit with the District prior to any work permit issuance in conformance with Section 10-01. Should conditions of the work or types of soils be encountered which require the use of unique methods of shoring or should a situation arise which, in the opinion of the Engineer or COSHA requires additional or modified shoring other than that specified in said Safety Orders, the Contractor shall submit such revised shoring details, as required, to COSHA prior to starting any work so affected.

- D. Signing - Whenever a contractor is working in an existing street, motorists must be given proper advance warning of the operation. Contractors shall place warning signs on either side of their work area. Placement of signs and barricades shall be in accordance with the requirements set forth in the current Manual of Traffic Controls for Construction and Maintenance Work Zones issued by the State of California, Department of Transportation. If the width of the pavement and/or drivable shoulder is less than twenty (20) feet or if two lanes of traffic cannot safely pass the area of work, flaggers must be used to control the flow of traffic. See Section 13-05 of these Specifications.
- E. Disposal of Excavated Material - Excavated material to be used for backfill shall be laid alongside of the trench and kept trimmed up so as to cause as little inconvenience as possible to public travel and the normal use of adjacent properties. Free access must be provided to all fire hydrants, water gates, meters, and private drives. Gutters or other drainage ways shall be kept clear unless other provisions are made for handling drainage.

All material excavated in streets, roadways, and rights of way, which is determined unsuitable for use as backfill or in excess of the amount required for backfilling, shall be removed immediately and disposed of as described in Section 13-07 of these Specifications.

- F. Unsuitable Material - In advance of placing sewer pipe, existing material within the area where such pipe is to be placed, which in the opinion of the Engineer is unsuitable as a foundation for the pipe, including but not limited to vegetable matter, garbage, and junk piles, either on the surface or buried, shall be removed in its entirety and disposed of in accordance with the provisions of Section 13-07 of these Specifications.

In rock excavation or a mixture of rock and earth excavation, such material shall be loosened and broken up for the full width of the trench so that no ribs, rocks, or solid projections will be within six (6) inches of the sewer pipe. The material thus broken up shall be removed and disposed of in accordance with the provisions of these Specifications.

Where the bottom of the trench becomes soft or is unstable due to groundwater and/or movement of construction equipment, the Contractor shall remove a minimum of nine (9) inches of unsuitable material or to a depth as otherwise directed by the Geotechnical Engineer. Geotextile fabric shall be placed on the

trench bottom and coarse bedding material shall be placed on the fabric in conformance with Section 16-03.A of these specifications.

The geotextile fabric placed on the native ground below the coarse pipe bedding shall be non-woven fabric consisting of polymeric filaments formed into a stable network. The fabric shall be inert to commonly encountered chemicals, rot-proof, and resistant to ultra-violet light exposures, insects, and rodents.

The geotextile fabric shall have a minimum grab tensile strength of 100 pounds in any direction, as measured in accordance with ASTM D1682, a Mullen burst strength of at least 200 pounds per square inch per ASTM D3786, and Equivalent Opening Size (EOS) no larger than U.S. Standard Sieve Number 50, as determined by U.S. Corps of Engineers Specification CW-02215.

16-03 TRENCH BACKFILLING

Trench backfill shall consist of all materials returned to an excavation in the process of constructing a sewer line and/or appurtenances. No backfill shall be deposited over a sewer line and/or appurtenances until pipe laid has been inspected. Backfill operations shall closely follow pipe laying, and the Contractor shall ensure no trench shall remain overnight without backfill or shoring and trench plates.

- A. Except for required foundation material (in an envelope of geotextile fabric) or coarse bedding material being placed in over-excavated areas, where water or soft ground is present, backfill shall not be placed until after all water is removed from the excavation.
- B. Replacement of Unsuitable Material - Materials excavated as being unstable or otherwise unsatisfactory in the vicinity of the sewer construction shall be replaced as follows:
 - 1. Material removed as unsuitable foundation for sewer construction shall be replaced with Coarse Bedding material (see Section 16-03.D.2.b) and compacted to achieve a firm trench bottom.

Under drains shall be installed as shown on the Plans or as directed by the Engineer and shall be constructed in accordance with the Specifications and details of Section 28-30.
 - 2. Over-excavation below the construction grades of the sewer work shall be restored by placing and compacting standard bedding material to the proper grade prior to any sewer construction.
 - 3. All unsuitable material (including slide, cave-in, etc.) which enters the excavation after pipe or other sewer construction materials have been placed in the excavation, shall be removed from the excavation prior to any backfilling with the specified bedding and/or backfill material.

- C. Bedding Details - Attention is directed to CCCSD Standard Drawing DWG14 and DWG16 for applicable pipe bedding details. Unless otherwise specified, Bedding DWG14 shall be used in the design and construction of all sewer system pipelines in compliance with the minimum and maximum cover limitations tabulated for the various pipe sizes, types and strength classes. Bedding Details and cover dimensions other than those specified shall require approval of the Engineer.

Six inches of Standard Bedding Material shall be placed under precast manhole bases, where allowed, and shall be compacted to a relative compaction of ninety (90) percent per ASTM/D1557-78, Moisture-Density Relations of Soils and Soil-Aggregate Mixtures (Laboratory) and ASTM 02922-81, Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Field). Precast manhole bases, where allowed, shall be installed in accordance with Section 21-13.

D. Bedding Material

1. Standard Bedding Material shall be ¾" crushed rock, free from vegetable matter and other deleterious substances and shall form a firm, stable base when compacted.

The percentage composition by weight shall conform to the following grading:

SIEVE SIZES	PERCENTAGE PASSING
1 "	100
¾"	87-100
No.4	30-60
No. 30	5-35
No. 200	0-12

The material shall also conform to the following quality requirements:

TESTS	CALIF. METHOD NO.	REQUIREMENTS
Resistance (R-Value)	301	78 Min.
Sand Equivalent	217	28 Min.

2. As determined by the Engineer, "Class 2 Aggregate Base" may be used in lieu of "standard bedding material". Class 2 Aggregate Base shall be newly quarried or recycled material (not mined alluvial material), and shall be certified by the quarry or recycler as complying with the provisions of Caltrans Specifications Section 26 (Class 2 Aggregate Base) for three-quarter (¾) inch maximum grading.
3. The use of other special pipe bedding will be determined by the Engineer.

- a. Fine bedding material shall be clean mineral aggregate free from deleterious substances, having a minimum sand equivalent of seventy-five (75) and conforming to the following grading requirements:

SIEVE SIZES	PERCENTAGE PASSING
3/4"	100
1/2"	90-100
3/8"	40-100
No.4	0-60
No.8	0-45
No. 200	0-3

Pea gravel and backfill sand are common types of "fine bedding material".

- b. Coarse bedding material shall be used under fine bedding material or TYPE I Backfill Material when conditions warrant or when ordered by the Engineer. Coarse bedding material shall be clean rock conforming to the following requirements:

GRADING LIMITS (CALIF. METHOD NO.202) SIEVE SIZE	PERCENTAGE PASSING
2"	100
1-1/2 "	90-100
3/4"	5-30
3/8"	0-5
No. 200	0-2

Unless otherwise ordered by the Engineer, the minimum vertical dimension of special bedding materials shall be six (6) inches under main sewers and nine (9) inches under trunk sewers.

4. Bedding around the pipe in restricted areas (tunnels, bores, casings, etc.) shall be placed by blowing sand in around the pipe or by the use of other suitable methods or materials accepted by the Engineer.
5. Bedding in trenches shall be placed uniformly on each side of the pipe to prevent displacement. Bedding shall be graded by hand to provide a uniform surface on which the sewer pipe is to be laid.
6. Bedding materials shall be compacted to a minimum of ninety (90) percent relative compaction and all bedding material shall be carefully handled to

prevent intrusion of foreign materials. Compaction tests may be required on a job by job basis. The Engineer may indicate the required tests on the Plans for the project or require that tests be taken during the construction of the project.

E. Backfill - Backfill is considered to be all material placed in the trench between the pipe bedding and the roadbed or ground surface. All backfill material shall be placed and consolidated in such a manner as to permanently prevent damage to the sewer, roadbed, road surfacing, and private property, or inconvenience to the public. Neither "recycled" backfill nor "recycled" bedding shall be used.

1. Backfill Materials shall be referred to by the following types.

- a. Type I: Type 1 Backfill Material shall be the same as standard bedding material.
- b. Type II: Type II Backfill Material (Aggregate Subbase) shall be free from vegetable matter and other deleterious substances and shall conform to the following grading requirements:

SIEVE SIZES	PERCENTAGE PASSING
2-1/2"	100
No.4	25-60
No. 200	0-11

The material shall also conform to the following quality requirements:

TESTS	CALIF. METHOD NO.	REQUIREMENTS
Resistance (R-Value)	301	55 Min.
Sand Equivalent	217	25 Min.

- c. Type III: Type III Backfill Material (Trench Material) shall be free from vegetable matter and refuse and shall contain no concrete, stones or clods larger than four (4) inches in diameter and shall contain sufficient fines so that all voids will be filled when compacted, and shall be so constituted that compaction requirements can be met.
- d. SELECT TYPE III: SELECT TYPE III Backfill Material (trench material) shall meet all requirements of the above described TYPE III Material except that the maximum particle size shall be three-quarters (3/4) inch in diameter.

- e. Type IV: Type IV Backfill Material (Controlled Low Strength Material or CLSM shall be provided in lieu of Type I Bedding and Backfill Material where indicated on the Plans, and in accordance with Section 31, Controlled Low Strength Material. Contractor shall provide a method to prevent pipe from floating during backfill. (The remaining portions of the trench shall be backfilled as specified elsewhere in this Section.)
2. Procedures and Required Materials for backfilling the various depths and types of trenches are covered in the following classes of backfill work:
 - a. All trenches in roadways, driveways, shoulders, parking, and other paved areas and any excavation for repairs shall be backfilled with TYPE I Backfill Material, unless otherwise directed by the District.
 - b. Trenches in landscaped or cultivated areas shall have the top twelve (12) inches backfilled with approved topsoil.
 - c. Trenches in new subdivisions may be backfilled from the top of the pipe bedding to the subgrade with Type III backfill.
 - d. Other Trenches - All trenches other than those in existing paved areas may be backfilled from the top of the pipe bedding to the finish grade with TYPE III Backfill unless otherwise specified.
 - e. Trench Maintenance - All backfilled trenches within roadways shall be maintained in a smooth, safe, passable manner at all times until final compaction and paving are completed.
 3. Earth Trench Dams (Sec. 28-53) shall be constructed over side sewers at property line or at the easement line, at locations indicated on the Plans and at locations designated by the Engineer.

F. Compaction of Backfill

1. Compaction of backfill material may be accomplished by mechanical tamper, by vibrating, by jetting or by a combination of these methods. Jetting of trench backfill will be permitted only when, in the written opinion of the Owner's Geotechnical Engineer, such backfill and surrounding ground are of such character that they will not soften or be otherwise damaged by applied waters. Jetting shall be supplemented by the use of mechanical compaction equipment to obtain the relative compaction requirements of these Specifications.

Jetting may be accomplished as follows or under the direction of a Geotechnical Engineer: by introducing water into the backfill by means of a jet pipe. The jet pipe shall be not less than one (1) inch in diameter and

shall extend to within fifteen (15) inches of the top of the sewer pipe during jetting. The source of water for jetting shall be a pressure hydrant or a water tank with a minimum pressure of sixty (60) pounds per square inch. All "bridges" in backfill shall be completely broken down during the jetting process without flooding. Proceeding upgrade, jet points along the line of the ditch shall be staggered from side to side at intervals not to exceed six (6) feet center to center or as necessary to ensure that the backfill takes full possible subsidence while water is being introduced into it through the jet pipe. When this method of consolidation is permitted either by the District or other agency having governing controls on such method, the backfill shall be placed in lifts or steps complying with the specific requirements of such agency having jurisdiction. Under no conditions shall successive lifts or steps of backfill placements to be jetted exceed six (6) feet in height.

2. For trenches in County roads, the relative compaction of trench backfill from the pipe bedding up to the subgrade or base of surfacing replacement shall be not less than ninety (90) percent.
3. Aggregate subbase or aggregate base shall be compacted to a minimum of ninety (90) percent relative compaction.
4. Standards designated above for County roads will be used.
5. Trench work within State Highway rights of way requires a specific permit to be obtained from Caltrans. Unless otherwise noted on the permit, all backfill will be compacted as specified above for County roads.
6. Trench backfill in private roadways and/or in other paved areas shall be placed and compacted in accordance with the requirements for County roads.
7. Type III Backfill Material not under pavement shall be compacted to a minimum of eighty (80) percent relative compaction. Jetting may be used for compaction if recommended by the Owner's Geotechnical Engineer.
8. Type IV Backfill Material shall be installed in accordance with Section 31.
9. All bedding material around plastic pipe specified in Section 18-01.D of these Specifications, excluding ABS Composite Pipe, shall be placed in two stages as follows: first, from the bedding material foundation to the top of pipe; second, from the top of pipe to a point at least three (3) inches over the top of the pipe. Each above-mentioned stage shall be compacted by hand or mechanical tamping to a minimum of eight-five (85) percent. No jetting of bedding materials will be permitted.

10. Relative compaction tests are required on a job by job basis. Tests shall conform to ASTM 01557-78 (Laboratory) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures and ASTM 02922-81 (Field) Density of Soils and Soil-Aggregate in Place by Nuclear Methods, unless specified otherwise by the Geotechnical Engineer for the particular job. Test results shall be expressed in terms of percent relative compaction, optimum moisture content in percent and maximum dry density in pounds per cubic foot. The Engineer may indicate the required tests on the plans for the project and may require that tests be taken during the construction phase of the project.

Where sewer work falls within existing public road areas, compaction is required (See Section 28-24). The Geotechnical Engineer for the job will specify the number, location and nature of the tests.

Confirmation, in writing, that all compaction has been satisfactorily completed shall be submitted by the Geotechnical Engineer prior to the installation of final pavement.

- G. Temporary Paving - The same day the trench is backfilled, it will be graded to conform to the existing surface and temporary pavement consisting of a minimum of two (2) inches of premixed asphaltic paving material will be placed over the trench. Temporary pavement shall be maintained in a safe and driveable condition until permanent paving is placed.
- H. Permanent Surfacing Replacement - During sealing or paving operations, all structure surface castings shall be protected from being covered. No adhesive materials that would affix to the top of said castings or otherwise fill frame and cover joints will be permitted.

Temporary pavement shall be removed and permanent pavement shall be installed within two (2) weeks after backfilling and compacting unless otherwise specified by the District or County. The permanent pavement shall be maintained to the satisfaction of the Engineer for the full guarantee period or until relief from maintenance is obtained in writing from the Owner or Agency maintaining the paved area.

1. Public Streets - Surfacing replacement in public streets and highways shall conform to the requirements of the Agency maintaining such streets and highways, but in no case will consist of less than the following:
 - a. Asphaltic pavement shall be replaced with an equal thickness of Asphalt Concrete or two (2) inches of Asphalt Concrete, whichever is greater.
 - b. Portland Cement Concrete pavement shall be replaced with an equal thickness of concrete, but not less than nine (9) inches, with

the top of the replacement level with the top of existing concrete pavement. Paving materials above the concrete pavement shall be replaced with Asphalt Concrete.

- c. Excavations backfilled with TYPE II (or better) backfill shall be restored with twelve (12) inches of Aggregate Base under paving.
 - d. Unpaved public streets, and public street areas outside of the traveled way but used by traffic, shall be surfaced with a minimum of six (6) inches of Aggregate Base.
2. Areas Other Than Public Streets - Paved or surfaced area other than public streets (such as private driveways) shall be restored by replacement of identical pavement and base when practical. Portland Cement Concrete pavement shall be replaced in kind, and color shall be matched. Asphaltic pavements shall be replaced with an equal or greater thickness of Asphalt Concrete, but in no case will less than two (2) inches be applied over trench areas. Base material will be replaced with a minimum of six (6) inches of Aggregate Base.

16-04 CASING, BORES, AND TUNNELS

For sewer lines within utility, road or railroad rights-of-way requiring tunnels, bores, and/or special pipe, the special pipe shall extend the entire length of the sewer within the particular right-of-way, unless otherwise designated by the Engineer.

- A. Bores - Where a casing or sewer pipe is installed in a bored hole, whether wet or dry, the hole shall be bored by use of a machine which will cut a true circular bore to the required line and grade. Bored tunnels shall be no more than two (2) inches larger in diameter than the maximum outside diameter of the casing or sewer pipe to be placed therein.

When designated on the plans, permit, or by the Engineer in writing, metal casing shall be placed in a bored hole under the area to be crossed. Metal casings, when required, shall have a minimum wall thickness as shown on the Plans and have an inside diameter not less than eight (8) inches greater than the largest outside diameter dimension of the sewer pipe to be installed therein. All metal casing used for any particular bore shall be the same throughout the limit of such bore. All bore and/or jacking pit shoring shall comply with Section 16-02.C of these Specifications.

After the casing has been installed, redwood planks with guide strips nailed thereon shall be inserted and blocked or wedged securely to grade. The previously jointed sewer pipe shall be placed thereon and slid along the guide planks into the casing. Standard jointing material shall be used on all sewer pipe placed in casings. If other than Ductile Iron pipe is used, a double joint immediately outside the casing is required to provide flexibility.

When casings or sewer pipes are jacked, guide rails shall be accurately set to the line and grade so that the pipe, while being jacked will be guided along the prescribed line and grade.

A rigid backstop shall be erected to withstand the full thrust of the jacks during the process of installing the pipe. Jacks and bearing frame with necessary blocking shall be provided of sufficient strength and number to propel the pipe forward as excavation progresses ahead of the forward end of the pipe.

Main or side sewer pipes installed in tunnels or bores without casings shall be ductile iron (Class 53 or better).

- B. Tunnels - Where tunnels or casings are required or permitted, they may be drilled as specified in Section 16-04.A above for bored holes, or they may be excavated by standard tunnel operations using shoring methods in accordance with the requirements of COSHA.

Upon written request, the Engineer may allow the tunnel to be dug by hand by men digging just ahead of and from within a metal casing that is being jacked. Work performed in this manner shall be done in accordance with special conditions prepared by the Job Engineer and reviewed by the Engineer.

Trunk sewer pipe installed in tunnels or bores shall be shown on the Plans.

- C. Backfill - After the main or sewer pipe is secured in place, a sand or concrete backfill shall be placed that completely fills the annular space between sewer pipe and casing and any annular space exceeding the specified clearance of two (2) inches between the sewer pipe or casing and bore or tunnel, as directed by the Engineer. Except for railroad rights of way, no backfill is required between the sewer pipe and casing if the sewer pipe is Ductile Iron.

16-05 STRUCTURE EXCAVATION AND BACKFILL

Structure excavation shall consist of the removal, to the lines designated on the plans or specified or ordered by the Engineer, of all material of whatever nature necessary for the construction of foundations and other structures and other excavation specifically designated on the Plans or in these Specifications.

Structure backfill shall consist of placing and compacting, to the lines designated on the Plans or specified or ordered by the Engineer, backfill material around structures and other backfill specifically designated on the Plans or in these Specifications as structure backfill.

Structure excavation and backfill shall include the furnishing of all equipment and the

construction or installation of all cofferdams and other facilities which may be necessary to perform the excavations and place and compact the backfill, and the subsequent removal of such facilities except where they are required or permitted by the Plans or Specifications to remain in place.

- A. Excavation - All excavation for structures shall be done to the dimensions and levels indicated on the plans or specified herein. Excavation shall be made to such width outside the lines of the structure as may be required for proper working methods, the erection of forms, and the protection of the work. Care shall be taken to preserve the foundation surfaces shown on the Plans in an undisturbed condition.

If the Contractor over-excavates or disturbs the foundation surfaces shown on the plans or specified herein without written authorization of the Engineer, the Contractor shall replace such foundations with compacted, standard bedding material (See Section 16-03.C) in a manner that will show by test an equal bearing quality with the undisturbed foundation material. If the Contractor encounters ground water and/or unsuitable foundation material, it shall increase the depth of excavation to a minimum of nine (9) inches below the required concrete base of the structure. The over-excavation (min. 9") shall be backfilled with Coarse Bedding Material (See Section 16-03.C) and compacted to a relative compaction of ninety (90) percent.

If the Contractor excavates beyond the limits that are specified for poured-in-place manhole bases, it shall install forms so that the concrete base, when poured, will conform to the dimensions shown on the details or Plans.

The Contractor shall notify the Engineer when excavation for a structure is complete and no forms, reinforcing steel, concrete, or pipe shall be placed until the excavation has been inspected by the Engineer.

- B. Foundation Treatment - When footing concrete or masonry is to rest upon rock, the rock shall be fully uncovered and the surface thereof shall be removed to a depth sufficient to expose sound rock. The rock shall be roughly leveled off or cut to approximate horizontal and vertical steps and shall be roughened.

When piles are to be used, the Contractor will be permitted to excavate a sufficient distance below the bottom of the footing as shown on the plans to take care of swell due to driving piles. After the piles are driven, if it is found that the ground has risen above plan grade, the Contractor shall remove such surplus material. After the piles are driven, if it is found that the surface of the ground is below plan grade, the Contractor shall backfill to the plan grade with standard bedding material (See Section 16-03.C).

In order to determine the character of the foundation material, the Contractor shall, if ordered by the Engineer, dig test pits and make test borings and foundation bearing tests.

- C. Inspection - Whenever any structure excavation is completed to the grade of the bottom of the footing shown on the plans, or as set forth in the special provisions or ordered by the Engineer, the Contractor shall notify the Engineer, who will make an inspection of the elevation and character of the foundation. No footing concrete or masonry shall be placed in a footing until the Engineer has inspected the elevation and character of the foundation for the footing.
- D. Backfill - Structure backfill operations shall conform to the requirements of this section.

Backfill material for all structures that are to be installed in existing streets shall be Type II Backfill Material as specified in Section 16-03.D.1.b of these Specifications. Structure backfill in areas other than streets may be native material free from stones and lumps four (4) inches and larger, vegetable and other deleterious matter resulting from structure excavation, when permitted by the Engineer.

Material resulting from structure excavation and not used as structure backfill shall be disposed of as specified in Section 13-07.

Structure backfill shall not be placed until the structure footings or other portions of the structures or facilities to be below ground line have been inspected by the Engineer. No backfill material shall be deposited against outside walls of concrete structures until the concrete has developed a strength of 2,500 pounds per square inch in compression as determined by test samples cured under conditions similar to those prevailing at the site and tested in accordance with standard methods.

All structure backfill material shall be placed in horizontal layers not exceeding eight (8) inches in loose thickness and brought up uniformly on all sides of the structure to avoid bending or distortional stresses. Each layer of backfill shall be moistened as required and thoroughly tamped, rolled or otherwise compacted until a relative compaction of not less than ninety (90) percent is achieved. Compaction by jetting or ponding may be allowed by the Engineer for import granular backfill materials and backfills placed outside of existing streets under the provisions and requirements of Section 16-03.E and/or Section 21-14.D of these Specifications.

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SECTION 17

EMBANKMENT CONSTRUCTION

17-01 DESCRIPTION

Embankment construction shall consist of the construction of fills, including the preparation of the ground areas upon which they are to rest; the construction of earth dikes for site protection; the placing and compacting of material within areas where unsuitable fill foundation material has been removed; and the placing and compacting of embankment material in holes, pits and other depressions within the work area.

Water for embankment construction and for dust control caused by grading operations and the passage of traffic through the work shall be applied by means of distributors equipped with a spray system that will ensure a uniform application of water. Dust resulting from the Contractor's operation shall be controlled and reduced to a minimum.

17-02 GENERAL REQUIREMENTS

The relative compaction of the natural ground area upon which embankments are to be constructed, for a depth of not less than three (3) feet below finished grade, shall be not less than ninety (90) percent. Relative compaction tests are required on a job by job basis. Tests shall conform to ASTM 01557-78 (Laboratory) moisture-density relations of soils and soil-aggregate mixtures and ASTM 02922-81 (Field) density of soils and soil-aggregate in place by nuclear methods, unless specified otherwise by the Geotechnical Engineer for the particular job. Test results shall be expressed in terms of percent relative compaction, optimum moisture content in percent and maximum dry density in pounds per cubic foot. The Engineer may indicate the required tests on the Construction plans for the project and he may require that tests be taken during the construction phase of the project.

Where sewer work falls within existing public road areas, off-site to subdivision construction, compaction tests are required (See Section 28-24). The Geotechnical Engineer for the job will specify the number, location and nature of the tests. Confirmation, in writing, that all compaction has been satisfactorily completed, shall be submitted by the Geotechnical Engineer prior to the installation of final pavement.

If finished grade is less than three (3) feet above natural ground, the natural ground shall be excavated to a depth of not less than three (3) feet below finished grade and recompacted to a relative compaction of not less than ninety (90) percent. Embankment material shall be placed in layers not exceeding eight (8) inches in loose thickness before compaction and each layer shall be compacted to a relative compaction of not less than ninety (90) percent.

When embankments are to be made and compacted on hillsides, or where new fill is to be compacted against existing embankments, the slopes of the original hillside, old or

new fill, shall be cut into a minimum of six (6) feet horizontally as the work is brought up in layers. Material thus cut out shall be recompacted along with the new fill.

Whenever selection is possible, embankment material having a sand equivalent value of less than ten (10) shall be deposited in the lower portions of embankments and no such material shall be placed within three (3) feet of planned finished grade.

When the embankment material consists of large rocky material or hard lumps such as hardpan or cemented gravel that cannot be broken readily, such material shall be well distributed throughout the embankment, and sufficient earth or other fine material shall be placed around the large material as it is deposited so as to fill the interstices and produce a dense compact embankment. In no case shall any material exceed twenty-four (24) inches in any dimension.

17-03 COMPACTING

Embankments shall be constructed in compacted layers of uniform thickness and each layer shall be compacted by means of compacting equipment with the following two exceptions. Sidehill fills, where the width, including bench cuts for bonding existing and new embankments, is too narrow to accommodate compacting equipment, may be placed by end dumping until the width of the embankment, including benching, becomes great enough to permit the use of compacting equipment, after which the remainder of the embankment shall be placed in layers and compacted as specified. Where embankments are to be constructed across low swampy ground that will not support the weight of trucks or other hauling equipment, the lower part of the fill may be constructed by dumping successive vehicle loads in a uniformly distributed layer of a thickness not greater than that necessary to support the vehicle while placing subsequent layers, after which the remainder of the embankment shall be constructed in layers and compacted as specified.

At the time of compaction, the moisture content of embankment material shall be such that the relative compactions specified will be obtained and the embankment will be in a firm and stable condition. Embankment material that contains less than the required moisture content shall be watered and material that contains excessive moisture shall not be compacted until the material is dry enough to obtain the required compaction.

SECTION 18

SEWER PIPELINES

18-01 MATERIALS

- A. General - All pipe installation procedures and materials shall be in accordance with the pipe manufacturer's recommendations where not modified under the various types of pipeline materials specified herein. A current list, referred to as "Approved Material List", of all pipe, fitting and joint materials specifically approved by the Engineer as conforming to these Specifications and for use in sewer pipeline installations under the jurisdiction of the District is on file and available at said District offices. Pipe, pipe products and/or pipe specifications not appearing on said "Approved Material List" shall not be used within the District without approval of and written authorization from the Engineer. All pipe sizes refer to the nominal inside diameter of pipe (including any pipe linings) and no pipe, except where specified herein, shall be more than one-quarter (1/4) inch smaller than the nominal size designated. All pipe, pipe joints incorporated into the pipe, and manufactured fittings connecting pipe between structures shall be of one and only one manufacturer's brand and of the same type, quality, class and size. Jointing of pipe dissimilar in size and/or material shall be accomplished either by use of an Expansion Block as detailed and specified under Section 28-40 of these Specifications or by use of special adapters or couplings accepted by the Engineer for such use. All field cut pipe shall be accomplished with equipment recommended by the pipe manufacturer. No hammer and chisel cuts will be permitted. All pipe and fittings delivered to the jobsite shall be marked by the manufacturer with such inventory and identification (Brand Name, Pipe Type, Strength Class, Batch Lot, Lengths, etc.) as to be properly identified in the field as meeting the requirements herein and for the work.
- B. Banded rubber couplings for use in the joining of new pipe or repair of existing pipelines shall be compression type "Band-Seal" couplings with external adjustable stainless steel shear rings, Mission Clay Products Corp., or "Ceramicweld" couplings Joints, Inc., or approved equal. Use of couplings without external shear support, or couplings with shear rings in direct contact with the pipe at joints, (internal of the rubber collar), will not be permitted except when joining dissimilar pipe (e.g. clay to cast iron).
- C. Rigid Pipe - Rigid pipe, fittings and joint materials specified herein consists of Vitrified Clay Pipe (VCP), Cast Iron Pipe (CIP), Reinforced Concrete Pipe (RCP), Concrete Lined Steel Cylinder (CL), Concrete Lined and/or Coated (CL&C), and Ductile Iron Pipe (DIP). See Section 18-02.D for repair procedures for rigid pipe in new construction.
1. Vitrified Clay Pipe - All VCP and fittings shall conform to the requirements of ASTM Designation C 700 as it applies to high strength, unglazed vitrified clay pipe.

- a. Resilient material conforming to the requirements of ASTM Designation C 425 shall be used for VCP Jointing.
 - b. Rubber couplings used to join plain end VCP shall conform to the material and performance requirements of ASTM Designation C 594.
2. Cast Iron Pipe - All CIP, for use in side sewer installations only, shall conform to the requirements of ASTM Designation A-74 as it applies to Single Hub, extra heavy and service weight pipe. Service weight, Class SV, pipe shall be the normal requirement of CIP installations; however, the Engineer may require use of extra heavy, Class XH, pipe under special conditions. CIP may be installed without the use of foundation bedding material where such trench bottom provides solid bearing for the full length of the pipe.

Cast Iron "No-Hub" pipe and fittings may only be used for four (4) and six (6) inch side sewers and, at a minimum, shall conform to the requirements of the Cast Iron Soil Pipe Institute, (CISPI), "Standard No. 301". "No-Hub" pipe shall be installed in accordance with CISPI Pamphlet No.100 using only "No-Hub" couplings, except where otherwise designated by the Engineer for dissimilar joints. Minimum cover for "No-Hub" installations in traffic areas shall be three (3) feet.

Maximum deflection permitted per "No-Hub" joint shall be ten (10) inches per ten (10) foot length of pipe or appropriate ratio thereof. Use of a properly calibrated torque wrench for jointing shall be mandatory.

3. Ductile Iron Pipe - All DIP and fittings for main and trunk sewers shall conform to the requirements of ANSI Standards A21.52 (Class 52) as they apply to Ductile Iron Pipe. All main and trunks sewer DIP and fittings shall be of sufficient thickness to withstand the depth of cover under the laying conditions and provisions of Section 4-02.C of these Specifications. There are no special lining or coating requirements; however, bituminous material coated or concrete coated and/or lined pipe conforming to the requirements of ANSI Standard A21.4 may be used.

All DIP shall be shown on construction drawings by type and thickness class designations herein.

- a. Bell and spigot joint assemblies shall conform to the requirements of Federal Specification WW-P-421c, Section 3.1.2 as it applies to TYPE II, Grades B or C pipe.

- b. Standardized mechanical joint assemblies shall conform to the applicable requirements of ANSI Standards for the pipe specified and ANSI Standard A21.11.
 - c. Lead caulked joint assemblies will not be permitted.
 - d. No joint will be required immediately outside of structure bases for all DIP installations.
 - e. DIP may be installed without use of foundation bedding material where trench bottom provides solid bearing for the full length of pipe between bell holes, where such installation otherwise meets the requirements of these Specifications and as approved by the Engineer.
 - f. The minimum radius for DIP shall be as shown on Section 28-31 of these Specifications.
4. Reinforced Concrete Pipe - All RCP and fittings shall conform to the requirements of either ASTM Designations C76 or C361, as modified hereunder:
- a. Where not otherwise modified by these Specifications, all provisions of the above-mentioned ASTM Designations shall govern.
 - b. The basis of acceptance of RCP manufactured in compliance with these Specifications shall be in accordance with Section 4.1.1 of ASTM Designation C76 and as follows:
 - i. Engineer review of submittals required under Sections 18-01.C.4.b.3, d.4, and f.7 of these Specifications.
 - ii. Three-edge bearing test loads shall be applied to the extent that no greater than a 0.01-inch crack is produced in tested pipe sections. Applied test loading may be terminated without producing a 0.01-inch maximum crack if or when such loading has reached one hundred twenty-five (125) percent of that required for and related to the specified D-load for the subject pipe.
 - iii. Test results shall be submitted to the District prior to shipment to the project jobsite. Results shall indicate the District-assigned project number, agency and operator performing the test, test date, pipe size and specified D-load and ultimate test load applied.

- c. Materials shall comply with Section 5 of the appropriate ASTM Designation under which the subject pipe is to be manufactured, modified as specified hereunder:
 - i. Cement used in the manufacture of RCP shall be TYPE II in conformance with ASTM Designation C150.
 - ii. Aggregates used shall consist of granitic, calcareous or combinations thereof such that the concrete material samples for testing alkalinity in conformance with Section 18-01.C.4.f of these Specifications shall exhibit a total Carbonate equivalence of not less than fifty (50) percent.
 - iii. No admixtures shall be introduced to concrete mixes without specific District authorization. Authorization for admixture or blend usage for pipe for a given project shall not be considered a general use authorization for subsequent projects unless so stated.
 - iv. Rubber for gaskets shall comply with the requirements of Section 2.11 of AWWA Standard C302.

- d. Design shall comply with Sections 6 and 7 of appropriate ASTM Designation under which the subject pipe is to be manufactured, modified as specified hereunder:
 - i. All RCP shall be designed for anticipated trench loads calculated in conformance with Section 18-01.C.4.g of these Specifications, combined with a minimum head of at least twenty-five (25) feet. However, in no case shall pipe design under ASTM C76 provisions be less than that specified therein for CLASS III (1350-D), nor shall pipe design under ASTM C361 provisions be less than that specified therein for Class B.
 - ii. Total concrete cover of reinforcement at the inner wall, (clearance of steel surface to inner wall surface), shall not be less than one (1) inch, regardless of pipe diameter size or type and placement configuration of reinforcement.
 - iii. Joint assembly design shall be reinforced concrete bell and spigot type incorporating a fully retained, single rubber gasket in accordance with Section 3.3 of AWWA Standard C302.
 - iv. Manufacturer's design drawings for each project shall be submitted to the Engineer for review prior to fabrication.

Drawings shall indicate, at relative scale, concrete covers, reinforcement placements and joint assembly design. Submittals shall also include the design pipe size, D-load, cement type, concrete strength and areas, types and placements of reinforcement.

- e. Pipe manufactured under these Specifications shall be fabricated by the "centrifugal spun" process in accordance with AWWA Standard C302 and as modified hereunder.
 - i. Section 3.6.9 - Form oils or release agents shall not contain any material or substance as would penetrate or otherwise retard concrete set at the formed surface.
 - ii. Section 3.6.10 - The steel forms shall be placed horizontally in a machine capable of spinning the forms at speeds that will produce concrete meeting or exceeding the concrete strengths required under the appropriate ASTM standard for the subject pipe specified.
- f. The method and procedure for determining the alkalinity content for the inner wall of RCP shall be as follows:
 - i. A minimum of two (2) carbonate equivalence tests shall be run on sample pipe manufactured from concrete ingredients batched each week of manufacture for each pipe size manufactured there from. Additional testing on different pipe sections shall be required if the carbonate equivalence results of individual tests per pipe sample vary by more than ten (10) percent.
 - ii. Test samples of concrete shall be obtained from random selected pipe sections by drilling, using carbide concrete bits as will procure at least five (5) grams of material per drilling. Sample material shall be taken at two (2) locations at least twelve (12) inches apart longitudinally and to the depth of the steel reinforcement, surface. (For elliptically-placed reinforcements, sample material shall be taken at the minor axis as marked on the pipe.)
 - iii. All drilled holes shall be repaired with cement and fine aggregate as specified and used in the manufacture of the subject pipe.
 - iv. Each material sample shall be tested separately as obtained from the subject pipe. Test material shall be ground or

pulverized sample material, oven dried for at least four (4) hours at a temperature of $100^{\circ}\text{C} \pm 50^{\circ}\text{C}$ just prior to testing.

- v. Testing shall involve the following equipment and procedures:
 - I. Equipment - Sample weighing shall be performed with a precision balance readable to at least the nearest ten (10) milligrams. Liquid measures shall be performed with precision burettes readable to at least two-tenths (0.2) of a milliliter. Ph meters shall read to at least the nearest tenth (0.1) of a unit. Weighing and pH meter equipment shall have been calibrated for correctness within six (6) months of the test.
 - II. Test procedure - Weight at least one (1) gram of the test material of each sample into an appropriately sized Erlenmeyer flask and add about 100 ml of distilled water. (Place glass funnel in neck of flask to minimize spray losses). Slowly add 50 ml of Standardized 1-Normal Hydrochloric Acid per gram of test material. When effervescence has subsided, heat to boiling and boil about 1/2 minute period. Cool and add 50-100 ml distilled water. Titrate with standardized, carbonate-free, 1-Normal Sodium Hydroxide solution to an end point of pH metering reading of 6.8 minimum to 7.8 maximum. End point reading must be stabilized for not less than two (2) minutes.
- vi. Calculation of Carbonate Equivalence - Calculations shall be based upon the chemical reaction of equivalent weights of Calcium Carbonate, CaCO_3 and the liquid measures of specifically standardized acid and base titrating solutions, to the nearest tenth of one (0.1) gram at the stabilized end point. The equivalence of the tested sample shall be expressed in a percentage as CaCO_3 to the nearest tenth of one (0.1) percent.
- vii. Quality Control Records - The Contractor shall, prior to pipe installation, furnish the Engineer with two (2) copy sets of the manufacturer's quality control records for pipe manufactured in accordance with this section. Records shall indicate thereon: (1) the agency and technician performing the test, (2) the test date, (3) the District's Job Number assigned to the project, (4) the pipe size and date manufactured, (5) the weight of the test material, (6) the actual standardized

normality of the acid and titrate solutions and the test amounts used, and (7) the individual sample and pipe section average equivalent CaCO₃ percentage. Each test record sheet shall be endorsed by the manufacturer, (and the agency performing the test if other than the manufacturer), as certifying compliance with this Section.

- g. Trench load calculations and design shall reflect the following minimum criteria:
 - i. Maximum trench width of twenty-four (24) inches greater than the outside diametric dimension (O.D.) of the pipe and a backfill density relative to that anticipated but in all cases not less than one hundred twenty (120) pounds per cubic foot.
 - ii. A dead load factor not greater than one and nine-tenths (1.9)
 - iii. Live load and impact factors relative to that anticipated but in all cases not less than that produced by using AASHTO H-20 load criteria and a one and one-half (1.5) impact factor.
 - iv. A safety factor of not less than one and one half (1.5).
- 5. CL and CL&C Pipe - CL and CL&C pipe shall conform to the requirements of Federal Specifications SS-P-381a of December 14, 1967 and latest amendments thereto and/or SS-P-385a of January 31, 1964 and latest amendments thereto except as modified herein. The total area of steel used for design purposes shall be the cross-sectional area of steel in the wall of the pipe cylinder only.

Rod-wrapping cross-sectional area shall not be considered for design purposes. Reinforcing steel used for rod-wrapping for all CL&C pipe shall have a minimum diameter of seven thirty-seconds (7/32) inch. Concrete linings and coatings shall be manufactured with Type II Portland cement conforming to the requirements of ASTM Designation C 150 Concrete linings shall extend to the ends of each pipe length. The concrete coating shall be held back three (3) inches from each end of each pipe, except where otherwise specified for abutting pipe or structure connections. An acceptable corrosion protective coating shall be shop applied to all exposed metal portions of pipe before shipment. Minor shop coating damage shall be repaired in the field with material consistent with that used by the pipe manufacturer as directed by and to the satisfaction of the Engineer. Except where shorter lengths are required to meet special conditions with due allowance for jointing, CL and CL&C pipe shall be fabricated in individual lengths not exceeding forty (40) feet. All pipe shall

be clearly marked with date of manufacture, type of concrete lining and/or coating and name or trademark of the manufacturer as identification on each individual length unless otherwise specified or shown on the Drawings. Fabrication of CL&C pipe for above ground crossings, siphon installations or other underground installations specified shall be in accordance with the minimum basic requirements of the following table: (Based on a maximum span of thirty (30) feet).

Lined inside diameter of pipe (In.)	6	8	10	12	14
Steel Cylinder Gauge (US Standard)	10	10	7	7	7
Uniform minimum Lining Thickness	1/2	1/2	1/2	2/3	2/3
Uniform minimum Coating Thickness	1	1	1	1	1
Rod-wrapping or wire Reinforcement	7/32 inch diameter or greater at 1.75 inches maximum clear spacing. Self-furring welded fabric of 2-by-4 inch No. 13 gage steel wire.				

Steel cylinders in the above table shall be such that the lined pipe shall have the nominal pipe size within the one-quarter (1/4) inch tolerance set by these Specifications. Fittings for CL&C pipe shall conform to the requirements of AWWA Standard C 208. Special fittings shall be shop fabricated as detailed on drawings for construction.

Deflection fittings shall not exceed fifteen (15) degrees at any one angle break in such fitting and the distance between all miters in a fabricated fitting shall be three (3) nominal pipe size diameters. The Contractor shall submit, at his own expense, shop and material details of all CL and/or CL&C pipe and fittings for District review before the pipe and/or fittings are manufactured for use in the work.

If such shop drawings are to be submitted by the pipe fabricator or manufacturer for District review, the District assigned Job Number and Contractor's signature must appear on each drawing, attesting the fact it has reviewed the drawings and if such are accepted, installation will be in conformance therewith.

- a. CL and/or CL&C joining by butt-welding shall be performed on all plain end pipe. Field welds will be permitted at support points only as designated on drawings reviewed by the Engineer and provided that the ends of such pipe are clean of all concrete, grease, scale

and dirt. All welding shall be accomplished as specified in accordance with the latest AWS standards. After field welding is complete and inspected by the Engineer, all exposed portions of the cylinder and joint shall be wrapped with eighteen (18) gage stucco wire and then cement grout band coated with CLASS I grout specified in Section 21 of these Specifications. The grout band, once finished, shall immediately be coated with a membrane-type, fast-curing material that will seal the band surface completely.

- b. Appropriately sized joint rings for joining CL and/or CL&C pipe shall be welded to the cylinder to form a self-centering bell and spigot type joint sealed by a compressed rubber gasket conforming to the requirements of said Federal Specification SS-P-381a. When such method of jointing is used,

CLASS I mortar, as specified in said Section 21, shall be used to point the joint on the inside and CLASS I grout, conforming to said Section 21, shall be used to completely fill the annular space between abutting pipe sections on the outside.

- c. Flexible steel couplings for joining CL and/or CL&C pipe shall consist of acceptable beveled or flared sleeves, pressed or rolled steel flanges, rubber or neoprene gaskets and steel bolts with hexagon nuts.

- D. Plastic Pipe - Plastic pipe, fittings and joint materials specified herein consist of Acrylonitrile Butadiene Styrene (ABS), High Density Polyethylene (HDPE) and Poly-Vinyl Chloride (PVC). All materials incidental to plastic pipe installations such as gaskets, joint lubricants, cements, etc., shall be supplied by the pipe manufacturer. All plastic pipe required in odd lengths shall be cut using a proper cutting tool and guide that ensures true line cut on planes perpendicular to the pipe axis. No bevel cuts for pipeline alignment adjustments will be permitted.

HDPE plastic pipe shall be bedded in 2-sack cement slurry wherever exposed in open trench. ABS Composite Pipe shall be bedded in pea gravel or backfill sand.

PVC plastic pipe shall be bedded and backfilled as specified with extra care taken in compaction of said bedding and backfills as specified in Section 16-03.F.9 of these Specifications.

The inside diameter of an installed section of plastic pipe shall not be allowed to deflect more than indicated below.

PVC SEWER PIPE DEFLECTION STANDARDS

<u>PIPE SIZE, IN.</u>	<u>MANDREL O.D., IN.</u>	
6	5.619 }	
8	7.524 }	
10	9.405 }	ASTM D-3034
12	11.191 }	SDR 35
15	13.849 }	
18	16.924 }	ASTM F-679
21	19.952 }	T-1 Wall
Over 21	Not Allowed	

Rerounding through the use of a vibratory machine will not be permitted.

1. ABS Pipe - All ABS pipe six (6) inches and greater in diameter shall conform to the requirements of ASTM Designation D 2680-86 as it applies to Composite Pipe. Fittings or parts thereof for the above-mentioned pipe sizes not manufactured under the provisions for Composite Pipe shall be shop fabricated or molded from resins specified and shall conform to the physical requirements in said ASTM D 2680 and shall be tested and proved to be equivalent quality to the pipe.

All ABS solid wall pipe and fittings less than eight (8) inches in diameter (side sewer) shall, at a minimum, conform to the requirements of ASTM Designation D 2751-75 and D 1527 as they apply to type SDR 35 and Schedule 40 ABS sewer pipe respectively using solvent cement joint assembly systems.

- a. Cement used for all ABS pipe joints shall conform to paragraph 7.3 of ASTM D 2680. Jointing shall be accomplished by applying a coating of cement to the inside to the socket and to the outside of the spigot end of pipe to be joined in sufficient quantity that when the spigot is fully inserted into the socket a bead of excess cement will form around the entire circumference of the outside juncture of said spigot and socket. Excess cement shall then be removed. The Contractor shall apply a coating of cement to all pipe ends of ABS Composite pipe whether within a coupling or not. The purpose is to prevent migration of ground water into the annular space.
- b. All ABS pipe entering or leaving a concrete structure shall have a standard (water stop) manhole gasket, as supplied by the pipe manufacturer, firmly clamped around the pipe exterior and cast into the structure base or near the structure wall center as a water stop. Where high groundwater is anticipated a LinkSeal may be substituted for a water stop at the discretion of the Engineer.

- c. ABS pipe is allowed for side sewers only and may not be installed outside the property line.
 - d. Individual pipe lengths for side sewers shall not exceed twelve and one-half (12.5) feet.
 - e. See Section 18-02.E for repair procedures for ABS pipe in new construction.
2. HDPE Pipe – All HDPE pipe and fittings shall, at a minimum, conform to the requirements of PPI/ASTM Designation PE 3408 with a material classification as per ASTM 1248, III C 5 P34 and a cell classification of PE 345434C. The pipe shall be gray in color and shall consist of virgin high molecular weight polyethylene, specified under ASTM D3350. All HDPE pipe shall be heat-welded, seamless pipe. Alternately, electrofusion HDPE couplings may be used to connect sections of HDPE pipe.
- a. HDPE pipe shall have a yield tensile strength of at least 3,200 psi and a ratio of pipe diameter to wall thickness of SDR 17 or better.
 - b. Side sewer connections to HDPE pipe shall be made by heat-welding an HDPE stub onto the main and tapping the pipe.
 - c. Neoprene gasket repair couplings with stainless steel shear bands may be used only to connect HDPE pipe to other pipe materials.
 - d. All HDPE pipe entering or leaving a concrete structure shall have a standard (water stop) manhole gasket, as supplied by the pipe manufacturer, firmly clamped around the pipe exterior and cast into the structure base or near the structure wall center as a water stop. Where high groundwater is anticipated, a Linkseal may be substituted at the discretion of the Engineer.
3. PVC Solid Wall Pipe
- a. All PVC pipe and fittings shall, at a minimum, conform to the requirements of ASTM Designation D 3034, minimum wall thickness of SDR 26, ASTM Designation F-679 Type PS-115, or the requirements for PVC pressure pipe, as they apply to type SDR 26 PVC Sewer Pipe using an Elastomeric Gasket Joint in a bell and spigot assembly system. Rubber sealing gaskets shall meet the requirements of ASTM Designation D-1869 or F-477.
 - b. All PVC pipe entering or leaving a concrete structure shall have a rubber sealing gasket, as supplied by the pipe manufacturer, firmly

seated perpendicular to the pipe axis, around the pipe exterior and cast into the structure base or near the structure wall center as a water stop. Said water stop may also consist of a manhole coupling with rubber sealing rings cast into the structure base. All rubber ring gaskets shall be in accordance with ASTM Designation F-477. Lubricant used for field assembly of gasketed PVC Pipe shall have no detrimental effect on the gasket, joint, fitting or pipe and shall be as recommended by the manufacturer. Where high groundwater is anticipated, a Linkseal may be substituted at the discretion of the Engineer.

- c. PVC pipe joining may occur at any convenient distance beyond and/or between structures.
- d. Cement used for non-gasketed PVC Pipe shall conform to ASTM Designation D 2564. Jointing of wet pipe is not allowed. Jointing of pipe shall be accomplished by applying a coating of cement to the inside of the bell and the outside of the spigot. The cement shall be applied in sufficient quantity to produce a bead of cement around the entire circumference of the pipe joint. Excess cement shall then be removed.
- e. See Section 18-02.E for repair procedures for PVC pipe in new construction.
- f. All sun-faded pipe or pipe with noticeable surface defects will be rejected and shall be replaced by the Contractor.

4. PVC Pressure Pipe

- a. Where PVC pressure pipe is required, PVC pressure pipe shall conform to the requirements of AWWA C-900-16 minimum Class 150 for Pressure Pipe manufactured in sizes from four (4) inches to thirty-six (36) inches in diameter. PVC pressure pipe shall be furnished in Ductile Iron Pipe equivalent outside diameters with rubber gaskets, separate couplings, or approved equal. Thrust restraint shall be provided at valves and changes of direction for pressure flow applications.

18-02 INSTALLATION

- A. Main or Trunk Sewer Installation by Open Cut Methods - All main and trunk sewer pipe installations shall be accomplished as specified, except where modified by the requirements peculiar to the various types of pipeline materials

specified under Section 18-01.C and D.

1. All sewer pipe shall be laid with a minimum six (6) inches vertical clearance from all other improvements and utilities, unless otherwise restricted by the other agency. Refer to the Pipe Cover Requirements at Section 4-02.C for minimum cover requirements. All pipe shall be laid to conform to the prescribed line and grade as shown on the plans and each pipe length checked to the grade line which the Contractor established from the grade stakes.

This grade line shall be established before any pipe is laid in the trench. For pipes with slopes greater than one (1) percent, the string line set for trenching purposes may be used as the grade line. For pipes with slopes less than one

(1) percent, either: (1) a grade line shall be established in the bottom of the trench such that the top of each bell will touch the line when the pipe has been properly positioned or, (2) a grade line shall be established above the trench on firmly secured batter boards from which the grade of each pipe can be checked by using a grade pole.

Alternate use of commercial LASER grade setting systems in lieu of string lines specified herein are acceptable when the following requirements and conditions are met:

- a. The Contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the LASER and said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Sections 1516 and 1800 through 1801 of said Orders for applicable requirements. .
- b. All LASER control points shall be established benchmarks or construction offset stakes identified on cut sheets and set in the field for the work. LASER set up points shall be on these control points or on points set directly from them by instrument.

2. Each length of pipe shall be laid on compacted, standard bedding material as specified and shall have full bearing for its entire length between bell holes excavated in said bedding material to allow for unobstructed assembly of all bell and spigot joints. 'Stabbing', 'Swinging In', or 'Popping On' spigot ends of pipe into bell ends will not be permitted. After jointing is accomplished, all annular spaces between pipe and bell holes shall be packed with bedding material, taking care not to damage, move, or lift the pipe from its bedding support.

Minimum two (2) foot pipe lengths may be supplied to install short radius curves conforming to the deflection limitation set forth in Section 4-02.A.3 of these Specifications.

Adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping bedding material under the body of the pipe. No wedging or blocking to support the pipe will be permitted.

A sewer line, gravity, or pressure, unless otherwise permitted by the Engineer, shall be laid, without break, upgrade from point of connection to existing sewer and with the bell end forward or upgrade. Pipe shall not be laid when the Engineer determines that the condition of the trench or the weather is unsuitable. When pipe laying is not in progress, the forward end of the pipe shall be kept effectively closed with an acceptable temporary plug or cap.

Sewer pipes, branches, stubs, or other open ends that are not to be immediately connected, shall be plugged or capped with a standard watertight plug or cap, as approved by the District for use in the particular installation. (See Approved Materials List.) The plug or cap shall be placed on a standard end. Open pipe ends on which rodding inlets, etc., are to be constructed shall be plugged with mechanical expanding plug at all times until the structure is completed and the cover is in place.

All rigid pipe entering and leaving manholes or other structures shall have a joint within forty-eight (48) inches of the center of manhole base. (See Section 28-01.)

In all cases, flexibility of joints in or at the manhole base shall be preserved to prevent damage to the pipe by differential settlement.

All sewer line connections to manholes, trunk sewers, or side sewers shall be left uncovered until after the inspection has been made. After inspection of the connection, the trench shall be backfilled as specified.

The Engineer may, at any time, require special pipe to be laid in areas that are potentially unstable or subject to settlement if in the Engineer's opinion field conditions warrant.

If the sewer is to be laid in an area that is to be filled, and the cover prior to filling is less than five (5) feet, the pipe shall not be laid until the area has been filled to a level five (5) feet above the proposed pipe and compacted to ninety (90) percent relative compaction, unless otherwise authorized by the Engineer.

When a new main or trunk sewer is extended from other than an existing manhole and the first new manhole upstream of the connection establishes conditions prescribed under Section 4-02.B.11, the Contractor installing such new facilities shall also be responsible for installing backwater overflow devices in conformance with said Section 4-02.B.11 on existing side sewers so affected.

- B. Side Sewer Installations by Open Cut Methods - Attention is directed to Sections 4-01.C, 4-02, and 28-32 through 28-35 of these Specifications for additional details and requirements pertinent to side sewer installations. When a Backwater Overflow Device or Backwater Check Valve and Shutoff System is required as specified under Section 4-02.B.11, such installation shall be made at the time of connection and at a location where sewage can overflow without serious property damage on adjacent areas.

All side sewer pipe, where applicable, shall be laid in conformance with the above requirements for Main and Trunk Sewer Pipe laying and to the following requirements:

1. Whenever the grade of any sewer pipeline has been designated by the Engineer to be installed on less than the minimum slope ratios specified under Section 4-02.B.2 of these Specifications, such pipeline installations shall be done under instrument control of grades.
2. The maximum slope of any portion of a side sewer shall not be greater than one hundred fifty (150) percent, (1-1/2 vertical to 1 horizontal ratio).
3. If a building is located immediately adjacent to a sewer main, the point of connection to the main shall be sufficiently downstream of the building sewer outlet so that the above maximum slope is not exceeded.
3. When a lateral sewer is not installed and tested in conjunction with a main line installation, it shall be installed as follows to provide for air testing: Place a test plug, with adequate length of one-quarter (1/4) inch minimum diameter air hose attached, in the downstream end of the first length of pipe upstream of the saddle. Thread the air hose through each successive length of pipe as it is laid to the property line, then place a test fitting at the upstream end of the lateral and plug the straight through end of the fitting.

4. If a complete side sewer is to be installed and tested as one section of sewer, a test fitting or test plug (as shown in Section 28-37) shall be installed immediately upstream of the saddle and at any alignment fittings at the main sewer.

Complete installation of the side sewer from the test fitting or test plug to a point near the building plumbing outlet, but do not connect until testing is complete and inspected. Side sewers shall not be connected directly into manholes on the line. The final air test for townhouses and similar housing developments shall be performed as specified herein for complete side sewers after all other utilities for such units have been installed.

5. A house sewer shall be installed by first placing a test fitting on the upstream end of the lateral sewer, unless this fitting has been previously installed. Then proceed with the installation of the house sewer to a point near the building plumbing outlet, but do not connect until all testing is completed and inspected.
6. All upstream ends of side sewer installations for townhouses and similar cluster housing developments shall be plugged with a standard watertight plug or cap, as supplied by the pipe manufacturer, immediately after such installation and shall remain plugged until the time of building drain connection. No side sewers in this category may be used until the job has been completed and accepted by the District.
7. Test fittings (See Section 28-37) shall be wye or tee branches of the same type, size, and quality as that to the side sewer pipe, unless otherwise approved, and shall be installed where required. The branch of each test fitting shall be laid in an upright position.
8. If the vertical location of adjacent utilities is such that it is necessary to install side sewers over the utilities, the side sewer shall be installed after these utilities have been properly installed and backfilled.
9. Contractors may tap and install four and six-inch diameter laterals on new HDPE and DIP sewer main pipelines under the following conditions:
 - a. All taps and materials used are to be installed in strict compliance with the pipe manufacturer's recommendations.
 - b. The location of each tap is to be verified by the Inspector prior to the drilling of each tap. Taps shall be spaced a minimum of two (2) feet for DIP. Contractors shall not be allowed to make taps on CIP, ABS or PVC. Taps may be allowed on VCP of 12 inches diameter or larger, only.

- c. All taps to be made by contractors on New Projects shall be noted on the Plans.
10. To mark the location of laterals, a three (3) inch wide strip of green plastic electronically detectable marking tape shall be installed horizontally one (1) foot below subgrade from the main line end of each sewer lateral. The electronically detectable tape shall be labeled "Buried Sewer Line Below."

When a lateral sewer is installed in advance of the house sewer, it shall be terminated five (5) feet within the property line. The contractor shall mark the location of the plugged end of the lateral with a No.4 reinforcing bar brought up to grade.

11. When an existing building that is sewerred by a septic tank is to be connected to the public sewer system, the new side sewer shall be installed in accordance with these Specifications. A cleanout and backwater overflow device shall be installed at the building, and a new side sewer shall be installed from the building to the public sewer. If a portion of the existing piping from the building to the septic tank is a minimum of four (4) inches in diameter and will hold a pressure test, as required in Section 18-03.B.2., that portion of the existing piping may be used in the new side sewer.

The air test of any existing piping, as well as the installation of the new side sewer, must be completed and accepted before the existing septic tank is removed from service. Removal of a septic tank from service shall be in accordance with the regulations of the Health Officer of Contra Costa County dated March 18, 1983, as follows:

"420-1.609.3 Abandonment of a Septic Tank. An abandoned tank shall be backfilled immediately. The tank shall be uncovered and filled with compacted dirt or sand. Gravel or crushed stone is not acceptable. If the drain field is not flooded, it may not be necessary to pump out the tank as the contents will rise and overflow to the drain field. The tank contents shall not be permitted to surface. Slight mounding of the final cover is acceptable to allow for subsequent settling.

- C. Connections to Existing Sewerage Systems - The existing sewers are shown on the Plans at the locations where the new sewers are to be connected. It is the responsibility of the Contractor to determine the exact location and depth of the existing sewers prior to the installation of any sewer pipe.
 1. Connection of new main and/or trunk sewers to existing lines up to and including forty-eight (48) inch in diameter shall be made at existing manholes or by constructing a new manhole over the point of connection or by removing an existing rodding inlet or plug. Where the connection is

to be made into an existing manhole, the Contractor shall make the connection by breaking through the manhole shelf to the existing channel, installing the new pipe (see Sections 28-01 and 02 for required joints), finishing a new channel within the manhole and repairing any damage to the structure. Where the connection is to be made by constructing a new manhole on an existing sewer, the manhole and new connection shall conform to details as shown in Sections 28-01 and 02. The existing sewer shall not be broken until immediately before the cleaning and flushing operation commences. Where the connection is to be made at a removed rodding inlet or plug, an air test fitting shall be installed at the connection of new and existing pipelines in preparation for said test, as directed by the Engineer. In each of the applicable cases mentioned above, temporary plugs shall be installed as specified in Section 21-17 of these Specifications.

2. Where wyes, tees, and/or laterals were previously installed on the main sewer, the side sewer shall be connected to the wye, tee or lateral as provided for the particular connection. Side sewer or lateral connections to new or existing manholes shall be as detailed on the drawing for Standard manholes (see Sections 28-01 and 02), unless otherwise shown on the Plans or directed by the Engineer. All side sewer connections shall be made with fittings or adapters recommended by the manufacturer for use with the particular pipe.
 - a. Side sewer connections to main sewers ten (10) inches or smaller where wyes, tees, or laterals were not installed, the Contractor shall install a new wye or tee to make the connection. A tap and saddle connection will not be permitted unless the standard fitting cannot be installed. The Contractor shall make arrangement for said tap and saddle at least forty-eight (48) hours in advance of the time the Contractor intends work. Contractors shall have adequate shoring on the jobsite conforming to the requirements of Section 16-02.C of these Specifications for the trench they plan to excavate. Contractors who have taps scheduled for District forces to install shall have a minimum of two (2) sets of approved shoring equipment at the site of work.
 - b. The required excavation and cleaning of main surfaces for a tap and saddle shall be performed by the Contractor and when such taps are installed by District forces, the Contractor shall have the additional materials and equipment at the job site as follows: hard hats for all workers under its supervision; barricades; proper pipe; Standard Bedding material as specified under Section 16-03.C.1 of these Specifications; and a ladder long enough to extend two and one half (2-1/2) feet above the top of the excavation. The Contractor will be charged a minimum of one (1) hour standby time (including overhead charges established by the District) when the

above-mentioned materials and equipment are not on hand at the jobsite when the work is scheduled. The excavation shall provide a minimum clearance of three (3) inches under and six (6) inches on each side of the main sewer for a distance of twelve (12) inches each way along the main from the point of connection. The outer surface of the main in this exposed area shall be thoroughly cleaned.

The excavation above the main, for the tap working area, shall be a minimum of two (2) feet in width without under-cut sides and shall be properly shored. Before the tap is made, the Contractor shall have sufficient standard bedding material at the site of the work to adequately backfill under the saddle to support it. No backfill shall be placed on the saddle fitting within one-half (1/2) hour after the completion of the work by District forces. If the Contractor breaks or otherwise damages the main while excavating for the tap, he shall notify the District and shall make repairs as necessary at the Contractor's sole expense.

- b. Side sewers equal in size to the main sewer shall be connected by installing a standard wye branch or tee fitting, of the same size and type of material as the main line, into the main line at the point of connection. The installation of the standard wye branch or tee shall be arranged with the District and the work will be performed by the Contractor. For a tee or wye installation, the Contractor shall excavate six (6) feet along the main line and install sufficient shoring to ensure a safe trench. The Contractor shall also provide ladder, bedding, and other necessary items as specified above in Section 18-02.C.2.a.

D. Repairs to Existing Side Sewers and Mains - The Contractor will make all repairs to existing sewer lines unless otherwise ordered by the Engineer. Repairs to main sewers shall be made using the same pipe material as the existing pipe. Repairs to side sewers shall be made using service weight soil pipe or CIP of quality stipulated by the Engineer and shall conform to the general requirements of Section 28-35. When a repair of a damaged section of pipe is required within 18 inches of a pipe joint, the repair replacement section shall be extended to include the joint. All repair couplings shall have shear bands. If an existing side sewer is being repaired or altered, a backwater overflow device or backwater check valve and shutoff system shall be installed on such side sewer system as part of the work.

E. Repairs to New Sewer Mains - The contractor shall use caution when doing construction on sewer pipelines. If the contractor damages new main sewer pipe during construction, the contractor shall contact the construction inspector to determine the type and extent of repairs necessary. The construction inspector shall determine if the damage is repairable or if complete sewer line replacement

is necessary. When a repair of a damaged section of pipe is required within 18 inches of a pipe joint, the repair replacement section shall be extended to include the joint. Repair procedures shall comply with the following:

1. VCP, CIP and DIP SEWER MAINS – Manufacturer's recommended couplings and/or clamps shall be used. Remove the damaged section by squarely cutting the ends of the damaged section and smooth the ends of the remaining pipe as needed. Cut replacement sections of pipe to fit with a maximum gap of one-half inch at each joint. Slide couplings/clamps onto appropriate ends and insert the replacement pipe. Slide couplings over the new joint and tighten accordingly. Place compacted bedding material around pipe prior to backfilling.
 2. HDPE SEWER MAINS – A standard heat welded coupling is required for each joint. A minimum of a two-foot length of pipe shall be used. Do not apply test pressures for 16 hours, but install 2-sack slurry backfill as soon as desired.
- G. Side Sewer Construction Requiring a Residential Sewage Pump - All information applicable to Section 28-50 shall be submitted and reviewed in accordance with Sections 28-50 and 4-01.Bb before a permit is issued or any work can begin on the side sewer or pumping system.
- H. A residential sewage pump station is subject to the provisions of CCCSD Standard Specifications Section 15.13100 Individual Lot Pumping Systems, Section 28-50, Section 28-50a, and approval by the Engineer.
- I. Pipe Installation Using Pipe Bursting Methods - Sewers that are installed using the pipe bursting installation method shall be installed in accordance with Section 29 – Pipe Bursting.
- J. Pipe Rehabilitation Using Cured-in-Place Pipe Methods - Sewers that are rehabilitated using the cured-in-place pipe method shall be installed in accordance with Section 30 – Cured-in-Place Pipe.

18-03 CLEANING AND TESTING

- A. Description - All work involved in testing and preliminary cleaning of sewer lines between manholes and/or rodding inlets, as required herein, shall be completed prior to the submission of the request for television inspection. In new subdivisions or projects involving possible conflicts with other underground utilities, preliminary tests may be conducted at the discretion and expense of the Contractor at any time, but the final test for acceptance will be made after the installation of all underground facilities and installation of aggregate subbase, but prior to installation of aggregate base. In wet weather, the Contractor may perform final tests after the installation of aggregate base. Where new roadways are to be all asphalt concrete layer constructed, pipelines installed under such paved ways shall be air tested prior to placement of the final layer of said asphalt concrete pavement.

If damage is done to the sewer system subsequent to the final test, the Contractor will be required to make another final test after the damage has been repaired. All final testing and cleaning of sewer lines shall be done in the presence of the Engineer. The Contractor shall furnish all labor, materials, tools, and equipment necessary to make the test, clean the lines, and perform any work incidental thereto. Precautions shall be taken to prevent joints from moving during tests, and any damage resulting from tests shall be repaired by the Contractor at his own expense. The type of test and the time of testing shall be specified by the Engineer.

- B. Testing - The Contractor shall perform pressure tests on the total footage of all new sewer pipeline installations after such pipelines have been properly installed, including necessary test fittings, backfilling, and, in the case of all main and trunk sewer pipeline installations, before all required District television inspections specified under Section 11-08 of these Specifications.

In new tract or subdivision developments, pressure testing shall be performed only after the installation of all proposed lateral sewers to the main sewer system has been completed. Attention is directed to Section 18-02C of these Specifications for other side sewer system installations to be air tested.

1. SEWERS UP TO AND INCLUDING 17-INCH DIAMETER - Low pressure air tests shall be conducted in accordance with the following Test Procedure and the details shown on Sections 28-37 of these Specifications. All necessary test equipment shall conform to the requirements of said Section 28-37 in proper working order and tests shall be made in the presence of the Contractor and a District representative. Test plugs shall be carefully placed at each end of the section of line to be tested. When all necessary test equipment (see Section 28-37) is in place, a compressed air supply shall be attached to the air fitting on the test equipment and the air pressure within the line increased to four (4) pounds per square inch (psi). After the air supply is securely turned off or

disconnected, there shall be a two (2) minute waiting period to allow stabilization of air within the sewer line before the actual test period begins. In no case shall the air pressure, within the line, be less than 3.5 psi at the beginning of the test period. The allowable air pressure loss shall not exceed one (1) pound per square inch. When testing sewers up to and including seventeen (17) inches in diameter, refer to Section 28-37 of these Specifications for the length of the test period (minimum two (2) minutes). When testing side sewers, or portions thereof, the test period shall be two (2) minutes and the allowable loss shall not exceed one (1) pound per square inch. After completion of a test, the air pressure shall be released slowly through the valve, which is incorporated in the test equipment.

Air test plugs shall not be removed until the air pressure is no longer measurable.

2. SEWERS GREATER THAN 17-INCH DIAMETER

a. Exfiltration Test

New sewers larger than 17 inches in diameter shall be hydrostatically tested in accordance with the following procedure:

After installation, all new Trunk Sewer pipelines shall be thoroughly cleaned prior to pressure testing. A section of trunk sewer shall be prepared for testing between two structures by plugging the inlet side of the discharge manhole and all openings in the upstream manhole except the discharge opening. All plugs shall be properly braced against the manhole wall to withstand the forces of the test in order to prevent loss in the event of a failure.

A section of the trunk sewer prepared as above shall be tested by filling it with water to an elevation five feet above the top of pipe at the upstream end of the test section, or five feet above the existing groundwater elevation, whichever is greater. The water shall be introduced into the test section at least one hour in advance of the official test period to allow the pipe and joint material to become saturated. The loss in water may be determined by measuring the rate of fall of the water level, but the level shall not be allowed to fall less than one foot below the specified head during the test prior.

For RCP, the pressure shall be maintained for not less than four hours and the leakage rate shall not exceed two hundred (200) gallons per inch of diameter per mile of pipe for 24 hours (ASTM C 969-82). For VCP, the pressure shall be maintained for not less than one hour and the leakage rate shall not exceed two hundred (200) gallons per inch diameter per mile for 24 hours (ASTM C

1091-88). For DIP, the pressure shall be maintained for not less than one hour and the leakage rate shall not exceed seventy (70) gallons per inch diameter per mile of pipe of 24 hours (AWWA C600-54T). All expenses of testing shall be borne by the contractor.

b. Infiltration Allowance

In addition to the requirements of Section 2(a) above, infiltration shall not exceed 15 gallons per day/inch diameter/1000 linear feet on new sewers greater than 17-inch diameter.

C. Cleaning - All new main and trunk sewer installations, and such site collector and side sewer system installations deemed necessary by the Engineer, shall be cleaned as required herein with a cleaning ball or device in accordance with such device manufacturer's instructions or recommendations and/or flushed prior to sanitary waste use. If high-pressure water cleaning such as hydro-flush is utilized, the pressure must be maintained below 2000 psi. Sand traps with screens shall be used in trapping debris, shall be in accordance with Section 28-39 and shall be secured to the manhole to prevent the sand trap from entering the pipe. All cleaning, including screen installations and removal, shall be accomplished by the Contractor in the presence of the Engineer.

1. After all work on the pipeline installation has been completed to the satisfaction of the Engineer, including all manhole channeling and final pressure testing, but prior to any final pavement placements and television inspection, the Contractor shall perform a preliminary cleaning in conformance with this Section 18-03.C to prepare installations for District television inspections in accordance with Section 11-08 of these Specifications.
2. Prior to acceptance, and after all other required inspections, and after the installation of final paving, top block, frames, and covers, the Contractor may be required to clean the pipeline a final time in conformance with this Section 18-03.C unless debris covers are installed in the manholes after television inspection.

D. Television Inspection of New Work - The Contractor shall arrange for television inspection in accordance with the following procedures:

1. The complete job is ready for television inspection when the following work has been completed:
 - a. All sewer pipelines are installed, backfilled, and compacted.
 - b. All structures are in place, all channeling is complete and pipelines are accessible from structures.

- c. All other underground facilities, utility piping, and conduits are installed.
 - d. Final street subgrading is complete. For wet weather periods, placement of aggregate base has been completed.
 - e. Pipelines to be inspected have been preliminarily cleaned and flushed.
 - f. Final pressure test has been completed.
2. After the above work is complete, the Contractor shall arrange for television inspection at his/her sole expense.
 3. The entire job will be initially televised by the Contractor and recorded in NASSCO PACP format DVD for the District to keep.
 - a. If no deficiencies are observed, the work will be considered satisfactory.
 - b. If deficiencies are observed, any defects serious enough to require correction will be determined by the District.
 4. Notification will be made in writing of any deficiencies revealed by the television inspection that will require repair. If corrective work is indicated and viewing of the videotapes is desired, the District shall be contacted to set a time for the viewing with the Engineer.
 5. Corrective work shall be done. District reserves the right to require another re-air test of any repair.
 6. Those portions of the pipeline system that have been corrected must be re-televised for District review.
 7. The procedure outlined in conditions 1 through 6 above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the District.
 8. All sewer main stubs will be televised.
 9. The following observations from television inspections will be considered defects in the construction of sewer pipelines and will require correction prior to paving:
 - a. Low spot 0.125 x diameter of pipe or greater, i.e. 1" for 8" pipe

- b. Joint separations [three quarters $3/4$ inch or greater opening between pipe sections]
 - c. Cocked joints present in straight runs or on the wrong side of pipe curves
 - d. Chips in pipe ends
 - e. Cracked or damaged pipe
 - f. Offset joints
 - g. Infiltration
 - h. Debris or other foreign objects
 - i. Other obvious deficiencies
 - j. Irregular condition without logical explanation
10. Television-inspection of new work and the correction of observed defects will not relieve the Contractor of its responsibility for the one-year guarantee period. The District may inspect and/or televise portions of any projects during said guarantee period. This inspection may include a televising of the pipelines and the checking of the pipeline deflection in the case of plastic pipes.

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SECTION 21

CONCRETE STRUCTURES

21-01 DESCRIPTION

Concrete manholes, manhole bases, expansion blocks, pedestal supports, walls, and all other types of concrete structures shall be constructed to the dimensions, lines and grades given by the Job Engineer and in accordance with the designs shown on the Standard Drawing or Plans. Class A concrete shall be used, and the aggregate shall conform to the combined aggregate size designated as one inch maximum.

21-02 DEPTH OF FOOTING

The elevations of the bottoms of footings, as shown on the Plans, shall be considered as approximate only and the Engineer may order in writing such changes in dimensions or elevations of footings as may be necessary to secure a satisfactory foundation (see Section 16-05.A).

21-03 PUMPING OF WATER

Pumping of water from the interior of any foundation enclosure shall be done in such manner as to preclude the possibility of any portion of the concrete materials being carried away. No pumping will be permitted during the placing of concrete, or for a period of at least eight (8) hours thereafter, unless it is done from a suitable sump separated from the concrete work.

21-04 FORMS

The forms shall be smooth, mortar-tight, true to the required lines and grade, and of sufficient strength to resist any appreciable amount of springing out of shape during the placing of the concrete. All dirt, chips, sawdust, and other foreign matter shall be thoroughly removed from forms before any concrete is deposited therein. Forms previously used shall be thoroughly cleaned of all dirt, mortar and foreign matter before being reused. Before concrete is poured in forms, all inside surface of the forms shall be thoroughly coated with form oil. The form oil shall be of high penetrating qualities leaving no film on the surface of the forms that can be absorbed by the concrete.

Falsework and forms supporting concrete beams, ribs, slabs, or other members subject to direct bending stress and forms on the underside of structures shall not be removed or released in less than twenty-one (21) days after the concrete has been placed, unless concrete test cylinders shown a strength of not less than three thousand (3,000) pounds per square inch in compression when cured under conditions similar to those affecting the structure. At times of low temperatures or other adverse conditions, the Job Engineer may increase the curing time.

Forms for all surfaces, which will not be completely enclosed or hidden below the permanent surface of the ground, or where plywood forms are not specified, shall be made of surfaced lumber or material that will provide a surface equally satisfactory. Any lumber or material that becomes badly warped or checked prior to placing of the concrete may be rejected.

All exterior angles shall be chamfered with one (1) inch by one (1) inch triangular fillets, unless otherwise directed by the Engineer. The triangular fillets or chamfer strips shall be milled or surfaced on all sides. Curved surfaces shall be formed of strips of matched lumber not over four (4) inches wide or of other material, such as plywood or metal.

Forms shall be sufficient strength to carry the dead weight of the concrete as a liquid without appreciable deflection, and if any such deflection occurs, it shall be sufficient cause for the rejection of the work. Form clamps or bolts shall be used to fasten forms. The use of ties consisting of twisted wire loops to hold forms in position during placing of concrete will not be permitted.

Bolts or form clamps shall be positive in action and shall be of sufficient strength and number to prevent spreading of the forms. They shall be of such type that they can be entirely removed or cut back one (1) inch below the finished surface of the concrete. All forms for the outside surfaces shall be constructed with stiff wales at right angles to the studs and all form clamps shall extend through and fasten such wales.

Forms for exposed surfaces shall be constructed of plywood or material that will produce a surface substantially equal to that which would result by the use of plywood forms.

21-05. FALSEWORK

When specified or requested, detailed plans of the falsework shall be supplied to the Job Engineer, but in no case shall the Contractor be relieved of responsibility for results obtained by use of these Plans.

All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads.

Falsework shall be founded upon a solid footing.

21-06. PLACING CONCRETE

All dirt, chips, sawdust, and other foreign material shall be removed from the forms prior to depositing any concrete. All concrete or mortar shall be used while fresh and before it has taken an initial set. Re-tempering any partially hardened concrete with additional water will not be permitted.

Any concrete pour involving four (4) or more cubic yards shall be made only under the

inspection of Engineer.

Where pavement or surfacing is to be placed around or adjacent to manholes, or other structures, which will be located within traffic lanes, concrete around such structures shall be poured to a grade two (2) inches below final pavement or surfacing.

Concrete, when mixed, shall be deposited immediately without segregation of its ingredients and shall be consolidated with internal vibrators in layers until it is thoroughly compacted, all voids are filled and free mortar appears on the surface. The concrete shall be placed as close as possible in its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be permitted. Fresh concrete shall not be permitted to fall from a height greater than six (6) feet without the use of adjustable length pipes or "elephant trunks."

The use of external vibrators for compacting concrete will be permitted when the concrete is otherwise inaccessible for adequate compaction provided the forms are constructed sufficiently rigid to resist displacement or damage from external vibration.

The use of chutes in conveying or depositing concrete will be allowed only at the discretion of the Job Engineer, and wherever they are used, they shall be laid at such inclination as will permit the flow of concrete of such consistency as is required. Where necessary in order to prevent separation, chutes shall be provided with baffle boards or a reversed section at the outlet.

NO CONCRETE SHALL BE DEPOSITED UNDER WATER.

21-07. CONSTRUCTION METHODS

The concrete in each integral part of the structure shall be placed continuously, and the Contractor will not be allowed to commence work on any such part until all material is on hand, and its forces are sufficient to complete the part without interruption.

21-08. JOINTS

Construction joints shall be made only where located on the plan or shown in the pouring schedule. In case of emergencies, joints shall be placed as directed by the Engineer.

When it is necessary to make a joint because of an emergency, additional reinforcing steel shall be placed across the joint as directed by the Engineer.

After the pour has been completed to the construction joint and after the concrete has taken a permanent set, the entire surface of the joint and the rebar shall be thoroughly cleaned of surface laitance and clean aggregate shall be exposed by wire brushing, sandblasting, or air and water pressure jets.

21-09. WATERSTOPS

Waterstops shall be furnished and installed in accordance with the details shown on the Plans.

21-10. BONDING

Construction joints shall be mechanically bonded by means of keys cast into the surfaces in contact. Keys shall be formed by beveled strips or boards placed at right angles to the direction of shear. Except where otherwise specified, keys shall be at least one and one-half (1-1/2) inches in depth over at least twenty-five (25) percent of the area of the section.

Where existing concrete and new concrete are to be joined, holes shall be drilled in the existing concrete and bar reinforcing steel dowels grouted in place as shown on the plans. The holes shall be filled with grout before placing the dowels.

Immediately before making a new concrete pour, the entire contact surface of the construction joint or the existing concrete structure shall be cleaned by methods specified in Section 21-08.

21-11. CURING

With certain exceptions described below, all newly placed concrete shall be kept wet by the continuous application of water for the first seven (7) days after the concrete has been placed. Water for use in curing concrete shall conform to the requirements for water for use in the manufacture of concrete.

Concrete surfaces where only Ordinary Surface Finish is to be applied and of which a uniform color is not required and which will not be visible from the traveled way, may be cured by the pigmented sealing compound method. Surfaces to be cured by the pigmented sealing compound method shall be kept moist or wet until the sealing compound is applied, and it shall not be applied until all patching or surface finishing has been completed.

21-12. SURFACE FINISHES

Ordinary Surface Finish in conformance with Section 51-1.18A of the State's Standard Specifications shall be applied to all concrete surfaces either as a final finish or preparatory to a higher class finish. On surfaces which are to be buried underground and are in contact with the ground or specified backfill, the removal of fins and form marks and the rubbing of mortared surfaces to a uniform color will not be required. Ordinary surface finish, unless otherwise specified, shall be considered as a final finish.

During the pouring of concrete, care shall be taken that the methods of compaction used will result in a surface of even texture free from voids, water, or air pockets, and that the coarse aggregate is forced away from the forms in order to leave a smooth

mortar surface.

Forms on all vertical faces that do not act as supporting members shall be removed as soon as practicable, but not sooner than forty-eight (48) hours after the concrete is poured.

Immediately after the forms have been removed, all form bolts shall be removed to a depth of at least one (1) inch below the surface of the concrete. All holes and depressions caused by the removal and setting back of such form bolts shall be cleaned and filled with a mortar of matching color. Care shall be exercised to obtain a perfect bond with the concrete. All fins caused by form joints, and other projections shall be removed and all pockets cleaned and filled. Cement mortar for filling pockets shall be treated as specified for bolt holes. In the judgment of the Engineer, if rock pockets are of such an extent or character as to materially affect the strength of the structure or to endanger the service life of the steel reinforcement, the Engineer may declare the concrete defective and require the removal and replacement of that portion of the structure affected.

21-13. MANHOLE BASES

- A. Cast-in-place manhole bases are intended to be poured against native, undisturbed material, which has been excavated to the dimensions shown on the plans (see Sections 28-01 through 28-08). If the Contractor over-excavates beyond the horizontal dimensions shown on the standard drawings, he shall construct forms and pour the base to the specified dimensions.

A forming ring shall be used to form a level joint groove in fresh concrete of a manhole base; to receive the first precast barrel section of the manhole. The metal forming ring may be removed as soon as the concrete has set sufficiently to eliminate any slump in the joint groove.

Special approval must be obtained from the District prior to any work on a manhole to be constructed in an existing street or other area, which requires that the manhole barrel be set directly into the freshly poured manhole base in order that the manhole may be backfilled the same day that it is excavated.

- B. Precast manhole bases will not normally be permitted. Precast manhole bases may be installed if they are specifically designated for use on the approved sewer construction plans. Precast manhole bases shall be manufactured in accordance with the requirements of ASTM Designation C478-85a. Precast manhole bases shall have a smooth flow line with a constant slope from inlet to outlet. Precast bases shall have a shelf area conforming to the requirements of Section 28-01. Aggregate base shall be placed in accordance with the requirements of Section 16-05.0. Precast manhole bases shall be installed to the sewer design lines and grades shown on the plans and shall be installed as an integral part of the pipe laying operation.

21-14. MANHOLES

All manhole precast sections shall conform to ASTM C-478-85a where not otherwise modified in the Standard Drawings of Section 28. Manholes shall be leak-free structures. Structures constructed with precast sections shall be so constructed using a single manufacturer's products and/or with such compatible products as may be recommended by the precast section manufacturer.

A. Types of Manholes -

1. Standard Manholes are precast reinforced concrete section manholes conforming to the applicable Section 28-01 or 28-02 requirements of these Specifications.
2. Special shallow manholes are precast concrete grade ring manholes conforming to the applicable Section 28-05 requirements of these specifications.
3. Syphon Manholes are reinforced cast-in-place concrete structures conforming to the applicable Section 28-08 or 28-09 requirements of these Specifications
4. Metering Manholes are precast reinforced concrete section manholes with appurtenances specified in Section 4-03.1 of these Specifications.

B. Manhole Channels - Where sewer lines pass through manholes, construction shall conform to the applicable Standard Detail. Pipe shall be used as a form for the channel. After the manhole base concrete has taken a set, the channel shall be carefully shaped and mortared to obtain a smooth channel. All channels shall be checked with the proper template.

C. Manhole Throat - The maximum depth of the manhole throat shall be eighteen (18) inches, measured from the top of the manhole cover to the lower extremity of the throat at the top of the cone section.

The throat shall be constructed by use of appropriately sized reinforced concrete grade rings that will bring the manhole cover to finished grade surface. No plastic sealing gaskets shall be used for jointing grade or extension rings in place.

D. Manhole Construction - All manholes shall be excavated and backfilled in conformance with the requirements of Section 16-05.D of these Specifications and installed as specified herein. All embedment materials under, around, and at least three (3) inches over all pipelines located within five (5) feet of structure bases shall be compacted without jetting prior to barrel section placement. All manholes shall be constructed to subgrade prior to jetting adjoining sewer pipeline trench and/or structure backfill where such method of compaction is

permitted and used.

All joint surfaces of precast sections and face of manhole base shall be thoroughly clean prior to setting precast sections. These various sections shall be set in preformed plastic sealing gaskets of material conforming to the requirements of Federal Specifications SS-S-00210.

1. Installation of gaskets
 - a. Apply one coat of primer to clean, dry joint surface (both tongue and groove) and allow to dry. Remove the paper wrapper from one side only of the two-piece wrapper on the gasket. The outside paper will protect the gasket and assure against stretching. Before setting the manhole section in the trench, attach the plastic gasket strips end-to-end to the tongue or groove of each joint, forming a continuous gasket around the entire circumference of the manhole joint.
 - b. Handling of barrel sections after the plastic gasket has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or covering it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced.
 - c. Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.
 - d. During cold or wet weather, pass direct heat over the concrete joint surface lightly until ice, frost, and moisture are removed and surface to be primed is dry and warm immediately before application of primer. Direct heat shall also be passed over plastic gasket strips immediately prior to attaching them to joint surfaces and immediately prior to insertion of tongue into groove.
 2. When plastic sewer pipelines are installed, the manholes constructed in conjunction with the pipelines shall be marked to indicate that the pipelines entering or leaving the manholes are plastic. The marking shall consist of a raised ceramic pavement marker epoxied to the top grade ring. The marker shall be white for PVC, yellow for ABS, and orange for other materials.
- E. Manhole Surface Block - Manhole blocks for precast manholes are intended to be poured against native, undisturbed earth or compacted structure backfill material, (see Section 16-05.0) which has been excavated to the dimensions shown on the drawings, (see Sections 28-01 and 28-02). If the Contractor over-excavates beyond or otherwise cannot maintain the horizontal or vertical dimensions shown on the Standard Drawings, the Contractor shall construct

forms to the specified dimensions prior to placement of concrete for the surface block.

- F. Manholes on Steep Slopes - All manholes to be located on slopes steeper than forty-five (45) degrees in easement areas shall be constructed without top blocks with the rim elevation set approximately twelve (12) inches above the adjacent upslope ground surface. The method proposed to attach the frame assembly to the cone shall be shown in a detail on the plans. Manhole rims and top blocks on less steep slopes shall have a reinforced concrete or reinforced concrete block retaining wall where required.

21-15. RODDING INLETS

Rodding inlets shall conform to Section 28-11. The frame and cover shall not be installed at the same time that the top block is poured. A recess shall be formed to receive the frame and cover. The Contractor may use repair couplings to extend the pipe portion of the rodding inlet structure on new installations when raising the inlet to its final elevation.

21-16. OTHER STANDARD STRUCTURES

All other standard structures to be made of concrete shall be constructed in accordance with this section and as detailed in Section 28.

21-17. TEMPORARY COVERS AND PLUGS FOR STRUCTURES

- A. Temporary Covers - Temporary covers for new construction or reconstruction of manholes shall be fabricated as detailed in Section 28-54.

Temporary covers shall be used during construction in subdivisions or other areas where final grades for unfinished roadbeds have not been determined, or where ordered by the Engineer.

A temporary debris cover, as described in Section 21-17.B, shall be placed over the base of any existing manhole prior to beginning any adjustment or repair work.

- B. Temporary debris covers (false bottom) should be installed in all manholes after TV. If covers are not installed the Contractor shall be required to clean and flush the lines a final time. See Section 18-03.C.2.

Temporary Plugs - Temporary plugs shall be mechanical expanding types. These plugs shall be installed and removed in the presence of an Inspector and shall be secured to the top 1 foot of a 2x4 using a 1/4 inch nylon rope. The 2x4 shall be of sufficient length to extend to within 6 inches of grade when placed on the manhole shelf. Temporary plugs shall be installed on all projects as noted below

and remain there intact, until immediately prior to the beginning of the cleaning and flushing operation.

1. If there is an existing manhole at the beginning of a new system, a plug shall be installed in the new pipe at the existing manhole and another plug installed on the downstream side of the first manhole upstream in the new system pipeline.
2. If the Contractor constructs a new manhole at the beginning of a new system, the existing pipe in that manhole shall not be broken until immediately prior to the commencing of the balling and flushing operation and a plug shall be installed on the downstream side of the first manhole upstream from the existing manhole.
3. If the new system begins at an existing rodding inlet or stub, a plug shall be installed on the downstream sides of the first two manholes upstream from the beginning of the new system.
4. Temporary plugs shall be installed in the open ends of sewer lines while adjusting, repairing, or pouring the top blocks on rodding inlets or similar structures.

21-18. RECONSTRUCTION OF EXISTING STRUCTURES

- A. General - The Contractor, when removing existing structures located on live systems, shall take precautions to insure that no foreign material enters into the existing sewer lines. Care shall be taken and proper methods employed to prevent pieces of concrete mortar, brick, wood, etc., from entering into the live lines.

During the period of time in which the Contractor is rebuilding a structure located on a live sewer system, District maintenance forces shall have continuous access to the structure. All work on the new structure shall be diligently prosecuted and shall be completed within three (3) days after the old structure is removed.

- B. Structure Adjustments and Repairs - All workmanship and materials for structure adjustments shall conform to the requirements of these Specifications and the provisions herein. In the case of existing brick or cast-in-place concrete structures, repair or adjustments shall be accomplished with materials in kind or with precast elements as detailed on the drawings.
1. Before any work is started on adjusting or repairing manhole, the channels in the base shall be covered with plywood or a similar material and then

the entire base covered with a heavy piece of canvas temporary debris cover. This temporary debris cover shall be kept in place during all work, and upon completion, picked up containing all debris. The canvas and the plywood shall be carefully removed from the manhole allowing no debris to fall or to remain in the manhole.

2. Existing structure precast elements, adjustment rings, frames, and covers removed in adjustments and/or repairs may be reinstalled only when such undamaged items are permitted by the Engineer for reuse.
3. Manhole adjustments shall be accomplished by one of the methods specified herein or as detailed on the Drawings.
 - a. Upward adjustments of standard manholes to finish grade surface may be accomplished with reinforced concrete grade rings or formed concrete (Case II) and/or a cast iron extension ring (Case I) when the completed manhole throat does not exceed a total of eighteen (18) inches; single concrete grade rings may be used for such adjustments not exceeding four (4) inches. In no case shall multiple cast iron extension rings be used in adjustments. When adjustments are made that position the bottom of the cast iron manhole frame above the existing concrete block, said block shall be extended to meet the requirements of Section 28-01 or 28-02 of these Specifications and as directed by the Engineer.
 - b. Precast reinforced concrete grade rings and/or cast iron extension rings shall not be used in upward adjustments of standard manholes that would create a completed manhole throat section exceeding eighteen (18) inches. In all such cases, the upper manhole section, including reinforced concrete block and cone section shall be removed and the adjustment shall be accomplished by use of additional manhole barrel sections, cone, grade rings, etc., (Case III) and such manhole reconstruction shall comply with the requirements of Section 28-01 or 28-02 and applicable provisions thereto of these Specifications.
 - c. Downward adjustments of standard manholes (Case III) may be accomplished by removal of existing grade or extension rings and/or, when specifically permitted by the Engineer, by carefully chipping the top of the existing precast cone section away such that the inside diameter of said cone at the top does not exceed twenty-seven (27) inches. When chipping the cone is so permitted, the chipped portion of the cone shall be mortared to a smooth, level surface with mortar in conformance with Section 19-01 and allowed to dry prior to replacement of the frame and cover. No downward adjustment by chipping will be permitted if the frame and cover casting is the standard weight variety (see Section 28-15). When

such removals and/or chipping will not accomplish the necessary adjustment, the upper manhole section, including barrel sections as required, shall be removed and the manhole reconstructed as specified in Section 21-18.B.3.b above. In all downward adjustments the dimensional requirements of the reinforced concrete block in the upper section of the manhole as detailed in said Section 28-01 or 28-02 shall be maintained or restored.

- d. Unless otherwise designated by the Engineer, when adjustment of an existing standard main or trunk manhole in a street or other traveled way is required and no manhole surface block exists, the Contractor performing the adjustment shall provide and install a manhole surface block in conformance with the applicable Section 28-01 or 28-02 as part of the work.
4. Rodding inlet adjustments shall be accomplished by one of the methods specified herein or as detailed on the Drawings.
 - a. Upward adjustments of rodding inlets to finish grade surface may be accomplished with formed concrete or a cast iron extension ring (Case I) where such does not already exist and where such extension does not exceed eight (8) inches. The existing reinforced concrete block shall be extended whenever the bottom of the cast iron frame is to be positioned above the top of said existing block.
 - b. Upward adjustments of rodding inlets exceeding eight (8) inches shall be accomplished by removing the structure's frame, cover, and concrete block and reconstructing said structure as detailed in Section 28-11 of these Specifications (Case II). Pipe used for such adjustments shall be consistent in material, line and grade with that already in place and be appropriately jointed where required.
 - c. Downward adjustments of rodding inlets shall be accomplished by removal and reconstruction of the entire upper section, including the block (Case III).

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SECTION 22

CASTINGS AND METAL FABRICATIONS

22-01 DESCRIPTION

The Contractor shall install or erect the metal work, remove the temporary construction, including the removal of the old structure or structures if specified, in accordance with the Plans and/or these Specifications.

22-02 MATERIALS

The various materials shall conform to the requirements of the specifications of the ASTM as listed in the following tabulation with certain modifications and additions as specified later in this Section.

MATERIAL	ASTM DESIGNATION
Structural steel	A-36
High-strength low-alloy structural steel for welding	A-242
Bolts and nuts	A-307
Black steel pipe (std. wt. seamless)	A-120
Carbon steel for forgings	A-668, Class C
Alloy steel for forgings	A-668, Class A
Steel castings	A-27, Grade 65-35
Gray iron castings	A-48, Class 30
Malleable iron castings	A-47, Grade 32510
Bronze castings	B-22, UNS No. C93700
Aluminum Alloy GS11A-T6	B-209
Stainless steel forgings	A-473
Ductile iron castings	A-536, Grade 65-45-12

Materials used in the manufacture of corrugated metal pipes shall conform to AASHO Designation: M-36.

Where the Contractor substitutes rolled stock for forgings, the rolled stock shall meet the physical and chemical requirements for forged steel.

22-03 CASTINGS

The steel used in steel castings shall contain not less than 0.60 percent of manganese and not less than 0.20 percent of silicon.

All castings shall be sound and free from shrinkage cracks, blow holes, and other defects. All fins and burnt sand shall be removed. Excessive porosity and spongy

surfaces will constitute causes for rejection. The Engineer shall be final judge as to whether the defects present are sufficient to cause rejection.

No welding or patching of defects in castings will be permitted unless authorized by the Engineer. Any such welding or patching done without the Engineer's consent shall be cause for rejection.

All castings shall be true to the form and dimensions shown on the plans. After inspection and prior to shipping, all machined surfaces shall be coated with a blue rust inhibitive lacquer, or other material that can be easily removed, unless otherwise specified.

The dimensions of the finished casting shall not be less than the specified dimensions. Castings shall not be more than seven and one-half (7 1/2) percent overweight. Large castings shall be suspended and hammered over their entire area. No cracks, flaws, or other defects shall appear after such hammering.

22-04 CAST IRON FRAME AND COVERS

Castings shall conform to the shape and dimensions shown on the Standard Drawings. (See Section 28.)

The cover and its seat in the frame shall be machined so that the cover will sit evenly and firmly in the frame.

Cast iron frames and covers shall be dipped or painted with asphalt.

22-05 FILLETS

Steel, gray iron, malleable iron, and bronze castings shall be provided with adequate continuous fillets cast in place in all re-entrant angles. The radius of curvature of the exposed surface of a fillet shall define the size of the fillet.

The size of fillets shall not be less than one-half (1/2) of the thickness of the thinnest adjoined member nor less than one-half (1/2) inch.

22-06 STRAIGHTENING MATERIAL

If straightening is necessary, it shall be done by methods that are acceptable to the Engineer. Sharp kinks and bends may be cause for rejection of the material.

Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture.

22-07 MATCH MARKING AND FINISH

Connecting parts assembled in the shop for the purpose of reaming holes in field

connections shall be matched marked, and a diagram showing such marks shall be furnished to the Engineer. Portions of the work exposed to view shall be finished neatly. Shearing and chipping shall be done carefully and accurately.

22-08 BOLTS

Bolted connections shall be used unless otherwise shown on the plans. Where bolted connections are required, the bolts shall be galvanized bolts or turned bolts, as specified. Bolts shall have hexagonal heads and nuts and shall be of such length that they will extend entirely through the nut but not more than one-quarter ($1/4$) inch beyond. Bolts in tension shall have two (2) nuts.

Unfinished bolts in shear shall have not more than one thread within the grip. The diameter of the unfinished bolt shall not be more than one thirty-second ($1/32$) inch smaller than the diameter of the hole.

The threads of turned bolts shall be entirely outside the grip. Nut locks or flat washers one-quarter ($1/4$) inch thick shall be furnished, as specified. The holes for turned bolts shall be reamed and the bolts shall be finished to provide a driving fit.

Threads shall make close fits in the nuts.

22-09 EYE BARS

Eye bars shall be straight, true to size, and free from twists, folds in the neck and head, and other defects. The heads shall be made by upsetting and rolling or forging, and not by welding. The form of the heads will be determined by the dies in use at the work where the eye bars are made, if they are satisfactory to the Engineer. The thickness of the head and neck shall not overrun more than one-sixteenth ($1/16$) inch.

All eye bars that are to be placed side by side in anyone group in the structure shall be bored so accurately that upon being placed together, pins one thirty-second ($1/32$) inch less in diameter than the pin holes will pass through the holes at both ends at the same time without driving.

22-10 BEARINGS AND ANCHORAGE

During construction, the anchor bolts shall be placed within pipe sleeves as shown on the Plans or as directed by the Engineer. The concrete bearing plates shall be set level and properly supported in exact position until fixed with Portland cement grout. The grout shall be forced under the plates so as to completely fill the pipe sleeves and to give a uniform and even bearing for the plates.

22-11 CUTTING WITH TORCH

The use of a cutting torch is permissible if the metal being cut is not carrying stress during the operation.

The radius of re-entrant flame cut fillets shall be as large as possible, but never less than one (1) inch. To determine the net area of members so cut, one-eighth (1/8) inch shall be deducted from the flame cut edges. Stresses shall not be transmitted through a flame cut surface.

When cutting with a torch, cuts shall be true to line with a maximum deviation of one-sixteenth (1/16) inch. All burned edges shall be finished by grinding or chipping.

The use of the cutting torch will be permitted on ends that form compression connections, providing a minimum of one-quarter (1/4) inch of metal is left to be removed by machining.

22-12 WELDING

All welding shall be done by certified welders in accordance with the requirements of the American Welding Society. All welding operators shall be subject to examination for recertification at any time during the progress of the work.

Welding electrodes shall comply with the requirements of the ASTM Designation: A233, except they shall be uniformly and heavily coated (not washed) and shall be of such nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer.

22-13 GALVANIZING

When galvanizing is specified for structural steel shapes, plates, and bars, and other products, it shall be performed by the hot-dip process after fabrication into the largest practical sections. The galvanizing shall conform to the requirements of the ASTM Designation: A123. Fabrication shall include all operations such as shearing, punching, forming, bending, welding, riveting, etc. When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the spelter coating.

Small structural steel or cast steel articles, such bolts, nuts, washers, and similar articles that are to be galvanized, shall be galvanized after fabrication in accordance with the requirements of the ASTM Designation: A153.

22-14 REMOVAL OF OLD FABRICATIONS AND FALSEWORK

The Contractor shall dismantle old structures, which, unless otherwise provided on the plans, shall be disposed of by the Contractor at no cost to the District. If a structure is to be re-erected, it shall be dismantled without unnecessary damage and the parts match marked and carefully stored.

The Contractor shall dismantle the falsework, and remove all debris and refuse resulting from his work leaving the premises in a clean condition.

22-15 INSPECTION

All castings and fabrications shall be inspected prior to installation. Finished members shall be true to line and free from twists, bends, and open joints. District reserves the right to reject the material before or after the installation, if found defective. Rejected material shall be replaced promptly or corrected by the Contractor.

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SECTION 23

ABANDONMENT OF LINES AND STRUCTURES

23-01 ABANDONMENT OF SEWER LINES

- A. Main Sewer Lines - Main line sewers to be abandoned shall be filled completely with sand or 2-sack sand/cement slurry.
- B. Side Sewer Lines - Before a building connected to the District sewer system is removed or modified in a manner that requires a physical disconnection of the building from the sewer system, the owner of the building shall obtain an abandonment permit from the District.

The District will allow the owner's contractor to abandon the side sewer on a case by case basis.

The side sewer to be abandoned shall be sealed at the property line by use of a concrete plug or a manufactured plug or cap.

23-02 STRUCTURES TO BE ABANDONED

Structures to be abandoned shall have their bases broken to prevent entrapment of water. The structure shall be removed to a point three (3) feet below the proposed street grade or ground surface and filled with TYPE I backfill if structure is in State, County or City roadway right of way; or filled with earth and compacted if structure is outside of State, County or City roadway right of way.

23-03 SALVAGED MATERIALS

Salvaged metal castings such as frames and covers and other metal appurtenances shall be delivered to the District's pump station for reuse.

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SECTION 25

AGGREGATE BASE

25-01 AGGREGATE BASE

Aggregate base shall consist of mineral aggregate, furnished and placed on prepared subgrade, subbase or as backfill in conformity with the lines, grades and dimensions shown on the Plans or Standard Drawings. Material, subgrade preparation, adding water, spreading, and compacting shall conform to the requirements for "AGGREGATE BASE" under SECTION 26 of the State Standard Specifications.

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SECTION 26

BITUMINOUS SEALS

26-01 SEAL COATS

Seal coats shall consist of an application or applications of bituminous binder and a cover of screenings applied to pavement, prepared base or surfacing in conformance with the requirement excluding measurement and payment for a BITUMINOUS SEALS under SECTION 37 subsection "37-1 SEAL COATS" and the requirements, excluding measurement, for "ASPHALTIC EMULSIONS" under SECTION 94 of the State Standard Specifications.

Unless otherwise specified or directed by the Job Engineer, Seal Coats specified herein shall meet the requirements for "Fine" Seal Coat Type and the bituminous binder shall be penetration type asphaltic emulsion Grade MS2 specified in said State Standard Specifications.

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SECTION 27

ASPHALT CONCRETE

27-01 ASPHALT CONCRETE

Asphalt Concrete shall consist of a mixture of mineral aggregate and bituminous binder, the materials of which, proportioning, mixing spreading and compaction thereof shall conform to the requirements, excluding measurement and payment, for "ASPHALT CONCRETE" under SECTION 39, "ASPHALTS" under SECTION 92, "LIQUID ASPHALTS" under SECTION 93, and for "ASPHALTIC EMULSIONS" under SECTION 94 of the State Standard Specifications. Unless otherwise specified or directed by the Job Engineer, Asphalt Concrete shall be Type B with aggregate conforming to the grading requirements specified for the one-half (1/2) inch maximum medium grading. Asphalt binder for permanent paving shall consist of paving asphalt, Grade designation AR-4000. Asphalt binder for temporary paving shall consist of liquid asphalt grade MC-800. Liquid asphalt for use as a Prime Coat shall be Grade SC-70, spread at the approximate total rate of one-quarter (1/4) gallon per square yard of surface covered. Asphaltic emulsion for use as a Paint Binder shall be Grade SS-1, applied in one application at a rate of from two-hundredths (0.02) to one-tenth (0.10) gallon per square yard of surface covered.

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SECTION 28

STANDARD DRAWINGS

28 STANDARD DRAWINGS

The standard drawings are placed at the end of the specifications for easy reference.

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SECTION 29

PIPE BURSTING

29-01 PIPE BURSTING

- A. Pipe bursting work shall be done by a qualified Contractor with at least five (5) years of pipe bursting experience including a minimum of three (3) projects of similar in pipe size and length to the work to be done.
- B. All work shall be performed as indicated on the plans and as required in these Specifications and shall be supervised by personnel experienced in installation of pipe using the pipe bursting technique. The Contractor shall provide all materials, labor, equipment, and services necessary for bypass pumping and/or diversion of sewage flows, installation of sewer pipe, and testing of completed pipe system.
- C. The Contractor's pipe bursting equipment shall be capable of bursting the host pipe and installing the new pipe as shown on the plans and specified herein.
- D. The Contractor shall be responsible for repairing or replacing existing utilities, pavements, structures or other improvements damaged by the pipe bursting work.
- E. If pipe bursting operation results in a partial or complete blockage of the public main sewer, the Contractor shall immediately notify the District. If the District is required to clear the blockage, the Contractor will be billed for all District costs incurred to clear the blockage.

29-02 CONTRACTOR SUBMITTALS

- A. The Contractor shall submit the following items to the District for review prior to ordering pipe materials and/or commencement of work.
 - 1. Pipe manufacturer's technical information; physical properties of pipe; joining/fusion method; dimensions of pipe and fittings; manufacturer's recommendation for handling; storage and repair of pipe and fittings; and certificate of compliance of the pipe and fittings with these Specifications.
 - 2. Method of pipe bursting; type of bursting tool (e.g., pneumatic, static) and installation equipment; procedures for operating the equipment; copies of any technology licenses; and types of lubricant and Material Safety Data Sheets (MSDS).

3. Estimated pull load, jacking/winch, cable/tow rod capacity for static pipe bursting method.
4. Pneumatic hammer size and winch capacity.
5. Service connection restoration plan/installation schedule; shop drawings and written description of the entire construction sequence, procedures for bedding pipe and insertion/reception/lateral connection pits; plan to remove and dispose of old pipe (if necessary) and a contingency plan.
6. Contingency plans for the following: unforeseen obstructions causing burst stoppage, surface heave, damage to existing utilities and improvements, loss of return to line and grade, and sewer backup.
7. Sewer bypassing plans and procedures.
8. Site layout including: location/dimension of insertion and reception pits; pipe layout and joining work areas; storage and equipment layout areas; proposed modifications of manholes; and traffic control plans.
9. Reports from independent testing laboratory certifying that the pipe material including physical properties and dimensions meet the requirements of these Specifications.
10. Contractor's pipe bursting qualifications.
11. Data from potholing of existing utilities.
12. Procedures for protection of existing utilities, structures and other improvements.

29-03 PIPE MATERIALS

The Contractor shall provide thermo-fusion welded HDPE pipe (minimum SDR 17) as specified in Section 18.01D – Plastic Pipe.

29-04 INSTALLATION

- A. The Contractor shall fully clean the sewer proposed for pipe bursting and inspect the line to reveal any deficiencies in the line (e.g., sags, offsets and/or repaired sections that could affect pipe bursting). Deficiencies shall be corrected prior to pipe bursting.
- B. The Contractor shall provide bypass pumping and/or diversion as required for acceptable completion of the pipe installation.

- C. The Contractor shall locate, design, construct, properly brace or shore, dewater, maintain, and restore insertion and receiving pits. Insertion and receiving pits shall be large enough large enough so that the pipe can be installed without exceeding the manufacturer's recommendations for curvature of the pipe.
- E. The Contractor shall fully expose the main sewer where a lateral is to be joined to the new sewer.
- F. The pipe bursting machine shall be equipped with a direct-reading pulling force gauge. The maximum pulling force that may be applied to any pipe shall be as follows:

HDPE-SDR 17 (DIPS) Nominal Pipe Size	Outside Diameter (inches)	Minimum Wall Thickness (inches)	Average Inside Diameter (inches)	Allowable Maximum Pulling Force (lbs.)
4-inch	4.800	0.282	4.202	3,500
6-inch	6.900	0.406	6.039	7,500
8-inch	9.050	0.532	7.922	13,000
10-inch	11.100	0.653	9.726	20,000
12-inch	13.200	0.776	11.555	28,000

- G. Pipe shall not be pulled through bends greater than forty- five degrees (45°).
- H. The pipe shall be pulled a minimum of two (2) feet beyond the planned connection to allow inspection of the condition of the pipe (e.g., for scarring or other damage).
- I. Prior to making connection at each end of an installed reach of pipe with fittings or couplings, the Contractor shall allow a minimum of six (6) hours to elapse to allow pipe to relax from the tension resulting from pulling the pipe and for the pipe to equalize with ambient ground temperature.
- J. Connections at and restoration of manholes shall be in accordance with Section 21-14, Manholes.
- K. Restoration of sewer laterals and other requirements not described in this Section shall be in accordance with Section 18 – Sewer Pipelines.

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SECTION 31

CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

31-01 CONTROLLED LOW STRENGTH MATERIAL

- A. The Contractor shall furnish all materials for Controlled Low Strength Material (CLSM) in accordance with the provisions of this Section.

31-02 SUBMITTALS

- A. The Contractor shall submit the following:
 - 1. Design mix for CLSM, including list of admixtures to be used. Design mix shall include source of materials and gradations of aggregate.
 - 2. Manufacturers' information for admixtures.
 - 3. CLSM properties including, but not limited to, design flow and design air content.
 - 4. Strength test report for preliminary trial mix(es), including all admixtures.

31-03 MATERIALS

- A. CLSM shall be a mixture of cement (one (1) sack per cubic yard minimum; two (2) sacks per cubic yard maximum), pozzolan, fly ash, coarse and fine aggregate, admixtures, and water batched by a ready mix concrete plant and delivered to the work by means of standard transit mixing trucks. The mixture shall produce a material which may be excavated by hand. The minimum twenty-eight (28) day compressive strength shall be fifty (50) psi and the maximum twenty-eight (28) day compressive strength shall be no greater than one hundred fifty (150) psi in accordance with ASTM C 39.
- B. Cement shall be Type II in accordance with the requirements of ASTM C 150.
- C. Pozzolan and/or fly ash may be added to improve the flowability and shall be Type F in accordance with the requirements of ASTM C 618.
- D. Coarse aggregate shall consist of a well-graded mixture of crushed rock, or sand with a maximum size aggregate of three-eighth (3/8) inch. One hundred percent (100%) shall pass the one-half (1/2) inch sieve. Not more than thirty percent (30%) shall be retained by the three-eighth (3/8) inch sieve and not more than twelve percent (12%) shall pass the number two hundred (200) sieve. All material shall be free from organic matter and meet the requirements of ASTM C 33.

- E. Clean potable water free from objectionable quantities of silty organic matter, alkali salts and other impurities shall be used.

31-04 ADMIXTURES

- A. An air entraining admixture may be added to improve the workability and shall be in accordance with the requirements of ASTM C 260. The entrained air content shall be a minimum of eight percent (8%) and a maximum of twenty percent (20%) as required by the Contractor to meet the uses specified herein.
- B. A water reducing agent may be added in accordance with the requirements of ASTM C 494 to improve workability.

31-05 INSTALLATION

- A. The subgrade and compacted fill and/or trench to receive CLSM shall be complete and acceptable in accordance with Section 16 – Excavation, Bedding and Backfill.
- B. Use of CLSM in the pipe zone may cause flotation or displacement of the pipe during installation of the CLSM. The Contractor shall take necessary precautions to prevent flotation and ensure that the pipe is installed according to the alignment and grade shown on the plans.
- C. A vibrator may be used to ensure that all voids, crevices, and pockets are filled with CLSM. Care shall be taken to avoid over-consolidation of the material separating the large and fine aggregate.
- D. Where new CLSM must be placed against existing CLSM, the placement shall be clean of all loose and foreign material. The surface of existing CLSM shall be soaked a minimum of one (1) hour before placement of fresh CLSM. No standing water will be allowed before starting placement of fresh CLSM.
- E. When placing CLSM for trench dams, the Contractor shall ensure that no voids exist around the pipe barrel and that the CLSM completely fills the trench width, including keyways, for the full depth required, as shown.
- F. The finished surface of CLSM shall be smooth and to the grade shown on the plans or as directed by the District.
- G. CLSM shall be protected from running water, rain, freezing, or other conditions that could damage the material until cure is complete.
- H. No equipment, traffic, or backfill shall be allowed on the CLSM until the surface of the CLSM is able to withstand a twenty (20) psi load without displacement or damage. If necessary, the Contractor shall provide steel trench plates that span the trench until the CLSM has reached the required strength.

- I. When using CLSM as abandonment grout, the Contractor shall contain CLSM in sewer pipelines and structures to be abandoned using bulkheads.

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SECTION 32

SEWER LATERALS

32-01 SEWER LATERALS

This specification references and consolidates other Sections related to sewer laterals. When conflicts occur between this Section 32 and the referenced specification sections, the referenced section takes precedence.

32-02 LINE SIZE AND SERVICE POLICY (ref. Section 3-09)

- A. Side sewers shall be connected only to existing or new six (6), eight (8), ten (10), or twelve (12) inch diameter main sewers. All side sewer connections to public sewers over twelve (12) inches in diameter shall be made at manholes or by extending an eight (8) inch main from a downstream manhole to the parcels being served, unless written special approval to allow taps is received from the District.
- B. The side sewer size is four (4) inches in diameter for single family residential, duplex, or accessory dwelling. Six (6) inches or larger diameter side sewer shall be installed where use is to be industrial, commercial, or multi-family residential as required by capacity (see Section 4.01). Joint use of side sewers (known as common laterals) will not be permitted for new connections. Side sewers shall have an approved backwater overflow device installed on or near the cleanout. (See Sections 18-02.D, 28-34A, and 28-34B.)

32-03 BASIC SEWER SERVICE POLICY (ref. Section 3-11)

Generally, the limit of public ownership and responsibility on each branch of the sewer system is defined as the last upstream manhole, lamphole or rodding inlet on each branch. Beyond that point the District shall bear no responsibility for maintenance and repair of sewer piping. Such piping that may exist is hereby defined as part of a building sewer or common lateral and is subject to private property maintenance requirements of Ordinance 78-79-2. Private sewers, i.e., the sewer pipeline from the building to the public sewer, including the connection to the public sewer, are owned and maintained by the Owner. (ref. Section 3-10)

32-04 SEWER LATERAL DESIGN STANDARDS (ref. Section 4)

- A. Each individual building shall be connected by a separate side sewer. Sample side sewer layouts are illustrated in Section 4-02B.
- B. Side sewers of six (6) inches or eight (8) inches diameter require two (2) prints of Site Plans for permit issuance.
- C. Size and Slope

1. Minimum sizes and slopes for side sewer shall not be less than indicated below:

	<u>Size</u>	<u>Slope</u>
- Single Family Residential, Duplex	4"	2%
- Other	6"	1.1%

2. The size of the side sewer shall be increased to the largest of the building plumbing stub or the size indicated for horizontal drainage piping in Table 4-3 of the Uniform Plumbing Code, latest edition.
3. The maximum slope of any portion of a side sewer shall not be greater than one hundred fifty percent (150%).
4. Side sewers for townhouses and similar cluster housing developments shall be installed on an even slope from the main line connection to a point two (2) feet from the end of the building clean out conforming to the above requirements.

D. Fixture Units

1. The fixture unit equivalents for plumbing fixtures shall be based on the tables of the Uniform Plumbing Code, latest edition.
2. Side sewers exceeding two hundred (200) feet in length shall include an infiltration allowance of five (5) fixture units per acre or one (1) fixture unit per forty (40) feet of sewer installed.

- E. Pipe Material. A lateral sewer, being installed concurrently with a main sewer, shall be of the same type and class as the main. Any house sewer or side sewer, not being installed concurrently with the main sewer, may be any one of the types of pipe approved for side sewers, as indicated on the Approved Materials List. Shear band couplings are required on all lateral joints.

F. Vertical and Horizontal Deflections

1. All lateral sewers shall have an alignment that provides an angle of intersection with the downstream section of main sewer of no less than ninety degrees (90°). No lateral alignments adverse to the flow of the main will be permitted. Refer to Section 28-07 of these Specifications for example.
2. The maximum deflection at anyone point in a side sewer, not including fittings at wye connection to the main sewer or at angle points having clean outs shall be twenty-two and one-half degrees (22-1/2°) (1/1 6 bend) and any two (2) consecutive deflections (bends) shall not be less than two (2) feet apart.

- G. Building Drains. The "Building Drain" shall be arranged so that the point of connection with the house sewer is on the side of the building facing the public sewer main.
- H. Lateral Sewer Location. Location of lateral sewers in public road rights-of-way shall be in relation to the nearest corner of the property being served. Unless otherwise determined by physical controls, the lateral sewer shall be located ten (10) feet from the lower property corner at the right-of-way line of hillside lots (3 % + slope).
- I. Location Mark
1. Where curbs, gutters, and/or sidewalks exist or are to be installed as a part of an improvement, the lateral sewer shall be permanently located by imprinting an "S" (1-1/2" size) or by chiseling an "S" (4" high) in the concrete surface vertically above the side sewer pipe. The "S" shall be located in order of preference on sidewalk, gutter, or curb. (See Section 28-33.)
 2. It shall be the responsibility of the Contractor installing such lateral sewer to mark its location as specified herein.
- J. Lateral Depth. Depth of the lateral sewer end at the property line or easement edge shall be set by the Engineer to serve the house sewer. (See Section 28-33.) Where lateral sewer end depths must be specially designed to serve the home site, their depths shall be indicated on the Plans.
- K. Clean outs shall be provided in the side sewer system at the following locations:
1. At the point of connection to the building drain.
 2. At any single turn greater than forty-five degrees (45°).
 3. At intervals along the side sewer system where the accumulative total of deflection from the point of connection to the main or from another clean out exceeds forty-five degrees (45°).
 4. At intervals not to exceed one hundred (100) feet along the side sewer system.
 5. Clean out risers shall be cast iron, HDPE or ABS in conformance with Section 18-01.C and Section 18-01.D and equal in size to the side sewer and shall be installed in conformance with Standard Drawing Sections 28-32 through 28-34.
- L. Backflow Prevention Device. When stoppages occur in sanitary sewers, a danger

of damage to health and property exists resulting from the possibility of sewage overflow and backflooding on public and private property. It is the purpose of the District to protect the health and safety of the residents of the District and to minimize the possibility of damage to property by requiring, where topographical conditions warrant it, the installation and maintenance of a protective device approved by the Engineer. (District Code Section 9.08)

1. No person shall construct, alter, or repair a side sewer connection to the District system without installing an approved backwater overflow device if one does not already provide protection.
2. A backwater overflow device, as detailed in Sections 28-34 of these Specifications, shall be installed in conformance with Section 18-02.B. A gate valve, as detailed and specified for backwater check valve and shutoff systems herein is optional but should be considered for installation for additional protection.
3. Consideration must be given to the damage potential to adjacent property by sewage released through a backwater overflow device per Section 28-34.
4. Backwater overflow devices shall be located in areas away from vehicular and foot traffic. If a backwater overflow device must be located in an area that will have concrete or asphalt such as a driveway or sidewalk, the device shall be installed in a reinforced concrete utility box with a lid marked SEWER. A "sewer popper" may be used as an overflow device provided that it is installed within a concrete Christy box (see Section 28-34B).
5. Where the sewage cannot overflow on the area surrounding a backwater overflow device without damage to property, a backwater check valve and shutoff system, as detailed in Sections 28-34A and 28-34B of these Specifications, shall be installed.
6. Homeowners shall be responsible for the maintenance of backwater overflow devices. Homeowners shall be liable for the costs of cleanup and repair of damage from overflows if a backwater overflow device is tampered with or removed after it has been installed.
7. In the event of any occurrence of backflow of sewage from the sewer system that results in a sewage overflow inside a building, the District may adopt a finding by resolution that the building sewer is non-conforming. The property owner shall be immediately notified (1) that an overflow device is required and must be installed within 90 days; (2) that the property is vulnerable to future interior spills and the consequence of not installing an overflow device will be owner responsibility for future damages by interior spills; (3) that this notification will be recorded with the

Contra Costa County Recorder; (4) that the County Environmental Health Department will be notified of an existing health hazard to be abated; and (5) that in the event of non-compliance the District may install an overflow device and recover abatement costs on the next tax roll as a surcharge on sewer service charges.

8. In the event of a damage claim from the property owner for a sewage overflow that leads to a settlement of the claim, as a condition of payment the owner shall be required to sign an agreement that a portion of the settlement amount shall be withheld by the District to fund installation of an overflow device on the owner's behalf.

M. Joint Building Sewers Not Permitted

1. Every building containing sanitary plumbing or an interior drainage system shall be connected to the sewer system. A separate building sewer shall be provided for each building.
2. Where a joint building sewer ("common lateral") preexists these Specifications, such conditions are considered non-conforming. It is the policy of the District Board that non-conforming conditions, with the exception of common lateral on the same parcel, shall be abated as soon as possible and that no permit to repair or alter a common lateral shall be issued absent determination by the General Manager that no feasible alternative exists. Where common laterals are known to exist between multiple property owners, they shall be recorded with the Contra Costa County Recorder as awaiting abatement of non-conforming conditions and the owner's shall be notified.

N. Pipe Cover. Side sewers shall have the following pipe cover:

That portion of a side sewer within public roadway (lateral) shall have the minimum cover of five (5) feet at the property line or at a point five (5) feet outside the curb face or edge of paving, whichever is the greater distance from the roadway center line.

Minimum cover for side sewers in driveways, parking, and all other traffic areas within properties other than single family residential shall be five (5) feet. Such cover conditions shall exist from the property line to a point within eight (8) feet of the building drain connection. If the minimum cover cannot be obtained, cast iron or ductile iron pipe shall be used.

The minimum cover for side sewers outside of traffic areas from the property line to a point within eight (8) feet of the building drain connection shall be thirty (30) inches.

Minimum cover for side sewers at the point of connection to the building drain

(within two (2) feet of the foundation) shall be eighteen (18) inches. All side sewer pipelines within eight (8) ft. of the building drain connection and having a minimum cover less than thirty (30) inches shall be cast iron or HDPE in conformance with Section 18-01.C.2. Instrument control of grades with an engineer's level will be required where side sewer installation exceeds fifty (50) ft.

Where grades are less than two percent (2%), cut sheets will be required and cuts must be staked at the site prior to trenching.

For side sewer connections to existing ten (10) inches or smaller sewers, see Section 18-02.C.2 of these Specifications. For side sewer connections to existing or new sewers twelve (12) inches or larger in diameter, see Section 3-09 of these specifications.

O. Sewers to Be Installed As Site Collector Systems (See Definition In Section 2-01)

1. Sewers shall be designed in conformance with main line standards specified within Section 4.
2. Design and construction engineering procedures shall conform to the applicable sections of the Standard Specifications with the following additional requirements:
 - a. Where fixture units exceed 1,500, the District may incorporate additional requirements, including such structures as manholes and rodding inlets.
 - b. Minimum pipe cover for the site collector sewer pipe shall be as specified for main sewers in Section 4-02.C.
 - c. Instrument control of grades will be required where side sewer installation exceeds fifty (50) feet.
 - d. Where grades of side sewers are less than two percent (2%), cut sheets will be required and cuts staked at the site prior to trenching.

P. Test Fittings

1. All test fittings, unless otherwise approved, shall be wye or tee branches of the same size, type, and quality as that of the line in which they are being installed.
2. Test fittings for air testing shall be installed in all new side sewers at the locations described herein under Section 18-02.B.

32.05 Lateral Sewer Locations on Plans (ref. Section 5-05)

- A. Lateral sewers shall be shown and stationed on the sewer plans and cut sheets.

The length of each lateral shall be shown on the sewer plans either by note or by individual distance. Laterals shall be of sufficient length to clear all existing utility easements. The distance from the lateral where it crosses the property line to the nearest property corner shall be shown on the sewer plans.

- B. Laterals may not be installed by tapping into existing mains or manholes, unless otherwise approved by the Engineer. All taps to be made on new sewer projects shall be noted on the sewer plans submitted for review.

32-06 MARKING OF SIDE SEWERS (ref. Section 7-01)

- A. Where curbs, gutters, and/or sidewalks exist or are to be a part of an improvement, each side sewer shall be permanently located by imprinting an "S" (1-1/2" size) or by chiseling an "S" (4" size) in the concrete surface vertically above the side sewer pipe. The "S" shall be marked on the curb, gutter, or on the sidewalk. Responsibility for providing the marking and for its accuracy shall rest with the sewer contractor.

32-07 LATERAL CUT SHEETS (ref. 7-02)

Cut sheets shall be prepared in accordance with the example shown in Figure 7-1 of these Specifications for all sewer system pipe-lines specified herein, and submitted with plans for final review where noted below.

- A. All side sewers six (6) inches or greater in size and where such installations exceed fifty (50) feet (available in the field prior to trenching).
- B. All side sewers for townhouses, condominiums, and similar cluster housing developments.
- C. All side sewers permitted by the Engineer to be installed on less than minimum slope ratios specified under Section 4-02.B.2 (available in the field prior to trenching).

32-08 LATERAL SEWER LOCATION FIELD SURVEY (ref. Section 7-03)

- A. Prior to installation of lateral sewers in subdivisions, the lot corner nearest the side sewer and the lateral sewer terminus shall both be staked and flagged in the field.

32-09 NO REUSE OF OLD LATERALS (I&I Control, ref. Section 9-08)

- A. Preexisting laterals from demolished buildings may not be reused when a new building is built. Preexisting laterals from derelict buildings may not be reused when such a building is rehabilitated.

32-10 SIDE SEWER PERMITS (ref. Section 10-02)

- A. Lateral Permits shall be issued for construction or replacement of laterals when the public main is existing and available for connection. Laterals constructed as part of main line work will be covered under the Mainline Permit. Sewer plans for subdivision will show all lateral locations. Plans are required showing location and slope for all laterals six (6) inches or larger for non-subdivision work.
- B. Repair Permits shall be issued for work on existing side sewers. Repair permits are issued when the work requires no alignment modification of the existing private system and all work is solely for repair of existing sewers, or when additional private systems are installed to existing side sewers, to sewer house additions, for modifications, or for ease of maintenance to existing side sewers.
- C. Abandonment Permits shall be issued for abandonment of side sewers.
- D. Pump Permit shall be issued for construction of non-gravity side sewer installation.

32-11 LICENSING (ref. Section 10-02)

- A. All contractors doing sewer work within the District shall be properly licensed in accordance with the provisions of Division 3, Chapter 9, Business and Professional Code, of the State of California, as amended. Contractors shall present evidence of licensing, including license number. Work on public property, roads, streets, and other rights-of-way shall be performed only by duly licensed contractors. Acceptable license classifications are "A" General Engineering Contractor; C-34 Pipeline; and C-42 Sanitation Systems. (District Code Section 5.04.015)
- B. Contractors with C-36 licenses may perform side sewer work to service those structures in which they have installed plumbing systems and repairs or alterations to existing private side sewers (excluding connections to the public sewer mains).

32-12 VIOLATIONS AND PENALTIES (ref. Section 10.04)

- A. The District may require immediate excavation and inspection of buried work on side sewers, at no cost to the District, whenever work requiring a permit has been buried without inspection and approval by the District.
- B. By Notice of Violation, when authorized by the General Manager, the District may order the property owner to discontinue use of the sewer and/or to discontinue all construction work with respect to the sewer and to abate defective lateral conditions under District permit. The District may similarly require immediate stoppage of any illegal discharge and actions to prevent recurrence, or immediate abatement of any other violation of these Specification or District

Ordinances. (District Code Section 1.08.010)

- C. Such Notice of Violation shall be served personally to the owner or by mailing such notice to the owner certified, postage prepaid and addressed to the address last shown on the Contra Costa County secured assessment rolls. Any stoppage in the building lateral or break in the watertight integrity of the lateral shall be conclusively presumed to be a menace to life, health, safety or property for purposes of requiring abatement of such defective conditions. Should the property owner fail to comply with the Notice of Violation within the time limits set forth by the notice, the District Manager and his/her designee are hereby authorized to enter the property to cause such repairs as are necessary to abate a public nuisance.

32-13 EXCAVATION AND BACKFILL (ref. Section 16-02)

- A. Trench Width
1. Trenches shall be excavated with full depth vertical sides where possible. Minimum vertical trench shall be from pipe flow line to a point two (2) feet above top of pipe. Any over-width trench, whether by over excavation, cave-in, or by ground movement, will require special pipe and/or special backfill, as directed by the Engineer.
 2. Trenches for side sewers up to three and one-half (3 1/2) feet in depth shall be eighteen (18) inches in width. Trenches for side sewers greater than three and one-half (3 1/2) feet in depth shall be twenty-four (24) inches in width.
- B. Earth Trench Dams (Sec. 28-39) shall be constructed over side sewers at property line or at the easement line, at locations indicated on the Plans and at locations designated by the Engineer.

32-14 CASINGS, BORES, OR TUNNELS (ref. Section 16-04) - Main or side sewer pipes installed in tunnels or bores without casings shall be ductile iron (Class 53 or better).

32-15 SEWER PIPELINE MATERIALS (ref. Section 18-01)

- A. General - All pipe installation procedures and materials shall be in accordance with the pipe manufacturer's recommendations where not modified under the various types of pipeline materials specified herein. A current list, referred to as "Approved Material List", of all pipe, fitting and joint materials specifically approved by the Engineer as conforming to these Specifications and for use in sewer pipeline installations under the jurisdiction of the District is on file and available at said District offices. Pipe, pipe products and/or pipe specifications not appearing on said "Approved Material List" shall not be used within the District without approval of and written authorization from the Engineer. All pipe

sizes refer to the nominal inside diameter of pipe (including any pipe linings) and no pipe, except where specified herein, shall be more than one-quarter (1/4) inch smaller than the nominal size designated. All pipe, pipe joints incorporated into the pipe, and manufactured fittings connecting pipe between structures shall be of one and only one manufacturer's brand and of the same type, quality, class and size. Jointing of pipe dissimilar in size and/or material shall be accomplished either by use of an Expansion Block as detailed and specified under Section 28-40 of these Specifications or by use of special adapters or couplings accepted by the Engineer for such use. All field cut pipe shall be accomplished with equipment recommended by the pipe manufacturer. No hammer and chisel cuts will be permitted. All pipe and fittings delivered to the jobsite shall be marked by the manufacturer with such inventory and identification (Brand Name, Pipe Type, Strength Class, Batch Lot, Lengths, etc.) as to be properly identified in the field as meeting the requirements herein and for the work.

- B. Banded rubber couplings for use in the joining of new pipe or repair of existing pipelines shall be compression type "Band-Seal" couplings with external adjustable stainless steel shear rings, Mission Clay Products Corp., or "Ceramicweld" couplings Joints, Inc., or approved equal. Use of couplings without external shear support, or couplings with shear rings in direct contact with the pipe at joints, (internal of the rubber collar), will not be permitted except when joining dissimilar pipe (e.g. clay to cast iron).
- C. Rigid Pipe - Rigid pipe, fittings and joint materials specified herein consists of Vitrified Clay Pipe (VCP), Cast Iron Pipe (CIP), Reinforced Concrete Pipe (RCP), Concrete Lined Steel Cylinder (CL), Concrete Lined and/or Coated (CL&C), and Ductile Iron Pipe (DIP). See Section 18-02.D for repair procedures for rigid pipe in new construction.
1. Vitrified Clay Pipe - All VCP and fittings shall conform to the requirements of ASTM Designation C 700 as it applies to high strength, unglazed vitrified clay pipe.
 - a. Resilient material conforming to the requirements of ASTM Designation C 425 shall be used for VCP Jointing.
 - b. Rubber couplings used to join plain end VCP shall conform to the material and performance requirements of ASTM Designation C 594.
 2. Cast Iron Pipe - All CIP for use in side sewer installations only, shall conform to the requirements of ASTM Designation A-74 as it applies to Single Hub, extra heavy and service weight pipe. Service weight, Class SV, pipe shall be the normal requirement of CIP installations; however, the Engineer may require use of extra heavy, Class XH, pipe under special conditions. CIP may be installed without the use of foundation bedding

material where such trench bottom provides solid bearing for the full length of the pipe.

Cast Iron "No-Hub" pipe and fittings may only be used for four (4) and six (6) inch side sewers and, at a minimum, shall conform to the requirements of the Cast Iron Soil Pipe Institute, (CISPI), "Standard No. 301". "No-Hub" pipe shall be installed in accordance with CISPI Pamphlet No.100 using only "No-Hub" couplings, except where otherwise designated by the Engineer for dissimilar joints. Minimum cover for "No-Hub" installations in traffic areas shall be three (3) feet.

Maximum deflection permitted per "No-Hub" joint shall be ten (10) inches per ten (10) foot length of pipe or appropriate ratio thereof. Use of a properly calibrated torque wrench for jointing shall be mandatory.

3. Ductile Iron Pipe - All DIP and fittings for main and trunk sewers shall conform to the requirements of ANSI Standards A21.52 (Class 52) as they apply to Ductile Iron Pipe. All main and trunks sewer DIP and fittings shall be of sufficient thickness to withstand the depth of cover under the laying conditions and provisions of Section 4-02.C of these Specifications. There are no special lining or coating requirements; however, bituminous material coated or concrete coated and/or lined pipe conforming to the requirements of ANSI Standard A21.4 may be used.

All DIP shall be shown on construction drawings by type and thickness class designations herein specified.

- a. Bell and spigot joint assemblies shall conform to the requirements of Federal Specification WW-P-421c, Section 3.1.2 as it applies to TYPE II, Grades B or C pipe.
- b. Standardized mechanical joint assemblies shall conform to the applicable requirements of ANSI Standards for the pipe specified and ANSI Standard A21.11.
- c. Lead caulked joint assemblies will not be permitted.
- d. No joint will be required immediately outside of structure bases for all DIP installations.
- e. DIP may be installed without use of foundation bedding material where trench bottom provides solid bearing for the full length of pipe between bell holes, and where such installation otherwise meets the requirements of these Specifications.

- f. The minimum radius for DIP shall be as shown on Section 28-31 of these Specifications.
4. Reinforced Concrete Pipe - All RCP and fittings shall conform to the requirements of either ASTM Designations C76 or C361, as modified hereunder:
- a. Where not otherwise modified by these Specifications, all provisions of the above-mentioned ASTM Designations shall govern.
 - b. The basis of acceptance of RCP manufactured in compliance with these Specifications shall be in accordance with Section 4.1.1 of ASTM Designation C76 and as follows:
 - i. Engineer review of submittals required under Sections 18-01.C.4.b.3, d.4, and f.7 of these Specifications.
 - ii. Three-edge bearing test loads shall be applied to the extent that no greater than a 0.01-inch crack is produced in tested pipe sections. Applied test loading may be terminated without producing a 0.01-inch maximum crack if or when such loading has reached one hundred twenty-five (125) percent of that required for and related to the specified D-load for the subject pipe.
 - iii. Test results shall be submitted to the District prior to shipment to the project jobsite. Results shall indicate the District-assigned project number, agency and operator performing the test, test date, pipe size and specified D-load and ultimate test load applied.
 - c. Materials shall comply with Section 5 of the appropriate ASTM Designation under which the subject pipe is to be manufactured, modified as specified hereunder:
 - i. Cement used in the manufacture of RCP shall be TYPE II in conformance with ASTM Designation C150.
 - ii. Aggregates used shall consist of granitic, calcareous or combinations thereof such that the concrete material samples for testing alkalinity in conformance with Section 18-01.C.4.f of these Specifications shall exhibit a total Carbonate equivalence of not less than fifty (50) percent.
 - iii. No admixtures shall be introduced to concrete mixes without specific District authorization. Authorization for admixture or

blend usage for pipe for a given project shall not be considered a general use authorization for subsequent projects unless so stated.

- iv. Rubber for gaskets shall comply with the requirements of Section 2.11 of AWWA Standard C302.
- d. Design shall comply with Sections 6 and 7 of appropriate ASTM Designation under which the subject pipe is to be manufactured, modified as specified hereunder:
- i. All RCP shall be designed for anticipated trench loads calculated in conformance with Section 18-01.C.4.g of these Specifications, combined with a minimum head of at least twenty-five (25) feet. However, in no case shall pipe design under ASTM C76 provisions be less than that specified therein for CLASS III (1350-D), nor shall pipe design under ASTM C361 provisions be less than that specified therein for Class B.
 - ii. Total concrete cover of reinforcement at the inner wall, (clearance of steel surface to inner wall surface), shall not be less than one (1) inch, regardless of pipe diameter size or type and placement configuration of reinforcement.
 - iii. Joint assembly design shall be reinforced concrete bell and spigot type incorporating a fully retained, single rubber gasket in accordance with Section 3.3 of AWWA Standard C302.
 - iv. Manufacturer's design drawings for each project shall be submitted to the Engineer for review prior to fabrication. Drawings shall indicate, at relative scale, concrete covers, reinforcement placements and joint assembly design. Submittals shall also include the design pipe size, D-load, cement type, concrete strength and areas, types and placements of reinforcement.
- e. Pipe manufactured under these Specifications shall be fabricated by the "centrifugal spun" process in accordance with AWWA Standard C302 and as modified hereunder.
- i. Section 3.6.9 - Form oils or release agents shall not contain any material or substance as would penetrate or otherwise retard concrete set at the formed surface.
 - ii. Section 3.6.10 - The steel forms shall be placed horizontally

in a machine capable of spinning the forms at speeds that will produce concrete meeting or exceeding the concrete strengths required under the appropriate ASTM standard for the subject pipe specified.

- f. The method and procedure for determining the alkalinity content for the inner wall of RCP shall be as follows:
- i. A minimum of two (2) carbonate equivalence tests shall be run on sample pipe manufactured from concrete ingredients batched each week of manufacture for each pipe size manufactured there from. Additional testing on different pipe sections shall be required if the carbonate equivalence results of individual tests per pipe sample vary by more than ten (10) percent.
 - ii. Test samples of concrete shall be obtained from random selected pipe sections by drilling, using carbide concrete bits as will procure at least five (5) grams of material per drilling. Sample material shall be taken at two (2) locations at least twelve (12) inches apart longitudinally and to the depth of the steel reinforcement, surface. (For elliptically-placed reinforcements, sample material shall be taken at the minor axis as marked on the pipe.)
 - iii. All drilled holes shall be repaired with cement and fine aggregate as specified and used in the manufacture of the subject pipe.
 - iv. Each material sample shall be tested separately as obtained from the subject pipe. Test material shall be ground or pulverized sample material, oven dried for at least four (4) hours at a temperature of $100^{\circ}\text{C} \pm 50^{\circ}\text{C}$ just prior to testing.
 - v. Testing shall involve the following equipment and procedures:
 - I. Equipment - Sample weighing shall be performed with a precision balance readable to at least the nearest ten (10) milligrams. Liquid measures shall be performed with precision burettes readable to at least two-tenths (0.2) of a milliliter. Ph meters shall read to at least the nearest tenth (0.1) of a unit. Weighing and pH meter equipment shall have been calibrated for correctness within six (6) months of the test.
 - II. Test procedure - Weight at least one (1) gram of the

test material of each sample into an appropriately sized Erlenmeyer flask and add about 100 ml of distilled water. (Place glass funnel in neck of flask to minimize spray losses). Slowly add 50 ml of Standardized 1-Normal Hydrochloric Acid per gram of test material. When effervescence has subsided, heat to boiling and boil about 1/2 minute period. Cool and add 50-100 ml distilled water. Titrate with standardized, carbonate-free, 1-Normal Sodium Hydroxide solution to an end point of pH metering reading of 6.8 minimum to 7.8 maximum. End point reading must be stabilized for not less than two (2) minutes.

- vi. Calculation of Carbonate Equivalence - Calculations shall be based upon the chemical reaction of equivalent weights of Calcium Carbonate, CaCO_3 and the liquid measures of specifically standardized acid and base titrating solutions, to the nearest tenth of one (0.1) gram at the stabilized end point. The equivalence of the tested sample shall be expressed in a percentage as CaCO_3 to the nearest tenth of one (0.1) percent.
- vii. Quality Control Records - The Contractor shall, prior to pipe installation, furnish the Engineer with two (2) copy sets of the manufacturer's quality control records for pipe manufactured in accordance with this section. Records shall indicate thereon: (1) the agency and technician performing the test, (2) the test date, (3) the District's Job Number assigned to the project, (4) the pipe size and date manufactured, (5) the weight of the test material, (6) the actual standardized normality of the acid and titrate solutions and the test amounts used, and (7) the individual sample and pipe section average equivalent CaCO_3 percentage. Each test record sheet shall be endorsed by the manufacturer, (and the agency performing the test if other than the manufacturer), as certifying compliance with this Section.
- g. Trench load calculations and design shall reflect the following minimum criteria:
 - i. Maximum trench width of twenty-four (24) inches greater than the outside diametric dimension (O.D.) of the pipe and a backfill density relative to that anticipated but in all cases not less than one hundred twenty (120) pounds per cubic foot.

- ii. A dead load factor not greater than one and nine-tenths (1.9).
 - iii. Live load and impact factors relative to that anticipated but in all cases not less than that produced by using AASHO H-20 load criteria and a one and one-half (1.5) impact factor.
 - iv. A safety factor of not less than one and one half (1.5).
5. CL and CL&C Pipe - CL and CL&C pipe shall conform to the requirements of Federal Specifications SS-P-381a of December 14, 1967 and latest amendments thereto and/or SS-P-385a of January 31, 1964 and latest amendments thereto except as modified herein. The total area of steel used for design purposes shall be the cross-sectional area of steel in the wall of the pipe cylinder only.
- a. Rod-wrapping cross-sectional area shall not be considered for design purposes. Reinforcing steel used for rod-wrapping for all CL&C pipe shall have a minimum diameter of seven thirty-seconds (7/32) inch.
 - c. Concrete linings and coatings shall be manufactured with Type II Portland cement conforming to the requirements of ASTM Designation C 150 Concrete linings shall extend to the ends of each pipe length. The concrete coating shall be held back three (3) inches from each end of each pipe, except where otherwise specified for abutting pipe or structure connections. An acceptable corrosion protective coating shall be shop applied to all exposed metal portions of pipe before shipment. Minor shop coating damage shall be repaired in the field with material consistent with that used by the pipe manufacturer as directed by and to the satisfaction of the Engineer.
 - d. Except where shorter lengths are required to meet special conditions with due allowance for jointing, CL and CL&C pipe shall be fabricated in individual lengths not exceeding forty (40) feet. All pipe shall be clearly marked with date of manufacture, type of concrete lining and/or coating and name or trademark of the manufacturer as identification on each individual length unless otherwise specified or shown on the Drawings.
 - e. Fabrication of CL&C pipe for above ground crossings, siphon installations or other underground installations specified shall be in accordance with the minimum basic requirements of the following table: (Based on a maximum span of thirty (30) feet).

Lined inside diameter of pipe (In.)	6	8	10	12	14
Steel Cylinder Gauge (US Standard)	10	10	7	7	7
Uniform minimum Lining Thickness	1/2	1/2	1/2	2/3	2/3
Uniform minimum Coating Thickness	1	1	1	1	1
Rod-wrapping or wire reinforcement	7/32 inch diameter or greater at 1.75 inches maximum clear spacing. Self-furring welded fabric of 2-by-4 inch No. 13 gage steel wire.				

Steel cylinders in the above table shall be such that the lined pipe shall have the nominal pipe size within the one-quarter (1/4) inch tolerance set by these Specifications. Fittings for CL&C pipe shall conform to the requirements of AWWA Standard C 208. Special fittings shall be shop fabricated as detailed on drawings for construction.

- f. Deflection fittings shall not exceed fifteen (15) degrees at any one angle break in such fitting and the distance between all miters in a fabricated fitting shall be three (3) nominal pipe size diameters.
- g. The Contractor shall submit, at his own expense, shop and material details of all CL and/or CL&C pipe and fittings for District review before the pipe and/or fittings are manufactured for use in the work.

If such shop drawings are to be submitted by the pipe fabricator or manufacturer for District review, the District assigned Job Number and Contractor's signature must appear on each drawing, attesting the fact it has reviewed the drawings and if such are accepted, installation will be in conformance therewith.

- h. CL and/or CL&C joining by butt-welding shall be performed on all plain end pipe. Field welds will be permitted at support points only as designated on drawings reviewed by the Engineer and provided that the ends of such pipe are clean of all concrete, grease, scale and dirt. All welding shall be accomplished as specified in accordance with the latest AWS standards. After field welding is complete and inspected by the Engineer, all exposed portions of the cylinder and joint shall be wrapped with eighteen (18) gage stucco wire and then cement grout band coated with CLASS I grout specified in Section 21 of these Specifications. The grout band, once finished, shall immediately be coated with a membrane-type,

fast-curing material that will seal the band surface completely.

- i. Appropriately sized joint rings for joining CL and/or CL&C pipe shall be welded to the cylinder to form a self-centering bell and spigot type joint sealed by a compressed rubber gasket conforming to the requirements of said Federal Specification SS-P-381a. When such method of jointing is used, CLASS I mortar, as specified in said Section 21, shall be used to point the joint on the inside and CLASS I grout, conforming to said Section 21, shall be used to completely fill the annular space between abutting pipe sections on the outside.
 - j. Flexible steel couplings for joining CL and/or CL&C pipe shall consist of acceptable beveled or flared sleeves, pressed or rolled steel flanges, rubber or neoprene gaskets and steel bolts with hexagon nuts.
6. Plastic Pipe - Plastic pipe, fittings and joint materials specified herein consist of Acrylonitrile Butadiene Styrene (ABS), High Density Polyethylene (HDPE) and Poly-Vinyl Chloride (PVC). All materials incidental to plastic pipe installations such as gaskets, joint lubricants, cements, etc., shall be supplied by the pipe manufacturer. All plastic pipe required in odd lengths shall be cut using a proper cutting tool and guide that ensures true line cut on planes perpendicular to the pipe axis. No bevel cuts for pipeline alignment adjustments will be permitted.
- a. HDPE plastic pipe shall be bedded in 2-sack cement slurry wherever exposed in open trench. ABS Composite Pipe shall be bedded in pea gravel or backfill sand.
 - b. PVC plastic pipe shall be bedded and backfilled as specified with extra care taken in compaction of said bedding and backfills as specified in Section 16-03.F.9 of these Specifications.
 - c. The inside diameter of an installed section of plastic pipe shall not be allowed to deflect more than indicated below.

PVC SEWER PIPE DEFLECTION STANDARDS

<u>PIPE SIZE, IN.</u>	<u>MANDREL O.D., IN.</u>	
6	5.619 }	
8	7.524 }	
10	9.405 }	ASTM D-3034
12	11.191 }	SDR 35
15	13.849 }	
18	16.924 }	ASTM F-679
21	19.952 }	T-1 Wall
Over 21	Not Allowed	

- a. Rerounding through the use of a vibratory machine will not be permitted.
7. ABS Pipe - All ABS pipe six (6) inches and greater in diameter shall conform to the requirements of ASTM Designation D 2680-86 as it applies to Composite Pipe. Fittings or parts thereof for the above-mentioned pipe sizes not manufactured under the provisions for Composite Pipe shall be shop fabricated or molded from resins specified and shall conform to the physical requirements in said ASTM D 2680 and shall be tested and proved to be equivalent quality to the pipe.
- a. All ABS solid wall pipe and fittings less than eight (8) inches in diameter (side sewer) shall, at a minimum, conform to the requirements of ASTM Designation D 2751-75 and D 1527 as they apply to type SDR 35 and Schedule 40 ABS sewer pipe respectively using solvent cement joint assembly systems.
 - b. Cement used for all ABS pipe joints shall conform to paragraph 7.3 of ASTM D 2680. Jointing shall be accomplished by applying a coating of cement to the inside to the socket and to the outside of the spigot end of pipe to be joined in sufficient quantity that when the spigot is fully inserted into the socket a bead of excess cement will form around the entire circumference of the outside juncture of said spigot and socket. Excess cement shall then be removed. The Contractor shall apply a coating of cement to all pipe ends of ABS Composite pipe whether within a coupling or not. The purpose is to prevent migration of ground water into the annular space.
 - c. All ABS pipe entering or leaving a concrete structure shall have a standard (water stop) manhole gasket, as supplied by the pipe manufacturer, firmly clamped around the pipe exterior and cast into the structure base or near the structure wall center as a water stop.

- d. ABS pipe is allowed for side sewers only and may not be installed outside the property line.
 - e. Individual pipe lengths for side sewers shall not exceed twelve and one-half (12.5) feet.
 - f. See Section 18-02.E for repair procedures for ABS pipe in new construction.
8. HDPE Pipe – All HDPE pipe and fittings shall, at a minimum, conform to the requirements of PPI/ASTM Designation PE 3408 with a material classification as per ASTM 1248, III C 5 P34 and a cell classification of PE 345434C. The pipe shall be gray in color and shall consist of virgin high molecular weight polyethylene, specified under ASTM D3350. All HDPE pipe shall be heat-welded, seamless pipe. Alternately, electrofusion HDPE couplings may be used to connect sections of HDPE pipe.
- a. HDPE pipe shall have a yield tensile strength of at least 3,200 psi and a ratio of pipe diameter to wall thickness of SDR 17 or better.
 - b. Side sewer connections to HDPE pipe shall be made by heat-welding an HDPE stub onto the main and tapping the pipe.
 - c. Neoprene gasket repair couplings with stainless steel shear bands may be used only to connect HDPE pipe to other pipe materials.
 - d. All HDPE pipe entering or leaving a concrete structure shall have a standard (water stop) manhole gasket, as supplied by the pipe manufacturer, firmly clamped around the pipe exterior and cast into the structure base or near the structure wall center as a water stop. Where high groundwater is anticipated, a Linkseal, may be substituted at the discretion of the Engineer.
9. PVC Solid Wall Pipe
- a. All PVC pipe and fittings shall, at a minimum, conform to the requirements of ASTM Designation D 3034, minimum wall thickness of SDR 26, ASTM Designation F-679 Type PS-115, or the requirements for PVC pressure pipe, as they apply to type SDR 26 PVC Sewer Pipe using an Elastomeric Gasket Joint in a bell and spigot assembly system. Rubber sealing gaskets shall meet the requirements of ASTM Designation D-1869 or F-477. .
 - b. All PVC pipe entering or leaving a concrete structure shall have a rubber sealing gasket, as supplied by the pipe manufacturer, firmly seated perpendicular to the pipe axis, around the pipe exterior and cast into the structure base or near the structure wall center as a

water stop. Said water stop may also consist of a manhole coupling with rubber sealing rings cast into the structure base. All rubber ring gaskets shall be in accordance with ASTM Designation F-477. Lubricant used for field assembly of gasketed PVC Pipe shall have no detrimental effect on the gasket, joint, fitting or pipe and shall be as recommended by the manufacturer. Where high groundwater is anticipated, a Linkseal, may be substituted at the discretion of the Engineer.

- c. PVC pipe joining may occur at any convenient distance beyond and/or between structures.
- d. Cement used for non-gasketed PVC Pipe shall conform to ASTM Designation D 2564. Jointing of wet pipe is not allowed. Jointing of pipe shall be accomplished by applying a coating of cement to the inside of the bell and the outside of the spigot. The cement shall be applied in sufficient quantity to produce a bead of cement around the entire circumference of the pipe joint. Excess cement shall then be removed.
- e. See Section 18-02.E for repair procedures for PVC pipe in new construction.
- f. All sun-faded pipe or pipe with noticeable surface defects will be rejected and shall be replaced by the Contractor.

32-16 SIDE SEWER INSTALLATIONS BY OPEN CUT METHODS (ref Section 18-02)

- A. All sewer line connections to manholes, trunk sewers, or side sewers shall be left uncovered until after the inspection has been made. After inspection of the connection, the trench shall be backfilled as specified.
- B. Attention is directed to Sections 4-01.C, 4-02, and 28-32 through 28-35 of these Specifications for additional details and requirements pertinent to side sewer installations. When a Backwater Overflow Device or Backwater Check Valve and Shutoff System is required as specified under Section 4-02.B.11, such installation shall be made at the time of connection and at a location where sewage can overflow without serious property damage on adjacent areas.
- C. All side sewer pipe, where applicable, shall be laid in conformance with the requirements in Section 18 for Main and Trunk Sewer Pipe laying and to the following requirements:
 - 1. The maximum slope of any portion of a side sewer shall not be greater than one hundred fifty (150) percent, (1-1/2 vertical to 1 horizontal ratio). If a building is located immediately adjacent to a sewer main, the point of

connection to the main shall be sufficiently downstream of the building sewer outlet so that the above maximum slope is not exceeded.

2. When a lateral sewer is not installed and tested in conjunction with a main line installation, it shall be installed as follows to provide for air testing: Place a test plug, with adequate length of one-quarter (1/4) inch minimum diameter air hose attached, in the downstream end of the first length of pipe upstream of the saddle. Thread the air hose through each successive length of pipe as it is laid to the property line, then place a test fitting at the upstream end of the lateral and plug the straight through end of the fitting.
3. If a complete side sewer is to be installed and tested as one section of sewer, a test fitting or test plug (as shown in Section 28-37) shall be installed immediately upstream of the saddle and at any alignment fittings at the main sewer.
4. Contractor shall complete installation of the side sewer from the test fitting or test plug to a point near the building plumbing outlet, but shall not connect until testing is complete and inspected. Side sewers shall not be connected directly into manholes on the line. The final air test for townhouses and similar housing developments shall be performed as specified herein for complete side sewers after all other utilities for such units have been installed.
5. A house sewer shall be installed by first placing a test fitting on the upstream end of the lateral sewer, unless this fitting has been previously installed. Then proceed with the installation of the house sewer to a point near the building plumbing outlet, but do not connect until all testing is completed and inspected.
6. All upstream ends of side sewer installations for townhouses and similar cluster housing developments shall be plugged with a standard watertight plug or cap, as supplied by the pipe manufacturer, immediately after such installation and shall remain plugged until the time of building drain connection. No side sewers in this category may be used until the job has been completed and accepted by the District.
7. Test fittings (See Section 28-37) shall be wye or tee branches of the same type, size, and quality as that to the side sewer pipe, unless otherwise approved, and shall be installed where required. The branch of each test fitting shall be laid in an upright position.
8. If the vertical location of adjacent utilities is such that it is necessary to install side sewers over the utilities, the side sewer shall be installed after these utilities have been properly installed and backfilled.

9. Contractors may tap and install four and six-inch diameter laterals on new HDPE and DIP sewer main pipelines under the following conditions:
 - a. All taps and materials used are to be installed in strict compliance with the pipe manufacturer's recommendations.
 - b. The location of each tap is to be verified by the Inspector prior to the drilling of each tap. Taps shall be spaced a minimum of two (2) feet for DIP. Contractors shall not be allowed to make taps on CIP, ABS or PVC. Taps may be allowed on VCP of 12 inches diameter or larger, only.
 - c. All taps to be made by contractors on New Projects shall be noted on the Plans.
10. To mark the location of laterals, a three (3) inch wide strip of green plastic electronically detectable marking tape shall be installed horizontally one (1) foot below subgrade from the main line end of each sewer lateral. The electronically detectable tape shall be labeled "Buried Sewer Line Below."
11. When a lateral sewer is installed in advance of the house sewer, it shall be terminated five (5) feet within the property line. The contractor shall mark the location of the plugged end of the lateral with a No.4 reinforcing bar brought up to grade.
12. When an existing building that is sewerred by a septic tank is to be connected to the public sewer system, the new side sewer shall be installed in accordance with these Specifications. A cleanout and backwater overflow device shall be installed at the building, and a new side sewer shall be installed from the building to the public sewer. If a portion of the existing piping from the building to the septic tank is a minimum of four (4) inches in diameter and will hold a pressure test, as required in Section 18-03.B, that portion of the existing piping may be used in the new side sewer.
13. The air test of any existing piping, as well as the installation of the new side sewer, must be completed and accepted before the existing septic tank is removed from service. Removal of a septic tank from service shall be in accordance with the regulations of the Health Officer of Contra Costa County dated March 18, 1983, as follows:

"420-1.609.3 Abandonment of a Septic Tank. An abandoned tank shall be backfilled immediately. The tank shall be uncovered and filled with compacted dirt or sand. Gravel or crushed stone is not acceptable. If the drain field is not flooded, it may not be necessary to pump out the tank as the contents will rise and overflow to the drain field. The tank contents shall not be permitted to surface. Slight mounding of the final cover is acceptable to allow for subsequent settling."

14. Where wyes, tees, and/or laterals were previously installed on the main sewer, the side sewer shall be connected to the wye, tee or lateral as provided for the particular connection. Side sewer or lateral connections to new or existing manholes shall be as detailed on the drawing for Standard manholes (see Sections 28-01 and 02), unless otherwise shown on the Plans or directed by the Engineer. All side sewer connections shall be made with fittings or adapters recommended by the manufacturer for use with the particular pipe.
15. Side sewer connections to main sewers ten (10) inches or smaller where wyes, tees, or laterals were not installed, the Contractor shall install a new wye or tee to make the connection. A tap and saddle connection will not be permitted unless the standard fitting cannot be installed. The Contractor shall make arrangement for said tap and saddle at least forty-eight (48) hours in advance of the time the Contractor intends work. Contractors shall have adequate shoring on the jobsite conforming to the requirements of Section 16-02.C of these Specifications for the trench they plan to excavate. Contractors who have taps scheduled for District forces to install shall have a minimum of two (2) sets of approved shoring equipment at the site of work.
16. The required excavation and cleaning of main surfaces for a tap and saddle shall be performed by the Contractor and when such taps are installed by District forces, the Contractor shall have the additional materials and equipment at the job site as follows: hard hats for all workers under its supervision; barricades; proper pipe; Standard Bedding material as specified under Section 16-03.D.1 of these Specifications; and a ladder long enough to extend two and one half (2-1/2) feet above the top of the excavation. The Contractor will be charged a minimum of one (1) hour standby time (including overhead charges established by the District) when the above-mentioned materials and equipment are not on hand at the jobsite when the work is scheduled. The excavation shall provide a minimum clearance of three (3) inches under and six (6) inches on each side of the main sewer for a distance of twelve (12) inches each way along the main from the point of connection. The outer surface of the main in this exposed area shall be thoroughly cleaned.
17. The excavation above the main, for the tap working area, shall be a minimum of two (2) feet in width without under-cut sides and shall be properly shored. Before the tap is made, the Contractor shall have sufficient standard bedding material at the site of the work to adequately backfill under the saddle to support it. No backfill shall be placed on the saddle fitting within one-half (1/2) hour after the completion of the work by District forces. If the Contractor breaks or otherwise damages the main while excavating for the tap, he shall notify the District and shall make repairs as necessary at the Contractor's sole expense.

18. Side sewers equal in size to the main sewer shall be connected by installing a standard wye branch or tee fitting, of the same size and type of material as the main line, into the main line at the point of connection. The installation of the standard wye branch or tee shall be arranged with the District and the work will be performed by the Contractor. For a tee or wye installation, the Contractor shall excavate six (6) feet along the main line and install sufficient shoring to ensure a safe trench. The Contractor shall also provide ladder, bedding, and other necessary items as specified above in Section 18-02.C.2.a.
 19. The Contractor will make all repairs to existing sewer lines unless otherwise ordered by the Engineer. Repairs to side sewers shall be made using service weight soil pipe or CIP of quality stipulated by the Engineer and shall conform to the general requirements of Section 28-35.
 20. If an existing side sewer is being repaired or altered, a backwater overflow device or backwater check valve and shutoff system shall be installed on such side sewer system as part of the work.
- D. Side Sewer Construction Requiring a Residential Sewage Pump - All information applicable to Sections 28-50 and 28-50a shall be submitted in accordance with Section 28-50, 28-50a, and 4.01.B before a permit is issued or any work can begin on the side sewer or pumping system.

32-17 CLEANING AND TESTING (ref. 18-03)

- A. In new tract or subdivision developments, pressure testing shall be performed only after the installation of all proposed lateral sewers to the main sewer system has been completed. Attention is directed to Section 18-02.C of these Specifications for other side sewer system installations to be air tested.
- B. Low pressure air tests shall be conducted in accordance with the following Test Procedure and the details shown on Sections 28-37 and 28-38 of these Specifications. All necessary test equipment shall conform to the requirements of said Section 28-38 in proper working order and tests shall be made in the presence of the Contractor and a District representative. Test plugs shall be carefully placed at each end of the section of line to be tested. When all necessary test equipment (see Section 28-38) is in place, a compressed air supply shall be attached to the air fitting on the test equipment and the air pressure within the line increased to four (4) pounds per square inch (psi). After the air supply is securely turned off or disconnected, there shall be a two (2) minute waiting period to allow stabilization of air within the sewer line before the actual test period begins. In no case shall the air pressure, within the line, be less than 3.5 psi at the beginning of the test period. The allowable air pressure loss shall not exceed one (1) pound per square inch. When testing side sewers, or portions thereof, the test period shall be two (2) minutes and the allowable loss

shall not exceed one (1) pound per square inch. After completion of a test, the air pressure shall be released slowly through the valve, which is incorporated in the test equipment

- C. Air test plugs shall not be removed until the air pressure is no longer measurable.
- D. Cleaning - All new main and trunk sewer installations, and such site collector and side sewer system installations deemed necessary by the Engineer, shall be cleaned as required herein with a cleaning ball or device in accordance with such device manufacturer's instructions or recommendations and/or flushed prior to sanitary waste use. If high-pressure water cleaning such as hydro-flush is utilized, the pressure must be maintained below 2000 psi. Sand traps with screens shall be used in trapping debris, shall be in accordance with Section 28-39, and shall be secured to the manhole to prevent the sand trap from entering the pipe. All cleaning, including screen installations and removal, shall be accomplished by the Contractor in the presence of the Engineer.
- E. Television Inspection - The Contractor shall arrange for television inspection in accordance with the following procedures:
 - 1. The complete job is ready for television inspection when the following work has been completed:
 - a. All sewer pipelines are installed, backfilled, and compacted.
 - b. All structures are in place, all channeling is complete and pipelines are accessible from structures.
 - c. All other underground facilities, utility piping, and conduits are installed.
 - d. Final street subgrading is complete. For wet weather periods, placement of aggregate base has been completed.
 - e. Pipelines to be inspected have been preliminarily cleaned and flushed.
 - f. Final pressure test has been completed.
 - 2. After the above work is complete, the Contractor shall arrange for television inspection at his/her sole expense.
 - a. The entire job will be initially televised by the Contractor and recorded in NASSCO PACP format DVD for the District to keep.
 - b. If no deficiencies are observed, the work will be considered satisfactory.

- c. If deficiencies are observed, any defects serious enough to require correction will be determined by the District.
 - d. Notification will be made in writing of any deficiencies revealed by the television inspection that will require repair. If corrective work is indicated and viewing of the videotapes is desired, the District shall be contacted to set a time for the viewing with the Engineer.
 - e. Corrective work shall be done. District reserves the right to require another re-air test of any repair.
 - f. Those portions of the pipeline system that have been corrected must be re-televised for District review.
 - g. The procedure outlined above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the District.
3. The following observations from television inspections will be considered defects in the construction of sewer pipelines and will require correction prior to paving:
- a. Low spot 0.125 x diameter of pipe or greater, i.e. 1" for 8" pipe
 - b. Joint separations [three quarters [3/4] inch or greater opening between pipe ends]
 - c. Cocked joints present in straight runs or on the wrong side of pipe curves
 - d. Chips in pipe ends
 - e. Cracked or damaged pipe
 - f. Offset joints
 - g. Infiltration
 - h. Debris or other foreign objects
 - i. Other obvious deficiencies
 - j. Irregular condition without logical explanation

4. Television-inspection of new work and the correction of observed defects will not relieve the Contractor of its responsibility for the one-year guarantee period. The District may inspect and/or televise portions of any projects during said guarantee period. This inspection may include a televising of the pipelines and the checking of the pipeline deflection in the case of plastic pipes.

32-18 ABANDONMENT (ref. Section 23)

- A. Before a building connected to the District sewer system is removed or modified in a manner that requires a physical disconnection of the building from the sewer system, the owner of the building shall obtain an abandonment permit from the District.
- B. The District will allow the owner's contractor to abandon the side sewer on a case by case basis.
- C. The side sewer to be abandoned shall be sealed at the property line by use of a concrete plug or a manufactured plug or cap.

SECTION 33

HORIZONTAL DIRECTIONAL DRILLING (HDD)

33.01 GENERAL SUMMARY

- A. The Contractor shall furnish and install sewer pipe, complete and in place, by the horizontal directional drilling (HDD) method. All work shall be performed as indicated in the Contract Documents and as required in these Specifications and shall be supervised by personnel experienced in HDD pipe installation. Note that HDD installation of sewers will only be allowed where the design slope is at least three percent (3 percent; $S \geq 0.0300$).
- B. The HDD rig and tooling shall be of sufficient capacity to complete the pilot bore, reaming and pull-back of pipe.
- C. The drilling fluid mixing and delivery system shall be of sufficient capacity to successfully complete the HDD work.
- D. The Contractor shall provide all materials, labor, equipment and services necessary for bypass pumping and/or diversion of sewage flow (if required), installation of sewer pipe and testing of the completed pipe system.

33.02 EXPERIENCE REQUIREMENTS

- A. Contractor shall have a minimum of three (3) HDD projects of similar diameter, length, soil type and installation conditions successfully completed within the last 3 years.
- B. Fusion equipment shall be operated only by technicians who have been certified by the pipe manufacturer or supplier and who have a minimum of three (3) years of experience fusion welding 4-inch or larger diameter HDPE pipelines.

33.03 SUBMITTALS

- A. The Contractor shall submit the following to the District for review and approval prior to ordering materials:
 - 1. Cut Sheets for field staking at twenty (20) foot intervals along the proposed centerline of the pipe alignment. No HDD work shall be started prior to the District's field check of the stakes.
 - 2. Site maps to scale indicating the locations proposed for pipe assembly work (e.g., butt-fusion welding), laydown areas, pipe and material storage areas, insertion and receiving pits, Pipe

3. location monitoring grid, tanks, pumps, HDD rig and trailers.
 4. Technical data for pipe and fittings, and pipe joining, drilling, reaming, pulling and locating equipment.
 5. A proposed construction sequencing plan.
 6. Procedure for handling and disposal of drilling fluids and cuttings including the locations of disposal sites.
 7. Calculations of anticipated HDD installation loads demonstrating that the pipe and pipe fittings system is capable of withstanding the anticipated installation and operating loads with an appropriate factor of safety.
 8. Calculations of minimum penetration rates for all reaming passes.
 9. Contingency Plan for dealing with the potential for drilling fluids to surface (e.g., through hydrofractures).
 10. Material Safety Data Sheets (MSDS) for all drilling fluids, lubricants, and other products used for the HDD drilling and pipe installation work.
 11. A statement of the qualifications of the foreman, local operator and crew who will be responsible for HDD work. No Substitution of these personnel shall be made without the written acceptance of the District.
- B. The Contractor shall submit the following installation information daily:
1. Raw pilot hole data including all magnetic steering and surface monitoring readings.
 2. The pitch and three (3) dimensional (x, y, z) coordinates of the probe for every drill rod length or thirty (30) feet, whichever is shorter length. Coordinates shall be referenced to the drilling entry pit coordinate taken as the origin (0, 0, 0).
 3. A log of the maximum thrust, maximum torque, and maximum slurry flow during pull back at every drill rod length or thirty (30) feet whichever is shorter length.
 4. Records of any hydrofracture encountered or other problems and correction measures taken.
 5. The Contractor shall submit detail drawings and a written description of the construction procedure, sequence to bypass sewage flow, install pipe, and reconnect lateral sewers.
 6. The Contractor shall submit Pre- and Post-CCTV Inspection videos of all sanitary sewer mains within the scope of work. See Section 18-03D, TELEVISION INSPECTION.
 7. The Contractor shall submit a copy of the technician's

8. certification(s) for the operation of the fusion equipment for HDPE pipe.
9. Submit debearing process and equipment for use in removing the internal bead for the newly joined HDPE pipe sections.

33.04 QUALITY ASSURANCE

- A. The Contractor shall test and inspect the installed pipeline and shall conduct post-job television inspection in accordance with the requirements of Section 18-03D, TELEVISION INSPECTION.
- B. All HDD work shall be done by a qualified Contractor with at least five (5) years' experience with HDD and a minimum of three (3) projects of similar diameter, depth, and length.

33.05 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall exercise special care during the unloading, handling, and storage of all polyethylene pipe to ensure that the pipe is not cut, gouged, scored or otherwise damaged. Any pipe segment which has cuts in the pipe wall exceeding 10 percent of the wall thickness shall be cut out and removed from the site at the Contractor's cost. The pipe shall be stored so that it is not deformed axially or circumferentially.
- B. All pipe without an ultraviolet inhibitor shall not be stored uncovered outside.

33.06 PRODUCTS

- A. The Contractor shall provide HDPE pipe with butt fusion welded joints, as specified in Section 18-01D(2), HIGH DENSITY POLYETHYLENE (HDPE) PIPE.
 1. For installations with shallow cover, restrained-joint ductile iron pipe as specified in Section 18-01C(3), DUCTILE IRON PIPE (DIP) may be used if approved by the District.

33.07 HDD EQUIPMENT AND MATERIALS

- A. The drill unit shall be a remote-steerable tunneling system that is designed and is capable of accurately drilling (true to line and grade as specified on the drawings) through the ground conditions identified in the geotechnical report and in bedrock and in mixed bedrock and soil face conditions. The drilling system shall utilize a high-pressure, low-volume,

- B. slurry-assisted, mechanical excavation technology capable of installing pipelines of the diameter required.
- C. The drilling slurry compound shall be totally inert.
- D. The Contractor shall provide and use an electronic detection system that is capable of continuously locating the position of the drilling head to an accuracy of one percent (1%) of the depth in both the horizontal and vertical planes (e.g., within 0.1 feet when the drilling head is ten (10) feet deep), if the design slope of the sewer being installed by HDD is less than ten percent (10%; $S = < 0.010$ feet per foot). Where the design slope for the sewer being installed by HDD is equal to or greater than ten percent (10%), the electronic detection system shall be capable of continuously locating the drilling head to an accuracy of five percent (5%) of the depth in both the horizontal and vertical planes (e.g., within 0.5 feet when the drilling head is ten (10) feet deep).
- E. All drilling equipment shall have a permanent, inherent alarm system capable of detecting an electrical current. The equipment shall be grounded and shall be equipped with an audible alarm to warn the operator when the drill head nears electrified cable.
- F. All crews shall be provided with grounded safety mats, heavy gauge ground cables with connectors, hot boots and gloves.

33.08 EXECUTION

- A. Work shall meet or exceed the requirements of these Standard Specifications.
- B. The Contractor shall protect all surface and subsurface site improvements, facilities, and utility pipelines, ducts and conduits from being damaged by the directional drilling operation.

33.09 PREPARATION

- A. Cut Stakes shall be provided at twenty (20) foot intervals along centerline to provide for monitoring of the drilling head.
- B. Easements shall be staked at fifty (50) foot intervals.
- C. Potholing shall be required for marked utilities within ten (10) feet of centerline.
- D. The Contractor shall walk the alignment to check for potential sources of interference that could affect the accuracy of the drilling head locating

- E. system. The Contractor shall properly calibrate the locating system prior to beginning and regularly during the HDD operation as required to achieve the accuracy specified herein.

33.10 BYPASS PUMPING

- A. The Contractor shall provide bypass pumping and/or diversion when required for acceptable completion of the pipe installation.

33.11 PIPE INSTALLATION

- A. The Contractor shall locate, design, construct, properly brace or shore, dewater, maintain, and restore insertion and receiving pits. Insertion and receiving pits shall be a minimum of four (4") feet by six (6") feet in horizontal cross section and shall be shored in accordance with Section 16-02D, SHORING. Bracing shall be adequate to resist drilling and pull-back loads.
- B. The Contractor shall employ a slurry-assisted, mechanical excavation process for the HDD operation. The drilling slurry compound shall maintain boring stability and provide lubrication to reduce frictional drag while the pipe is being installed.
- C. The Contractor shall employ a mobile vacuum spoils recovery vehicle or drilling fluid recycling system to remove drilling spoils from the access pits. The Contractor shall collect, transport, and properly dispose of drilling spoils away from the jobsite. Disposal of drilling spoils to sanitary, storm or other public or private drainage systems or waterways is strictly prohibited. The Contractor shall immediately clean up any leakage or spillage of drilling fluids.
- D. Mechanical, pneumatic, or water-jetting methods are unacceptable due to the possibility of surface subsidence.
- E. After a pilot bore has been completed, a reamer shall be installed at the termination pit and the bore shall be reamed, as many times as necessary, for proper insertion of the pipe, before the pipe is pulled back to the starting pit. The reamer shall be capable of discharging drilling slurry compound to facilitate the installation of the pipe into a stabilized and lubricated tunnel.
- F. Prior to insertion of thermo-fusion welded HDPE pipe larger than six (6) inches in diameter, the Contractor shall properly remove all internal weld beads from the interior surface of the pipe.
- G. During insertion, the pipe shall be supported on roller supports to isolate the pipe from the ground or pavement and avoid damage to the pipe.

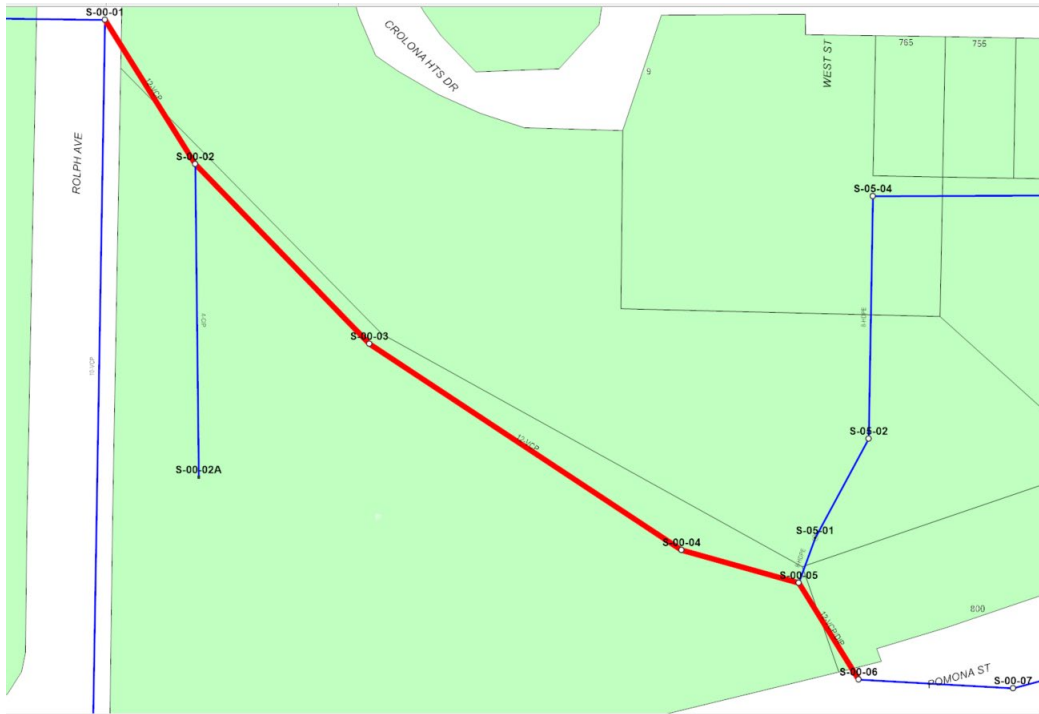
- H. During pull back operations, the maximum safe pulling load for the pipe shall not be exceeded.
- I. Prior to making connection at each end of an installed reach of HDPE pipe, the Contractor shall allow a minimum of six (6) hours to elapse to allow pipe to relax from the tension resulting from pulling the pipe into and for the pipe to equalize with ambient ground temperature.
- J. Upon completion of boring and pipe installation, the Contractor shall remove all spoils, debris and unsuitable material from the starting and termination pits. All pits shall be backfilled in accordance with the requirements of Section 16-03, TRENCH BACKFILLING.
- K. The installed pipeline shall be within six (6) inches horizontal and one (1) inch vertical of the alignment indicated in the Project Contract Documents at all locations. In addition, for gravity sewers the pipeline shall be free-draining throughout.
- L. The Contractor shall repair, replace or compensate the respective Owners for any damage to property including, but not limited to, utilities, pavements, landscaping and other improvements.

PART V

DRAWINGS

INSERT HERE FROM 2316 FILE....DRAWINGS

Below: Map of the proposed Alexander Park Sewer Replacement Project. Sewer to be replaced shown in red:



The Sewer pipe segments and structures that make up the Principle items of work:

All Pipe segments are 12" Dia.

Segment	Approximate Length
S-00-01 to S-00-02	145
S-00-02 to S-00-03	179
S-00-03 to S-00-04	284
S-00-04 to S-00-05	84
S-00-05 to S-00-06	71
TOTAL FOOTAGE:	763

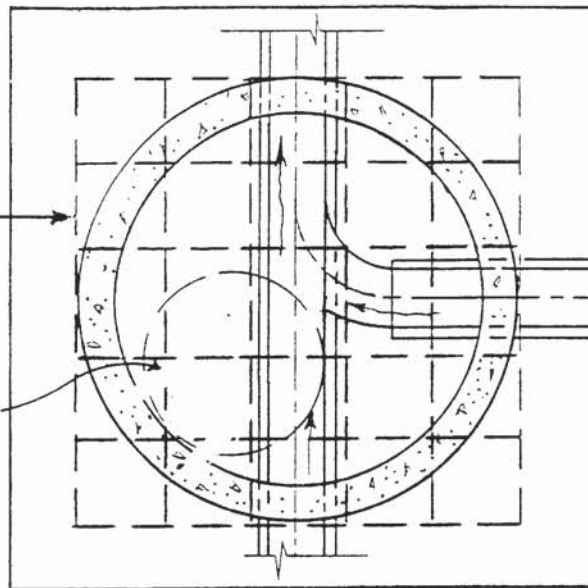
Manhole	Invert Depth
S-00-01	9'4"
S-00-02	3'10"
S-00-03	3'10"
S-00-04	4'1"
S-00-05	4'4"
S-00-06	3'10"



Above, Photo of job site showing approximate location of portions to be replaced by open trench.

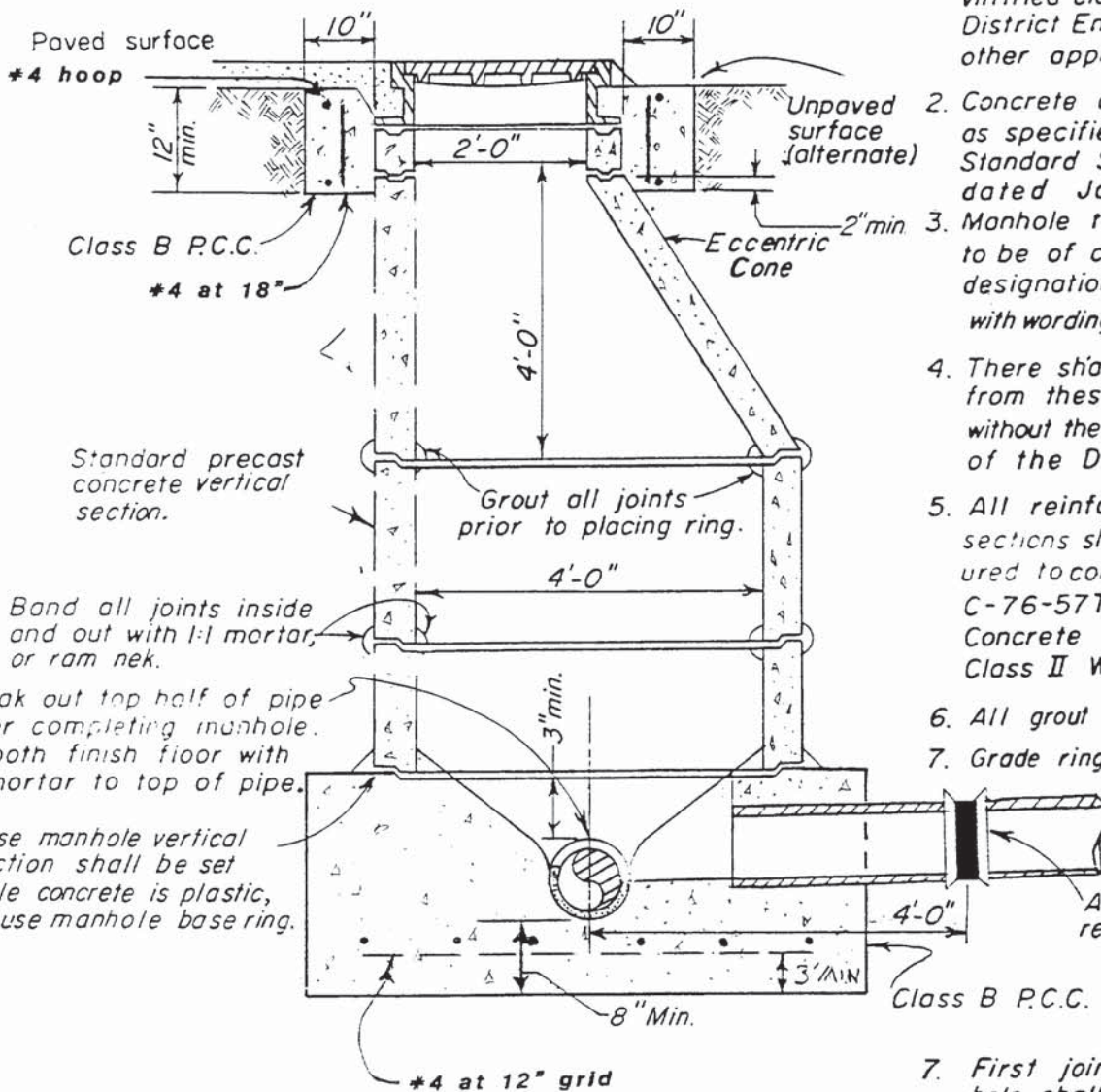
Approved: *[Signature]*
District Engineer

*4 at 12" grid
Base



NOTES

1. Standard shows installation of vitrified clay pipe; consult District Engineer for use of other approved materials.
2. Concrete classification is as specified in California Standard Specifications dated January 1981.
3. Manhole frame and cover to be of cast iron A.S.T.M. designation A-48, C.I. 30. with wording "Sanitary Sewer".
4. There shall be no deviation from these standard plans without the express permission of the District Engineer.
5. All reinforced concrete sections shall be manufactured to comply with A.S.T.M. C-76-57T for "Reinforced Concrete Culvert Pipe" Class II Wall A.
6. All grout to be 1:1 mortar.
7. Grade rings 9" max.
7. First joint outside manhole shall be of flexible rubber repair coupling.

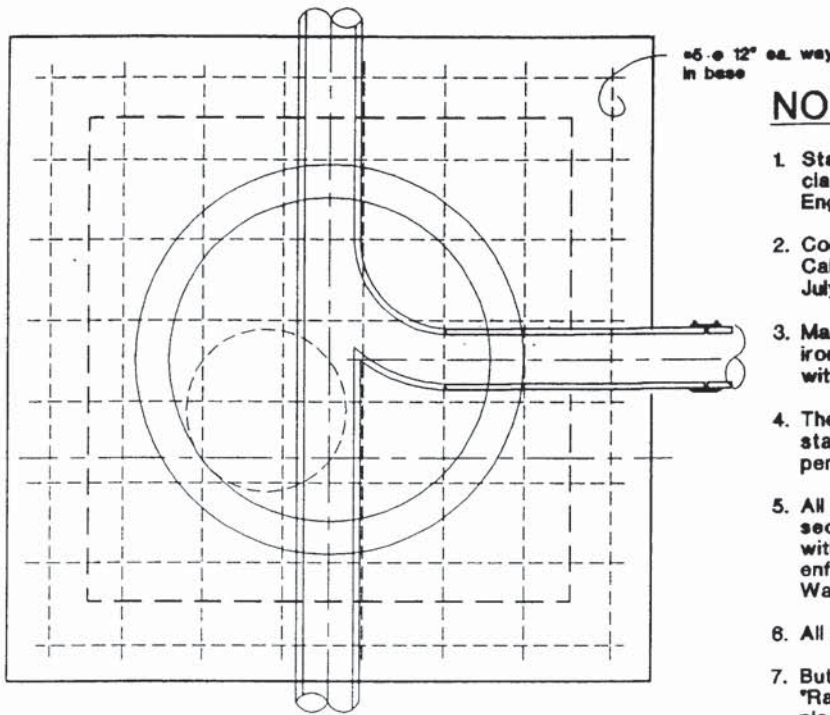


WEST CONTRA COSTA SANITARY DISTRICT

JULY 1988
DRAWN BY: AKS

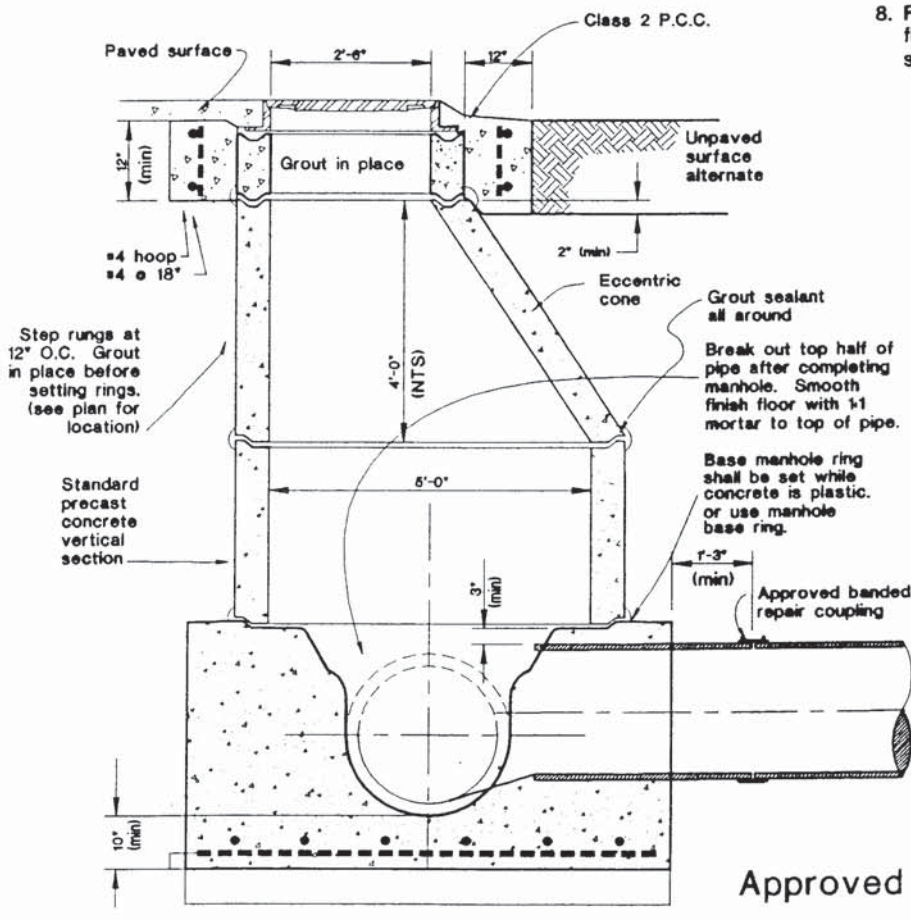
STANDARD CONCRETE MANHOLE

STANDARD
DETAIL NO. M-1



NOTES:

1. Standard shows installation of vitrified clay pipe (VCP) pipe; consult the District Engineer for use of other approved materials.
2. Concrete classification is as specified in California Standard Specifications dated July, 1984 or later.
3. Manhole frame and cover shall be of cast iron, A.S.T.M. designation A-48, C.I. 30. with wording "SANITARY SEWER".
4. There shall be no deviation from these standard plans without the express permission of the District Engineer.
5. All reinforced concrete barrel and taper sections shall be manufactured to comply with A.S.T.M. spec C-78-57-T for "Reinforced Concrete Culvert Pipe" Class II Wall "A".
6. All grout shall be 1:1 mortar
7. Butter the mating surfaces of all rings with "Ram Nek" resilient joint material prior to placing rings, band all outside and inside of joints with 1:1 mortar after placing rings.
8. First joint outside manhole shall be of flexible rubber, repair coupling with stainless shear ring.



Approved *Paul J. Winicki*
District Engineer

WEST COUNTY WASTEWATER DISTRICT

DRAWN BY: MWA

DATE: MARCH 1993

STANDARD TRUNK MANHOLE

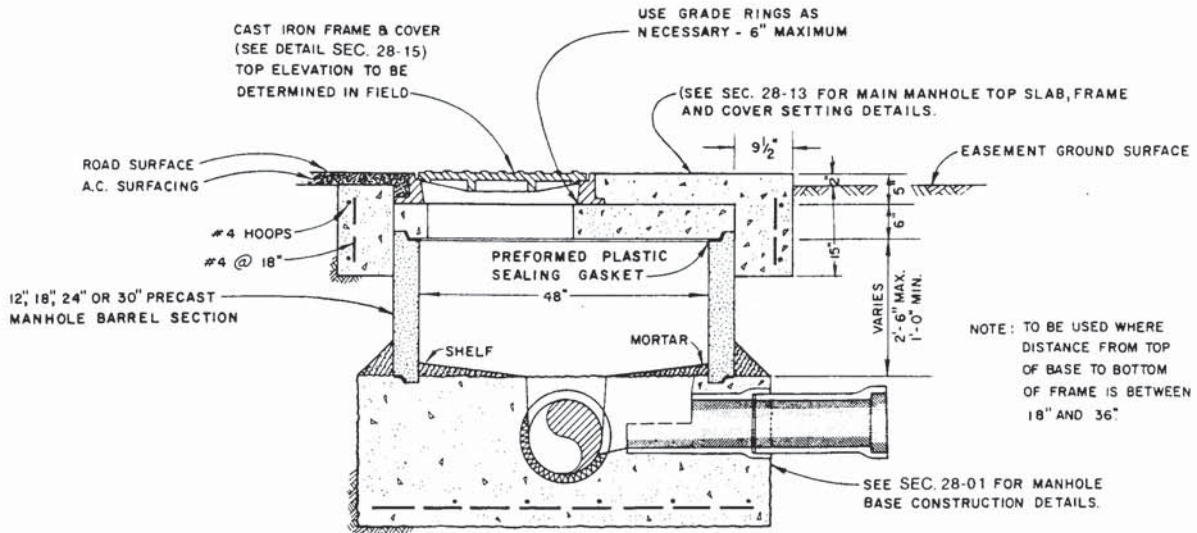
STANDARD DETAIL
M-3

CENTRAL CONTRA COSTA SANITARY DISTRICT

MARTINEZ, CALIFORNIA

STANDARD SHALLOW MANHOLES

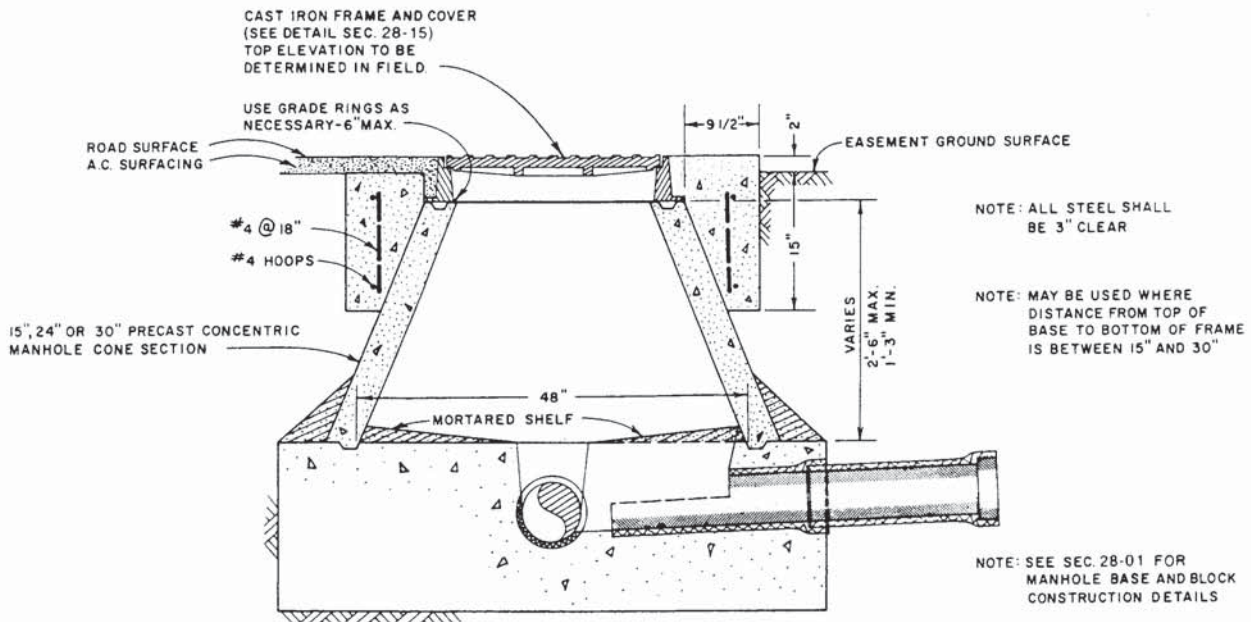
SPECIAL APPROVAL REQUIRED



SECTION

NOTE: ALL STEEL SHALL
BE 3" CLEAR

BETWEEN 36" & 54" (RIM TO FLOWLINE)

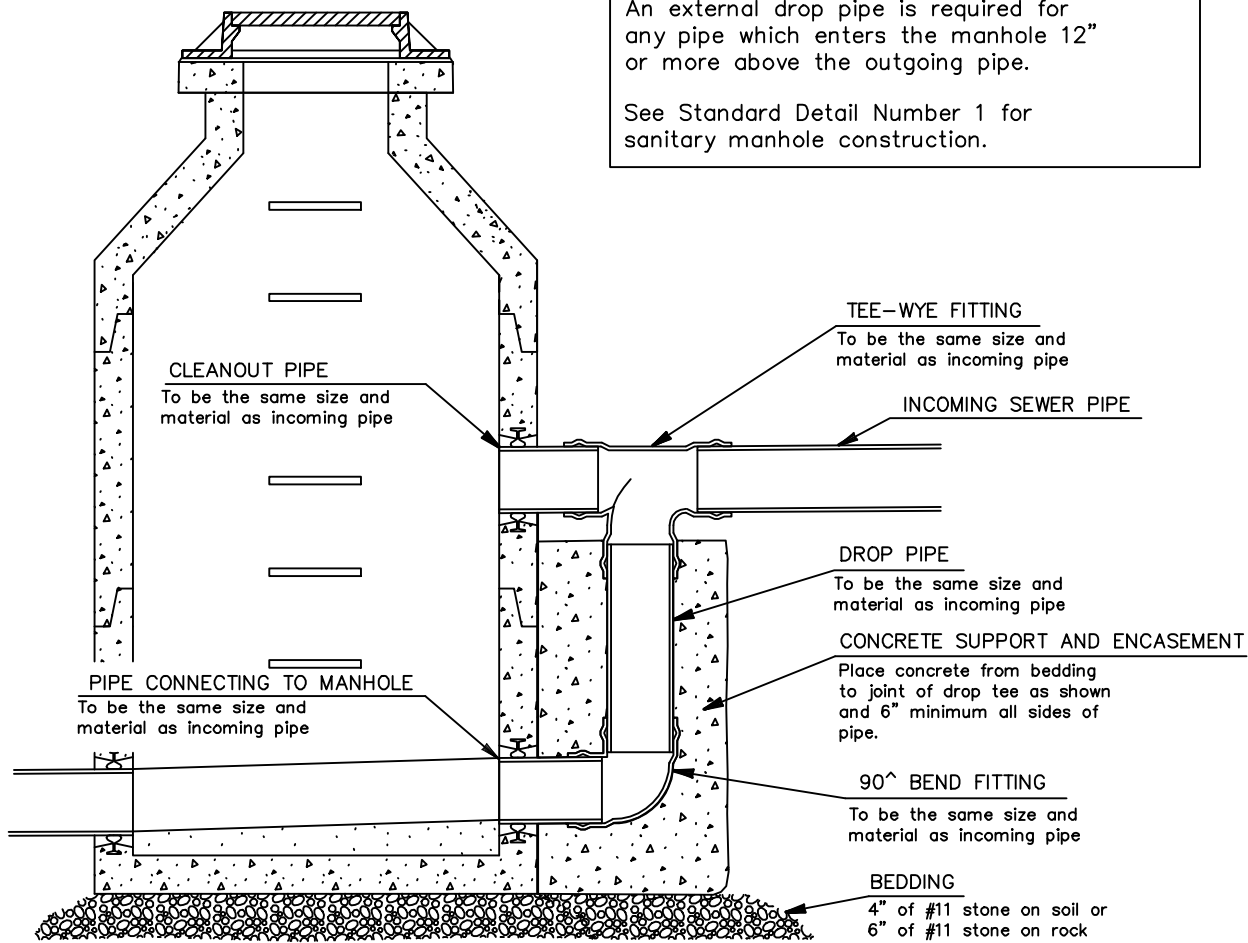


SECTION

BETWEEN 32" & 47" (RIM TO FLOWLINE)

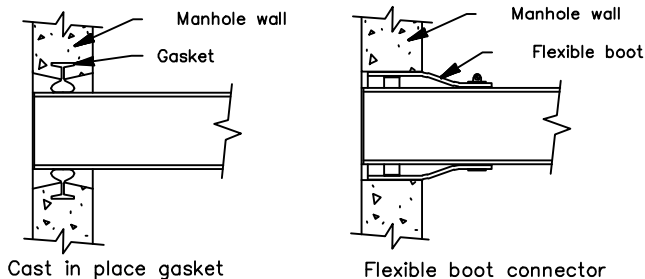
An external drop pipe is required for any pipe which enters the manhole 12" or more above the outgoing pipe.

See Standard Detail Number 1 for sanitary manhole construction.



SECTIONAL VIEW

PIPE CONNECTIONS TO MANHOLE



MINIMUM PIPE INVERT DROP THROUGH MANHOLE

TROUGH DEFLECTION	MIN. DROP (Ft.)
0° - 22°	.10
23° - 45°	.20
46° - 90°	.30