STANDARD SPECIFICATIONS

FOR PUBLIC WORKS CONSTRUCTION

City of Sacramento

California



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OFFICE OF THE DIRECTOR OF PUBLIC WORKS

JANUARY 1989

CITY of SACRAMENTO

STANDARD SPECIFICATIONS

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Section 1

DEFINITIONS AND TERMS

The following terms or abbreviations used in these Specifications, or in any document or instrument governing these Specifications, shall be interpreted as follows:

- 1-1 "A.A.S.H.T.O." The American Association of State Highway and Transportation Officials.
- 1-2 "A.S.T.M." The American Society for Testing Materials.
- 1-3 "A.W.W.A." The American Water Works Association.
- 1-4 "Bid" shall mean Proposal.
- 1-5 "Bidder" shall mean any individual, partnership, or corporation, or combination thereof, submitting a Proposal for the work contemplated, whether acting directly or through a duly authorized representative.
- 1-6 "City" shall mean the municipal corporation known as the City of Sacramento, State of California.
- 1-7 "City Council" shall mean the City Council of the City of Sacramento or any other board, body, official or officials, to which or to whom the power belonging to the said Council shall, by virtue of any act, or acts, hereinafter pass, or be held to appertain.
- 1-8 "Project Estimate" shall mean the list of estimated quantities of work to be performed as contained in the Notice to Contractors.
- 1-9 "City Manager" shall mean the City Manager of the City of Sacramento acting either directly or through properly authorized agents acting within the scope of the particular duties delegated to such agents.
- 1-10 "Contract" shall mean 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 be construed to include the Notice to Contractors, Proposal, Plans, Specifications, Special Provisions and Contract Bonds, and any and all supplemental agreements. A supplemental agreement shall mean and include any written agreement concerning any alteration, amendment, or extension to the Contract and shall include, but not be limited to, Contract Change Orders.

- 1-11 "Contractor" shall mean the individual, partnership, corporation, or combination thereof, who has entered into a Contract with the City, or his or their duly authorized representatives.
- 1-12 "Day" shall mean a working day, unless otherwise expressly defined in the Special Provisions.
- 1-13 "Date of Signing Contract" shall mean the date upon which the Contract, properly executed by the Contractor, is delivered to and executed by the City Manager.
- 1-14 "Director of Public Works" shall mean the executive officer of the Department of Public Works as created by law or his assigned representative. The Director of Public Works is also referred to within these Specifications as *ex officio* City Engineer.
- 1-15 "Engineer" shall mean the Director of Public Works of the City of Sacramento and such assistants who have been assigned to the work and exercising control and supervision of the work.
- 1-16 "Federal Specifications" shall refer to the particularly designated Standard Specifications of the United States Government.
- 1-17 "Field Order" shall mean a written instruction from the Director of Public Works to the Contractor made in the field.
- 1-18 "Finance Director" shall mean the Director of Finance of the City of Sacramento and shall include the term "City Controller" as used in the Sacramento City Charter.
- 1-19 "Fixed Cost" shall mean a cost which remains constant regardless of the quantity of work done.
- 1-20 "Inspector" shall mean an engineering or technical inspector duly authorized and appointed by the City Council or Director of Public Works, acting within the scope of the particular duties delegated to such inspector.
- 1-21 "Intention of Terms." Whenever, in these Specifications, or upon the Plans, the words "directed," or "required," "permitted," "ordered," "designated," "prescribed," or words like import are used, it shall be understood the direction, requirement, permission, order, designation, or prescription of the Engineer is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable

to, or satisfactory to the Engineer, subject in each case to the final determination of the Director of Public Works. Whenever a reference is made in these Specifications to a paragraph or subparagraph of another Specification, such reference shall be deemed to include the General Provisions of the section or sections of the Specifications of which the paragraph or subparagraph is a part, which may be pertinent to the reference.

- 1-22 "Liquidated Damages" shall mean the sum prescribed in the Specifications, pursuant to the authority of Government Code Section 53069.85, to be paid to the City or to be deducted from any payment due or to become due to the Contractor for each calendar day's delay beyond the time allowed in the Specifications for completing the whole, or any specified portion, of the work.
- 1-23 "Landscape Architect" shall mean the Landscape Architect of the City of Sacramento Department of Parks and Community Services, and it shall mean assistants to the Landscape Architect who have been assigned to the work by the Landscape Architect.
- 1-24 "Payment Bond" shall have the same meaning given to it by Section 3096 of the Civil Code of the State of California, and shall refer to the approved form of security furnished by the Contractor and his surety to guarantee that he will pay in full all bills, accounts and related costs for labor and materials used in construction of the work.
- 1-25 "Performance Bond" shall mean the approved form of security furnished by the Contractor and his surety to guarantee his good faith and ability to execute the work in accordance with the terms of the Contract.
- 1-26 "Plans" shall mean the official Project Plans and Standard Details, profiles, typical cross sections, general cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Director of Public Works, which show the location, character, dimensions and details of the work to be performed. All such documents shall be construed to be part of the Plans whether or not reproduced in the Special Provisions. In the above definition, the terms "Standard Details" and "Project Plans" mean:
 - (A) "Standard Details". The Standard Details set forth in these Standard Specifications.
 - (B) "Project Plans". The Project Plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Details insofar as the same may apply.

- 1-27 "Proposal" shall mean the offer of the Bidder for the work when properly completed, executed, guaranteed and submitted on the Proposal Form.
- 1-28 "Proposal Form" shall mean the approved form upon which the City requires formal bids for the work to be prepared and submitted.
- 1-29 "Proposal Guarantee" shall mean the security to be furnished by the Bidder as a guarantee of good faith that it will enter into a Contract and execute the required Bonds covering the work contemplated, if the City selects him as the successful Bidder.
- 1-30 "Special Provisions" shall mean the specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications.
- 1-31 "Specifications" shall mean the directions, provisions, and requirements contained herein. In the Special Provisions these Specifications may also be referred to as "Standard Specifications". The Council of the City of Sacramento has adopted these Specifications as Standard Specifications for the City of Sacramento. When the Standard Specifications of other organizations or agencies, or parts of such Specifications are referred to in these Specifications, such Standard Specifications of other organizations or agencies, or parts of such Specifications of other organizations or agencies, or parts of such Specifications, are included in, and a part of, these Specifications.
- 1-32 "State Specifications" shall mean the Standard Specifications of the State of California, Department of Transportation, as currently approved and in effect. In referring to the State Specifications, the section numbers referred to are those contained in this current edition. If, in subsequent editions, the section numbers are changed, the reference shall be construed to refer to the class of material or item in the latest edition which was designated by that number in said current edition.
- 1-33 "Work" shall be synonymous with the "the Project" and each of these terms shall refer to and mean everything which the Contractor is to do as specified, indicated, shown or contemplated by the Contract to construct the improvements, including all alterations, amendments or extensions thereto made by contract change order or other written orders or directives of the Engineer.
- 1-34 "Working Time" shall mean the time stated as a definite number of working days in which all work is to be performed. The working time specified in the

Contract shall be considered as of the essence to the Contract. A working day is defined as any day, except as follows:

- (A) Saturdays, Sundays and legal holidays; unless work is approved and subsequently performed in accordance with the Contract Special Provisions, or at the direction of the Engineer.
- (B) Days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force engaged on such operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Section 2

PROPOSAL REQUIREMENTS AND CONDITIONS

2-1 NOTICE TO CONTRACTORS

"Notice to Contractors" is published by the City Clerk in accordance with Section 58.301 of Chapter 58 of the Sacramento City Code. The Notice to Contractors contains that information relating to the submission, opening and award of Bids required by Section 58.304 of said Chapter 58. In addition, the Notice to Contractors makes references to Section 1770 et seq. of the Labor Code relating to determinations regarding prevailing wages. The Contractor shall pay prevailing wages according to the rates established by said determinations. Copies of said determinations may be obtained from the City Clerk of the City of Sacramento.

2-2 PROPOSAL FORM

Each prospective Bidder shall be furnished with a Proposal Form which shall state the location and description of the contemplated work and shall show the Project Estimate of the various quantities and kind of work to be performed and materials to be furnished with a schedule of items for which bids are to be submitted. All Special Provisions shall be attached to the Proposal Form.

2-3 PROJECT ESTIMATE

The quantities given in the Project's Estimate in the Notice to Contractors, Proposal and Contract are approximate only, and are given as a basis for comparison of Bids. The City does not, expressly or by implication, represent or agree that the actual amount of work will equal the approximate estimate. The City reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable in the sole discretion of the Engineer.

2-4 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT AND SITE OF WORK

All Bidders shall examine carefully the site of the contemplated work, the Plans, Specifications, and the Proposal and Contract Forms. The submission of a Bid shall be conclusive evidence that all Bidders and the Contractor have investigated and are satisfied as to the conditions to be encountered, as to the character, quality, quantity, and scope of work to be performed, the quantities of materials to be furnished, and as to the requirements of the Proposal, Plans, Specifications and the Contract. If the Engineer has made investigations of conditions in areas where the work is to be performed or in other areas, some of which may constitute possible local material sources, such investigations are made only for the purpose of study and design. Subject to and upon the conditions hereinafter set forth, where such investigations have been made, prospective Bidders or the Contractor may, upon written request, inspect the records of the Design Section of the Engineering Division as to such investigations. Any such inspection of records shall be made at the office of the Design Section, Engineering Division, Department of Public Works, 927 10th Street, Sacramento, California, or at such other place or places which may be specified in the Special Provisions or by the Engineer.

The Records of any such investigations shall not be construed to be or become a part of the Contract and are shown solely for the convenience of prospective Bidders or the Contractor. It is expressly understood and agreed that the Engineer and the City assume no responsibility whatsoever in respect to the sufficiency or accuracy of such investigations, the records thereof, or any interpretation set forth therein or made by the Engineer and that there is no representation, warranty or guarantee, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unanticipated developments may not occur, or that materials other than, or in proportion different from those indicated, may not be encountered.

The availability for use of information described in this section is not to be construed in any way as a waiver of the provisions of the first paragraph of this section and all prospective Bidders and the Contractor are cautioned to make such independent investigations and examinations as each of them may consider necessary to sufficiently inform himself as to the conditions to be encountered in the performance of the work, and, with respect to possible local material sources, the quality and quantity of material available from such sources and the type and extent of processing that may be required in order to produce material conforming to the requirements of the Contract. No information derived from such inspection of records of investigations or complications thereof made by the Engineer or from the Engineer, or his assistants, will in any way relieve any prospective Bidder or the Contractor from any risk or from properly fulfilling the terms of the Contract.

2-5 PREPARATION OF PROPOSAL

The City Clerk shall furnish to each prospective Bidder a Proposal Form, which, when properly completed and executed may be submitted as his Bid. Bids not presented on the Proposal Form will be rejected.

The Proposal Form is bound in a book together with a Notice to Contractors, Special Provisions, and the Contract. Neither the Proposal Form nor any portion of said book shall be detached therefrom. The Proposal shall set forth for each item in clearly legible figures, an item price and a total for each item in the respective spaces provided, and shall be signed by the Bidder, who shall fill out all blanks in the Proposal Form. No bid shall be accepted from, or Contract awarded to, any Bidder to whom a Proposal Form has not been issued by the City Clerk.

2-6 DETERMINATION OF AMOUNT BID MATHEMATICAL ERROR

In determining the amount bid by each Bidder, the City shall disregard computations which contain obvious mathematical errors in addition, subtraction, multiplication, and division that appear on the face of the Proposal. When such a mathematical error appears on the face of the Proposal, the City may, but shall not be obligated to correct any such error and to compute the total amount bid by said Bidder on the basis of the corrected figure or figures to determine which Bidder has submitted the lowest bid.

When an item price is required to be set forth in the Proposal, and the total price for the item does not agree with a figure which is derived by multiplying the item price by the Project Estimate of the quantity of work to be performed for said item, the item price shall prevail over the total price for the item. The total to be paid for each item shall be based upon the item price and not the total price for the item. If the Proposal contains only a total price for the item, and not the item price, the City shall determine the item price by dividing the total price for the item by the stated Project Estimate of the quantity of work to be performed for said item.

If the Proposal contains neither the item price nor the total price for the item, then it shall be deemed to be incomplete and the Proposal shall be rejected.

2-7 REJECTION OF PROPOSALS

Proposals may be rejected if they show any alteration of form, additions not called for, mathematical errors, conditional Bids, erasures, changes which make the Proposal illegible in any manner, or irregularities of any kind.

When Proposals are signed by an agent, other than an officer or officers of the corporation authorized to sign Contracts on its behalf or a member of a partnership, a "power of attorney" must be filed with the City of Sacramento prior to opening Bids or submitted with the Proposal; otherwise, the Proposal shall be rejected as irregular and unauthorized. The City reserves the right to waive any informalities or minor irregularities in the Bids.

2-8 PROPOSAL GUARANTEE

All Bids shall be accompanied by one of the following forms of Bidder's security:

Cashier's check, a certified check, or a Bidder's Bond executed by an admitted surety insurer, made payable to the Director of Finance of the City of Sacramento.

No Bidder's Bond shall be accepted unless it conforms to the Bond form included in the Special Provisions. The Bidder's Bond form included in the Special Provision, properly completed as directed therein, may be executed and used. Bidder's Bond forms may be obtained from the Engineering Division.

2-9 SUBCONTRACTORS

Each Bidder and each Contractor shall, to the extent required by law, comply with the Subletting and Subcontracting Fair Practices Act of the State of California. (Public Contract Code Sections 4100 et seq.) Each person bidding on a Contract subject to said Act, shall in his Bid, on a form provided by the City in the Special Provisions, set forth:

- (A) The name and location of the place of business of each proposed subcontractor who shall perform work or labor or render service to the prime Contractor in or about the construction of the work or a subcontractor licensed by the State of California who, under a subcontract to the prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the Plans and Specifications in an amount in excess of one-half of one percent of the prime Contractor's total bid.
- (B)

The portion of the work which will be done by each such subcontractor which is subject to the Subletting and Subcontracting Fair Practices Act. The prime Contractors shall list only one subcontractor for each such portion as is defined by the prime Contractor in his proposed bid.

If a prime Contractor fails to specify a subcontractor, or, if a prime Contractor specifies more that one (1) subcontractor for the same portion of work to be performed under the Contract which portion exceeds one-half of one percent of the prime Contractor's total bid, any such bid shall be deemed to be irregular and shall be rejected. If after the award of the Contract, such prime Contractor shall, except as provided in Section 4107 or 4109 of the Act, subcontract any portion of the work, such prime Contractor shall be subject to the penalties specified in Section 4111 of the Act.

Contractor shall perform with his own organization and with the assistance of workers under his immediate superintendence, work of a value not less than fifty percent (50%) of the value of all work in the Contract. The value of any work subcontracted shall be determined by multiplying the number of units subcontracted of any item as determined from the Engineer's Estimate by the unit price. If any portion of an item of the work is subcontracted, City shall consider the entire item to be subcontracted. If any item is a specialty item, the foregoing may be waived in the discretion of the Engineer.

2-10 SUBMISSION OF PROPOSAL

The Proposal shall be submitted as directed in the Notice to Contractors in a sealed envelope provided by the City Clerk. The Bidder shall plainly mark the exterior of the envelope in which the Proposal is submitted to indicate that it contains a proposal for the project for which the proposal is submitted, and the date of the Bid opening therefor. Proposals submitted in envelopes which are not properly marked may be rejected. After the City Clerk receives the Proposal, it cannot be withdrawn or modified.

2-11 PUBLIC OPENING OF PROPOSALS

Proposals shall be opened and read publicly at the time and place indicated in the Notice to Contractors. Bidders or their authorized agents are invited to be present.

2-12 RELIEF OF BIDDERS

Attention is directed to the provisions of Public Contract Code Section 5100 through 5108, inclusive, which concern relief of Bidders, and in particular, to the requirements therein for any Bidder claiming a mistake to give City written notice of the mistake, within five (5) days after the opening of the Bid and to specify in detail in such notice the nature of the mistake and the manner in which the mistake occurred.

2-13 DISQUALIFICATION OF BIDDERS

City shall not consider more than one Proposal from an individual, partnership, corporation or combination thereof under the same or different names. If City has reasonable grounds to believe that any individual, partnership, corporation or combination thereof is interested in more than one Proposal as a prime Bidder for the work contemplated, City may reject all Proposals in which such individual, partnership, corporation or combination thereof is interested. If City has reason to believe that collusion exists among any Bidders, City may reject the Proposals. City may reject the Proposals in which the bids submitted are obviously unbalanced.

2-14 COMPETENCY OF BIDDERS

Attention is directed to the provisions of Chapter 9 of Division 3 of the Business and Professions Code concerning the licensing of Contractors.

All Bidders and Contractors shall be licensed in accordance with the laws of California and any Bidder or Contractor not so licensed is subject to the penalties imposed by such laws. The Bidder's or Contractor's license must be of a class which permits its holder to do the work contemplated as of the date the Proposal is submitted and such license must be maintained for the duration of the work. The Bidder shall indicate his license number and class in the space provided for that purpose on the Proposal Form.

Attention is also directed to the provisions of Public Contract Code Section 10164, which provides as follows:

"10164. In all state projects where federal funds are involved, no bid submitted shall be invalidated by the failure of the bidder to be licensed in accordance with the laws of this state. However, at the time the contract is awarded, the Contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made by the Director of Finance unless and until the State Registrar of Contractors certifies to the Director of Finance that the records of the Contractors State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors State License Board. The department shall include a statement to that effect in the standard form of pregualification questionnaire and financial statement. Failure of the Bidder to obtain proper and adequate licensing for an award of a Contract shall constitute a failure to execute the Contract as provided in Section 3 and shall result in the forfeiture of the security of the Bidder."

2-15 PREQUALIFICATION OF BIDDERS

If required in the Special Provisions, prospective Bidders must file with the Engineer answers to questions contained in a standard form of questionnaire and financial statement which includes a complete statement of financial ability and experience in performing public works. Pursuant to Public Contract Code Sections 10160 to 10166, standard forms of such questionnaire and financial statement may be obtained from the Engineer. No Proposal Forms will be furnished to a prospective Bidder unless such prospective Bidder has submitted the required questionnaire and financial statements for prequalification at least five (5) days prior to the date fixed for publicly opening sealed Bids and has been prequalified for at least one (1) day prior to the date for opening sealed Bids.

2-16 JOINT VENTURE BIDS

If two or more prospective Bidder desire to bid jointly as a joint venture on a single project, they must first file an affidavit of joint venture with the City Clerk on the form approved by the Engineer. Such affidavit of joint venture will be valid only for the specific project for which it is filed. If such affidavit of joint venture is not filed as aforesaid and approved by the Engineer prior to the time for opening Bids on the Specific project for which it is submitted, a joint bid submitted by said Bidders shall be rejected. On projects for which prequalification is required, each party to the joint venture must be separately prequalified in order to file a joint venture affidavit.

2-17 SUBMISSION OF BIDS TO PUBLIC PURCHASING BODY; AGREEMENT TO ASSIGN

The Bidder agrees that if the bid is accepted, it will assign to City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professionals Code), arising from purchases of goods, materials, or services by the Bidder for sale to City pursuant to the bid. Such assignment shall be effective at the time the purchasing body tenders final payment to the Bidder without further acknowledgement by the parties. (Cal. Govt. Code §4552).

2-18 SPECIFICATION OF CLASSIFICATION OF CONTRACTORS LICENSE AT TIME CONTRACT IS AWARDED

The City shall specify the Classification of the Contractor's license which a Contractor shall possess at the time a Contract is awarded. The Specification shall be included in any plans prepared and in any notice inviting bids for the City (Public Contract Code Section 3300).

Section 3

AWARD AND EXECUTION OF CONTRACT

3-1 AWARD OF CONTRACT

When required by law, the City Council shall by motion award Contracts for the City. The City Council reserves the right to reject any and all Proposals.

3-2 TIME OF AWARD

Unless otherwise provided in the Special Provisions, the award of the Contract, if it be awarded, shall be to the lowest responsible Bidder (as said term is defined in Section 58.102 of Chapter 58 of the Sacramento City Code) whose Proposal complies with all the requirements prescribed. Such award, if made, shall be made within forty-five (45) days after the opening of the Proposals. If the lowest responsible Bidder refuses or fails to execute the Contract, the City Council may award the Contract to the second lowest responsible Bidder. Such award, if made, shall be made within seventy-five (75) days after the opening of Proposals. If the second lowest responsible Bidder refuses or fails to execute the Contract, the City Council may award the Contract to the third lowest responsible Bidder. Such award, if made, shall be made within one hundred and five (105) days after the opening of the Proposals. The period of time specified above within which the award of the Contract may be made shall be subject to extension for such further periods of time as may be agreed upon in writing between the Engineer and the Bidder or Bidders concerned.

3-3 COMPARISON OF BIDS

All Bids shall be compared on the basis of the Project Estimate of quantities of work to be done, with such corrections in mathematical errors appearing on the face of the Proposal as the City may choose to make pursuant to Paragraph 2-6 of Section 2 of these Specifications.

3-4 PERFORMANCE AND PAYMENT BONDS

At the time of execution of the Contract, the successful Bidder shall provide a Performance Bond and a Payment Bond to the Director of Finance of the City. The Performance Bond shall be for a sum equal to one hundred percent (100%) of the Contract Price. The Payment Bond shall be in a sum equal to one hundred percent (100%) of the Contract price. Such Bonds shall be subject to the approval of the City Attorney. Such Bonds shall be executed by an admitted surety insurer. When the amount to be paid to the Contractor is based upon units of work to be

3 (1)

performed or items to be provided, the term "Contract Price," as used above for the purpose of posting Performance and Payment Bonds, shall be computed on the basis of the unit price bid multiplied by the Project Estimate of units of work to be performed or items to be furnished. Notwithstanding the foregoing, for any Contract with a Contract Price less than \$10,000.00, no Payment Bond will be required unless it is specifically required in the Special Provisions. Notwithstanding the foregoing, the Special Provisions may require a Payment Bond for any Contract notwithstanding the Contract Price of such Contract.

3-5 EXECUTION OF CONTRACT

The Contract shall be executed by the successful Bidder and returned together with the Performance and Payment Bonds, within fifteen (15) calendar days after the Bidder receives notice that the Contract has been awarded to him.

3-6 FAILURE TO EXECUTE CONTRACT

Failure of the lowest responsible Bidder, the second lowest responsible Bidder, or the third lowest responsible Bidder to execute the Contract and file acceptable Bonds as provided herein within fifteen (15) calendar days after such Bidder receives notice that the Contract has been awarded to him shall be just cause for the annulment of the award by the City Council and the forfeiture by the City Council of the respective Bidder's Proposal Guarantee. If the City Council awards the Contract to the second lowest responsible Bidder, the amount of the lowest responsible Bidder's security shall be applied by the City to the difference between his Bid and the Bid of the second lowest responsible Bidder and the surplus, if any, shall be returned to the lowest responsible Bidder if a check is used, or shall be credited to the surety on the Bidder's Bond if a Bond is used. On refusal or failure of the second lowest responsible Bidder to execute the Contract, the City Council may award it to the third lowest responsible Bidder. If the City Council awards the Contract to the third lowest responsible Bidder, in addition to application of the lowest Bidder's security as aforesaid, the amount of the second lowest responsible Bidder's security shall be applied by the City to the difference between the Bid of the second lowest responsible Bidder and the Bid of the third lowest responsible Bidder, and the surplus, if any, shall be returned to the second lowest responsible Bidder if a check is used, or credited to the surety on the second lowest Bidder's Bond if a Bond is used.

The successful Bidder may file with the Engineer a written notice, signed by the Bidder or his authorized representative, specifying that the Bidder will refuse to execute the Contract if presented to him. The filing of such notice shall immediately have the same force and effect as the failure or refusal of the Bidder to execute the Contract and furnish acceptable Bonds within the time hereinabove prescribed.

3-7 RETURN OF PROPOSAL GUARANTEES

Within ten (10) days after the award of the Contract to the lowest responsible Bidder, the City Clerk shall return the Proposal Guarantees, other than Bidder's Bonds, accompanying such of the Proposals as are not to be further considered in the executing of the Contract. Retained Proposal Guarantees will be held until the Contract has been finally executed, after which all Proposal Guarantees, except Bidder's Bonds and any Guarantees which have been forfeited, shall be returned to the respective Bidders who submitted them.

3-8 FORM OF CONTRACT AND SURETY BONDS

The form of the Contract and the form of the Payment and Performance Bonds required to be executed by the successful Bidder is attached as an appendix to this section.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That

WHEREAS, the City of Sacramento, State of California, has awarded to

hereinafter designated as the "Principal," a contract for;

AND 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

as Surety, are held and firmly bound unto the City of Sacramento in the penal sum of one hundred percent (100%) of bid amount,

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, successors, or assigns 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 perform the covenants, conditions and agreements in the said contract and any alteration thereof made as therein provided, on his or their 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 the City of Sacramento, its 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 the Surety, for value received hereby stipulates and agrees that, in accordance with the Standard Specifications or Special Provisions, no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or additions to the terms of the contract or to the work or to the specifications. IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their seals this ______day of ______, the name and corporate seals of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Principal			
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litle			
Surety	· ·	· .	
Addross			
Auuress			
City.	State	Zip	
By			
Address			
<u></u>	State	7:0	
City	State	Zīp	

APPROVED AS TO FORM:

City Attorney

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PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, The City of Sacramento, a municipal corporation, has awarded to

hereinafter designated as the "Principal," a contract for;

AND WHEREAS, said Principal is required to furnish a bond in connection with said contract, to secure payment of claims of laborers, mechanics, or materialmen employed on work under said contract, as provided by law;

(\$______), said sum being equal to the estimated amount payable by the said City of Sacramento under the terms of the contract, for which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if said Principal, his or its heirs, executors, administrators, successors, assigns, or subcontractors shall fail to pay for any material, provisions, provender or other supplies or teams, implements or machinery 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 amounts due under the Unemployment Insurance Act with respect to such work or labor, as required by the provisions of Chapter 7, Title XV, Part 4, Division 3, of provisions of the Civil Code and provided that the claimant shall have complied with the provisions of said Code; or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18806 of the Revenue and Taxation Code, with respect to such work and labor, the Surety or Sureties hereon will pay for the same and in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, said Surety will pay a reasonable attorney's fee to be fixed by the Court.

This bond shall insure to the benefit of any and all persons, companies and corporations entitled to file claims under Section 3181 of the Civil Code of the State of California so as to give a right of action to them or their assigns in any suit brought upon this bond.

Said Surety, for value received, hereby stipulates and agrees that, in accordance with the Standard Specifications or Special Provisions, 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 wise affect its obligations on this bond, and it does hereby waive notice of any such

change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

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

Principal			
Ву			
Title	- · · · · · · · · · · · · · · · · · · ·		
Surety			
Address			
City	State	Zip	
By			
Address	 -		
City	State	Zip	

APPROVED AS TO FORM:

City Attorney

AGREEMENT

THIS AGREEMENT, dated for identification as of	, 19,
between the CITY OF SACRAMENTO, a municipal corporation, (hereinaft	cer called "City"),
and	
(hereinafter called "Contractor").	

The parties hereto mutually agree to the terms and conditions set forth herein.

1. CONTRACT DOCUMENTS

Each of the items hereinafter referred to is incorporated herein by reference as if set forth in full in this contract.

Work called for in any one Contract Document and not mentioned in another is to be performed and executed as if mentioned in all Contract Documents. The table of contents, titles and headings contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect or limit the interpretations of the provisions to which they refer.

The Contract Documents, also referred to as "the Contract," consist of the Notice to Contractors, the completed Proposal Form submitted by Contractor to whom the Contract is awarded, the Instructions to Bidders insofar as they relate to events which will occur or actions to be taken after the submission of the Proposal, this Agreement, the Standard Specifications, the Special Provisions, Plans and Technical Specifications, the drawings and other data and all developments thereof prepared by City pursuant to the Contract, and any modifications of any of the foregoing in the form of Addenda or otherwise effected in accordance with the terms of the Contract.

The Standard Specifications shall mean and refer to the current Standard Specifications of the City of Sacramento which are incorporated herein by this reference as if set forth in full at this place.

2. DEFINITIONS

Unless otherwise specifically provided herein, all words and phrases defined in the Standard Specifications shall have the same meaning and intent in this Agreement.

3. AGREEMENT CONTROLS

In the event of a conflict between the terms and conditions as set forth in this Agreement and the terms and conditions set forth in other Contract Documents, the terms and conditions set forth in this Agreement shall prevail.

4. SCOPE OF CONTRACT

Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor and material and transportation necessary to perform and complete in a good and workmanlike manner to the satisfaction of City, all the work called for, and in the manner designated in, and in strict conformity with the Contract Documents entitled:

including the following alternative bid items described in the Proposal Form:

5. CONTRACT AMOUNT AND PAYMENTS

City agrees to pay, and Contractor agrees to accept, in full payment for the above work, the sum of _______DOLLARS (\$______), which sum is to be paid according to the schedule and in the manner set forth herein and subject to additions, deductions and withholding as provided in the Contract Documents.*

* When it is provided in the Notice to Contractors, Instruction to Bidders or Proposal Form that Contractor is to be paid on the basis of unit prices shown in his bid, instead of a lump sum price, this paragraph will be amended to read as follows:

"City agrees to pay and Contractor agrees to accept, in full payment for the above work, the sum computed in accordance with the actual amount of each item of work performed or material furnished and incorporated in the work, at the unit price which Contractor bid for each such item in his Proposal Form, said unit price to be determined as provided in the Standard Specifications or these Special Provisions."

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6. PROGRESS AND FINAL PAYMENTS

Subject to the terms and conditions of the Contract, City shall cause payments to be made upon demand of Contractor as follows:

(a) On the first of the month, the Engineer shall present to the Contractor a statement showing the amount of labor and materials incorporated in the work through the twentieth (20) calendar day of the preceeding month; the Contractor and Engineer shall inspect the statement and, if both approve the statement, the City shall issue a certificate for ninety percent (90%) of the amount it shall find to be due.

(b) No inaccuracy or error in said monthly estimates shall operate to release Contractor or Surety from damages arising from such work or from enforcement of each and every provision of the Contract Documents, and City shall have the right subsequently to correct any error made in any estimate for payment.

- (c) Contractor shall not be paid for any defective or improper work.
- (d) City shall pay the remaining ten percent (10%) of the value of the work done under this contract, if unencumbered, thirty-five (35) days after final completion and acceptance of work by City. Acceptance by Contractor of said final payment shall constitute a waiver of all claims against City arising under the Contract Document.
- (e) Progress payment due the Contractor shall be made within 30 days following receipt of statement jointly approved by the Contractor and the Engineer.

7. RETENTION OF SUMS CHARGED AGAINST CONTRACTOR

When under the provisions of this contract, City shall charge any sum of money against Contractor, City shall deduct and retain the amount of such charge from the amount of the next succeeding progress estimate, or from any other moneys due or that may become due Contractor from City. If, on completion or termination of the Contract, sums due Contractor are insufficient to pay City's charges against him, City shall have the right to recover the balance from Contractor or his sureties.

8. COMMENCEMENT AND PROSECUTION OF WORK

Contractor shall commence the work on or before fifteen (15) workingdays from and after the date of written Notice to Proceed from City to Contractor and will diligently prosecute the work to final completion. The phrase "commence the work" means to engage in a continuous program on-site including, but not limited to, site clearance, grading, dredging, land filling and the fabrication, erection, or installation of the work. Said Notice to Proceed shall be issued within fifteen (15) calendar days following execution of the Agreement by the City and the filing by Contractor of the required Bonds and proof of insurance. The continuous prosecution of work by Contractor shall be subject only to Excusable Delays as defined in this Agreement.

9. TIME OF COMPLETION

The entire work shall be brought to completion in the manner provided for in the Contract Documents on or before ______(____) working days (hereinafter called the "Completion Date") from the date of the Notice to Proceed unless extensions of time are granted in accordance with the Contract Documents.

Failure to complete the work by the Completion Date and in the manner provided for by the Contract Documents shall subject Contractor to liquidated damages as hereinafter provided in this Agreement. Time is and shall be of the essence in these Contract Documents.

10. PAYMENTS DO NOT IMPLY ACCEPTANCE OF WORK

The payment of any progress payment, or the acceptance thereof by Contractor, shall not constitute acceptance of the work or any portion thereof and shall in no way reduce the liability of Contractor to replace unsatisfactory work or material, though the unsatisfactory character of such work or material may not have been apparent or detected at the time such payment was made.

11. ACCEPTANCE NOT RELEASE

Contractor shall correct immediately any defective or imperfect work which may be discovered before final acceptance of the entire work. Any unsatisfactory materials shall be rejected, notwithstanding that they may have been overlooked by the Inspector. The inspection of the work, or any part thereof, shall not relieve Contractor of any of his obligations to perform satisfactory work as herein prescribed.

Failure or neglect on the part of City or any of its authorized agents to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials if such becomes evident at any time prior to final acceptance of the entire work or all materials, nor shall such failure be construed as barring City at any subsequent time from recovering damages or of

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such a sum of money as may be required to build anew all portions of the work in which fraud was practiced or improper materials used whenever City may discover the same.

12. RELEASE

If requested to do so by City, at the time of final payment, as a condition precedent to final payment, Contractor and each assignee under any assignment in effect at the time of final payment shall execute and deliver a release in form and substance satisfactory to and containing such exemptions as may be found appropriate by City which shall discharge City, its officers, agents and employees of and from all liability, obligations and claims arising under this contract.

13. CITY'S RIGHT TO TAKE POSSESSION OF THE WORK IN WHOLE OR IN PART

The City of Sacramento shall have the right at any time to enter upon the work and perform work not covered by this contract, or to occupy and use a portion of the work, prior to the date of the final acceptance of the work as a whole, without in any way relieving Contractor of any obligations under this contract.

Such use or occupation of the work shall not be construed as an acceptance of any portion of the work under this contract.

14. NO WAIVER OF REMEDIES

Neither the inspection by City or its agents, nor any order or certificate for the payment of money, nor any payment for, nor acceptance of the whole or any part of the work by City, nor any extensions of time, nor any position taken by City or its agents shall operate as a waiver of any provision of this Agreement or of any power herein reserved to City or any right to damages herein provided, nor shall any waiver of any breach of this Agreement be held to be a waiver of any other or subsequent breach. All remedies provided in this Agreement shall be taken and construed as cumulative; that is, in addition to each and every other remedy herein provided, and City shall have any and all equitable and legal remedies which it would in any case have.

15. GUARANTEE

Except as otherwise expressly provided in the Specifications, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect, Contractor guarantees all work executed by him and all supplies, materials and devices of whatsoever nature incorporated in, or attached to the work, or otherwise delivered to City as a part of the work pursuant to the Contract, to be absolutely free of all defects of workmanship and materials for a period of one year after final acceptance of the entire work by the City of Sacramento. Contractor shall repair or replace any or all such work or material, together with all or any other work or material which may be displaced or damaged in so doing, that may prove defective in workmanship or material within said one year guarantee period without expense or charge of any nature whatsoever to City. Contractor shall provide City with a Maintenance Bond or Letter of Credit in the amount of five percent (5%) of the Contract covering the warranty period. Said security shall be filed with the City prior to Contract acceptance by the City Council.

In the event that Contractor shall fail to comply with the conditions of the foregoing guarantee within ten (10) days time, after being notified of the defect in writing, City shall have the right, but shall not be obligated to repair, or obtain the repair of, the defect and Contractor shall pay to City on demand all costs and expense of such repair. Notwithstanding anything herein to the contrary, in the event that any defect in workmanship or material covered by the foregoing guarantee results in a condition which constitutes an immediate hazard to the health or safety, or any property interest, or any person, City shall have the right to immediately repair, or cause to be repaired, such defect, and Contractor shall pay to City on demand all costs and expense of such repair. The foregoing statement relating to hazards to health, safety or property shall be deemed to include either temporary or permanent repairs which may be required as determined in the sole discretion and judgement of City.

16. DETERMINATION OF DAMAGES

The actual fact of the occurrence of damages and the actual amount of the damages which City would suffer if the work were not completed within the specified times set forth are dependent upon many circumstances and conditions which could prevail in various combinations, and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which City would suffer in the event of delay include loss of the use of the project, and, in addition, expenses of prolonged employment of an architectural and engineering staff; costs of administration, inspection, and supervision; and the loss suffered by the public within the City of Sacramento by reasons of the delay in the completion of the project to serve the public at the earliest possible time. Accordingly, the parties hereto agree, and by execution of this Agreement, Contractor acknowledges that he understands, has ascertained and agrees, that the amounts set forth herein as liquidated damages shall be presumed to be the amount of damages sustained by the failure of Contractor to complete the entire work within the times specified.

17. LIQUIDATED DAMAGES

The amount of the liquidated damages to be paid by Contractor to City for failure to complete the entire work by the Completion Date (as extended, if applicable) will be

(\$______) for each calendar day, continuing to the time at which the work is completed. Such amount is the actual cash value agreed upon as the loss to City resulting from Contractor's default.

18. PAYMENT OF DAMAGES

In the event Contractor shall become liable for liquidated damages, City, in addition to all other remedies provided by law, shall have the right to withhold any and all payments which would otherwise be or become due Contractor until the liability of Contractor under this section is finally determined. City shall have the right to use and apply such payments, in whole or in part, to reimburse City for all liquidated damages due or to become due to City. Any remaining balance of such payments shall be paid to Contractor only after discharge in full of all liability incurred by Contractor under this section or otherwise. If the sum so retained by City is not sufficient to discharge all such liabilities of Contractor, Contractor and his sureties shall continue to remain liable to City until all such liabilities are satisfied in full. No failure by City to withhold any payment as hereinbefore specified shall in any manner be construed to constitute a waiver of any right to liquidated damages or any right to any such sum.

19. INDEMNITY AND HOLD HARMLESS

Contractor shall assume the defense of, and indemnify and save harmless, the City, its officers, employees, and agents, and each and every one of them, from and against all actions, damages, claims, losses or expenses of every type and description to which they may be subjected or put, by reason of, or resulting from, the performance of the work, provided that such action, damage, claim, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to, or destruction of property, whether upon or off the work, including the loss of use thereof, and is caused in whole or in part by any negligent act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, whether or not it is caused in part by a party indemnified hereunder.

20. CONTRACTOR SHALL ASSUME RISKS

Until the completion and final acceptance by City of all work under this contract, the work shall be under Contractor's responsible care and charge. Contractor shall rebuild, repair, restore and make good all injuries, damages,

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reerections, and repairs occasioned or rendered necessary by accidental causes of any nature, to all or any portions of the work, except as otherwise stipulated.

21. GENERAL LIABILITY OF CONTRACTOR

Except as otherwise herein expressly stipulated, Contractor shall perform all the work and furnish all the labor, materials, tools, power and light, and appliances, necessary or proper for performing and completing the work herein required in the manner within the time herein specified. The mention of any specific duty or liability of Contractor shall not be construed as limitation or restriction of any general liability or duty of Contractor and, any reference to any specific duty or liability shall be construed to be for the purpose of explanation.

22. INSURANCE

During the term of this Agreement and until final completion and acceptance of the work required by the Contract Documents, Contractor shall maintain in full force and effect at his own cost and expense the following insurance coverage:

(A) Worker's Compensation

Full Worker's Compensation Insurance and Employer's Liability policy or provide evidence of ability to undertake self-insurance. Limits of coverage shall be at least \$1,000,000 for any one person. In the event Contractor is self-insured, he shall furnish a Certificate of Permission to Self-Insure by the Department of Industrial Relations Administration of Self-Insurance, Sacramento.

(B) Comprehensive Auto and General Liability Insurance

Contractor must provide sufficient broad coverage to include: Comprehensive Auto and General Liability Insurance Products and Completed Operation Liability

Broad Form Property Damage Liability

Contractual Liability

Personal Injury Liability

The amount of the policy shall be no less than \$1,000,000 Single Limit per occurrence, issued by an admitted insurer or insurers as defined by the California Insurance Code, providing that the City of Sacramento, its officers, employees and agents are to be Named Insured under the policy, and the policy shall stipulate that this insurance will operate as Primary insurance and that no other insurance effected by City or other Named Insured will be called on to contribute to a loss covered thereunder.

(C) Certificate of Insurance

Contractor shall have City's standard Certificate of Insurance completed and filed with the Division of Risk Management within fifteen (15) calendar days of the execution of this Agreement. Said policies shall provide that no cancellation, major change in coverage, or expiration may be effected by the insurance company or the insured during the term of this Agreement, without first giving to City thirty (30) calendar days written notice prior to the effective date of such cancellation or change in coverage.

(D) Worker's Compensation Certificate

Contractor shall sign and file with the Division of Risk Management of the City of Sacramento the following certification prior to commencing performance of the work of the Contract:

"I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake selfinsurance in accordance with the provisions of the Code, and I will comply with such provisions before commencing the performance of the work of this Contract."

23. FAILURE TO MAINTAIN INSURANCE

If, at any time during the performance of this contract, Contractor fails to maintain any item of the required insurance in full force and effect, Contractor shall immediately discontinue all work under the Contract and City will withhold all Contract payments due or that become due until notice is received by City that such insurance has been restored in full force and effect and that the premiums therefor have been paid for a period satisfactory to the Division of Risk Management.

Any failure to maintain any item of the required insurance will be sufficient cause for termination of the Contract.

24. EXTENSIONS OF TIME

In the event City deems it necessary, in its sole discretion, to extend the time of completion of the work to be done under this contract beyond the required

Completion Date herein specified, such extensions shall in no way release any guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such extension of time relieve or release the sureties on the Bonds executed pursuant to said provisions. By executing such Bonds, the sureties shall be deemed to have expressly agreed to any such extension of time. The amount of time allowed in any extension of time shall be limited to the period of excusable delay as defined herein giving rise to the same as determined by City Council of City.

25. EXCUSABLE DELAYS

For the purpose of these Contract Documents, the term "Excusable Delays" shall mean, and is limited to, delays caused directly by acts of God; acts of the public enemy; fires; inclement weather as determined by the Engineer; riots; insurrections; epidemics; quarantine restrictions; strikes; lockouts; sitdowns; acts of a governmental agency; priorities or privileges established for the manufacture, assembly, or allotment of materials necessary in the work by order, decree or otherwise of the United States or by any department, bureau, commission, committee, agent, or administrator of any legally constituted public authority; changes in the work ordered by City insofar as they necessarily require additional time in which to complete the work; the prevention by City of Contractor from commencing or prosecuting the work because of the acts of others, excepting Contractor's subcontractors; or the prevention of Contractor from commencing or prosecuting the work because of a City-wide failure of public utility service.

The term "Excusable Delay" shall specifically not include: (i) any delay which could have been avoided by the exercise of care, prudence, foresight and diligence on the part of Contractor; (ii) any delay in the prosecution of parts of the work, which may in itself be unavoidable but which does not necessarily prevent or delay the prosecution of other parts of the work, nor the completion of the whole work within the time specified; (iii) any reasonable delay resulting from time required by City for review of Plans and submittals required of Contractor and for the making of surveys, measurements and inspections; (iv) any delay arising from an interruption in the prosecution of the work on account of the reasonable interference from other Contractors employed by City, which does not necessarily prevent the completion of the work within the time specified. Excusable Delays, if any, shall operate only to extend the Completion Date (not in excess of the period of such delay as determined by City) but shall not under any circumstances increase the sum City is to pay Contractor as provided in these Contract Documents.

26. CONTRACTOR TO SERVE NOTICE OF DELAYS

Whenever Contractor foresees any delay in the prosecution of the work, and in any event upon the occurrence of any delay which Contractor regards as an Excusable Delay, he shall notify the Engineer in writing immediately within 10 calendar days of the probability of such delay and its cause, in order that the Engineer may take immediate steps to prevent if possible the occurrence or continuance of the delay, or if this cannot be done, may determine whether the delay is to be considered excusable, how long it continues, and to what extent the prosecution and completion of the work are delayed thereby. Said notice shall constitute an application for an extension of time only if the notice requests such an extension and sets forth Contractor's estimate of the additional time required together with a full description of the cause of the delay relied upon.

After the completion of any part or whole of the work, the Engineer, in estimating the amount due Contractor, will assume that any and all delays which may have occurred in its prosecution and completion have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found by him to have been excusable. Contractor shall make no claim that any delay not called to the attention of the Engineer at the time of its occurrence has been an Excusable Delay.

27. EXTENSION OF TIME

Should any delays occur which the Engineer may consider excusable, as herein defined, Contractor shall, pursuant to his application, be allowed an extension of time beyond the time herein set forth proportional to said delay or delays in which to complete this contract; and, during an extension which may have been granted because of an excusable delay or delays, City shall not charge liquidated damages against Contractor for such delay. Only the Engineer may grant an extension of time on the Contract.

28. EXTENSION OF TIME DOES NOT WAIVE CITY'S RIGHTS

The granting of any extension of time on account of delays which in the judgment of the Engineer are excusable delays shall in no way operate as a waiver on the part of City of its rights under this contract excepting only the extension of the Completion Date.

29. NO PAYMENT FOR DELAYS

No damages or compensation of any kind shall be paid to Contractor or any subcontractor because of delays in the progress of the work whether such delays qualify for extension of time under this Agreement or not, providing the elements precluding recovery of damages by Contractor in Section 7102 of the Public Contracts Code are met.

30. CHANGES IN THE WORK

Changes in the work made pursuant to changes issued in accordance with the Standard Specifications and extensions of time of completion made necessary by reason thereof (beyond the Completion Date) shall not in any way release any guarantee given by Contractor pursuant to the provisions of the Contract Documents, or the Contract let hereunder, nor shall such changes in the work relieve or release the sureties on Bonds executed pursuant to the said provisions. By executing such Bonds, the sureties shall be deemed to have expressly agreed to any such change in the work and to any extension of time made by reason thereof.

31. TERMINATION AFTER COMPLETION DATE

In addition to any other rights it may have, City may terminate this contract at any time after the Completion Date as adjusted by any extensions of time for excusable delays that may have been granted. Upon such termination, Contractor shall not be entitled to received any compensation for services rendered by him before or after such termination, and he shall be liable to City for liquidated damages for all periods of time beyond such termination date until the work is completed.

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32. CONTRACTOR BANKRUPT

If Contractor should commence any proceeding under the Bankruptcy Act, or if Contractor be adjudged a bankrupt, or if Contractor should make any assignment for the benefit of creditors, or if a receiver should be appointed on account of Contractor's insolvency, then the City Council may, without prejudice to any other right or remedy, terminate the Contract and complete the work by giving notice to Contractor and his Surety according to the provisions of Section 33. Contractor's Surety shall have the right to complete the work by commencing within thirty (30) calendar days as specified in Section 33; and, in the event Contractor's Surety fails to commence work within thirty (30) calendar days as specified in Section 33, City shall have the right to complete, or cause completion of the work, all as specified in Section 33.

33. TERMINATION FOR BREACH OF CONTRACT

If Contractor should abandon the work under this contract, or if the Contract or any portion of the Contract should be sublet or assigned without the consent of the City Council, or if the Engineer should be of the opinion that the conditions of the Contract in respect to the rate of progress of the work are not being fulfilled or any part thereof is unnecessarily delayed, or if Contractor should willfully violate or breach, or fail to execute in good faith, any of the terms or conditions of the Contract, or if Contractor should persistently refuse or fail to supply enough properly skilled labor or materials, or fail to make prompt payment to subcontractors for material or labor, or persistently disregard laws, ordinances or proper instruction or orders of the Engineer, then, notwithstanding any provision to the contrary herein, the City Council may give Contractor and his Surety written notification to immediately correct the situation or the Contract shall be terminated.

In the event that such notice is given, and in the event such situation is not corrected, or satisfactory arrangement for correction is not made within ten (10) calendar days from the date of such notice, the Contract shall upon the expiration of said ten (10) calendar days cease and terminate. In the event of any such termination, City shall immediately serve notice thereof upon the Surety and Contractor; and the Surety shall have the right to take over and perform the Contract, provided, however, that if the Surety does not commence performance thereof within thirty (30) calendar days from the date of the mailing to such Surety of notice of termination, City may take over the work and prosecute the same to completion by Contract, or otherwise, for the account and at the expense of Contractor and his Surety shall be liable to City for any excess cost occasioned City thereby, as hereinafter set forth.

In the event City completes the work, or causes the work to be completed, as aforesaid, no payment of any sum shall be made to Contractor until the work is complete. The cost of completing the work, including, but not limited to, extra contract costs, the costs of City forces, extra costs of administration and management incurred by City, either direct or indirect, shall be deducted from any sum then due, or which becomes due, to Contractor from City. If no sum sufficient to pay the difference between sums due to Contractor from City and the cost of completing the work, Contractor and the Surety shall pay City a sum equal to said difference on demand. In the event City completes the work, and there is a sum remaining due to Contractor after City deducts the aforementioned costs of completing the work, then City shall thereupon pay such sum to Contractor and his Surety.

No act by City before the work is finally accepted, including, but limited to, exercise of other rights under the Contract, actions at law or in equity, extensions of time, payments, claims of liquidated damages, occupation or acceptance of any part of the work, waiver of any prior breach of the Contract or failure to take action pursuant to this section upon the happening of any prior default or breach by Contractor shall be construed to be a waiver by, or to estop, City from acting pursuant to this paragraph upon any subsequent event, occurrence or failure by

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Contractor to fulfill the terms and conditions of the Contract. The rights of City pursuant to this paragraph are cumulative and in addition to all other rights of City pursuant to this Agreement and at law or in equity.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement on the date set forth opposite their names.

CONTRACTOR

DATE:	By
	· · · · · · · · · · · · · · · · · · ·
	Title
	CITY OF SACRAMENTO, a municipal corporation
DATE:	By
	City Manager
ATTEST:	

City Clerk

ORIGINAL APPROVED AS TO FORM

City Attorney

. . .

FUNDING AVAILABLE:

By

Accounting Officer

3 (21)
Section 4

SCOPE OF WORK

4-1 INTENT OF PLANS AND SPECIFICATIONS

The intent of the Plans and Specifications is to prescribe the details for the completion of the work which the Contractor undertakes to perform in accordance with the terms of the Contract. Where the Plans and Specifications describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all the work involved in executing the Contract in a satisfactory and workmanlike manner.

4-2 CLEANING UP

The Contractor shall not allow the site of the work to become littered with trash, debris, garbage or waste material, but shall maintain the site in a neat, orderly and healthful condition until completion and acceptance of the work. Before final inspection of the work, the Contractor shall clean the work site and all ground occupied by him in connection with the work of all rubbish, excess materials, falsework, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Full compensation for cleaning up is included in the prices paid for the various Contract items of work, and no separate or additional payment shall be made for cleaning up.

4-3 LINES AND GRADES

All work done under this Contract shall be done to the lines and grades shown on the drawings. The Contractor shall keep the Engineer informed, at least 48 hours in advance, of the times and places at which he wishes to do work, in order that lines and grades may be furnished and necessary measurements for record and payment made with the minimum of inconvenience to the Engineer, and of delay to the Contractor.

The datum to which all elevations mentioned herein or shown on the drawings refer is the official datum of the City of Sacramento, unless specifically shown or stated to be otherwise.

4-4 CHANGES AND INCREASED OR DECREASED QUANTITIES OF WORK

The Engineer reserves and shall have the right to make such changes, from time to time, in the Plans, the character or quantity of the work as may be considered by him necessary or desirable to complete fully and acceptably the proposed construction in a satisfactory manner, providing such alterations do not change the total cost of any major item, based on originally estimated quantities, at the unit prices bid, by more than twenty percent (20%), (a major item shall be construed to be any item, the total cost of which is equal to or exceeds ten percent (10%), of the total Contract Price, computed on the basis of Proposal quantity and Contract unit price). Should it be necessary, for the best interest of the City, to make changes in excess of that above specified, the same shall be covered by Contract Change Order.

The Contractor shall not start work on any alteration requiring a Contract Change Order until the Change Order setting forth the adjusted prices shall be executed by the City and Contractor.

In those instances where the work would be delayed by waiting for the City to execute a Change Order the Engineer may direct the work be done by issuing a written Field Order and then the Change Order will be processed as quickly as possible following the issuance of the Field Order.

Should any of the changes be made, not requiring a Change Order as provided herein, the Contractor shall perform the work as altered, increased, or decreased at the Contract unit price or prices.

In case a satisfactory adjustment in price cannot be reached for any item requiring a Change Order, the City reserves the right to terminate the Contract as it applies to the items in question and make such arrangements as may be deemed necessary to complete the work.

4-5 OMITTED ITEMS

The Engineer may, in writing, order omitted from the work any item other than major items found by him to be unnecessary to the project, and such omission shall not be a waiver of any of the conditions of the Contract nor invalidate any of the provisions thereof. Major items may be omitted by Change Orders but this shall not alter the right of the Engineer to order such omissions. The Contractor shall be paid for all work done toward the completion of the item prior to such omission, as provided in Section 8 of these Specifications.

4-6 EXTRA WORK FORCE ACCOUNT

When work is necessary to the proper completion of the project, and same is not covered by the Proposal or Contract, the same shall be called extra work and shall be performed by the Contractor when so directed in writing by the Engineer. Extra work shall be performed in accordance with the Specifications and as may be directed by the Engineer.

Prices for extra work may be covered by Change Order. Should the parties be unable to agree to prices, or if it is impractical to give unit prices, then the Engineer may instruct the Contractor to proceed with the work by cost and percentage as hereinafter provided in Section 8 of these Specifications.

EXTRA WORK MUST BE AUTHORIZED IN WRITING BY THE ENGINEER BEFORE THE WORK IS STARTED. Payment for extra work will not be made unless such prior written authorization is obtained.

In the event of an emergency such as a bursting water main or other situation which endangers the work or endangers public safety, the Engineer is authorized to permit and to direct the Contractor by Field Order to perform such extra work as may be necessary to protect the work or the public.

4-7 PROCEDURE AND PROTEST

A Contract Change Order approved by the Engineer may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in the Change Order, he shall submit a written protest to the Engineer within fifteen (15) calendar days after the receipt of such Change Order. The protest shall state the points of disagreement, and, if possible, the Contract Specification references, quantities, and costs involved. If a written protest is not submitted within the time specified above, payment shall be made as set forth in the Change Order and such payment shall constitute full compensation for all work included therein or required thereby.

Where the protest concerning a Change Order relates to compensation, the compensation payable for all work specified or required by said Change Order to which such protest relates shall be determined as provided in Paragraph 4-1 to 4-8 inclusive. The Contractor shall keep full and complete records of the cost of such work and shall permit the Engineer to have such access thereto as may be necessary to assist in the determination of the compensation payable for such work.

Where the protest concerning a Change Order relates to the adjustment of Contract time for the completion of the work, the time to be allowed therefor will be determined as provided in Paragraph 27 of the Agreement.

4-8 CHANGES IN CHARACTER OF WORK

If an ordered change in the Plans or Specifications materially changes the character of the work of a Contract item from that on which the Contractor based his bid price, and if the change increases or decreases the actual unit cost of such changed item as compared to the actual or estimated actual unit cost of performing the work of said item in accordance with the Plans and Specifications originally applicable thereto, in the absence of a Contract Change Order specifying the compensation payable, an adjustment in compensation therefor shall be made in accordance with the following.

The basis of such adjustment in compensation shall be the difference between the actual unit cost to perform the work of said item, or portion thereof involved in the change as originally planned and the actual unit cost of performing the work of said item or portion thereof involved in the change, as changed. The Engineer shall determine actual unit costs in the same manner as if the work were to be paid for on a cost and percentage basis as provided in Paragraph 8-16; or such adjustment shall be as agreed to by the Contractor and the Engineer. Any such adjustment shall apply only to the portion of the work of said item actually changed in character. At the option of the Engineer, the work of said item or portion of item which is changed in character shall be paid for by cost and percentage as provided in Paragraph 8-16.

Failure of the Engineer to recognize a change in character of the work at the time the change is issued shall nowise be construed as relieving the Contractor of his duty and responsibility of filing a written protest within the fifteen (15) day limit as provided in Paragraph 4-7, "Procedure and Protest."

4-9 NOTICE OF CLAIMS FOR EXTRA WORK

Except as specifically otherwise provided herein, the Contractor shall not be entitled to payment of any additional compensation for any cause, including, but not limited to, any act or failure to act, by the Engineer or the City, or any agent, employee or contractor of the City, or the happening of any event or occurrences, unless Contractor shall give the Engineer prior written notice of any such potential claim and comply with the dispute procedure as hereinafter specified; provided however, that compliance with this provision shall not be necessary as to matters within the scope of Section 4-4 ("Changes and Increased or Decreased Quantities of Work"); or Paragraph 17 of the Agreement ("Liquidated Damages"), nor to any other claim which is based directly and solely on differences in measurements or errors in computation of Contract pay 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. The said notice as above required must be given to the Engineer prior to the time that the Contractor shall have performed the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within fifteen (15) calendar days after the happening of the event, thing or occurrence giving rise to the potential claim.

It is the intention of this provision that differences between the parties arising under and by virtue of the Contract be brought to the attention of the 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 no written notice of potential claim as herein required was filed.

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4-10 DISPUTED CLAIMS

In the event that, upon receiving a notice of potential claim from Contractor, the Engineer determines that the claim is not acceptable for any reason, as soon as practicable thereafter, the Engineer shall give the Contractor written notice that City rejects the claim and the reasons for the rejection. In the event the Engineer gives such notice of rejection, the Engineer shall, at the Contractor's written request, specify a date for a hearing before the Engineering Division Manager for the purpose of resolving the dispute. Such written request by the Contractor shall be made within fifteen (15) calendar days from the date of the written notice of rejection given by the Engineer. Unless otherwise directed by the Engineering Division Manager, pending resolution of any disputed claim, the Contractor shall proceed diligently with the performance of the Contract.

On such hearing date, or such other date to which the parties may agree, the Contractor shall be afforded a reasonable opportunity to present Contractor's position on and substantiation for the claim. The hearing shall be conducted in an informal manner, and no record shall be made of the proceedings other than any written materials which may be submitted by the City or the Contractor shall be preserved by the Engineering Division Manager until the work is finally accepted by the City.

As soon as practicable after the hearing, the Engineering Division Manager shall reduce his final decision in regard to the dispute in writing and forward it to the Contractor.

4-11 DETOURS

The Contractor shall construct and remove detours and detour bridges for the use of public traffic as provided in the Special Provisions, or as shown on the Plans, or as directed by the Engineer. Payment for such work shall be made as set forth in the Special Provisions or at the Contract Prices for the items of work involved if the work being performed is covered by Contract items of work. Otherwise, all detours shall be accomplished at no additional charge by Contractor.

The cost of repairing damage to detours caused by public traffic shall be paid by Contractor.

When public traffic is routed through the work, provision for a passageway through construction operations shall not be considered as a detour construction or detour maintenance, unless otherwise specified in the Special Provisions.

Detours constructed by the Contractor exclusively for his own use and convenience for hauling materials and equipment shall be constructed and maintained by him at his expense.

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.

Where the Contractor's hauling is causing such damage to the detour that its maintenance in a condition satisfactory for public traffic is made difficult and unusually expensive, the Engineer shall have authority to regulate the Contractor's hauling over the detour.

Section 5

CONTROL OF WORK AND MATERIALS

5-1 AUTHORITY OF ENGINEER

As defined in Section 1 of these Specifications, the "Engineer" may mean either the Director of Public Works or his assistants who may have been assigned to the supervision of the project by the Director of Public Works. Much of the actual supervision and control of the project may be by such assistants who are designated as "Engineer." However, whenever in these Specifications, Special Provisions, or on the Plans the designation Director of Public Works is made as the authority in any matter, it shall mean only the Director of Public Works of the City of Sacramento and not subordinates working under his supervision. Whenever the word "Engineer" is used in these Specifications, Special Provisions, or Plans, then either the Engineer assigned to the supervision and control of the project or the Director of Public Works himself will exercise such authority.

The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and rate of progress of the work. The Engineer shall decide all questions which may arise as to the interpretation of the Specifications, Special Provisions, and Plans relating to the work, the fulfillment of the Contract on the part of Contractor, and all questions as to the rights of different Contractors on the project. The Engineer shall determine the amount and quality of the several kinds of work performed and materials furnished, for which payment is to be made under the Contract.

5-2 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces in all cases shall conform to the lines, grades, crosssections, and dimensions shown on the approved Plans and working drawings. The Engineer shall determine whether the exigencies of construction require any deviation from the Plans, and, if so, shall authorize any such deviation in writing.

5-3 COORDINATION OF SPECIFICATIONS, PLANS AND SPECIAL PROVISIONS

These Specifications, Plans, Special Provisions, and all supplementary Plans, drawings, and documents are essential parts of the Contract, and a requirement occurring in one is just as binding as though occurring in all. They are intended to be integrated to describe and provide for a complete work. In case of discrepancy, indicated dimensions, unless obviously incorrect, shall govern over scaled dimensions. Plans shall govern over Specifications and Special Provisions shall govern over both Plans and Specifications. Contractor shall not take advantage of any apparent error or omission in the Plans and Specifications. In the event Contractor discovers any apparent error, discrepancy or omission, he shall immediately call upon the Engineer to make a determination and decision on the matter.

Should any discrepancy appear, or misunderstanding arise as to the import of anything contained in either, the explanation of the Engineer in relation thereto shall prevail. In the event of a dispute between the Contractor and the Engineer, appeals may be taken as provided herein.

The work shall be performed and completed according to the true spirit, meaning, and intent of the Specifications and the general stipulations and drawings.

All work shown on the drawings, the dimensions of which are not indicated, shall be accurately followed to the scale to which the drawings are made, but indicated dimensions are in all cases to be followed, where given, though they differ from scaled measurements. Large scale and full size drawings shall be followed in preference to small scale drawings.

In addition to the drawings made a part of this Contract at time of signing, by incorporation or reference, the Engineer shall furnish such additional drawings from time to time during the progress of the work, as are necessary to make clear and to define in greater detail, as may be necessary, the intent of the Specifications and drawings and the Contractor shall make his work conform to all such drawings.

5-4 COOPERATION OF CONTRACTOR

After execution by City, City shall supply Contractor one complete copy of Contract Documents. This set shall include Plans, Specifications, Special Provisions, and the fully executed Contract. City shall also make available to Contractor at least three (3) copies of Plans, Specifications, and Special Provisions for his use in prosecuting the work. Contractor may request additional copies of Plans, Specifications, and Special Provisions. City shall supply such copies as may be requested at the actual cost thereof to City.

Contractor shall give the work the constant attention necessary to facilitate the progress thereof. Contractor shall cooperate with the Engineer, inspectors and with other Contractors in every way possible. The Engineer shall allocate the work and designate sequence of construction in case of controversy between Contractors. Contractor shall at all times have a competent Superintendent at the site of the work and said Superintendent shall be fully authorized as his agent on the work. Such Superintendent shall be capable of reading and understanding the Plans, Specifications, and Special Provisions and shall receive and follow any instruction given by the Engineer. Unless specifically called for by the Special Provisions, Contractor is not required to provide an office for use by the Engineer.

5-5 CONSTRUCTION STAKES

Contractor shall make a written request on standard City Survey request form and give to Engineer at least two (2) working days before the stakes are required. The Engineer shall furnish Contractor with all lines, grades and measurements necessary for the proper prosecution and control of the work unless stated otherwise in the Special Provisions. Such stakes and markings as the Engineer may set for either his own or Contractor's guidance shall be preserved by Contractor. In case of negligence on the part of Contractor or his employees which results in the destruction of any such stakes or markings, City may, in its sole discretion, deduct from any payments due or to become due to Contractor, a sum equal to the cost of replacing such destroyed stakes or markers.

5-6 DRAWINGS TO BE FURNISHED BY CONTRACTOR

Contractor shall supply such working drawings of devices to be furnished under this Contract as are required by the Special Provisions or are required by the Engineer. Unless otherwise specified herein, Contractor shall submit such drawings to the Engineer for approval upon request. If the Engineer disapproves any such drawings submitted by Contractor, Contractor shall make the required revisions and again submit them to the Engineer for approval. After approval by the Engineer, such drawings shall become a part of this Contract, and the work shall be done in conformity with such drawings. No such work shall be started or devices purchased until the drawings covering it or them have been approved.

Contractor's drawings may be submitted for review before tracing. After review, they may be traced and Contractor shall deliver to the Engineer five (5) prints of each such drawing for approval. Drawings so furnished to the Engineer shall be finished drawings which shall be neat, legible, to scale, and to as large scale as reasonably possible.

5-7 SUGGESTIONS TO CONTRACTOR ADOPTED AT HIS OWN RISK

Any Plan or method of work suggested by the Engineer to Contractor in whole or in part, shall be used at the risk and responsibility of Contractor. The Engineer and City shall assume no responsibility therefor.

5-8 RIGHT TO MODIFICATION OF WORK

Should conditions occur during the progress of the work of such nature as to make it impossible for Contractor to comply strictly with the terms of this Contract, Contractor shall apply in writing to the Engineer for modification, provided that it be not detrimental to the work or of additional cost. If such modification is acceptable to the Engineer, Contractor shall be notified in writing, where upon the modification may be made. If such modification is not acceptable to the Engineer, Contractor shall determine some other method of doing the work acceptable to the Engineer.

Such modifications shall in no way affect, vitiate, or make void this Contract or any part thereof, except what is necessarily affected by such alterations and is clearly the intention of the parties of this Contract.

5-9 RIGHT TO PERFORM EXTRA WORK

In case of neglect or refusal by Contractor to perform any extra work which may be authorized by the Engineer or to make satisfactory progress in the execution of the same, the City Council may employ any person or persons to perform such work, and Contractor shall not in any way interfere with or molest the person or persons so employed.

5-10 PROVISIONS FOR EMERGENCIES

Whenever, in the opinion of the Engineer, Contractor has not taken sufficient precautions for the safety of the public or the protection of the work or adjacent structures or property which may be injured by processes of construction on account of such neglect, and whenever, in the opinion of the Engineer, an emergency shall arise and immediate action shall be necessary in order to protect any public or private, personal or property interest, then, the Engineer, with or without notice to Contractor, may, but shall not be obligated to, provide suitable protection to such interest by obtaining such work and material as the Engineer may consider necessary and adequate to furnish such protection.

The cost and expense of such work and material so furnished shall be borne by Contractor, and if the same shall not be paid upon presentation of the bills therefor, then such costs shall be deducted from any payment due or to become due Contractor.

The performance of such emergency work under the direction of the Engineer shall in no way relieve Contractor from any damages which may occur during or after such precaution has been taken by the Engineer.

5-11 SUSPENSION OF WORK ON NOTICE

In the event the Engineer determines that a situation exists where continuation of the work would be illegal or endanger the health, safety or welfare of persons on the work or affected by the work, he shall have the right to order Contractor to delay or suspend the work in whole or in part for a period of time equal to the time such situation exists. Any order given to Contractor to suspend or delay the work shall specify the situation which makes such suspension or delay necessary.

Whenever Contractor shall be so required by written order of the Engineer, and for such periods of time as the Engineer may order, Contractor shall delay or suspend the progress of the work or any part thereof, provided that in the event of such delay or delays or of such suspension or suspensions of the progress of the work, or any part thereof, the time for completion of the work so suspended or of work so delayed by such suspension or suspensions shall be extended for a period equivalent to the time lost by reason of such suspension or suspensions. Such order of the Engineer shall not otherwise modify or invalidate in any way any of the provisions of this Contract, and Contractor shall not be entitled to any damages or compensation from City on account of such delay or delays, suspension or suspensions.

5-12 RIGHT TO RETAIN IMPERFECT WORK

If any portion of the work done or material furnished under this Contract shall prove defective and not in accordance with the Specifications and drawings, and if the imperfection in the same shall not be of sufficient magnitude or importance to make the work dangerous or undesirable, the Engineer shall have the right and authority, but shall not be obligated, to retain such work instead of requiring the imperfect work to be removed and reconstructed. The Engineer may make such deduction therefor from the payments due or to become due Contractor as may be appropriate.

5-13 QUALITY OF MATERIALS AND WORKMANSHIP

Whenever it is provided in this Contract that 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 or articles of the kind required, with due consideration of the use of them. The work performed shall be in full conformity with the intent to secure the best standard of construction and equipment of the work as a whole or in part.

5-14 TRADE NAMES AND ALTERNATIVES

For convenience in designation, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalogue information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

The burden of proof as to the quality and suitability of alternatives shall be upon Contractor and he shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials and his decision shall be final.

Whenever the Specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made until the request for substitution is made in writing by Contractor accompanied by complete data as to the equality of the material or article proposed. Such requests shall be made in ample time to permit approval without delaying the work, but need not be made in less than thirty (30) days after award of the Contract.

5-15 DUTIES AND POWERS OF INSPECTORS

Properly authorized inspectors shall be considered to be the representatives of the City limited to the duties and powers entrusted to them. Their duty shall be to inspect materials and workmanship of those portions of the work to which they are assigned, either individually or collectively, under instructions of the Engineer, and to report any and all deviations from the drawings, Specifications and other Contract provisions which they may notice. Until such time as the Engineer is notified and determines and orders that the work may proceed, if in the inspector's opinion such action is necessary, any inspector assigned to the work shall have the authority to order Contractor to stop the work to which such inspector is assigned.

5-16 INSPECTION

All work and materials furnished pursuant to this Contract shall be subject to inspection and approval or rejection by the Engineer. In order to assure strict compliance with the requirements of the Contract, the Engineer may assign such assistants as he may deem necessary to inspect work and material furnished under this Contract. Contractor shall notify the Engineer of the time and place of any factory tests which are required by the Contract, and the time and place of preparation, manufacture or construction of any material for the work, or any part of the work, which the Engineer notifies Contractor that he wishes to inspect.

Contractor shall give such notice two (2) working days in advance of the beginning of the work on any such material or of the beginning of any such test to allow the Engineer to make arrangements for inspecting and testing or witnessing as the case may be, if such inspection and testing or witnessing are deemed practicable to the Engineer or are required by the Contract.

When the Engineer considers such action to be proper and practicable he shall, at the written request of Contractor, cause materials intended for use in the work to be inspected at the point of production or manufacture. The Engineer may at any time cause such an inspection, however, it will not be undertaken until the Engineer is assured of the cooperation and assistance of both Contractor and the material producer. The Engineer or his authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. City assumes no obligation to inspect materials at the source of supply.

Unless authorized by the Engineer, any work done in the absence of an inspector that may be completed or in progress shall be subject to inspection. Contractor shall furnish all tools, labor, materials, and other facilities necessary to make such inspection, even to the extent of uncovering or taking down portions of the finished work. Contractor shall pay the cost of making such inspection and the removal of any defective work and reconstruction.

5-17 REMOVAL OF CONDEMNED MATERIALS AND STRUCTURES

Contractor shall remove from the site of the work, without delay, all rejected and condemned materials or structures of any kind brought to or incorporated in the work, and upon his failure to do so, or to make satisfactory progress in so doing within forty-eight (48) hours after the service of a written notice from the Engineer, the condemned material or work may be removed by City and the cost of such removal be deducted from any payments that may be due or may become due Contractor. No such rejected or condemned material shall again be offered for use by Contractor under this Contract or any other contract with City. Contractor shall not use any such rejected or condemned material in the performance of the Contract.

5-18 APPROVAL OF SOURCES OF SUPPLY OF MATERIALS

The Engineer may require Contractor to provide information on the source of supply of any and all materials and may require that the Engineer's approval be given prior to the securing of any or all materials. The Engineer may require Contractor to submit representative samples for inspection and testing by City.

Even though a source of supply shall have been approved, such approval shall not prevent subsequent disapproval or rejection of materials, if the quality of the product or material is later determined to be below the standard or requirements set by these Specifications or the Special Provisions.

5-19 PREPARATION FOR TESTING

Contractor shall at all times maintain proper facilities and provide safe access for inspection by City to all parts of the work and to the shops wherein the work is in preparation. Where the Specifications or Special Provisions require work to be specially tested or approved, it shall not be tested or covered up without at least a 24 hour notice to the Engineer of its readiness for inspection unless the written approval of the Engineer for such testing or covering is first obtained.

5-20 METHODS OF SAMPLING AND TESTING

Contractor shall furnish samples of materials for testing as may be required by the Engineer. Contractor shall furnish such samples without cost to City.

Testing shall be done to such standards as may be set forth in the Specifications, Plans, or Special Provisions. References made in these documents to standard methods of testing materials shall by such reference make such standards a part of these Specifications.

Whenever a reference is made in the Specifications to a specification or test designation either of the American Society for Testing and Materials, the American Association of State Highway and Transportation Officials, the American Water Works Association, Federal Specifications, or any other recognized national organization or State of California Agency, and the number or other identification representing the year of adoption or latest revision is omitted, it shall mean the specification or test designation in effect on the day the Notice to Contractors for the work is dated.

Section 6

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

6-1 LAWS TO BE OBSERVED

Contractor shall be familiar with all Federal, State, and local laws, ordinances, codes and regulations which in any manner affect those engaged or employed in the work or the material or equipment used in or upon the site, or in any way affect the conduct of the work. No pleas of misunderstanding of such laws, ordinances, codes or regulations or of ignorance of the same, on the part of Contractor shall, in any way, serve to modify the Provisions of the Contract.

Contractor shall at all times observe and comply with all Federal, State, and local laws, ordinances, codes and regulations affecting the conduct of the work, and Contractor and his surety shall indemnify and save harmless City and all of its officers, agents, and employees against any claim for liability arising from, or based upon, the violation of any such law, ordinance, regulation, decree, or order, whether by Contractor or by his employees.

6-2 CERTAIN LAWS AFFECTING THE WORK

In this paragraph, attention of Contractor is directed to certain laws which affect this Contract. The listing of such laws in this paragraph is not to be construed as a listing of all applicable laws but is rather a summary upon which Contractor can base his investigation and familiarization of these and all other applicable laws.

a. Hours of Labor

Eight (8) hours of labor constitute a legal day's work, Contractor shall forfeit, as a penalty to City, \$25 for each workman employed in the execution of the Contract by Contractor or by any subcontractor for each calendar day during which such workman is 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 in violation of the provisions of the Labor Code, and in particular, Section 1810 to section 1815, thereof, inclusive, except that work performed by employees of Contractor in excess of eight (8) hours per day, and forty (40) hours during any one week, shall be permitted upon payment of compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half $(1\frac{1}{2})$ times the basic rate of pay, as provided in Section 1815.

b. Prevailing Wage

6 (1)

Contractor shall comply with Labor Code Sections 1770 et seq. In accordance with Labor Code Section 1775, Contractor shall forfeit, as a penalty to City, \$25 per each calendar day or portion thereof, for each workman paid less that the stipulated prevailing rates for such work or craft in which such workman 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 Section 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rate and the amount paid for each calendar day or portion thereof for which each workman was paid less than the amount of such stipulated prevailing wage rate shall be paid to each workman by Contractor. City shall not recognize any claim for additional compensation because of the payment by Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. Pursuant to Section 1770, and following, of the California Labor Code, the Contractor shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages are on file at the office of the City Clerk, Room 300, 915 "I" Street, Sacramento, California 95814. Those copies shall be made available to any interested party on request.

The wage rates determined by the Director of the California Department of Industrial Relations refer to expiration dates. Prevailing wage determinations with a single asterisk (*) after the expiration date are in effect on the date of advertisement for bids and are good for the life of the project. Prevailing wage determinations with double asterisks (**) after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. The contractor should contact the Prevailing Wage Unit, DLSR, Division of Labor Statistics and Research, Post Office Box 603, San Francisco, California 94101, (415-557-0561), to obtain predetermined wage changes. All determinations that do not have double asterisks (**) after the expiration date are good for the life of the project. The possibility of wage increases is one of the elements to be considered by Contractor in determining his bid, and shall not under any circumstances, be considered as the basis of a claim against the City of Sacramento on the Contract.

c. Labor Discrimination

There will be no discrimination in the employment of persons on any ground listed in Labor Code Section 1735, except as provided in Labor Code Section 1735. The penalty for any such discrimination will be as set forth in the Labor Code, Section 1735, and Chapter 1 of Part 7 of said Labor Code.

d. Apprentices

The laws governing the employment of apprentices shall be observed, and, in particular, Section 1777.5 of the Labor Code shall be obeyed.

e. Fair Labor Standards Act

Contractors shall comply with the Fair Labor Standards Act of 1938 as amended (52 Stat. 1060) as it may be applicable.

f. Contractors License

Bidders and Contractors shall maintain license as required by Chapter 9 of Division III of the Business & Professions Code.

Pursuant to Section 3300, Public Contract Code, the City shall specify the classification of the Contractor's license which the Contractor shall possess at the time a Contract is awarded. The specification shall be included in any plans prepared for a Public Project and in any Notice inviting bids pursuant to these Standard Specifications.

g. Subcontractors

The rules concerning the use of subcontractors have been discussed in Paragraph 2-9 of these Specifications. Particular reference was made therein to Section 4101 to Section 4113, inclusive, of the Public Contract Code.

6-3 PERMITS AND FEES

Contractor shall at his sole expense, obtain all necessary permits and licenses, for the construction of the work, give all necessary notices, pay all fees required by law, and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public health and safety.

6-4 PROTECTION OF CITY AGAINST PATENT CLAIMS

Contractor shall assume all cost arising from the use of patent materials, equipment, devices, processes used on or incorporated in the work and shall indemnify and save harmless the City of Sacramento together with all of its officers and employees, and their duly authorized representatives, from all actions of every nature for, or on account of the use of any patented materials, equipment, devices, or processes. Before final payment is made on account of this Contract, if requested by Engineer, Contractor shall furnish acceptable proof of a proper release from all cost arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work.

6-5 SANITARY REGULATIONS

The operations of Contractor shall be in full conformity with all of the Rules and Regulations of boards and bodies having competent jurisdiction with respect to sanitation.

Contractor shall construct and maintain, properly obscured from public view, the necessary sanitary conveniences for the use of the workers in such a manner and at such points as shall be approved by the Engineer, and the use of same shall be strictly enforced.

Contractor shall obey and enforce such sanitary regulations and orders and shall take such precautions against contagious or infectious diseases as the Engineer may deem necessary.

6-6 PUBLIC CONVENIENCE AND SAFETY

Materials stored on the work site shall be so placed that minimum hazard to the public and no damage to public property will result. In all Contracts for public works entered into between Contractor and City, public safety is a prime consideration and during the progress of the work Contractor shall constantly preserve the protection of the public. Any property damage caused by the Contractor shall be repaired to the satisfaction of the Engineer by the Contractor at his own expense.

6-7 TRENCH SAFETY PLANS

Before beginning excavation for a trench five (5) feet or more in depth, the Contractor shall secure a permit from the Division of Industrial Safety. A copy of this permit must be available at the construction site.

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When required on the Plans or by the Engineer, the Contractor shall submit to the Engineer a detailed Plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground. Such Plan shall be approved by the Engineer at least five (5) days before the Contractor intends to begin work on the trench. If such Plan varies from the shoring system standards established by the Construction Safety Orders, the Plan shall be prepared by a registered civil or structural engineer. Nothing herein shall be deemed to allow the use of shoring, sloping or protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety.

When any bid item requires the construction of a pipeline, sewer, sewage disposal system, boring and jacking pits, or similar trenches or open excavations, which are five (5) feet or deeper, each price bid in response thereto shall contain the cost of adequate sheeting, shoring and bracing, or equivalent method, for the protection of life or limb, which shall conform to applicable safety orders.

6-8 COMPLIANCE WITH OSHA

The Contractor shall be responsible for strict compliance with all requirements of the California Occupational Safety and Health Act (Labor Code Sections 6300 et seq.) which are applicable to the work to be accomplished. The foregoing shall include, but not be limited to, all applicable Construction Safety Orders issued by the State of California, Division of Industrial Safety, Title 8 Administrative Code.

6-9 BARRICADES AND WARNING SIGNS

The Contractor shall be solely and completely responsible for furnishing, installing and maintaining all warning signs and devices necessary to safeguard the general public and the work, and to provide for the proper and safe routing of the vehicular and pedestrian traffic during the performance of the work. This requirement shall apply continuously and not be limited to normal working hours. The use of flagmen, barricades and construction signing shall comply with the current edition of Work Area and Traffic Control Handbook (W.A.T.C.H.). The contractor shall submit a plan showing traffic control measures and/or detours for vehicles and pedestrians affected by the construction to the Engineer for review and approval. This plan shall be submitted a minimum of five (5) working days prior to the start of work within the street right of way. The Contractor will not be allowed to begin work until an approved plan is on file with the Engineer.

All work within public streets and/or roadway right-of-way shall be done in an expeditious manner so as to cause as little inconvenience to the traveling public as possible. Traffic must be allowed to pass at all times. Between 7 a.m. to 8:30 a.m. and 3:30 p.m. to 5:30 p.m., public traffic must have access on primary City streets to the number of lanes normally available for the section of roadway. A list of primary City streets is available from the City Traffic Engineer at (916)449-5307.

6-10 CONTRACTOR NOT AN AGENT OF CITY

At all times during the life of this Contract, Contractor shall be an independent contractor and shall not be an employee, agent or other representative of City of whatsoever nature. Nothing in this Contract shall be construed to create any relationship of joint venture, partnership or any other association of any nature whatsoever between City and Contractor other than that of owner and independent contractor. City shall have the right to control Contractor only insofar as provided in this Contract and only insofar as the results of Contractor's work pursuant to the Contract. The aforementioned right of supervision shall in no manner reduce or abrogate Contractor's liability of all damage or injury to persons, public property or private property which may arise directly or indirectly from Contractor's execution of the work.

6-11 APPROVAL OF CONTRACTOR'S PLANS NO RELEASE FROM LIABILITY.

The approval by the Engineer of any drawing or any method of work proposed by Contractor shall not relieve Contractor of any of his responsibility for any errors therein and shall not be regarded as any assumption of risk or liability by City or any officer or employee thereof. Contractor shall have no claim under this Contract on account of the failure or partial failure or inefficiency of any plan or method so approved. Such approval shall be considered to mean merely that the Engineer has no objection to Contractor's using, at Contractor's responsibility and risk, the plan or method Contractor proposes.

6-12 CONTRACTOR SHALL NOT MORTGAGE EQUIPMENT

Contractor shall not mortgage or otherwise convey the title of the plant, machinery, tools, appliances, supplies, or materials that may at any time be in use, or further required or useful, in the prosection of this Contract, without prior written consent of the Engineer.

6-13 PROPERTY RIGHTS IN MATERIALS

Nothing in this Contract shall be construed as vesting in Contractor any right of property in the materials used after they have been attached or affixed to the work, and on which partial payments have been made by City, but all such materials shall be the property of Contractor and City jointly as their interests may appear, and may not be removed from the work by Contractor without the consent of City.

6-14 USE OF EXPLOSIVES

Explosives shall not be used on the work unless permission to use them shall be granted by the Engineer and only then under such conditions as may be prescribed.

6-15 CONTRACTOR'S LEGAL ADDRESS

Both the address given in the Proposal and Contractor's office at the site of the work are hereby designated as places to either of which drawings, samples, notices, letters, or other articles or communications to Contractor may be mailed or delivered. The delivery at either of these places of any such thing from City to Contractor shall be deemed sufficient service thereof upon Contractor and the date of such service shall be the date of delivery. The address named in the Proposal may be changed at any time by notice in writing from Contractor to City. Nothing herein contained shall be deemed to preclude or render inoperative the service of any drawing, sample, notice, letter or other article or communication to or upon Contractor personally.

Contractor's office at the site of the work shall be the headquarters of a representative authorized to receive drawings, instructions or other communications or articles from City and any such thing given to the said representative or delivered at Contractor's office at the site of the work in his absence shall be deemed to have been given to Contractor.

6-16 RESERVED

6-17 MAIN AND TRUNKLINE UTILITIES

The City of Sacramento is a member of the Underground Service Alert (U.S.A.) one-call program. The Contractor or any subcontractor is required to notify the U.S.A. forty-eight (48) hours in advance of performing excavation work by calling the toll free number 800-642-2444. The provisions of Government Code, Section 4216 and 4217, shall be followed as they are outlined in the remainder of this Section of the City Standard Specifications.

Notwithstanding any provision to the contrary herein, subject to the provisions of this paragraph, City shall have the responsibility, as between Contractor and City, for the timely removal, relocation or protection of any existing main or trunkline utility facilities located on the site of any construction project which is the subject of the Contract; provided, that such main or trunkline utility facilities are not identified in the Plans and Specifications with reasonable accuracy; and, provided further, that nothing herein shall be deemed to require City to indicate the presence of existing nonpressurized service laterals or appurtenances whenever the presence of existing nonpressurized service laterals on the site of the Construction project which is the subject of the Contract can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, valves, service facilities, identification markings and other indicators of whatsoever and every nature, on, or adjacent to, the site of the construction.

In the event that existing main or trunkline utility facilities on the site of the construction project are required to be located or repaired, or removed and relocated or protected and, in the event that such main or trunkline utility facilities were not identified in the Plans and Specifications at their approximate subsurface location and, in the event that any damage occurring to such main or trunkline facilities was not due to the failure of Contractor to use reasonable care, then City shall pay for the cost of locating and repairing or removing, relocating and protecting such main or trunkline utility facilities, the public utility shall have sole discretion to perform repairs or relocation work or to permit the Contractor to do such repairs or relocation work at a reasonable price. Approximate location of subsurface installations means "a strip of land not more than twenty-four inches (24") on either side of the exterior surface of the subsurface installation". "Approximate location" does not mean depth.

The obligation of City to pay in instances of discovery of main or trunkline facilities on site in the circumstances described above shall be limited strictly to the costs described above and for equipment on the project necessarily idled during such work. In no event shall City be liable for any further or additional costs resulting directly or indirectly from any such occurrence.

In the event the completion of the project is delayed in failure of City or the owner of the existing main or trunkline utility facility to provide for the removal or relocation of the existing main or trunkline utility facility, or the location and repair of damage as aforesaid, then such delay shall be an excusable delay as that term is defined and provided for the Standard Specifications.

Nothing herein shall be construed to relieve any utility from any obligation as required either by law or by contract to pay the cost of removal or relocation of existing utility facilities. The public utilities, where they are the owner, shall have the sole discretion to perform repairs or relocation work or permit Contractor to do such repairs or relocation or permit Contractor to do such repairs or relocation work at a reasonable price. Nothing herein shall preclude City from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility. In the event that after the Contractor commences work, the Contractor discovers existing main or trunkline utility facilities located on the site of any construction project which were not identified in the Plans and Specifications with reasonable accuracy, Contractor shall immediately notify the Engineer and the owner of the utility facility in writing by the most expeditious means available.

6-18 ITEMS CONTAINING TRADE SECRETS OR PROPRIETARY RIGHTS PROHIBITED

Neither Contractor nor any subcontractor working for him shall furnish any item or combination of items to which, or in which, the Contractor or any such subcontractor claims any trade secret or proprietary right such that Contractor or any such subcontractor shall fail or refuse to furnish within the scope of the Contract and the Contract Price sufficient technical data or information in whatever form as may be required to enable City to contract with contractors other that Contractor and such subcontractor to maintain any such item or items in serviceable condition. "Contractors other than Contractor and such subcontractor" shall mean persons or business entities completely unrelated to Contractor or such subcontractor whether by ownership, business or familial relationship, contract, license arrangement or any other arrangement of any nature. The foregoing prohibition shall include, without limitation of the generality of the foregoing, any item assembly, or combination of items, process, or processes, electrical or mechanical or electro-mechanical or microprocessor process or program, or combination or sequence thereof. Neither Contractor nor any subcontractor shall furnish any item or combination of items pursuant to this Contract containing any program or programmable item without first obtaining the written consent of the Engineer which may be withheld or conditioned in any manner determined to be in the best interest of the City by the Engineer in his sole discretion. In the event of any conflict between the provisions of this paragraph and Paragraph 5-14 ("Trade Names and Alternatives"), the provisions of this paragraph shall prevail.

6-19 PUBLIC WORKS CONTRACTS OR SUBCONTRACTS; GOODS, SERVICES OR MATERIALS; ASSIGNMENT TO AWARDING BODY

Contractor assigns to City all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the Contract. This assignment is effective at the time the awarding body tenders final payments to the Contractor, without further acknowledgment by the parties. (Cal. Govt. Code §4551.)

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Section 7

PROSECUTION AND PROGRESS

7-1 ASSIGNMENT

The Contract may be assigned only upon written consent of the City Council of the City of Sacramento, and also with the consent of the surety, unless the surety has waived its right of notice of assignment.

7-2 WORK TO BE PROSECUTED WITH ADEQUATE AND APPROVED FORCE

Contractor shall prosecute the work under this Contract with all materials, tools, machinery, apparatus, and labor necessary to the complete execution of everything described, shown or reasonably implied under this Contract on or before the completion date.

Contractor shall give to the Engineer full information in advance as to his plans for carrying on any part of the work. The Contractor shall submit to the Engineer a practicable progress schedule within seven (7) working days of approval of the Contract, and within five (5) working days of the Engineer's written request at any other time.

The schedule shall show the order in which the Contractor proposes to carry out the work, the dates on which he will start the several salient features of the work (including procurement of materials, plant, and equipment), and the contemplated dates for completing the said salient features.

The progress schedules submitted shall be consistent in all respects with the time and order of work requirements of the Contract.

Subsequent to the time that submittal of a progress schedule is required in accordance with these specifications, no progress payments will be made for any work until a satisfactory schedule has been submitted to the Engineer.

If at any time before the beginning or during the progress of the work, any part of Contractor's plant, or equipment, or any of his methods of execution of the work, appear to the Engineer to be unsafe, inefficient, or inadequate to insure the required quality or rate of progress of the work, the Engineer may order Contractor to increase or improve his facilities or methods, and Contractor shall promptly comply with such orders; but neither compliance with such orders nor failure of the Engineer to issue such orders shall relieve Contractor from his obligation to secure the degree of safety, the quality of the work, and the rate of progress required of Contractor. Contractor alone shall be responsible for the safety, adequacy, and efficiency of his plant, equipment, and methods.

7-3 PURSUANCE OF WORK UNDER UNFAVORABLE WEATHER AND OTHER CONDITIONS

During unfavorable weather and other conditions, Contractor shall pursue only such portions of the work as will not be damaged thereby. No portions of the work whose unsatisfactory quality or efficiency will be affected by any unfavorable conditions shall be pursued while those conditions exist, unless Contractor shall be able to overcome them by special means or precautions approved by the Engineer.

7-4 SUNDAY, HOLIDAY, AND NIGHT WORK

No work shall be done between the hours of 6 p.m. and 7 a.m., nor on Saturdays, Sundays or legal holidays, except such work as is necessary for the proper care and protection of work already performed or except in case of emergency or special situation and in any case only with the permission of the Engineer.

Notwithstanding the foregoing, if Contractor first obtains the written permission of the Engineer, Contractor may establish Saturday and night work as a regular procedure; provided, however, in the event that Contractor at any time fails to maintain an adequate work force and equipment for reasonable prosecution and inspection of such Saturday and night work, the Engineer may revoke such permission at any time. The Engineer shall evaluate the Contractor's request to determine if there is a benefit to the City for off-period work, or nuisance or hazard to the project or area surrounding the site, and if the Contractor should agree to pay any overtime City costs related to the off-period work. The Engineer shall condition his approval based on the results of this analysis if in fact the off period work is approved.

During the Christmas holiday season construction will be suspended on designated streets. The Christmas holiday season is defined as beginning on Thanksgiving Day and ending on the first regular working day following New Years Day. No new activities that would interfere with traffic shall be made during this period and all existing openings will be backfilled and paved. All barricades and barriers will be removed from all traffic lanes.

Only bona fide emergency repairs will be permitted during this Christmas holiday period. All such repairs shall be reported to the Traffic Engineering Office, 915 I Street, Room 200, 449-5307 within one (1) hour of the determined need. If the emergency arises during the City non-working hours, the Traffic Engineering Office shall be notified before 9 a.m. the following work day.

HOLIDAY SEASON

CONSTRUCTION MORATORIUM STREETS

Alta Valley Way

Arden Way

Challenge Way

Del Paso Boulevard, between Acoma Street and Marysville Boulevard El Camino Avenue and West El Camino Avenue, east of I-5 Freeway Ethan Way

Evergreen Street

Exposition Boulevard

Fair Oaks Boulevard

Florin Road

Folsom Boulevard

Franklin Boulevard between 11th Avenue and Valley Hi Drive

Freeport Boulevard and within one block on all its cross streets between Broadway and Blair Avenue

Fruitridge Road between Rickey Drive and 59th Street

Greenhaven Drive between Havenhurst Drive and Windbridge Drive Heritage Lane

Howe Avenue

J Street

La Mancha Way between Mack Road and Seyferth Way

Mack Road

Marconi Avenue

Meadowgate Way between Munson Way and Franklin Boulevard

Munson Way

Northgate Boulevard between California 160 Freeway and Main Avenue

Point West Way

Power Inn Road

Response Road

Royal Oaks Drive

South Land Park Drive between 58th Avenue and Woodfield Way

Stockton Boulevard and within one block on all its side streets between Perry Avenue and the south city limits

Valley Hi Drive north of Wyndham Way

21st Street north of 4th Avenue

24th Street between Knight Way and Gardendale Road

55th Street south of Fruitridge Road

In addition to the above listed streets, there shall be no work on any street in that area bounded by the American River on the north, the Sacramento River on the west, one block south of Broadway on the south, and 34th Street on the east, without obtaining permission in writing from the Traffic Engineer. Each location will be reviewed on an individual basis for need and for the effect on traffic.

7-5 CARELESS DESTRUCTION OF STAKES AND MARKS NO CAUSE FOR DELAY

In the event that the stakes and marks placed by the Engineer are destroyed through carelessness on the part of Contractor and that the destruction of these marks causes a delay in the work, Contractor shall have no claim for damages or extensions of time. Additionally, the City shall have the right to charge the Contractor or deduct from the progress payments the costs to the City for any restaking required as a result of the Contractor's negligence.

7-6 SEPARATE CONTRACTS

City reserves the right to let other Contracts in connection with any project. Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

If any part of Contractor's work depends for proper execution or results upon the work of any other Contractor, Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. Contractor's failure so to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper for the reception of Contractor's work, except as to defects which may develop in the other Contractor's work after the execution of Contractor's work.

7-7 DISMISSAL OF UNSATISFACTORY EMPLOYEES

Contractor shall employ only workers who are competent and skilled in their respective lines of work, and whenever the Engineer shall notify Contractor that any worker on the work is in his opinion incompetent, unfaithful, or disorderly, or refuses to carry out the provisions of this Contract, or uses threatening or abusive language to any person on the work representing City, or is otherwise unsatisfactory, Contractor shall remove the worker from the work and shall not return that worker to the work unless Contractor can give assurance satisfactory to the Engineer that proper work and proper conduct can be expected.

7-8 PROTECTION OF WORK, PERSONS AND PROPERTY AGAINST DAMAGE

Contractor shall protect the work and materials from damage due to the nature of the work, the action of the elements, trespassers, or any other cause whatsoever, until the completion and acceptance of the work.

Neither the City Council nor any of its agents assume any responsibility for collecting indemnity from any person or persons causing damage to the work of Contractor.

Contractor shall furnish such guards, fences, warning signs, walks, and lights as shall be necessary, and shall take all other necessary precautions to prevent damage or injury to persons or property.

7-9 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 Provisions.

Should the Contractor prepare to begin work at the regular starting time of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during said day and the major portion of the day could be considered to be suitable for such construction operations.

The current controlling operation or operations is to be construed to include any feature of the work (e.g., an operation or activity, or a settlement or curing period) considered at the time by the Engineer and the Contractor, which, if delayed or prolonged, will delay the time of completion of the Contract.

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom, shall be made by the Engineer. The Contractor will be allowed 15 calendar days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects he differs from the Engineer, otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the Contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the Contract and the extended date for completion thereof, except when working days are not being charged in accordance with the provisions in Section 7-10 "Temporary Suspension of Work."

7-10 TEMPORARY SUSPENSION OF WORK

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

In the event that a suspension of work is ordered as provided above, and should such suspension be ordered by reason of the failure of the Contractor to carry out orders or to perform any provision of the Contract; or by reason of weather conditions being unsuitable for performing any item or items of work, which work, in the sole opinion of the Engineer, could have been performed prior to the occurrence of such unsuitable weather conditions had the Contractor diligently prosecuted the work when weather conditions were suitable; the Contractor, at his expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of such suspension and as specified in the Special Provisions for the work. In the event that the Contractor fails to perform the work above specified, the City will perform such work and the cost thereof will be deducted from moneys due or to become due the Contractor.

In the event that a suspension of work is ordered by the Engineer due to unsuitable weather conditions, and in the sole opinion of the Engineer, the Contractor has prosecuted the work with energy and diligence prior to the time that operations were suspended, the cost of providing a smooth and unobstructed passageway through the work will be paid for as extra work; or at the option of the Engineer, such work will be performed by the City at no cost to the Contractor.

If the Engineer orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions are considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days. If a portion of work at the time of such suspension is not

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a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.

If a suspension of work is ordered by the Engineer, due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the Contract, the days on which the suspension order is in effect shall be considered working days if such days are working days within the meaning of the definition set forth.

In the event of a suspension of work under any of the conditions set forth in this Section, such suspension of work shall not relieve the Contractor of his responsibilities as set forth elsewhere in these Specifications.

Section 8

MEASUREMENT AND PAYMENT

8-1 MEASUREMENT OF QUANTITIES

The Engineer shall determine quantities of work acceptably completed under the terms of the Contract, or as directed by the Engineer in writing, based on measurements taken by the Engineer or his assistants. In computing quantities, the length, area, solid contents, number, weight or time in standard units, as the case may be, shall be computed as specified in the Contract. All earth excavation shall be computed to the neat lines and grades as set and directed by the Engineer and shall be computed in amounts as in its original undisturbed position.

8-2 SCOPE OF PAYMENT

Contractor shall accept the compensation, as provided by the Contract, as full payment for furnishing all materials, supplies, equipment, tools, labor, and all incidentals necessary to complete the work and for performing all work contemplated and implied by the Contract, and for loss or damage arising from the nature of the work, or from action of the elements, or from unforeseen difficulties which may be encountered during the prosecution of the work and until its final acceptance, and for all risks of every description connected with the prosecution of the work, and for any infringement of patent, trademark, or copyright and for completing the work according to the Plans, Specifications and Special Provisions.

On Unit Bid items, the list of bid quantities as set forth in the Proposal and payment of those items at the price bid for by Contractor shall be full payment for a full and complete work. On any type of work not specifically described as part of an item, Contractor will include payment for that work under the bid of any item he deems appropriate and City shall not pay extra compensation for each such work.

8-3 PAYMENT ON ENGINEER'S CERTIFICATE

City shall make no payment pursuant to the Contract until the Engineer certifies that such payment is due on account of work done and material furnished in accordance with the Contract.

8-4 FINAL ACCEPTANCE AND FINAL PAYMENT OF THE WORK

Contractor shall notify the Engineer in writing of completion of the work, and the Engineer will promptly satisfy himself as to the actual completion. A list of deficiencies remaining in the work will be presented to the Contractor by the Engineer.

Upon completion of the Contract and the correction of all deficiencies noted above, the Engineer shall make a final estimate of the amount of work done thereunder, and the value of such work and, if required, a balancing Change Order.

The final estimate is sent to the Contractor with a balancing Change Order, if required, for his review and signature. The Contractor returns the signed final estimate and balancing Change Order, if any, to the Engineer. If the Contractor fails to return the executed final estimate within 30 calendar days from the date shown on it or does not notify the Engineer in writing of any disagreement with the final estimate within the same 30 calendar days, the Contractor shall have given implied acceptance of the final estimate as presented.

Upon acceptance of the final estimate by the Contractor the Engineer will recommend acceptance to the City Council.

The City of Sacramento will pay the entire sum so found to be due after deducting therefrom all previous payments and all amounts charged against Contractor and all amounts to be retained under the provisions of this Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

No Certificate given or payments made under this Contract except the Final Certificate or final payment, shall be conclusive evidence of the performance of this Contract, either wholly or in part, against any claim of the City. No payments shall be construed to be an acceptance of any defective work or improper materials.

The payment of the final amount due under this Contract, and the adjustment and payment for any work done in accordance with any alteration of the same, shall release the City of Sacramento, its officers and agents from any and all claims or liability on account of work performed under the Contract or any alteration thereof. The Contract retention shall not be due and payable until the expiration of thirty-five (35) calendar days from the date of acceptance of the work by the City Council.

8-5 RESERVED

8-6 CLAIMS FOR DAMAGES

In the event Contractor shall claim compensation for any damages sustained on account of any act by the City, within five (5) calendar days of sustaining any such damage, Contractor shall give written notice to the Engineer, along with an itemized statement and explanation of such damage. In the event no such notice is given, City shall not consider any claim by Contractor for such damage. In the event City does not accept any such claim, the matter shall be resolved pursuant to Section 4-10.

8-7 ASSIGNMENT OF CLAIMS

Contractor shall not assign, by power of attorney or otherwise, any portion of the moneys that may become due or may be claimed to become due to him under this Contract without the written approval of the City Council. No person other than the party signing this Contract shall have any claim thereunder, except as provided herein.

8-8 PAYMENTS BY CONTRACTOR

a. Contractor shall provide all labor, services, materials, and equipment necessary to perform and complete the work under this Contract. Except as otherwise approved by City, Contractor shall: (1) pay in full for transportation and utility services on or before the 20th day of the month following the calendar month in which such services are rendered; and, (2) pay for all materials, tools, and other expendable equipment, to the extent of at least ninety percent (90%) of the cost thereof, on or before the 10th day after payment by City of any progress payment relating thereto as required by Section 7108.5 of the California Business and Professions Code.

b.

In the absence of other provisions in this Contract applicable to any subcontractor, Contractor shall pay each subcontractor, within ten (10) days after each payment City makes to Contractor, the sum allowed Contractor for and on account of the work performed by the subcontractor, to the extent of the subcontractor's interest therein.

- c. The Contractor shall be responsible for payment of:
 - (1) Restaking costs resulting from loss of stakes and survey markers due to the Contractor's negligence;
 - (2) Second testing of soils and materials when the original testing results were not up to the results specified;
 - (3) Overtime inspection costs when the Engineer determines the overtime inspection was performed primarily to benefit the Contractor.
- d. Compliance with the provisions of subparagraphs (a) and (b) of this paragraph is a condition precedent to any partial payment under the Contract.

8-9 WAGE CLAIM AND ADJUSTMENTS

In cases of underpayment of wages, City will withhold from Contractor out of payments due, or to become due, a sum sufficient to pay persons employed on the work covered by this Contract the difference between the wages required to be paid under this Contract and the wages actually paid such employees. City shall disburse the sums so withheld for and on account of Contractor to the respective employees to whom they are due. The provisions of California Labor Code Section 1775 shall apply.

8-10 FINAL PAYMENT TO TERMINATE LIABILITY OF CITY

The acceptance by Contractor of the final payment made according to the terms of this Contract, subject, if applicable, to any retention pursuant to Paragraph 8-17, shall operate as and be a release to the City of Sacramento, the City Council and every member and agent thereof, from all claims and liabilities to Contractor for anything done or furnished for or relating to the work or for any act or neglect of the City of Sacramento or of any person relating to or affecting the work under this Contract, except the claim against City for the remainder, if there be any amounts kept and retained as provided by the terms of this Contract. The later release to Contractor of all or any portion of any sum retained by City pursuant to Paragraph 8-17 of these Specifications shall not be considered to be a "final payment" as the term is used in this paragraph.

8-11 RESERVED

8-12 EXTRA WORK A PART OF THIS CONTRACT

If extra work orders are given in accordance with the provisions of this Contract, such work shall be considered a part hereof and subject to each and all of its terms and conditions.

8-13 INSPECTION AND PAYMENTS NO WAIVER OF CONTRACT PROVISIONS

No inspection, order, measurement, approval modification, certificate, payment, acceptance of work or material (including, but not limited to, acceptance of the entire work), extension of time or possession of any part of or the entire work shall operate as a waiver of any of the terms and conditions of this Contract, the powers reserved herein to the City Council, or any right of City to damages or to reject work in whole or part. No breach of this Contract shall be construed to constitute a waiver of any other or subsequent breach. All remedies provided in this Contract shall be construed to be cumulative and shall be in addition to all other rights and remedies which may exist at law or in equity.

8-14 VALUE OF WORK OR CHANGES

Should any dispute arise respecting the true value of any work done, or of any omitted, or of any extra work which Contractor may be required to do, or respecting the sum of any payment to Contractor during the performance of this Contract, said dispute shall be decided by the Engineering Division Manager according to the procedures set forth in Paragraph 4-10, and the decision of the latter shall be final and conclusive.

8-15 PAYMENT FOR EXTRA WORK

Reference is made to Paragraph 4-10 of these Specifications regarding disputed claims for extra work. At any time during the progress of work, in the event the Engineer orders any alterations, deviations, additions, or omissions from the Contract, Specifications, Special Provisions or Plans, the same shall in no way affect or make void the Contract, but its value will be added to or deducted from the sum of the Contract Price, as the case may be, by a fair and reasonable valuation. The price of any such extra work or change shall be determined in the sole discretion of the Engineer in one or more of the following ways:

- a. By an approved change order the price of which is established by estimate and acceptance in a lump sum;
- b. By unit prices named in the Contract or subsequently agreed upon; and

c. By cost and percentage.

If Contractor receives an order as above, even if Contractor does not agree with the method selected by the Engineer to determine the price of the extra work, Contractor shall nevertheless proceed with the work. Contractor shall not perform any extra work unless in pursuance of a written order as set forth in these Specifications.

8-16 PAYMENT FOR EXTRA WORK UNDER COST AND PERCENTAGE

Payment by cost and percentage shall be made as follows:

a. For all materials purchased by Contractor and used in this specific work he shall receive the actual cost of such materials including freight charges, as shown by original receipted bills for material and freight, to which shall be added an amount equal to fifteen percent (15%) of the sum thereof.

For all labor of any class including foremen engaged in the specific operation, Contractor shall receive the prevailing wage and fringe benefits (not including payroll taxes) paid on the project for each hour said labor is engaged in the specific work, in accordance with the following method of calculation:

1.33 [(hourly wage + fringes) + 0.24 (hourly wage + fringes)]

c.

b.

For any machine, power machinery and equipment which it is deemed necessary and desirable to use on this specific work, Contractor shall be allowed a rental price equivalent to the current CalTrans rental rate (less any state mark-ups) + 15%. Rental price, fully maintained, will be agreed upon in writing before such work is begun, for each hour such machines and equipment are used, to which shall be added no percentage.

d. Where extra work under cost and percentage is being performed by a subcontractor, the Contractor shall be allowed a ten percent (10%) surcharge on the combined total of (a), (b) and (c) above done by the subcontractor. This surcharge shall be allowed only to the Contractor and not to any subcontractors.

Contractor shall keep and present in such form as City may direct, a correct amount of the net cost of labor and materials, together with vouchers. In any case, City shall certify to the sum, including the allowances for overhead and profit specified above, due to Contractor for such work. Pending final determination of price, payments shall be made on City's Certificate.
Attention is again directed to the provisions of these Specifications which provide that no claim for payment for extra work, whether done by cost and percentage or otherwise, can be honored unless the Engineer has given written authority and permission for such work.

8-17 RETENTION FOR MINOR DISCREPANCIES

In the event that the ten percent (10%) retention sum specified in Section 6 (D) of the Agreement exceeds \$100,000, and, in the event that the work is satisfactorily completed, excepting only minor discrepancies worth less than one-fifth of said retention sum, and, in the event that, in the sole discretion and judgment of the Director of Public Works, it is fair, reasonable and equitable for City to accept the work subject to retaining a sufficient sum to assure Contractor's faithful completion and correction of such minor discrepancies, then, if Contractor agrees to reduce the retention sum to a lesser amount as proposed by the Director of Public Works, the retention sum shall be reduced to a sum adequate to assure Contractor's faithful completion and correction of such minor discrepancies. No action by City pursuant to this provision shall waive, modify or affect in any manner any term or condition of the Contract or pursuant thereto, excepting only the sum specified in Section 6 (D) of the Agreement.

Section 9

ASSESSMENT PROCEEDINGS

9-1 ASSESSMENT PROCEEDINGS, GENERAL

Sections 1 to 8, inclusive of these Specifications, contain the general clauses and conditions concerning the bidding on contract work, the performance of contract work, and the City of Sacramento's payment for contract work. The City of Sacramento, however, may conduct assessment district proceedings pursuant to the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913" in which case the provisions of such Acts shall apply.

All of the provisions of these Specifications are meant to apply to all work performed by contract with the City of Sacramento, but because of provisions of special assessment it is necessary to modify in some degree said provisions in the cases when the provisions of said Sections 1 to 8, inclusive must apply to contract work done under either Division 7 of the Streets and Highways Code of the State of California (The Improvement Act of 1911) or Division 12 of said Code (The Municipal Improvement Act of 1913). Work done under said Acts is also referred to in these Specifications as "Assessment Proceedings" or Assessment Work".

The City of Sacramento informs all persons that this Section 9 of the Specifications contains certain modifications, changes, and additions to the City of Sacramento Standard Specifications respecting all contracts that the City awards under "The Improvement Act of 1911" or "The Municipal Improvement Act of 1913".

9-2 GENERAL APPLICATION OF ASSESSMENT DISTRICT LAWS

The provisions of the "Improvement" Act of 1911", as amended, and of the "Municipal Improvement Act of 1913, as amended, and in force at the time when the City Council acts in respect of an assessment proceeding or at the time when an officer or employee of the City of Sacramento acts in respect of an assessment proceeding, shall be the law applicable to such actions and to such proceedings.

In any matter wherein there is conflict between the Specifications, Special Provisions, or Plans, and the provisions of the Acts cited above, the requirements of said Acts shall govern.

9-3 DEFINITIONS - ASSESSMENT WORK

The definitions previously given in Section 1 of the Specifications shall be applicable in assessment proceedings being conducted pursuant to either the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913" with the following changes and additions:

- a. The definition of "Engineer" stated in Paragraph 1-15 shall not apply on Assessment Work. Instead, definition given in the "Improvement Act of 1911" or in the "Municipal Improvement Act of 1913", as the case may be, shall apply.
- b. All definitions given in either the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913", as the case may be, shall apply in addition to the definitions stated in Section 1 of the Specifications, and made applicable herein to Assessment Work.

9-4 PROPOSAL REQUIREMENTS - ASSESSMENT WORK

a. The "Notice to Contractors" will be published in accordance with the provisions of either Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code of the State of California. The provisions of Ordinance No. 355, 4th Series, and Sections 2.49, 2.50, 2.51, and 2.52 of the Code of the City of Sacramento shall apply on the project. Reference is made to copies of said Ordinance No. 355 and to City of Sacramento Code Sections 58.301 and 58.304 that appear in these Specifications as part of Paragraph 2-1.

The Director of Industrial Relations of the State of California determines the Prevailing Wage Rate, and the City Council of the City of Sacramento adopts a resolution embodying and adopting said wage rates, and a copy of the resolution currently in force is a part of the Special Provisions and said resolution is available in the office of the City Clerk.

b. Proposal Form

The Proposal form is given in the Special Provisions and when used by the Bidder it must remain bound in the Special Provisions. The time in which the Contractor shall complete the Contract is stated in the Proposal form.

c. Paragraphs 2-3 to 2-7 of the Specifications apply to Assessment Work.

- d. The Proposal Guarantee as called for in Paragraph 2-8 shall not apply. Instead, a guarantee in the amount of ten percent (10%) shall be furnished as prescribed by said Public Contracts Code.
- e. Paragraphs 2-9 to 2-16, inclusive, of the Specifications apply equally to Assessment Work.

9-5 AWARD AND EXECUTION OF CONTRACT - ASSESSMENT WORK

- a. Paragraphs 3-1 to 3-3, inclusive, of the Specifications apply equally to Assessment Work.
- b. The provisions of Paragraph 3-4 of the Specifications concerning a Performance Bond shall not apply for Assessment Work. Instead, a bond conditioned upon the faithful performance of the Contract, in the amount of not less than one hundred percent (100%) of the Contract Price, shall be furnished. The Contractor and a corporate surety, or two or more other sureties shall execute the bond to the satisfaction and approval of the Superintendent of Streets (Engineer). All individual sureties shall justify before any person competent to administer an oath, in double the amount mentioned in the bond, over and above all statutory exemptions.
- c. The provisions of Paragraph 3-4 of the Specification concerning a Payment Bond shall not apply on Assessment Work. The Contractor shall furnish a Labor and Material Bond hereinafter described in the amount of not less than fifty percent (50%) of the Contract Price. The Labor and Material Bond shall be filed with the Superintendent of Streets (Engineer) at the time of signing and executing the Contract. It shall be a good and sufficient bond, approved by the Street Superintendent (Engineer) in a sum not less than one-half of the Contract Price of the work. The bond shall be executed either by two or more good and sufficient Sureties who have each qualified before an officer competent to administer an oath, in an amount not less than the sum specified in the bond over and above all statutory exemptions,or by one or more duly authorized corporate Sureties.
- d. In proceedings being conducted pursuant to the "Improvement Act of 1911", the Bidder to whom the award is made at the time of signing the Contract, unless otherwise stated in the Special Provisions, must advance to the Superintendent of Streets (Engineer) for payment by him "incidental expenses" as defined in said Act.
- e. Paragraphs 3-5 and 3-6 of the Specifications shall not apply to Assessment Work, but instead the provisions of either Article 27 or Article 29 of Part 3 of Division 2 of said Public Contract Code, as the case may be, shall govern the execution of the Contract, approval of Contract and any failure to execute the Contract.
- f. Paragraph 3-7 of the Specifications shall apply equally to Assessment Work.

Form of Contract and Surety Bonds

g.

The sample forms provided in Paragraph 3-8 of the Specifications shall not apply to Assessment Work done under the Improvement Act of 1911. For Assessment Work done under the Improvment Act of 1911, the form of such documents shall be substantially in the form shown in this paragraph and on the following pages:

9 (4)

SAMPLE CONTRACT - ASSESSMENT PROCEEDINGS IMPROVEMENT ACT OF 1911

THIS CONTRACT, made and entered into this _____ day of _____, 19____, by and between ______, part _____ of the first part, and ______ as Superintendent of Streets of the City of Sacramento, State of California, under and by virtue of the authority granted him as such, by a law of the State of California known as Division 7 of the Streets and Highways Code, the "Improvement Act of 1911," party of the second part,

WITNESSETH:

WHEREAS, the said part_______of the first part, (as will fully appear by reference to the record to the proceedings of the City Council of said City on the ______ day of ______, 19_____) has been awarded the Contract for the work hereinafter mentioned:

NOW, THEREFORE, the said part________of the first part, for the consideration hereinafter mentioned promises and agrees with said ________as such Superintendent of Streets, and not otherwise, that________will do and perform, or cause to be done and performed, in a good and workmanlike manner, under the direction and to the satisfaction of said Superintendent of Streets, and will furnish the necessary labor and materials required for the execution and completion thereof, in compliance with the Plans, Specifications, and Special Provisions therefore, heretofore adopted by the City Council of the City of Sacramento, which are hereby referred to and by such reference incorporated herein and made a part hereof, as fully as though set forth at length, and to the satisfaction of said Superintendent of Streets, the work of improvement therein provided for, as follows, to wit:

And the said _______ acting in his official capacity as such Superintendent of Streets, hereby fixes the time for the commencement of said work to be within ______ days next after the date of this contract; and for its completion to be within ______ days from the date hereof; and further promises and agrees that upon the performance of the

convenants aforesaid, by the part_____ of the first part, he will duly make and issue in favor of the part_____ of the first part an assessment, and attach a warrant, diagram and certificate thereto, as provided in the aforementioned Act for the expenses of the work aforesaid, at and for the prices hereinafter stated (including also any incidental expenses).

And it is further covenanted and agreed that said work shall be done and said materials shall be furnished by said part____ of the first part for the following prices:______

And it is mutually agreed between the parties hereto that in no case (except where it is otherwise provided by law) will the said City of Sacramento, or any officer thereof, be liable for any portion of the expense of said work or for any delinquency of any persons or property assessed to pay the expenses thereof.

IT IS FURTHER STIPULATED AND AGREED by and between the parties hereto that the time of service of any laborer, workman or mechanic employed upon any part of the foregoing work shall be limited and restricted to eight (8) hours during any one (1) calendar day, and neither said first party nor any subcontractor or other person employed upon said work shall require, suffer or permit any such laborer, workman or mechanic to labor thereon more than eight (8) hours during any one (1) calendar day, except in cases of extraordinary emergency caused by fire, flood, or danger to life or property.

IT IS FURTHER AGREED AND STIPULATED HEREIN that the minimum wages or compensation to be paid of labor performed under this contract shall be in accordance with the rates determined by the Director of Industrial Relations of the State of California, which wage rates the City Council of the City of Sacramento has adopted and embodied herein by its Resolution; and

IT IS FURTHER AGREED AND STIPULATED HEREIN that for any breach of any of the stipulations contained in the above paragraphs relative to hours of labor and rates of wages the party of the first part shall forfeit to the City of Sacramento, to be retained by said City of any moneys payable by it to said first party under the terms of this contract, a penalty in the sum of Twenty-Five Dollars per day for each laborer, workman or mechanic employed in the execution of said Contract by said first party or by a subcontractor under ______

______, for each calendar day during which any such laborer, workman or mechanic is required or permitted to labor more than eight (8) hours, or is paid a rate of wages in violation of the provisions of said paragraphs and the stipulations of this contract.

IT IS FURTHER AGREED AND STIPULATED by and between the parties hereto that to the extent that there is insufficient money due the party of the first part to cover all said penalties to be forfeited, the payment of the amount of said penalties shall be enforced pursuant to the provisions of Section 1775 of the Labor Code of the State of California.

IN WITNESS WHEREOF, the parties have subscribed this contract the day and year first above written.

By__

As Superintendent of the Streets of the City of Sacramento

The form of the foregoing Contract is hereby approved this _____ day of _____, 19_____.

City Attorney of the City of Sacramento

SAMPLE CONTRACT BOND - ASSESSMENT PROCEEDINGS -IMPROVEMENT ACT OF 1911

SEALED AND DATED, this _____ day of _____, A.D., 19

THE CONDITIONS of this obligation are such that, WHEREAS, the City Council of the City of Sacramento has adopted a Resolution awarding the Contract to the above bounden principal for doing and performing certain public improvement work in accordance with the Plans and Specifications, and Special Provisions therefor, said public improvement work being described in the Resolution of Intention duly adopted by said Council for Improvement Proceeding No._____,

viz: the improvement of

By_

in the City of Sacramento, and the said principal is about to enter into a Contract with the Superintendent of Streets of said City for the furnishing of the materials and the doing of the work in accordance with said Specifications and in accordance with the proceedings taken by said City Council under and pursuant to said Resolution of Intention.

NOW, THEREFORE, if the above bounded principal shall, in all particulars, faithfully perform and abide by said Contract, and each and every condition, covenant and part thereof, then this obligation shall be void; otherwise, it shall remain in full force and effect.

(Seal) (Seal) (Seal)

STATE OF CALIFORNIA

ss.

COUNTY OF SACRAMENTO

and

the Sureties on the foregoing

bond, being duly sworn, each for himself says: That he is a resident and freeholder within the City of Sacramento, State of California, and that he is worth double the amount named in the foregoing bond as the penalty thereof, over the above all his just debts and liabilities, exclusive of property exempt from execution and forced sale.

_____day of______, 19 _____

(Seal) (Seal)

Subscribed and sworn to before me, this

Notary Public in and for the County of Sacramento, State of California

(Note: This certificate is appropriately changed when corporate Sureties are used)

The above bond and the Sureties thereon are hereby approved, this ______day of ______, 19

Superintendent of Streets of the City of Sacramento

The form of the foregoing bond is hereby approved, this ______day of _____, 19_____

City Attorney of the City of Sacramento

9 (9)

SAMPLE LABOR AND MATERIAL BOND - ASSESSMENT PROCEEDINGS -IMPROVEMENT ACT OF 1911

KNOW ALL MEN BY THESE PRESENTS: That we,

as principal, and ______, as Suret____, are held and firmly bound, unto any and all persons, companies or corporations who perform work or labor on, or furnish materials, provisions, provender or other supplies, or the use of implements or machinery, used or to be used, in the work of improvement hereinafter mentioned, in the sum of _______) for which payment, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SEALED with our seals and dated this _____ day of _____, 19

THE CONDITIONS of this obligation are such that, WHEREAS, the City Council of the City of Sacramento has adopted a Resolution awarding the Contract to the above bounden principal for doing and performing certain public improvement work in accordance with the Plans and Specifications, and Special Provisions therefor, said public improvement work being described in the Resolution of Intention duly adopted by said Council for Improvement Proceeding No.

viz: the improvement of

in the City of Sacramento, and the said principal is about to enter into a Contract with the Superintendent of Streets of said City for the furnishing of the materials and the doing of the work in accordance with said Specifications, and in accordance with the proceedings taken by said City Council under and pursuant to said Resolution of Intention;

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the amount i debts and lia Subscribed a Notar of Sad (Note The above b	named in the for abilities, and ex and sworn to be day of day of ry Public in and cramento, State : This certificat corporate Sure bond and the S , 19	fore me this fore me this for the Cour e of Californi te is appropri eties are used uret the 	as the penalty operty exempt , 19 ately changed l) ereon are her	t from exe	ved this	day

9 (11)

The form of the foregoing bond is hereby approved this _____ day of _____, 19____

City Attorney of the City of Sacramento

9-6 SCOPE OF WORK - ASSESSMENT WORK

Section 4 of these Specifications outlining the scope of the work shall apply to Assessment Work and in addition, specific requirements concerning the scope of work under Assessment Proceedings as set forth in the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913", as the case may be, shall be followed.

Since Assessment Work is only contracted after extensive hearings which include consideration of the Plans and Specifications and the cost to each owner, it is difficult to contemplate any "extra work" which could be allowed without changing the project in a manner which might jeopardize the validity of the proceedings.

9-7 AUTHORITY OF ENGINEER - ASSESSMENT WORK

The authority of the Superintendent of Streets (Engineer) on Assessment Work shall be as set forth in the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be.

Section 5 of these Specifications shall also apply on Assessment Work provided, however, that in any conflict between the said Section 5 of these Specifications and under the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913", as the case may be, the latter shall govern.

9-8 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC - ASSESSMENT WORK

The legal relations and responsibility to the public on Assessment Work shall be as set forth in the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Conract Code, as the case may be.

Section 6 of these Specifications shall also apply on Assessment Work, provided, however, that in any conflict between the said Section 6 and the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, the latter shall govern.

9-9 PROSECUTION AND PROGRESS - ASSESSMENT WORK

a. Paragraph 7-1 of these Specifications applies on Assessment Work.

9 (13)

b. Paragraph 8 of the Agreement set out in Paragraph 3-8 of these Specifications shall not apply on Assessment Work, but instead the provisions of the "Improvement Act of 1911" or the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, shall apply.

The time of commencement of work under Assessment Proceedings shall be not more than fifteen (15) calendar days from the date of the Contract. The time of completion, expressed in working days, will be printed on the Proposal form when it is received by the Bidder. This time of completion will have been fixed by the Superintendent of Streets (Engineer).

Paragraphs 7-2 to 7-8, inclusive, of these Specifications shall apply on Assessment Proceedings unless there be conflict with the provisions of the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, in which case the latter shall govern.

c.

e.

- d. Any extensions of time given under an Assessment Contract shall not be in accordance with Paragraph 27 of the Agreement set out in Paragraph 3-8 of these Specifications, but will instead be given under the provisions of the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be.
 - Paragraph 28 of the Agreement set out in Paragraph 3-8 of these Specifications shall apply to Assessment Work unless there is conflict with the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, in which case the latter shall govern.
- f. Paragraphs 16, 17 and 18 of the Agreement set out in Paragraph 3-8 of these Specifications concerning failure to complete work and payment of liquidated damage to the City shall not apply on Assessment Work. Instead, the provisions of the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, shall apply.
- g. Paragraph 32 of the Agreement set out in Paragraph 3-8 of these Specifications shall apply to Assessment Work unless there be conflict with the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, in which case the latter shall govern.

9-10 MEASUREMENT AND PAYMENT - ASSESSMENT WORK - IMPROVEMENT ACT OF 1911

Particular attention of the Bidder is directed to payment for Assessment Work as set forth in Division 7 of the Streets and Highways Code.

Payment for work upon its completion is accomplished by delivery to the Contractor of a warrant, assessment and diagram. In the usual Assessment Proceeding there is no City cash contribution.

Progress payments in costs not containing City cash contribution money are not possible, except by partial assessment and, in Assessment Work for the City of Sacramento, partial assessments are not used.

Cash progress payments of City contribution moneys are made only by the special order of the City Council.

All measurement and payment for Assessment Work is in accordance with the "Improvement Act of 1911", the "Municipal Improvement Act of 1913", or Article 27 or Article 29 of Part 3 of Division 2 of the Public Contract Code, as the case may be, and Section 8 of these Specifications shall not apply.

Section 10

CONSTRUCTION MATERIALS

In this Section of the Specifications are given the requirements for various classes and types of materials used in public works construction by the City. Materials to be used on the work and not included in this Section shall be described and specified in the Special Provisions.

10-1 PORTLAND CEMENT

Unless otherwise specified in the Special Provisions, all cement used in concrete shall conform to ASTM Designation C150, Type II, and these Specifications.

C150, Type III, Portland Cement shall be used for concrete requiring high early strength where specifically required by the Special Provisions.

Type II and Type III Portland Cements shall be "low alkali", containing not more that 0.60 percent by weight of alkalies, calculated as the percentage of Na_2O plus 0.658 times the percentage of K_2O .

When directed by the Engineer, the Contractor shall furnish certificates of compliance stating that the cement delivered to the work complies with these Specifications.

10-2 CONCRETE AGGREGATES

Unless otherwise specified in the Special Provisions all concrete aggregates shall conform to ASTM Designation C33, except that grading requirements shall be as specified in Section 10-5 of these Specifications.

10-3 WATER FOR CONCRETE

Water used for mixing concrete and water used for curing concrete shall be clean, free from oil, acid, alkalies, vegetable matter, or other deleterious matter. No water containing excessive amounts of salts, sulphates, or chlorides shall be used.

10-4 PREMOULDED EXPANSION JOINT FILLER

Unless otherwise specified in the Special Provisions, premoulded expansion joint filler material shall conform to ASTM Designation D1751.

10-5 PORTLAND CEMENT CONCRETE

a. COMPOSITION:

Portland Cement concrete shall be composed of Portland Cement, fine aggregate, coarse aggregate, admixtures if used, and water; and shall be designated as one of the following classes:

Class "A" Concrete shall contain six (6) sacks (564 pounds) of Portland Cement per cubic yard and shall have a maximum size of coarse aggregate of one and one-half inches $(1\frac{1}{2})$.

Class "B" Concrete shall contain six (6) sacks (564 pounds) of Portland Cement per cubic yard and shall have a maximum size of coarse aggregate of three-quarter inch (3/4").

Class "C" Concrete shall contain five (5) sacks (470 pounds) of Portland Cement per cubic yard and shall have a maximum size of coarse aggregate of one inch (1").

Class "D" Concrete shall contain five (5) sacks (470 pounds) of Portland Cement per cubic yard and shall have a maximum size of coarse aggregate of three-quarters inch (3/4").

Should the quantity of ingredients designed to produce a cubic yard of finished concrete result in a yield greater than one cubic yard, the relative proportions of fine and coarse aggregates shall be adjusted as necessary to maintain a constant quantity of Portland Cement in each cubic yard of concrete.

The Contractor shall determine the mix proportions for all Portland Cement concrete to be used in the work. A mix design for each Class of Portland Cement concrete used in the work shall be submitted to the Engineer for approval at least five (5) working days prior to the proposed Portland Cement concrete being incorporated into the work.

PROPORTIONING:

b.

The coarse and fine aggregates shall be combined in such proportions that the percentage composition by weight of the individual and primary sizes of aggregates and of the combined aggregates, as determined by laboratory screens and sieves, will be as follows:

GRADING AND COMPOSITION REQUIREMENTS

		Percentage Passing Sieves Designation and Nominal Size													
Sieve Size	Prima	ry Aggregat	e Sizes	Combined Aggregate Sizes											
	1 1 x 3/4"	1"x No.4	Fine	1 1 " Max.	1" Max.	3/4" Max.									
2"	100		·	100											
111	88-100	100		90-100	100										
1"	1-59	88-100		50-86	90-100	100 -									
3/4"	0-17	37-100		45-75	55-100	90-100									
3/8"	0-7	0-53	. 100	38-55	45-75	60-80									
No. 4		0-16	95-100	30-45	35-60	40-60									
No. 8		0-6	65-95	23-38	27-45	30-45									
No. 16			45-85	17-33	20-35	20-35									
No. 30		- ÷	25-55	10-22	12-25	13-23									
No. 50			10-35	4-9	5-15	5-15									
No. 100			2-10	1-3	1-5	1-5									
No. 200	0-2	0-2	0-5	0-2	0-2	0-2									

In addition to the above required grading analysis in the primary aggregate size, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the No. 16 sieve and the total percentage passing the No. 30 sieve shall be between 10 and 40; and the difference between the percentage passing the No. 30 and No. 50 sieves shall be between 10 and 40.

Exact proportions of primary aggregate sizes used in the concrete mix shall be as designated and/or approved by the Engineer. The Engineer may adjust the mix to accommodate changes in aggregates and moisture contents, to improve mixing and placing characteristics and to secure maximum quality of the finished concrete. All concrete mixing shall be done in machine batch mixers of an approved type, having a capacity of not less than a full one-sack batch, unless the quantity to be mixed is, in the opinion of the Engineer, too small to justify the use of a batch mixer. Sacks of cement shall be completely emptied by dumping directly upon other materials previously measured into the mixer, and no splitting of sacks of cement will be allowed, provided, however, that where the Contractor provides suitable equipment approved by the Engineer, the cement may be weighed into the batch from bulk storage.

Mixing shall continue for not less than one (1) minute and in mixers larger than one cubic yard capacity this minimum shall be increased so that minimum mixing time shall not be less than one (1) minute for each cubic yard or part thereof of mixer capacity. Where transit mixers are used, the mixing period shall conform to the requirements of ASTM Designation C94. The total volume of material mixed per batch shall not exceed the rated capacity of the mixer as determined by the standard requirements of the Associated General Contractors of America. All mixing equipment shall be operated at the speeds recommended by the manufacturer, provided, however, that the revolving drum type, except on transit mixers, shall not make less than fourteen (14) or more than eighteen (18) revolutions per minute, and that the rotation rate of transit mixing drums be such as to produce a peripheral speed of approximately two hundred feet (200') per minute.

Each paving mixer or stationary mixer shall be equipped with an acceptable timing device.

Should the Contractor elect to utilize transit mixing equipment, he shall make adequate advance arrangements for preventing delays in delivery and placing of the concrete. An interval of more than forty-five (45) minutes between any two consecutive batches or loads, or a delivery and placing rate of less than eight (8) cubic yards of concrete per hour, shall constitute cause for shutting down the work for the remainder of the day, and if so ordered by the Engineer, the Contractor shall make at his own expense, a construction joint at the location and of the type directed by the Engineer, in the concrete already placed.

Transit-mixed concrete shall be delivered to the site of the work and discharge shall be completed within ninety (90) minutes after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever comes first. In hot weather or under conditions

contributing to quick stiffening of the concrete or when the temperature of the concrete is 85° F. or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed forty-five (45) minutes.

Each batch or transit-mixed concrete delivered at the job site shall be accompanied by a ticket showing volume of concrete, the weight of cement in pounds and the total weight of all ingredients in pounds. The ticket shall also show the time of day at which the materials were batched.

The placing of the concrete from a stationary or transit mixer must be done in such a manner as to avoid separation of constituent materials of the concrete. The Engineer shall have the right to stop concrete pouring if the placing of the concrete is improper in this respect.

d. WATER CONTROL:

Within the limits hereinafter specified, the amount of water required for the proper consistency of concrete shall be determined by the slump test, in accordance with ASTM Designation C143.

The allowance for slump, unless otherwise directed by the Engineer, shall be as follows:

Concrete paving and reinforced structures (heavy sections), not more than three inches (3"); reinforced structures (thin sections) and columns, not more than four inches (4"); concrete placed under water, not less than six inches (6") nor more than eight inches (8").

No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.

If mixing in transit is allowed, the control equipment as above specified shall be at the proportioning plant and there shall be no water added after the mixture leaves the plant, unless directed by the Engineer.

The Contractor shall furnish, without charge, such materials as may be required for making tests of concrete during the progress of the work. Such tests will be made at the expense of the City of Sacramento. No concrete shall be used which has partially set, and no concrete shall be retempered or remixed.

10-6 CURING COMPOUNDS FOR CONCRETE

Concrete curing compounds shall be used where specified in these Specifications and the Special Provisions.

The compounds shall meet the requirements of ASTM Designation C309-81 as modified below and shall be of the following two types:

- (1.) Type 1-D, clear or translucent with a red fugitive dye, Class A vehicle.
- (2.) Type 2, white pigmented, Class A vehicle.

The water retention test shall be modified in that the loss of water shall not exceed 0.040 grams per square centimeter of surface in seventy-two (72) hours.

10-7 AGGREGATE BASES

Aggregate bases shall conform to the requirements of Section 26 of the State Specifications, except as modified herein.

The combined aggregate shall conform to the grading specified for the three-quarter inch (3/4") maximum aggregate for Class 2 aggregate base, unless otherwise specified in the Special Provisions.

Aggregate base will be paid for at the contract price bid per ton or per cubic yard delivered to the job and placed according to the Plans and Specifications. The method used on any work will be shown by the list of quantities on the Proposal and by the type of unit price requested in the Proposal. The weight of material to be paid for will be determined by deducting from the weight of material delivered to the work, the weight of water in the material, at the time of weighing, as determined by California Test 226, in excess of one (1) percentage point more than the optimum moisture content as determined by ASTM Designation D1557. The weight of water deducted as provided in this Section will not be paid for.

Quantities of aggregate base to be paid for by the cubic yard will be calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the Engineer. No allowance will be made for aggregate base placed outside said dimensions unless otherwise ordered by the Engineer. The above prices and payment shall be full compensation for furnishing all labor, material, tools, equipment, water, and incidentals, and for all work involved in constructing aggregate base complete in place as shown on the Plans, and as specified in these Specifications and the Special Provisions or as directed by the Engineer.

10-8 "PIT RUN" BASE (GRADED)

Pit run base is a processed pit run material from local sources, which may be specified on the Plans or in the Special Provisions for work where ordinary earth fill may not be satisfactory.

Pit run material shall have a minimum sand equivalent of 25, as determined by California Test 217.

Pit Run Base shall have the following limits of gradation:

Siev	<u>e_</u>	Si	Z	e															 						P	eı	°C	e	nt	<u>:a</u>	g	e	Ρ	as	şiı	ng
$2\frac{1}{2}''$	•						•	•									•		•				•	•		•	•		•	•	•	•		1(00	
2".	•	• •										•		•	•									•			•	•	•	•		7	5-	-1(00	
1".	•	• •					•			•	•	•						•	•	•	•	•	•			•	•	•	•	•			5()-'	75	
No.	4						•					•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		2()-:	50	
No.	20)0	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	. ()-:	10	

Payment for pit run base shall be per ton of material delivered to the job and placed in accordance with the Plans and Special Provisions. The weight of material to be paid for will be determined by deducting from the weight of material delivered to the work, the weight of water in the material, at the time of weighing, as determined by California Test 226, in excess of one (1) percentage point more than the optimum moisture content as determined by ASTM Designation D1557. The weight of water deducted as provided in this Section will not be paid for.

The compacting of the material shall be done in accordance with the requirements for placing aggregate bases, as provided in these Specifications.

Payment for the material at a price per ton shall constitute full compensation for furnishing, hauling, placing, compacting, and finishing the material including the furnishing of all labor, material, tools, equipment, water and incidentals.

10-9 CEMENT TREATED BASES

Road-mixed and plant-mixed cement treated bases shall comply with Section 27 of the State Specifications.

Measurement and payment for cement treated bases shall be in accordance with the State Specifications or may be paid for at a price per square foot of cement treated base complete in place as so indicated in the Special Provisions.

The method of payment used on any work will be shown by the type of unit price requested in the Proposal.

10-10 LIME TREATED BASE

Road-mixed lime treated base shall be constructed by mixing lime and water with existing subgrade materials. Lime to be mixed with the existing material shall be a commercial hydrated lime conforming to the requirements of ASTM Designation C51. When sampled by the Engineer at the point of delivery, the sample of hydrated lime shall contain not less than eighty-five percent (85%) of calcium hydroxide (Ca(OH)₂) as determined by California Test 414.

A certificate of compliance with Specifications shall be supplied with each delivery of lime and shall be submitted to the Engineer along with a certified copy of weight of each delivery.

10-11 RIVER SAND

On the Plans, or in the Special Provisions, the use of river sand may be specified for backfilling, sand cushion, or similar purposes. When river sand is specified, the material shall be free from vegetable matter, lumps, balls of clay, or adherent films of clay. The material shall not have more than twenty percent (20%) passing a 200 mesh screen and minor amounts of small gravel up to one-half inch $(\frac{1}{2}")$ in size will be permitted.

Payment for river sand shall be made at a price per cubic yard unless otherwise indicated in the Special Provisions and shall be based on the Plan dimensions. Payment as set forth shall be full compensation for furnishing, hauling, placing and compacting the material.

10-12 CRUSHED ROCK

In these Specifications, in the Special Provisions, or on the Plans, the use of crushed rock may be specified for certain purposes. When so specified this shall mean a uniformly graded material that is the product of crushing rock or gravel; free of organic matter, oil, alkali, or other deleterious substances and is hard, sound and durable.

Unless otherwise indicated in the Special Provisions, the crushed rock shall conform to the requirements for coarse $(\frac{1}{2}$ " x No. 4) crushed screenings as set forth in Section 37-1.02 of the State Specifications. In addition, crushed rock shall have a minimum Cleanliness Value of fifty (50) as determined by California Test 227.

10-13 SLURRY CEMENT BACKFILL

Slurry Cement Backfill specified herein for use as trench backfill shall conform to the requirements of Section 19-3.062 of the State Specifications.

10-14 CLEAN CRUSHED ROCK

In these Specifications, on the Plans, or in the Special Provisions, the use of clean crushed rock may be specified for certain purposes. When so indicated on the Plans or in the Special Provisions, a clean crushed rock of the Type indicated shall be provided which is the product of crushing rock or gravel. The percentage composition by weight of clean crushed rock shall conform to the following gradations for the Type specified.

	% Passing Sieves										
_Sieve_Size	Type A	Type B	Type C	Type D							
2"				100							
111			100								
1"		100	90-100								
3/4"	100	90-100	30-60	0-17							
1 ¹¹ 2	90-100	30-60	0-20								
3/8	20-60	0-20		0-7							
No.4	0-15	0-5	0-5								
No.200	0-2	0-2		0-2							

Clean crushed rock shall have a minimum Cleanliness Value of sixty (60) as determined by California Test 227, and the portion of the material which is retained on the 3/8-inch sieve shall contain at least fifty percent (50%) of particles having three (3) or more fractured faces.

10-15 ASPHALTS, LIQUID ASPHALTS AND ASPHALTIC EMULSIONS

Asphalts, liquid asphalts and asphaltic emulsions as required by these Specifications or by the Special Provisions shall mean respectively the asphalts as specified in Section 92 of the State Specifications, liquid asphalts as specified in Section 93 of the State Specifications and asphaltic emulsions as specified in Section 94 of the State Specifications.

10-16 VITRIFIED CLAY PIPE (VCP)

Vitrified clay pipe shall conform to the specifications for extra strength clay pipe as set forth in ASTM Designation C700.

Stoppers shall be used with branch pipes that are to be left unconnected. Stoppers for branch pipes having flexible compression joints may be either clay discs with flexible compression joints, factory applied, that will mate with the branch joint; or a resilient material of controlled design and dimensions for mating with the branch pipe to which it is to be applied; or, of other material approved by the Engineer. Wooden stoppers will not be accepted.

10-17 SUBSURFACE DRAINS

Subsurface drains shall comply with Section 68 of the State Specifications.

10-18 NONREINFORCED CONCRETE PIPE (CP)

Nonreinforced concrete pipe shall conform to ASTM Designation C14.

10-19 REINFORCED CONCRETE PIPE (RCP)

Reinforced concrete pipe shall conform to ASTM Designation C76 for Class I, II, III, IV, or V. The class of pipe will be shown on the Plans or indicated in the Special Provisions.

Sections of circular pipe with elliptical reinforcing shall have the location of the minor axis of the reinforcing indicated by three inch (3") wide, waterproof, painted stripes on the inside and outside of the pipe at the top and bottom, at least twelve inches (12") long at each end of the pipe section.

10-20 ASBESTOS-CEMENT PIPE (ACP)

Asbestos-cement pipe for drainage conduits shall conform to ASTM Designation C428 Type II and these Specifications.

Asbestos-cement pipe shall be designated on the Plans or in the Special Provisions by class based on the minimum crushing strength per foot of pipe as listed in the following table:

	·		Crushing
			strength per
<u>Pipe Class</u>		:	<u>foot, in pounds</u>
II			1500 D
III			2000 D
IV			3000 D
V			3750 D

(Where D is the diameter of pipe, in feet)

10-21 ACRYLONITRILE-BUTADIENE-STYRENE (ABS) PIPE

ABS gravity sewer pipe and fittings in sizes 4" & 6" shall conform to ASTM Designation D2661. Eight inch (8") and larger in diameter shall conform to either ASTM Designation D2751, SDR 23.5 or ASTM Designation D2680 (ABS composite pipe).

Joints shall be Solvent Cemented (SC). All Service connections shall be installed with "Tee" or "Wye" fittings. Saddles are not approved. When the sewer main is of a material other than ABS, the connection joint to the sewer main shall be made with a FERNCO; or an approved equal, flexible adapter.

10-22 POLYVINYL CHLORIDE (PVC) PIPE

PVC gravity sewer and storm drainage pipe and fittings in sizes 4"-15" in diameter shall conform to ASTM Designation D3034 and shall be SDR 35 with Elastomeric - Gasket joints providing a watertight seal. Minimum pipe stiffness at five percent (5%) deflection shall be 46 PSI according to ASTM Designation D2412.

All joints shall be integral wall bell and spigot configuration, factory formed. Pipes at joints are not to be inserted beyond "stop-mark" on spigot end. All Service connections shall be installed with "Tee" or "Wye" fittings, gasketed "Tee" saddles with stainless steel bands, or other approved tapping devices. Solvent welded "Wye" saddles are not approved.

All rubber rings shall conform to ASTM Designation F477.

10-23 CORRUGATED METAL PIPE

Corrugated metal pipe shall conform to AASHTO Designation M36.

10-24 FIELD ASSEMBLED PLATE CULVERT

Field assembled plate culverts shall conform to Section 67 of the State Specifications.

10-25 REINFORCING STEEL

Reinforcing steel shall conform to Section 52, "Bar Reinforcement", in the State Specifications. Unless otherwise provided by the Special Provisions, bar reinforcement shall be deformed Grade 60 conforming to ASTM Designation A615, "Deformed Billet-Steel Bars for Concrete Reinforcement".

Welded steel wire fabric for concrete reinforcement shall conform to ASTM Designation A185. The gauge of the wire and the dimensions of the mesh will be as shown on the Plans or indicated in the Special Provisions.

10-26 CURB DOWEL AND TIE BARS

Dowel and tie bars for curbs shall conform to ASTM Designation A615. Grade 60 or Grade 40 may be used at the Contractor's option.

10-27 CASTINGS FOR MANHOLES, COVERS, ETC.

All castings for manhole heads, covers, and other purposes shall be tough gray iron, free from cracks, holes, swells and cold sheets, be of workmanlike finish, and conform to the details shown on the Plans. The cast iron shall conform to ASTM Designation A 48, Class 30.

The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting, without flaking or cracking the metal.

All castings are to be manufactured true to pattern and with satisfactory fit of component parts. Round Frames and covers shall have machined bearing surfaces. All manhole covers which do not fit neatly and bear firmly in the ring shall be rejected.

10-28 WATER PIPE

Water Distribution System pipe shall be of the material type as indicated on the Plans or specified in the Special Provisions and shall conform to the following requirements: 1. Cast Iron Pipe

All cast iron pipe shall conform to the following AWWA Standards:

- a. AWWA C-101 (ANSI-A21.8), "Thickness Design of Cast Iron Pipe."
- b. AWWA C-104 (ANSI-A21.4), "Cement-Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water."
- c. AWWA C-106 (ANSI-A21.6), "Cast Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids."
- d. AWWA C-108 (ANSI-A21.8), "Cast Iron Pipe Centrifugally Cast in Sand Lined Molds for Water or Other Liquids."
- e. AWWA C-111 (ANSI-A21.11), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings."

Pipe shall comply with the following requirements:

- a. Size 4, 6, 8, 10, 12 inch diameter only
- b. Iron Strengths 21/45
- c. Laying Condition B
- d. Depth of Cover $3\frac{1}{2}$ feet
- e. Internal Pressure 150 psi
- f. Laying Length 18 feet
- g. Joints Push On or Mechanical
- h. Gasket Lubricant Minimum Required Plus 10% Additional
- i. Thickness Class 22
- j. Linings Double Thickness of Cement with Bituminous Seal Coat
- k. Certification by Manufacturer Required

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2. Ductile Iron Pipe

All ductile iron pipe shall conform to the following AWWA Standards:

- a. AWWA C-104 (ANSI-A21.4), "Cement-Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water."
- b. AWWA C1-11 (ANSI-A21.11), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings."
- c. AWWA C-150 (ANSI-A21.50), "Thickness Design of Ductile Iron Pipe."
- d. AWWA C-151 (ANSI-A21.51), "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds for Water or Other Liquids."

Pipe shall comply with the following requirements:

- a. Sizes 4, 6, 8, 10, 12 inch diameter only
- b. Laying Condition Type 2
- c. Depth of Cover $3\frac{1}{2}$ feet
- d. Internal Pressure 150 psi
- e. Laying Length 18 feet
- f. Joints Push On or Mechanical
- g. Gasket Lubricant Minimum Required Plus 10% Additional
- h. Thickness Class 4 inch Class 51; 6, 8, 10 and 12 inch Class 50
- i. Linings Double Thickness of Cement with Bituminous Seal Coat.
- j. Certification by Manufacturer Required
- 3. Asbestos-Cement Pipe

All asbestos-cement pipe shall conform to the following AWWA Standards:

a. AWWA C-400 "Asbestos-Cement Distribution Pipe, 4 inches Through 16 inches for Water and Other Liquids." b. AWWA C-401 "Standard Practice for the Selection of Asbestos-Cement Water Pipe."

Pipe shall comply with the following requirements:

a. Size - 6, 8, 10, 12 inch diameter only

b. Chemical - Type II

c. Class 150

d. Laying Length - 13 feet

e. Gasket Lubrication - Minimum Required Plus 10% Additional

- f. Certification by Manufacturer Required
- g. Dimensions

	Outside Diameter (in.)							
Pipe Size (in.)	Min.	Max.						
6	7.07	7.37						
8	9.27	9.62						
10	11.82	12.12						
12	14.08	14.38						

4. Polyvinyl Chloride (PVC) Pipe

All polyvinyl chloride pipe shall conform to the following AWWA Standard:

a. AWWA C-900 "Polyvinyl Chloride (PVC) Pressure Pipe," 4 inch through 12 inch for Water.

Pipe shall comply with the following requirements:

- a. Size 4, 6, 8, 10 & 12 inch diameter only
- b. O.D. Base Cast Iron
- c. Class 150
- d. Dimension Ratio 18

e. Laying Length - 20 feet

f. Joints - Elastomeric - Gasket Bell

g. Gasket Lubricant - Minimum Required Plus 10% Additional

10-29 WATER PIPE FITTINGS

All water pipe fittings shall be Cast Iron or Ductile Iron and shall conform to the following AWWA Standards:

- A. AWWA C-104 (ANSI-A21.4), "Cement Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water."
- B. AWWA C-110 (ANSI-A21.10), "Gray Iron and Ductile Iron Fittings 2 inch through 48 inch for Water & Other Liquids."
- C. AWWA C-111 (ANSI-A21.11), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings."
- D. AWWA C-153 (A21.53) Ductile-Iron Compact Fittings.

Fittings shall comply with the following requirements:

- A. Pressure Rating 250 psi
- B. Linings Double Thickness of Cement with Bituminous Seal Coat
- C. Joints Push-On, Mechanical, or Flange
- D. Certification by Manufacturer
- E. Dimensions AWWA C-111 Compact Fittings are approved.

10–30 FIRE HYDRANTS

All Standard (Low Risk) and Double Pumper (High Risk) fire hydrants shall be as specified herein unless otherwise indicated on the Plans or Special Provisions.

1. All fire hydrants shall conform to AWWA Standard C-502 for Dry-Barrel Fire Hydrants as currently in effect or amended. An Affidavit of Compliance as per Section 1.7 of the AWWA C-502 Standard shall be furnished with all hydrants or groups of hydrants. The Certificate of

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Compliance shall provide assurance that all material and manufacturing requirements have been met and head losses are within specified limits.

2. Table 3 of AWWA Standard C-502 is amended to limit loss of head (drop in pressure) to a maximum of three pounds per square inch (3 psi) at a flow rate of 1000 gallons per minute through one four and one-half inch $(4\frac{1}{2}")$ diameter pumper outlet nozzle.

3. Markings-All fire hydrants shall be clearly and permanently marked so as to be readily discernable and legible after hydrants have been installed. Such marking should include:

a. Name of manufacturer

b. Model name or number

c. Size of main valve opening

d. Date of manufacture

e. Direction of operation

f. Ground or bury line (mark to reflect point of bury to maximize breakaway features.)

4. Two (2) copies of operating manuals and/or descriptive literature shall be furnished with all fire hydrants or groups of hydrants supplied by the same manufacturer. The manuals or literature shall include assembly drawings, schedule of parts, maintenance instructions, and complete tool kits.

5. A complete tool kit for those fire hydrants requiring special tools shall be provided.

6. In addition to the above, Standard and Double Pumper fire hydrants shall meet the following requirements:

a. Size and Type of Inlet Connection:

(1) Standard Hydrants-Dimension of the foot piece shall be as required to fit cast or ductile iron pipe of six inches (6") nominal inside diameter.

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- (2) Double Pumper Hydrants-Dimension of the foot piece shall be as required to fit cast or ductile iron pipe of eight inches (8") nominal inside diameter.
- (3) Connection-Type of inlet connection for standard or double pumper hydrants shall be either mechanical joint or "pushon" rubber ring. If the "push-on" rubber ring type is used the foot piece shall be provided with lugs for harnessing the hydrant to the branch or lead connection pipe or fitting.
- b. Breakaway Features-A frangible section immediately above the ground or bury line is required. If breakable features depend upon bolts of reduced cross-section, hollowed out bolts will not be permitted.
- c. Number and Size of Outlet Nozzles:
 - Standard Hydrants Two (2) hose nozzles each with a nominal inside diameter of two and one-half inches (2¹/₂") and one (1) pumper nozzle with a nominal inside diameter of four and one-half inches (4¹/₂").
 - (2) Double Pumper Hydrants Two (2) pumper nozzles each with a nominal inside diameter of four and one-half inches $(4\frac{1}{2}")$.
- d. Outlet Nozzle Arrangement
 - Standard Hydrant-Nozzle arrangement requires that the two
 two and one-half inch (2½") diameter hose nozzles be opposite (180°) of each other. The single four and one-half inch (4½") diameter pumper nozzle shall be at right angles (90° degrees) to the hose nozzles. The horizontal centerline of all nozzles shall be on the same plane and not less than sixteen inches (16") above the hydrant ground flange or bury line.
 - (2) Double Pumper Hydrant-Nozzle arrangement requires that the two (2) four and one-half inch (4½") diameter pumper nozzles be either at ninety degrees (90°) or one hundred twenty degrees (120°) of each other. The horizontal centerline of both nozzles shall be on the same plane and not less than sixteen inches (16") above the hydrant flange or bury line.

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- e. Three hundred sixty Degree (360°) Nozzle Rotation-Nozzles, or the entire above ground section, shall allow three hundred sixty degree (360°) rotation to the exact desired position after installation.
- f. Outlet Hose Nozzles and Threads-Hose nozzles shall be made of Grade I. VII, or X bronze. The hose nozzles shall be fastened into the hydrant outlet tap by a thread of not less than seven and one half $(7\frac{1}{2})$ threads per inch. A pin shall be employed to prevent the threaded outlet hose nozzle from turning or backing out. The cap or hose accepting end of the outlet nozzles shall be threaded with National (American) Standard Fire-Hose Coupling Screw Threads.
- g. Nozzle Cap Materials-Grey cast or ductile iron caps with a recess at the inner end of the thread to retain a gasket. Caps shall be securely chained to the hydrant barrel with a metal chain having links made from stock not less than one-eighth inch (1/8") in diameter. The attachment shall permit free rotation of the cap.
- h. Size of Hydrant-Nominal diameter of main valve shall be a minimum of five inches (5") for both standard and double pumper fire hydrants.
- i. Main Valve Seat and Seat Ring-Shall be bronze to bronze in hydrants which have the main valve assembly in the lower end of the barrel. Threads shall be isolated from the waterway by O-ring seals.
- j. Size and Shape of Operating Nut and Outlet Nozzle Cap Nuts Seven eighths inch (7/8") square, full section without undercutting or hollowing out. A threaded hole not to exceed one-quarter inch (1/4") in diameter will be allowed in the operating nut for lubrication purposes. Any such hole shall be plugged flush with the top of the operating nut and be water tight.

k. Operating Stem, Nut, and Lubricate Reservoir-The nut shall be made of bronze. Threads shall be lubricated by an oil or grease reservoir sealed by double O-rings, top and bottom to prevent intrusion of moisture and dirt. Length of operating stem surface in contact with O-ring seals shall be protected by a bronze sleeve.

A weather shield shall be provided to prevent dirt and moisture from entering between the sides of the operating nut and the hold down nut, or bonnet opening. Wet top hydrants are not acceptable.

- 1. Direction of Rotation of Operating Nut-Open right (clockwise) unless otherwise specified on Plans. A clearly visible arrow and the word "open" shall be cast in relief on the top of the hydrant so as to designate the proper direction of opening.
- m. Stuffing Boxes-If used, shall be provided with O-ring seals.
- n. Barrel Drain Outlet-None required. If hydrant is provided with such an outlet, it must be plugged with a threaded bronze or cast iron plug.
- o. Toggle Joint Hydrants-Shall be provided with bronze parts as follows: nozzles, lower threaded stem or spindle, stem nuts, seat ring, gate pins, cotter pins, main valve gate threaded stud, and nut.
- p. All nozzles, caps, operating nuts, O-rings, friction bearing threaded surfaces, and grease fittings shall be lubricated with the appropriate factory recommended lubricating material. All reservoirs designed to hold a designated quantity of lubricant shall be filled to maximum capacity.
- 7. A coat of aluminum exterior paint shall be applied as a color or finish coat over the primer coat on the top (above ground) section.

10-31 VALVES

- 1. Gate valves shall be cast iron, bronze disc, parallel seat, non-rising stem with a two inch (2") square operating nut. Valves to conform to AWWA Standard C-500.
- Resilient Seated gate valves shall be cast iron, non-rising stem with a two inch (2") square operating nut. Valves to conform to AWWA Standard C-509. Interior coating of resilient seated gate valve shall be factory applied.
- 3. Unless otherwise shown on the Plans, valves provided shall open to the right (clockwise) and be furnished with flange, mechanical or push-on joint. Valves shall bear the registered certification mark of the AWWA.
- 4. Swing check valves are contained on an approved listing maintained by the Water Division. Alternate swing check valves shall be added to this list upon review, test and acceptance by the Water Division.

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10-32 VALVE BOXES, VALVE BOX COVERS, DROP CAPS, AND SERVICE VALVE BOXES

Valve boxes and valve box covers for streets and alleys shall be two-piece units conforming to Standard Drawing SD-9. The valve box and cover shall be of cast or ductile iron with a minimum tensile strength of 25,000 psi. The riser portion shall be ten (10) gauge - eight inch (8") steel pipe.

Drop caps and risers for non-traffic use in public utility easements shall conform to Standard Drawing SD-9. The riser portion shall be ten (10) gauge -eight inch (8") steel pipe.

Service valve boxes shall be in conformance with Standard Drawings SD-10 and SD-12. The riser portion shall be ten (10) gauge - eight inch (8") steel pipe.

10-33 WATER SERVICE CONNECTION MATERIALS

The Water Division maintains a listing of approved water service connection fittings which establish a standard of material quality. Fittings used shall be limited to those on the list. Alternate material may be added to this list upon review, test and acceptance by the Water Division.

Threads for underground water service connection fittings shall conform to AWWA Standard C800 Threads for Underground Service Line Fittings. Service lines shall be copper tubing conforming to ASTM Designation B88, Type K, soft tempered.

Additional requirements for connection to existing mains is contained within Section 27-16 of these Standard Specifications.

10-34 JOINT MATERIALS FOR CLAY PIPE

Joint materials for vitrified clay pipe shall be an approved type of factorymade mechanical compression joint conforming to the requirements of ASTM Designation C425. Banded rubber couplings and sleeves conforming to ASTM Designation C425 are acceptable.

10-35 JOINT MATERIALS FOR CONCRETE PIPE

Joint materials for concrete pipe shall be rubber gasketed joints conforming to the requirements of ASTM Designation C443 and shall be flexible and able to withstand expansion, contraction, and settlement. All rubber gaskets shall be stored in as cool a place as practicable, preferably at 70° F. or less, and in no case shall the rubber gaskets be exposed to the direct rays of the sun.

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Rubber gaskets, of the type requiring lubrication, shall be lubricated with the lubricant recommended and supplied by the manufacturer of the pipe.

10-36 JOINT MATERIALS FOR ASBESTOS-CEMENT PIPE

Joint materials for asbestos-cement pipe shall consist of a sleeve coupling designed to maintain alignment and insure tight flexible joints. The material for the couplings shall be of the same composition as the pipe. Couplings shall be sampled for compliance testing at the same rate of frequency as required for the pipe.

Couplings shall meet the same crushing strength requirements as required for the pipe. The couplings shall contain rubber gaskets or sealing rings. These rubber rings shall conform to the requirements of ASTM Designation D1869.

10-37 JOINT MATERIALS FOR MANHOLES

Joint materials for precast reinforced concrete manhole sections shall conform to one of the following:

- 1. Mortar proportioned as one (1) cubic foot of Portland Cement to two (2) cubic feet of concrete sand. All mortar shall be used within thirty (30) minutes after the mixing water has been added.
- 2. Preformed plastic sealing compound shall conform to Type 1 Rope Form, one and one-half inch $(1\frac{1}{2}")$ diameter, Federal Specification SS-S-210A.

10-38 FENCING - CHAIN LINK

- 1. All chain link fence and gates shall conform to the requirements as set forth in Section 80-4 of the State Specifications, except as herein modified.
- 2. The carbon content of steel posts shall not exceed 0.82 percent (0.82%).
- 3. The height, dimension and layout of the fence will be as shown on the Plans and specified in the Special Provisions.

4. Chain link fence fabric shall meet the requirements of zinc-coated steel chain link fence fabric, ASTM Designation A392 with Class 1 zinc coating. Unless otherwise indicated on the Plans or in the Special Provisions, the fabric shall be a two inch (2") mesh of nine (9) gauge wire, with a minimum breaking strength of twelve hundred and ninety (1,290) pounds.

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- The base material for the manufacture of steel pipe used for posts, braces, 5. rails and gate frames shall be commercial quality, or better, weldable steel, conforming to the specifications of ASTM Designation A120. At the option of the Contractor, and upon approval of the Engineer; high-strength tubing fabricated by cold rolling and radio frequency welding from steel conforming to ASTM Designation A446, Grade D, may be used provided that the product of the yield strength and the section modulus shall not be less than that of pipe conforming to ASTM Designation A120. The base material for the manufacture of other steel sections used for posts and braces shall conform to ASTM Designation A572, Grade 45, with a minimum yield strength of forty thousand pounds per square inch (40,000 psi). All posts, braces, rails and gate frames shall be hot dipped galvanized in accordance with ASTM Designation A123, or ASTM Designation A525, Coating Designation G235 plus chromate conversion coating and 0.4 mils minimum thickness finish coat of clear. cross-linked acrylic.
- 6. Posts and Rails shall be as specified below, unless otherwise indicated on the Plans or specified in the Special Provisions. The Contractor shall have the option of section types to be used with the condition that the option exercised shall be uniform throughout the project.

FENCE	DIMENSI	ON SECTION	MINIMAL WEIGHT
I	0.0.		LBS. PER LINEAL FOOT
Line Posts	1.875" 2.375" 2.375"	C-Section Sch. 40 pipe Hi-strength tubing	2.15 3.65 3.12
Terminal, Corner, Latch Posts	2.875" 2.875"	Sch. 40 pipe Hi-strength tubing	5.79 4.64
Horizontal, Diagonal Braces, Top Rails	1.825" 1.660" 1.660"	C-Section Sch. 40 pipe Hi-strength tubing	1.35 2.27 1.82
Gate Frames	2.375" 2.375"	Sch. 40 pipe Hi-strength tubing	3.65 3.12
Gate Posts: <u>Gate Width</u> Up thru 6'	2.875" 2.875"	Sch.40 pipe Hi-strength tubing	5.79 4.64
Over 6' thru 12'	4.500" 4.000"	Sch.40 pipe Hi-strength tubing	10.79 4.64
Over 12' thru 18'	5.563"	Sch.40 pipe	14.62
Over 18' to to 24' Max	6.625"	Sch.40 pipe	18.97

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- 7. Fittings shall be hot-dip galvanized and shall be of malleable, cast iron, or pressed steel.
- Fabric is to be fastened to line posts with fabric bands spaced approximately fourteen inches (14") apart and to top rail and bottom tension wire with nine (9) gauge galvanized tie wires spaced approximately twenty-four inches (24") apart.

9. Unless otherwise set forth in the Special Provisions all fence shall be constructed with a top rail, and a bottom tension wire.

10. A Certificate of Compliance shall be furnished to the Engineer prior to the installation of any chain link fencing, gates or components stating that the steel and protective coatings comply with the above requirements. Said Certification shall be in accordance with the provisions of Section 6-1.07, "Certificates of Compliance", of the State Specifications.

10-39 SOIL AMENDMENT

Soil amendment shall be the following type, unless otherwise indicated in the Special Provisions.

Composted Bark composed of ninety-five percent (95%) of the material passing through a one-fourth inch $(\frac{1}{4}")$ screen, fifty percent (50%) through a one-eighth inch (1/8") screen. Material shall be stabilized with Nitrogen ($\frac{1}{2}$ lb. actual nitrogen per cubic yard) and shall not contain more than 5,000 p.p.m soluble salt. The material shall weigh a minimum of 450 pounds per cubic yard by dry weight.

10-40 IRON SULFATE

Iron Sulfate shall be ferric sulfate in pelleted or granular form containing not less than eighteen and one-half percent (18.5%) iron expressed as metallic iron and shall be formulated to contain a sequestering agent (chelates).

Iron Sulfate shall conform to the requirements of the Agricultural Code of the State of California.

10-41 COMMERCIAL FERTILIZER

Commercial fertilizer shall be uniformly sized, homogenous pelleted form and shall be guaranteed to comply with the chemical analysis specified in the Special Provisions.

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Commercial fertilizer shall be as specified in the Special Provisions.

10-42 SEED

Seed shall be labeled in accordance with the California Department of Agriculture State Seed Law and Regulations effective on the date of invitation for bids. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will be subject to test at the discretion of the Landscape Architect.

Seed shall be supplied in unopened containers by a commercial seed dealer. It may be either mixed or in separate containers for each lot. Seed shall be as specified in the Special Provisions.

10-43 PLANTS

Plants shall be the variety and sizes shown on the Plans and shall conform to the requirements of these Specifications.

The Contractor shall place an order for the required number of plants including a reasonable number of replacement plants within ten (10) working days after he has received notice of award of the Contract. The Contractor shall submit a copy of the order showing the number of plants ordered, from whom ordered and the anticipated delivery date, and request for substitutions for all plant materials that are unavailable to the Landscape Architect within fifteen (15) working days after award of the Contract. No substitutions will be made that are not requested as specified above.

All plants shall comply with Federal and State laws requiring inspection for plant diseases and infestations. Any inspection certificates required by law shall accompany each shipment of plants and certificates shall be delivered to the Landscape Architect.

The Contractor shall obtain clearance from the County Agricultural Commissioner as required by law before planting plants delivered from outside the County. Evidence that such clearance has been obtained shall be filed with the Landscape Architect.

All plants furnished by the Contractor shall be true to type or name as shown on the Plans and shall be tagged in accordance with the standard practice recommended by the American Association of Nurserymen.

Plants furnished by the Contractor shall be healthy, shapely and well rooted. Roots shall show no evidence of having been restricted or deformed at any time. Plants shall be well grown, free from insects, disease or mechanical injury. No

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plants shall be transported to any planting area that is not thoroughly wet throughout the ball of earth surrounding the roots.

Plants shall be inspected by the Landscape Architect prior to planting. Any plants rejected shall be removed from the site and replaced by the Contractor, at his expense.

10-44

GALVANIZED STEEL IRRIGATION PIPE AND FITTINGS

Galvanized steel pipe and fittings shall be hot dip galvanized steel conforming to the specifications of ASTM Designation A120, standard weight.

Male pipe threads on galvanized steel pipe shall be coated with a joint compound that is non-hardening and non-corrosive or teflon tape. The compound may consist of seventy percent (70%) of 200 mesh lead, white lead, red lead, graphite, cement dust or talc inert fillers in non-volatile hydrocarbon or raw linseed oil vehicles.

10-45 PLASTIC IRRIGATION PIPE

Plastic pipe for irrigation systems shall be polyvinyl chloride (PVC) plastic pipe extruded from one hundred percent (100%) virgin material and shall conform to ASTM Designation D2241.

Plastic pipe on the supply side of the irrigation control valve shall be one or more of the following types as indicated in the Special Provisions.

- 1. $1\frac{1}{4}$ " or smaller shall be PVC-1120 Class 160 solvent weld pipe.
- 2. $1\frac{1}{2}$ " or larger shall be PVC-1120 Class 160 integrally molded ring-tite pipe, or
- 3. PVC-1120 Class 315.

Plastic pipe on the discharge side of the irrigation control valve shall be PVC-1120 Class 160 solvent weld pipe.

10-46 PLASTIC POTABLE PIPE

Plastic pipe for potable water systems within City parks and recreation areas and where designated on the Plans, shall be polyvinyl chloride (PVC) plastic pipe extruded from one hundred percent (100%) virgin material conforming to ASTM Designation D2241. Plastic potable pipe one and one-half inches $(1\frac{1}{2})$ and smaller

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shall be PVC Class 315 solvent weld; two inches (2") and larger shall be Schedule 40 PVC.

10-47 PLASTIC IRRIGATION PIPE FITTINGS

Fittings for PVC plastic pipe shall be rigid polyvinyl chloride, Schedule 40 high impact fittings and shall be solvent weld type. Plastic fittings shall have a higher bursting pressure rating than the pipe which they join.

All joints utilizing ring tite fittings and pipe shall be sealed with rubber rings. Fittings shall be of the joint design as recommended by the manufacturer. Ring type plastic pipe and fittings shall be assembled with a non-toxic lubricant as recommended by the manufacturer.

10-48 ELECTRIC AUTOMATIC CONTROLLER

The irrigation system controller shall be a microprocessor based/micro electronics solid-state type, capable of fully automatic or manual operation of the system. It shall be housed in a wall mountable, weatherproof, lockable steel cabinet.

The controller shall operate on a minimum of 117 volts A.C. power input and be capable of operating up to two 23 volt A.C. electric remote control valves per station. The controller shall have a reset circuit breaker to protect it from field wire short circuits entering the controller.

The controller shall have a maximum of 12 stations. Each station of the 4 station and 6 station models shall have the capability of being programmed to operate for 0 to 60 minutes in 1 minute increments or 0 to 6 hours in 1 hour increments. Each station of the 8 station and 12 station models shall have the capability of being programmed to operate for 0 to 99 minutes in one minute increments or 0 to 9.9 hours in 0.1 hour increments. The controller shall have two independent programs with three automatic starts per day for each. Each station on the controller shall be assignable to either or both programs. The controller shall have 14-day programming for flexibility in programming day starts. During operation, the controller shall provide a monitoring readout indicating station in operation and time remaining. The controller shall have a 12-hour AM/PM clock.

The 6, 8 and 12 station models shall have a master valve/remote pump start circuit for use with a mainline master valve to pressurize system when the irrigation cycle starts, or to activate a remote pump start relay to the pump during the irrigation cycle.

The controller shall be capable of being operated manually at any time. A manual "single station" operation for programmed time or new time setting shall be possible without affecting the original program.

The controller shall have a factory preset back-up program for standby operation in the event of a program loss and a battery back-up circuit to maintain program during power loss.

The controller shall be as manufactured by Rain Bird Sprinkler Mfg. Corp, Glendora, California, or approved equal.

Electric Controller Enclosure Cabinet shall be as shown on the Standard Drawings in Section 38 of these Specifications. Cabinet shall be fabricated from 12 gauge cold rolled steel. Joints shall be seam welded and external welds ground smooth to a minimum one-eighth inch (1/8") radius. Enclosure shall receive one (1) coat of rust inhibiting primer and two (2) coats of Rustoleum - Ranch Green Paint, or approved equal.

10-49 IRRIGATION CONTROL CONDUCTORS

Irrigation Control Conductors shall be underground feeder types (U.F.) with 4/64" minimum thickness of TW grade polyvinyl chloride insulation.

Control conductors shall be No. 14 AWG, unless otherwise indicated in the Special Provisions. Insulation shall be any color except white.

Neutral conductors shall be No. 12 AWG, unless otherwise indicated in the Special Provisions. Insulation shall be white.

10-50 BACKFLOW PREVENTION ASSEMBLY

Backflow Devices are contained on a listing of approved backflow prevention devices. Backflow devices used shall be limited to those on the list. The list of approved backflow devices is available from the Engineer or from the Administrative office of the Water Division. Alternate backflow devices shall be subject to approval by the Water Division Manager.

10-51

ELECTRIC REMOTE CONTROL VALVES-SIZES 3/4" to 2"

Electric remote control valves shall have a brass or bronze body with straight or angle pattern. Valves shall be normally closed and shall be the same size as the pipeline which they control, unless otherwise indicated in the Special Provisions. Electric remote control valves shall be capable of withstanding a working pressure of two hundred pounds per square inch (200 psi).

Valves shall be completely serviceable from the top without removing the valve body from the system and shall have a wheel or nut type manual adjustment feature to regulate flow from fully open to closed. The adjustment shall remain in set position when the valve is operated manually or automatically. The adjustment feature shall regulate automatic closing time to not less than four (4) seconds. Each valve solenoid shall be designed for operation on a 24 volt 60 cycle AC circuit at a 3.1 watt maximum.

10-52 MANUAL CONTROL VALVES

Manual control valves shall be straight or angle pattern globe valves of brass or bronze construction with replaceable compression discs and shall be of the same size as the pipeline which said valve serves, unless otherwise shown on the Plans. Control valves shall be capable of withstanding a working pressure of two hundred pounds per square inch (200 psi).

10-53 IRRIGATION VALVE BOXES

Irrigation valve boxes shall be one of the following types; as indicated on the Plans or in the Special Provisions, or directed by the Engineer:

- 1. Portland cement concrete boxes with a one piece concrete or cast iron cover, rated for an H2O traffic loading.
- 2. Plastic boxes conforming to ASTM Designation D638, tensile strength 3400 psi and impact strength of 1.5 pounds per inch.

Valve box extensions shall be of the same type as the valve box.

All covers shall be lockable and be legibly marked "Water".

10-54 QUICK COUPLING VALVES

Quick coupling valves shall be of one (1) piece brass or bronze construction, single slot type with one inch (1") threaded pipe connection and one and one-quarter inch (1 $\frac{1}{4}$ ") key connection, guaranteed to withstand normal working pressure of one hundred and fifty pounds per square inch (150 psi) without leakage. Quick couplers shall be installed with swing joint assembly and shall be installed a minimum of one foot (1') from curbs and walks where applicable.

10-55 ELECTRONIC MARKER SYSTEM (EMS)

Electronic marker systems shall consist of a two-part system: Marker Locator and Markers.

- A. <u>Marker Locator</u>. The EMS II shall consist of a CB-radio sized electronics package (4 lbs.) with a shoulder strap and a lightweight (1.5 lbs.) hand-held antenna probe. The electronics package shall produce an audible pulsating signal and have a meter indicating signal strength simultaneously. The probe shall operate on eight (8) standard "C" cell alkaline batteries, produce a ticking sound when it is on, and transmit low frequency radio signals to the marker. Contractor shall supply two (2) locators.
- B. <u>Markers</u>. The EMS electronic markers shall be air core based and shall be reusable, with passive-tuned coil antennas encased in waterproof, high-stress, crack-resistant polyethylene, impervious to minerals, chemicals or temperature extremes. The markers shall be the mini-markers, approximately 8-1/4" in diameter, color-coded and tuned to the frequency for water. The markers shall be buried approximately two inches (2") above the valve cover.

PRECONSTRUCTION PHOTOGRAPHS

11-1 REQUIREMENT

Preconstruction photographs are not required unless specifically set forth in the Special Provisions for the project.

11-2 SPECIFICATION

When preconstruction photographs are specified in the Special Provisions, the Contractor shall provide the Engineer with the negative and one 4" X 5" glossy print of each photograph taken at one hundred foot (100') intervals along the route of the project before any work is started. Each view shall contain the date, project name, lateral or street, and station. The sign which shows this data shall not block the important areas of the picture and should be of the smallest size possible consistent with legible presentation of the required information when a 4" X 5" print is viewed. Each photo shall be taken from a point four to eight feet (4-8') above the ground. All prints shall show good details in both shadow and sunlit areas. Negatives may be of any size provided minimum negative resolution through out the major area of the negative is 100 lines per inch multiplied by the enlargement factor necessary to produce an 8" X 10" print.

Prints shall be submitted in a three ring photo album binder with clear plastic covered fillers, four photos each side, grouped according to street, lateral or line, and in sequence. On the cover of the binder shall appear the names of the project and Contractor. Each group of prints shall be identified by a label which projects beyond the edge of filler and is easily recognized. Negatives may be placed within the filler sleeves or submitted separately.At the option of the Contractor, a video tape in a VHS format may be submitted in lieu of preconstruction photographs. All essential features of the project area are to be recorded and all orientations of the view recorded in an accurate manner satisfactory to the Engineer.

11-3 PAYMENT

The cost of the preconstruction photographs or video tape shall be at the lump sum price bid and shall be full compensation for providing all labor, materials, tools, and equipment necessary to satisfactorily furnish the photographs or video tape.

CLEARING AND GRUBBING, TREE REMOVAL

12-1 TREES

Unless specifically indicated on the Plans or set forth in the Special Provisions no trees may be removed without direct authority of the Engineer.

For the purposes of this section, trees shall be considered as those having a trunk diameter of three inches (3") and greater measured at a height of three feet (3') above the ground.

In cases where tree removal is shown on the Plans or is called for by the Special Provisions the Contract may either provide for a lump sum removal of all trees or a unit price per tree.

12-2 CLEARING AND GRUBBING

- A. General Clearing and grubbing shall consist of removing all objectionable material from within the rights-of-way, construction areas, or other areas that may be specified in the Special Provisions which interferes with the work.
- B. Vegetation and Debris All vegetation such as weeds, grass, shrubbery, roots, and stumps and debris such as broken concrete and trash shall be removed. Tree branches which extend over roadways shall be trimmed to provide a minimum vertical clearance of fourteen feet (14'). The Contractor shall remove or trim other tree branches as directed by the Engineer so that the trees will present a balanced appearance. Branches which are to be removed will be cut off at the boles in a workmanlike manner. Scars resulting from the trimming or removal of branches shall be treated with a heavy coat of an approved tree seal. Trees, shrubbery, lawns, and other vegetation adjacent to the work that is not to be removed shall be protected form injury or damage resulting from the Contractor's operations.

C. Existing Facilities - Existing facilities such as pavements, curbs, gutters, sidewalks, lawn sprinklers, mailboxes, fences, pipes, and culverts that interfere with the work shall be removed under the item of clearing and grubbing unless the Plans or Special Provisions provide for separate items.

The methods of removing existing facilities shall conform to Section 13 of these Specifications.

- D. Disposal Material resulting from clearing and grubbing operations and that is not to be salvaged or otherwise used shall be disposed of outside the project limits and at the expense of the Contractor.
- E. Payment In a lump sum Contract all necessary clearing and grubbing is included in the lump sum bid. In unit price Contracts an item for "clearing" or "clearing and grubbing" may be included among the items. Where no separate unit prices are requested on trees to be removed then the "clearing" or "clearing and grubbing" will be a lump sum figure and shall include all such work within the project limits, including such disposal as may be required outside the project limits.

EXISTING FACILITIES

13-1 PROTECTION

Existing facilities within the rights-of-way and construction areas that do not interfere with the work shall be protected from damage.

13-2 REMOVING

Existing facilities that interfere with the work shall be removed, reset, relocated, adjusted or otherwise worked on as specified herein, on the Plans, or as directed by the Engineer. Removed facilities that are not to be salvaged or otherwise used shall be disposed of away from the project. Holes or depressions resulting from the removed facilities shall be filled, compacted, and brought to grade at the direction of the Engineer.

- (a) Asphalt and Concrete Asphalt and concrete such as pavements, curbs, gutters and sidewalks that are to be removed shall be cut to neat, straight lines with an approved saw or other means acceptable to the Engineer.
- (b) Mailboxes Existing mailboxes and supports shall be removed and reset where shown on the Plans or as directed by the Engineer. Existing posts shall be removed and transported from the job site and replaced with 4" X 4" Redwood posts conforming to the provisions of Section 56-2.02B, "Wood Posts and Braces" of the State Specifications. The mail boxes shall be suitably mounted on a platform which shall be set three and one-half feet $(3\frac{1}{2})$ to four feet (4') above the ground. Posts shall be set at least two feet (2') in the ground and firmly positioned by tamping. Existing newspaper receptacles shall be attached to new posts.

Existing mail box supports constructed of material other than normal 4" X 4" wooden posts shall be stacked in the owner's yard for his recovery. Contractor shall replace with 4" X 4" wooden posts as described above.

(c) Fences - Fences shall be relocated where shown on the Plans or as directed by the Engineer. The Contractor shall relocate an existing fence on the property line at the proposed back of sidewalk grade.

Fence shall be relocated to provide two foot (2') minimum clearance from relocated or new fire hydrants.

The intent of this specification is for the Contractor to relocate the fence in a more suitable location without completely rebuilding it and with an absolute minimum of effort and expense. It may not be known how much of any type of fencing the Contractor will be required to replace. The Contractor shall submit a unit price per lineal foot of fence to replace regardless of type or quantity.

(d) Sprinklers and lights - lawn sprinkler system pipes, heads, hose bibs, and yard lighting systems shall be cut and capped at the right of way line. The sprinkler system will be replumbed to insure it is operational at completion of construction. The material removed and salvaged shall be stockpiled with the abutting property owner.

(e) Pipes and Culverts - Pipes and culverts that are no longer to be used shall be removed if they are within two feet (2') of subgrade. Such pipes that are lower than the aforementioned, shall be removed or the ends shall be plugged with concrete at the option of the Contractor.

13-3 PAYMENT

Full payment for protecting existing facilities shall be considered as included in the price paid for the various Contract items of work and no additional compensation will be allowed therefor.

Payment for removing, resetting, relocating, adjusting, or otherwise working on existing facilities will be paid for at the Contract unit or lump sum prices for the various Contract items of work involved as shown by the list of quantities on the Proposal and shall be payment for all work involved including disposal and salvaging.

When the Contract does not provide for separate items for removing existing facilities, full payment shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

EARTHWORK, EXCAVATION, EMBANKMENT AND SUBGRADE

14-1 ROADWAY EXCAVATION

In the Contract this item shall consist of excavating, removing, and satisfactory disposal of all material within the limits of the work for roadways, drainage channels, ditches, and any other work as may be specified in the Special Provisions or shown on the Plans. Suitable excavated material may be used for embankment and for backfilling. The rough excavation shall be carried to such depths that sufficient material will be left above the finished grade to allow for compaction to the required grade. Should the Contractor excavate below the designated lines he will be required to replace the material with suitably compacted import material or Class "D" Concrete as determined by the Engineer, without cost to the City.

No excavation shall be started on a project until approval has been given by the Engineer, this approval being for the purpose of having prepared all necessary surveys, cross sections, and measurements which may be required for determining the quantities removed.

If all or part of the excavated material is to be used as fill, and preparation for the fill placement has not been made, the Engineer may require the stockpiling of this material. The Engineer shall have the right to select excavated material to be used in fill.

Payment for excavation shall be based on cross section measurements taken prior to the beginning of work and the final lines and grades of the finished section. Payment shall be made per cubic yard of material excavated in accordance with the Plans.

14-2 STRUCTURE EXCAVATION

Structure excavation shall consist of excavation performed to place structures such as footings, walls, etc. Excavation for placement of manholes will be paid for under the price bid for manholes, complete in place.

Payment for structure excavation and backfilling shall be considered as included in the prices paid for the various items of work involved and no separate payment will be made therefor.

Backfill material shall be specified in the Special Provisions or indicated on the Plans. The backfill material shall be compacted by mechanically tamping in maximum eight-inch (8") layers so as to achieve a minimum relative compaction of ninety-five percent (95%).

Material excavated in excess of that required for backfilling will be disposed of away from the site of the work, unless otherwise permitted by the Engineer.

14-3 TRENCH EXCAVATION

Trench excavation for placement of pipelines will not be paid for separately but will be paid for at the price bid for placing pipe.

14-4 EMBANKMENT AND FILL

Fill on a roadway will normally be made with material excavated on the same work unless otherwise indicated by the Special Provisions or Plans.

Fill will be paid for per cubic yard measured in place by computing the yardage between the original ground elevation and the final grades as shown on the Plans.

Tests performed to determine relative compaction shall be performed using the following methods:

ASTM D1557 laboratory test for maximum dry density at optimum moisture.

ASTM D2922 field test for in-place wet density by nuclear methods.

ASTM D3017 field test for in-place moisture content by nuclear methods.

Relative compaction shall mean the ratio of the field dry density to the laboratory maximum dry density expressed as a percentage.

In general, construction of fill shall be in accordance with the methods set forth in the State Specifications. The relative compaction shall be at least ninety percent (90%), unless otherwise indicated.

14-5 LANDSCAPE FILL

Landscape fill shall consist of fertile, friable soil of loamy character. It shall be obtained from well-drained arable land outside of the project limits and

shall be free from subsoil, refuse, roots, heavy or stiff clay, stones larger than one inch (1") in size, coarse sand, noxious weeds, such as Bermuda, Nut Grass and Morning Glory, sticks, brush, litter and other deleterious substances. Topsoil shall be capable of sustaining healthy plant life.

Landscape fill will be paid for per cubic yard, measured in place by computing the yardage between the original ground elevation and the final grades as shown on the Plans; which price shall include full compensation for all labor, equipment and materials necessary for placement of landscape fill. Minimum relative compaction shall be eighty-five percent (85%), unless otherwise indicated.

14-6 SUBGRADE

Subgrades for pavement, curb and gutter, sidewalk, lined channels and ditches, or for rock base under pavements shall be finished accurately and true to the lines and sections shown on the Plans, within a tolerance of $\pm .05$ feet. The top six inches (6") of subgrade immediately prior to placing subsequent material thereon shall have a relative compaction of not less than ninety-five percent (95%). The subgrade shall be free of segregated material and shall be smooth and true to the required grade and cross section. The Contractor shall repair, at his expense, any damage to a prepared subgrade caused by his operations or by use of public traffic. No material shall be placed upon the prepared subgrade until it is in a condition meeting the requirements specified. Unless otherwise provided by the Special Provisions, the finishing of subgrade will not be paid for as a separate item but this work will be included by the Contractor under such items as he deems appropriate.

WATER USED IN CONSTRUCTION

15-1 WATER USED IN CONSTRUCTION

Elsewhere in these Specifications there is specified the quality of water used for concrete. This paragraph is intended to cover only water used in construction.

The application of water shall be under the control of the Engineer at all times and shall be applied in the amounts and at the locations designated by the Engineer or as specified.

At the option of the Contractor, excavation areas may be watered prior to excavating the material.

All equipment used for the application of water shall be equipped with a positive means of shut off.

Unless otherwise permitted by the Engineer, at least one mobile unit with a minimum capacity of 1,000 gallons shall be available for applying water on the project at all times.

Water for compacting embankment material, subbase, base and surfacing material, and for controlling dust shall be applied by means of pressure-type distributors that will insure a uniform application of water.

If the Contractor elects to do so he may use chemical additives in water used for compaction. If such additives are used, furnishing and applying the additives shall be at the Contractor's expense. The right is reserved by the Engineer to prohibit the use of a particular type of additive, to designate the locations where a particular type of additive is to be used, all if the Engineer has reasonable grounds for believing that such use will be in any way detrimental to the work.

Arrangements for obtaining water needed for construction purposes must be made with the supplying agency. Proof of such arrangement, including method of reimbursement, shall be subject to inspection and approval by the Engineer.

Unless otherwise approved by the City's Water Division, connections to the City's water distribution system used to fill tank trucks or other such equipment, shall include an air gap to separate the water supply from the equipment to be filled. The Air-gap separation shall be at least double the diameter of the supply pipe, measured vertically from the flood rim of the receiving vessel to the supply pipe; however, in no case shall this separation be less than one inch (1"). In no case will a direct connection to the City's water supply be allowed.

Water used in construction, including compacting fill, preparing subgrade, dust control, mixing concrete, concrete curing, laying and compacting any type of base material, settling backfill in trenches or at structures, or water used for any other purpose shall be provided and paid for in accordance with the Water Divisions "Water Hydrant Policy". A copy of said policy is available at the Water Division Administration Office at 1391-35th Avenue.

DUST CONTROL

16-1 DUST CONTROL

Dust control consists of applying water for the alleviation or prevention of dust nuisance originating either within the right-of-way or outside the right-of-way of the project resulting from the Contractor's operations.

All dust control operations shall be performed by the Contractor at the time, location and in the amount ordered by the Engineer.

It is understood that the provisions in this section will not prevent the Contractor from applying water for his convenience if he so desires.

Water shall be applied as provided in Section 15 of these Specifications.

Full payment for water used in dust control will be considered as included in the prices paid for the various items of work involved and no separate payment will be made therefor.

Section 17 ·

LAYING AGGREGATE BASE

17-1 LAYING AGGREGATE BASES

Aggregate bases shall be placed on the prepared subgrade to such a depth that when thoroughly compacted it will conform to the grades and dimensions shown on the Plans. The material shall be placed from vehicles through an approved spreader box or other device. At locations which are inaccessible to spreading equipment, the material may be spread by any means to obtain the specified results. When the compacted depth exceeds six inches (6") the material shall be placed and compacted in two layers.

Segregation of the material shall be avoided and the material, as spread, shall be free from pockets of rock or fine material. Segregated material must be remixed by harrowing and blading.

After placing the material and shaping it by blade the compaction shall be accomplished by tandem steel-wheel rollers weighing not less than 12-tons. In lieu of tandem steel-wheel rollers, a pneumatic-tired roller of either the single or double-axle type may be used. A pneumatic-tired roller must have a width not less than four feet (4') nor more than seven feet (7'). The space between the side walls of adjacent tires shall not be greater than five inches (5"), and on the double axle type the rear tires shall be staggered with relation to the front tires. Such a roller will be equipped with mechanical means of distributing the contact pressure uniformly among all tires and all tires shall be uniformly inflated. The roller must be so constructed that the weight per tire can be varied between 1000 and 2000 lbs. per tire. The operating weight of a pneumatic roller shall be subject to the control of the Engineer.

Alternative compacting equipment may be used when approved by the Engineer.

Aggregate bases shall be compacted to a minimum relative compaction of ninety-five percent (95%) in accordance with Section 14-4 of these Specifications.

The surface after compaction shall be tight and smooth and conform to the requirements of Section 26 of the State Specifications. All water applied to the aggregate base as it is placed on the job shall conform to Section 15 of these Specifications.

Payment for laying aggregate base shall be either at the contract price bid per ton or per cubic yard delivered to the job and placed according to the Plans and Specifications. Quantities of aggregate base to be paid for by the cubic yard will be calculated on the basis of the dimensions shown on the Plans adjusted by the amount of any change ordered by the Engineer. No allowance will be made for any aggregate base placed outside said dimensions unless otherwise directed by the Engineer.

The weight of material to be paid for will be determined by deducting from the weight of material delivered to the work, the weight of water in the material, at the time of weighing, as determined by California Test 226, in excess of one percentage point more than the optimum moisture content as determined by ASTM Designation D1557. The weight of water deducted as provided herein will not be paid for.

Payment shall include full compensation for furnishing the material, placing it on the roadway, applying water, compacting the material, finishing the surface, and furnishing all labor and equipment necessary to perform the work.

17-2 LAYING ROAD-MIXED AND PLANT-MIXED CEMENT TREATED BASES

Road-mixed and plant-mixed cement treated bases shall be spread and compacted in accordance with Section 27 of the State Specifications.

17-3 LAYING LIME TREATED BASE

Road-mixed lime treated base shall be constructed in accordance with Section 24 of the State Specification.

Lime to be mixed with the existing material shall conform to the requirements set forth in Section 10-10 of these Specifications.

The percentage of hydrated lime to be added by weight shall be as set forth in the Special Provisions.

Removal of rocks greater than two and one-half inches $(2\frac{1}{2}")$ in size shall be included in the cost of the base in place.

Lime treated base shall be compacted to a minimum relative compaction of ninety-five percent (95%) in accordance with Section 14-4 of these Specifications.

Lime treated base shall be paid for at the contract price bid per square yard which shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing lime treated base, complete in place, as shown on the Plans and as directed by the Engineer.

SIDE FORMS AND HEADERS

18-1 GENERAL DESCRIPTION

Side forms and headers shall be placed upon an approved subgrade prepared in conformance to the requirements of Section 14-6 of these Specifications. All forms shall be mortar tight.

Side forms of timber or steel shall be in such condition that the top edge of each individual section of form does not vary more than one-quarter inch $(\frac{1}{4}")$ from a true, straight line in the length of the form, and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement, that they will not at any time deviate laterally more than one-quarter inch $(\frac{1}{4}")$ or vertically more than one-eight inch (1/8") from proper line and grade.

All forms, whether timber or metal, shall be thoroughly cleaned and oiled before being used and shall be restored to their original condition each time they are used throughout the job. Each individual length of form must be frequently tested and if it fails to conform to the above requirements it shall be rejected from the work.

18-2 FORM JOINTS

Form joints shall be so designed that a perfect support is obtained, and in case joints do not furnish such support, the Contractor will be required either to substitute acceptable forms or, with the approval of the Engineer, to wedge the forms with wood and provide double supporting stakes underneath the form ends. There shall be a one-quarter inch $(\frac{1}{4}")$ expansion gap between the ends of the frame.

18-3 TIMBER SIDE FORMS

Timber side forms shall be Construction Douglas Fir, in accordance with Standard Grading Rules of the West Coast Lumbermen's Association, and shall consist of at least two inch (2") material, surfaced on one edge and on the side which is placed next to the pavement. Their depth shall be equal to the specified depth of the edge of the pavement, but shall not be less than four inches (4"), except where placed on existing pavements. Timbers with rounded edges, ends or corners, or split ends, shall not be used. Timber side forms shall be secured by nailing to side stakes spaced not more than four feet (4') apart and driven vertically in such a manner that their tops will be one inch (1") below the top edge of the side form. These stakes shall not be less than three inches (3") wide, one and one-half inches $(1\frac{1}{2}")$ thick, and eighteen inches (18") long. The length shall be increased when the character of the soil is such that it will not give sufficient bearing to an eighteen inch (18") stake.

Side forms shall be spliced with a section of timber four feet (4') in length, one inch (1") thick and six inches (6") wide, which shall be nailed lengthwise, lapping the joints.

Timber side forms shall rest upon two inch by three inch $(2" \times 3")$ stakes, spaced not more than four feet (4') apart and driven with their tops to the line and grade for the bottom of the side form. These stakes shall be of adequate length to support the forms rigidly, but in no case shall they be less than eight inches (8")long.

18-4 METAL SIDE FORMS

Metal side forms for this work shall be straight, free from warp, of heavy section, with sufficient rigidity to prevent springing during the placing, tamping and finishing of the pavement mixture. Their depth shall be equal to the specified depth of the edge of the pavement. Forms shall be of the full depth required, in one piece; splicing of forms by the addition of a wooden base will not be permitted.

Metal side forms shall rest each end upon a two inch by three inch $(2" \times 3")$ stake of adequate length to rigidly support the form but in no case shall the stake be less than eight inches (8") long. The stakes shall be driven with their tops to the line and grade for the bottom of the side form.

Metal forms shall be staked firmly by means of steel stakes, placed not more than five feet (5') apart, and shall be so designed that stakes may be driven through the base of the form and locked in position.

18-5 MAINTENANCE OF FORMS

Side forms of either wood or metal must be trued up and maintained to the required line and grade for a distance of at least one (1) day's run ahead of the placing of Portland Cement concrete or asphaltic concrete, and the Contractor shall provide experienced side form men for this purpose. When side forms do not conform to the correct line and grade, or have become loose, this shall be considered sufficient cause to stop work until the fault is corrected to the satisfaction of the Engineer.

18-6 PAYMENT FOR FORMS

Forms shall be paid for in the price bid for concrete pavements, concrete sidewalk, or similar construction and not as a separate item.

PORTLAND CEMENT CONCRETE PAVEMENT, JOINTS AND CURING

19-1 GENERAL DESCRIPTION

Portland Cement concrete pavement shall be constructed to the dimensions, lines and grades shown on the Plans. Unless otherwise provided in the Special Provisions, the pavement shall be constructed of Class "B" concrete, conforming to the requirements of Section 10-5 of these Specifications. Unless otherwise indicated in the Special Provisions, the Portland Cement used in the concrete shall be Type II as described in Section 10-1 of these Specifications.

19-2 SUBGRADE

Subgrade for concrete pavement shall be prepared as specified in Section 14-6 of these Specifications. Subgrade shall also be free of all loose and extraneous material when concrete is placed thereon and shall be uniformly moist. Any excess water on the surface shall be removed prior to placing concrete as directed by the Engineer.

19-3 SIDE FORMS

Side forms shall be furnished and installed in accordance with Section 18 of these Specifications.

19-4 CONCRETE CUTTING

Where new concrete is to join existing concrete, the existing concrete shall be cut to a true line to a minimum depth of one and one-half inches $(1\frac{1}{2}")$ with a power driven abrasive type saw.

19-5 EXPANSION JOINTS IN ALLEY PAVEMENT

An expansion joint shall be placed ten feet (10') from each end of the work and every twenty feet (20') therefrom and at other places shown on the Plans. The expansion joint material shall be not less than three-eighths inch (3/8") in thickness and shall conform to Section 10-4 of these Specifications.

Payment for expansion joint material shall be included in the price bid for concrete per cubic yard which shall include full compensation for furnishing and placing material.

19-6 PLACING CONCRETE PAVEMENT

The Contractor shall make adequate advance arrangements for preventing delay in delivery and placing of the concrete. An interval of more than 45 minutes between placing of any 2 consecutive batches or loads shall constitute cause for stopping paving operations, and the Contractor shall make a contact joint at his expense at the location and of the type directed by the Engineer in the concrete already placed.

Slip-form paving and finishing machines shall be in satisfactory adjustment and operational condition. Prior to placing concrete, the Contractor shall demonstrate proper adjustment of all screeds and floats on slip-form pavers by measurements from grade stakes driven to known elevation. Satisfactory operation and adjustment of all propulsion and control equipment, including pre-erected grade and alignment lines, shall be demonstrated by moving slip-form pavers and finishing machines over a five hundred foot (500') length of prepared subgrade with all propulsion and control equipment fully operational.

Unless otherwise required by these Specifications, the Plans or the Special Provisions, pavement shall be constructed in twelve foot (12') traffic lane widths separated by contact joints, or monolithically in multiples of twelve foot (12') traffic lane widths with a longitudinal weakened plane joint at each traffic lane line.

All concrete shall be placed while fresh. The use of water for retempering any concrete will not be permitted. The temperature of the concrete mix at the time of placement shall not exceed 90° F.

19-7 FINISHING CONCRETE PAVEMENT

The surface of the concrete shall be finished smooth and true to grade with wooden floats. Floats shall be operated from the end of the pavement and parallel with the centerline of the pavement by means of a long handle.

The edge of the float shall be used to cut down all high areas and the material so removed shall be floated into the depressions until a true surface is obtained.

Finishers and floatmen shall be required to remain at work, after placing of concrete has stopped, long enough to complete the finishing of the pavement when the concrete has hardened sufficiently.

19-8 CURING PORTLAND CEMENT CONCRETE PAVEMENT

The curing of Portland Cement concrete pavement shall be with a pigmented sealing compound as specified in Section 10-6 of these Specifications. The application of the sealing compound shall be in accordance with the requirements of Section 90-7.01B of the State Specifications.

19-9 PROTECTION OF PAVEMENT

The Contractor shall protect the surface of the concrete pavement against all damage and markings, both from pedestrian and other traffic. Barriers shall be placed at the proper locations to protect the concrete from traffic.

The concrete pavement shall be maintained at a temperature of not less than 45°F for 72 hours after placement. When required by the Engineer, the Contractor shall submit a written outline of his proposed methods for protecting the concrete pavement and maintaining the required temperature.

When required by the Special Provisions, bridges or other devices of the type shown on the Plans, or approved by the Engineer, shall be installed across the pavement to provide crossing for the public and private traffic such as will prevent damaging or marking the pavement.

The crossing devices shall be maintained in satisfactory condition throughout the period of use at any location, and, when no longer required, shall be removed by and become the property of the Contractor.

After the Engineer has ordered the pavement opened to traffic, the Contractor will not be held responsible for damage resulting from its use by public traffic, provided, however, that the Contractor shall be liable for any damage to the newly laid pavement caused by his operations.

19-10 PAVEMENT DAMAGE AND REPAIR

All damage done to or openings cut in concrete pavement or alley crossings during the progress of the work shall be repaired by the Contractor under the direction of the Engineer, using for such repairs, materials conforming to the requirements of these Specifications.

19-11 PAYMENT FOR PORTLAND CEMENT CONCRETE PAVEMENT

Clearing, grubbing, and tree removal prior to grading for laying of concrete pavement shall be paid for as set forth in Section 12 of these Specifications.

Excavation and fill will be paid for as provided for in Section 14 of these Specifications.

Subgrade preparation shall be paid for in accordance with Section 14-6 of these Specifications.

The Portland Cement concrete shall be paid for per cubic yard of concrete required to construct the pavement to the lines, grade and to the thickness shown on the Plans. Should the subgrade be low or irregular, thus requiring additional yardage above that computed from the thickness specified on the Plans, no allowance shall be made for such additional concrete yardage.

The price paid per cubic yard for furnishing and placing Portland Cement concrete in pavements shall include full compensation for preparing and finishing the subgrade, cutting existing concrete, furnishing and placing the concrete, furnishing and placing premoulded joint filler, finishing concrete surface, furnishing and applying curing compound, protecting the pavement and repairing any damage thereto before final acceptance.

CONCRETE IN STRUCTURES

20-1 GENERAL

"Concrete in structures" shall mean concrete placed in structures such as culverts, headwalls, retaining walls, drop inlets, pump pits, slabs, foundations and similar concrete structures. Specifically excluded shall be concrete in pavements, curbs, gutters, and sidewalks, concrete in these cases being described and specified in other sections of these Specifications.

20-2 FOOTINGS

Footing elevations shown on the Plans shall be considered as approximate only and only when excavation is completed and the exact character of the supporting natural ground is ascertained can the exact elevation of the bottom of footings be determined by the Engineer.

20-3 DROP INLET

Drop Inlet types shall conform to the Standard Drawings contained within Section 38 of these Specifications.

Concrete for drop inlets shall be Class "A" or "B", and shall conform to Section 10-5 of these Specifications. The concrete box portion of the drop inlet shall be cast to the proper grade in a maximum of two (2) placements of concrete. Use of grout to adjust the drop inlet frame to the proper grade will not be permitted without specific approval of the Engineer.

Reinforcing bar supports or other approved means shall be used to hold the frame at proper grade during final placement of concrete. Broken pieces of concrete, or other debris, shall not be used for this purpose.

At the option of the Contractor, drop inlets may be furnished and installed as precast units, or the units may be combined precast and cast-in-place structures, provided the structures in place substantially conform to cast-in-place construction as specified in these Specifications.

20-4 FORMS FOR STRUCTURES

Forms shall be smooth and mortar tight. They shall be true to the required lines and grade and of sufficient strength and supported in such a manner that no springing out of shape or sagging occurs between form supports during the placing of concrete. All dirt, chips, sawdust, nails and other foreign matter shall be completely removed from forms before any concrete is deposited therein. Forms previously used 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.

Forms for all surfaces which will be exposed to view shall be made of surfaced lumber or of other material which will provide an equally smooth and satisfactory surface. Lumber which is warped, badly checked, or contains loose knots or knot holes, shall not be used on any surface form.

All sharp edges shall be chamfered with three-quarter inch by three-quarter inch $(3/4" \times 3/4")$ triangular fillets unless the Plans specifically require that they not be used. Curved surfaces shall be formed in a manner which will give accurate and true surfaces. The construction methods of curved forms shall be approved by the Engineer before such forms are placed.

Forms shall be so constructed that form marks will conform to the general lines of the structure.

Only approved form clamps, form ties or bolts shall be used to fasten forms. Ties of twisted wire will not be permitted.

Forms for girders or slabs shall be chamfered in such amounts as indicated on the Plans.

The strength of the forms and the supporting structure for forms is the responsibility of the Contractor and permission to pour concrete in forms as given by the Engineer shall not relieve the Contractor of this responsibility. If sagging or appreciable deflection or movement of the forms shall occur when the pour is made, this shall be cause for rejection of the work by the Engineer.

Work so rejected must be removed and replaced at the expense of the Contractor and without cost to the City.

20-5 REMOVAL OF FORMS

The falsework and forms of supporting members of a structure and those supporting slabs or members subject to bending stress shall not be removed in less than twenty-one (21) days unless test cylinders taken during the pour shall indicate compressive strength of three thousand pounds per square inch (3,000 psi) or greater prior to that time. During cold weather the Engineer may increase the setting period to twenty-eight (28) days. Forms or other parts of the structure which do not carry loads as above described may be stripped in from two (2) to five (5) days as may be approved by the Engineer.

20–6 REINFORCEMENT

Reinforcement in concrete structures shall be placed as described in Section 21 of these Specifications.

20-7 MIXING OF CONCRETE

The Contractor will not be allowed to commence a pour until proper facilities are available for mixing the concrete in accordance with Section 10-5 of these Specifications. Transit-mixed concrete, when used, shall be assured of delivery in a regular and systematic order. Concrete for structures shall be mixed with a minimum of water to provide a workable mix as determined by the Engineer.

The use of admixtures will be permitted in concrete for structures subject to the written approval of the Engineer, or if set forth in the Special Provisions.

Unless otherwise provided for on the Plans or in the Special Provisions, concrete in structures shall be Class "A" as specified in Section 10-5 of these Specifications, except that concrete for drop inlets may be Class "B" as specified herein.

20-8 PLACING CONCRETE

No concrete shall be placed in forms until the forms have been approved by the Engineer.

Concrete shall not be placed on frozen or ice-coated ground or subgrade, nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.

Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage as determined by the Engineer.

All concrete shall be fresh and shall be placed before it has taken an initial set. Retempering with additional water to make concrete more workable after it has partially hardened will not be permitted. The temperature of the concrete at the time of placement shall not exceed 90°F.

The Plans may show a pouring schedule and this schedule may not be varied without written approval of the Engineer.

Concrete in structures must be tamped and compacted by means of high frequency internal vibrators of a size, type and number to be approved by the Engineer provided, however, that not less than two serviceable vibrators shall always be available when concrete is being poured on work requiring twenty-five (25) cubic yards or more of concrete.

The location, manner and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of the mortar and coarse aggregate, and without causing water or cement paste to flush to the surface. Fresh concrete shall be spread in horizontal layers insofar as practicable and the thickness of the layers shall not be greater than can be satisfactorily consolidated with the vibrators. If additional concrete is to be placed, care shall be taken to remove all laitance and to roughen the surfaces of the concrete to insure that fresh concrete is deposited upon sound concrete surfaces. Layers of concrete shall not be tapered off in wedge-shaped slopes, but shall be built with square ends and level tops.

Mixed concrete, after being deposited, shall be consolidated until all voids are filled and free mortar appears on the surface. The concrete shall be placed as nearly as possible in its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be permitted. The number of vibrators employed shall be ample in the opinion of the Engineer to consolidate the incoming concrete to a proper degree within fifteen (15) minutes after it is deposited in the forms. Fresh concrete shall not be permitted to fall from a height greater that six feet (6') without the use of adjustable length pipes or "elephant trunks."

Vibrators shall not be attached to or held against the forms or the reinforcing steel. The use of approved external vibrators for compacting concrete will be permitted when the concrete is inaccessible for adequate compaction, provided the forms are constructed sufficiently rigid to resist displacement or damage from external vibration.

Surfaces shall be smooth and free from voids caused by stone pockets. Where necessary, vibration shall be supplemented by hand spading to secure these results.

The use of chutes in conveying or depositing concrete will be allowed only at the discretion of the 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

20 (4)

required. The use of additional water in mixing the concrete to promote free flow in chutes of low inclination will not be allowed.

20-9 BONDING

Construction joints shall be made only where indicated on the Plans or authorized by the Engineer. In case of emergency, construction joints shall be placed as directed by the Engineer. When it is necessary to make a joint because of an emergency, reinforcing steel shall be furnished and placed across the joint as directed by the Engineer. Furnishing and placing such reinforcing steel shall be at the Contractor's expense and no additional compensation will be made therefor.

After the pour has been completed to the construction joint and the concrete has hardened, the entire surface of the joint shall be thoroughly cleaned of surface laitance and clean aggregate shall be exposed by abrasive blast cleaning. Wire brushing and air and water jets may be used while the concrete is fresh, provided results equal to abrasive blast cleaning are obtained.

Construction joints shall be keyed. Keyways shall be formed by beveled strips or boards placed at right angles to the direction of shear. Except where otherwise shown on the Plans or specified, keyways shall be at least one and one-half inches $(1\frac{1}{2}")$ in depth over at least twenty-five percent (25%) of the area of the section.

When new concrete is shown on the Plans to be jointed to existing concrete by means of bar reinforcing steel dowels grouted in holes drilled in the existing concrete, the holes shall be drilled to the required depth, blown out, wetted and filled with Portland Cement grout, after which the dowel shall be inserted and left undisturbed until the grout has hardened. The grout shall consist of one (1) part Portland Cement to two (2) parts clean concrete fine aggregate.

20-10 CONCRETE PLACED UNDER WATER

Unless specifically indicated on the Plans or called for by the Special Provisions, no concrete may be poured underwater without approval of the Engineer.

When underwater placement of concrete is so approved, the placement shall be by approved tremie or bottom dump bucket. The consistency of the concrete shall be varied to suit this type of placement and must meet the approval of the Engineer. Underwater pours shall be continuous until completed. Pouring of concrete in running water will not be permitted.
20-11 EXPANSION JOINTS AND RUBBER WATERSTOPS

When premoulded joint filler is shown on the Plans or specified, the filler shall be placed in correct position before concrete is placed against the filler. The edges of the concrete at the joint shall be edger finished. Unless otherwise provided in the Special Provisions, expansion joint material shall be as specified in Section 10-4 of these Specifications.

Rubber waterstops, when shown on the Plans, shall conform to the requirements of Section 51-1.14 of the State Specifications.

20-12 CURING OF CONCRETE

All concrete in structures must be kept wet for the first ten (10) days after placement, except that deck surfaces or floor slabs may be cured as specified in Section 19-7 of these Specifications. On decks or floor slabs, the surface must be kept wet by a mist type application of water until the curing medium is applied.

20-13 PROTECTING CONCRETE

In addition to the requirements of Section 5 of these Specifications; "Control of Work and Materials", the Contractor shall protect concrete as provided herein.

All concrete that has been frozen, or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at his expense.

All concrete in structures shall be maintained at a temperature of not less than 45° F for 72 hours after placing and at not less than 40° F for an additional four (4) days. When required by the Engineer, the Contractor shall submit a written outline of his proposed methods for protecting the concrete.

20-14 WEEP HOLES IN WALLS

Weep holes or drains in walls shall be provided as shown on the Plans and with the drain rock backing indicated. Placement of the drain rock behind the weep hole shall be made in a manner satisfactory to the Engineer.

20-15 SURFACE FINISH OF CONCRETE STRUCTURES

The ordinary surface finish required on concrete structures shall be that obtained by careful forming, proper compaction and even texture of concrete. Immediately after forms have been removed, all form bolts will be cut off one inch (1") below the finished surface of the structure and the holes remaining will be filled with cement mortar using one (1) part cement to two (2) parts sand.

Any defects in the concrete surface caused by poor material in the forms, poor form construction, or by voids or pockets in the concrete, will be repaired and finished to make the surface finish uniform. The Engineer will direct the Contractor to correct such defects and they shall be repaired without extra compensation.

The surface finish of any structure may be given further treatment if such a requirement is made and specified by the Special Provisions.

20-16 MEASUREMENT OF QUANTITIES

The volume of concrete to be paid for shall be determined by computation from the actual dimensions of the structure as shown on the Plans. No deduction will be made for volume of reinforcing steel.

20-17 PAYMENT FOR CONCRETE IN STRUCTURES

The price bid per cubic yard for concrete in structures shall include full compensation for all excavation and backfill, for furnishing and building all necessary forms, for furnishing and placing all concrete, for furnishing and placing all reinforcing steel, for furnishing and placing expansion joint material and rubber water stop if shown on the Plans, for curing the concrete, for weep holes in walls, for finishing all concrete surfaces, and for doing such other work as may be necessary to build the structure as indicated on the Plans.

Unless otherwise indicated in the Special Provisions payment for drop inlets shall be at the unit price bid per each and shall include full compensation for excavation, backfill, furnishing all material, labor, tools and equipment and doing all work necessary for construction, complete in place of drop inlets.

Section 21

PLACING STEEL REINFORCEMENT

21-1 MATERIALS

Steel reinforcement shall be as specified in Section 10-25 of these Specifications.

21-2 STEEL LISTS

Reinforcing steel lists showing lengths and bending details shall be submitted to the Engineer for his approval. Such approval is intended only as an additional precaution against errors, and shall not be construed as relieving the Contractor of his responsibilities for the accuracy of the lists.

21-3 CLEANING

Reinforcing steel, before being placed in the forms, shall be thoroughly cleaned of loose mill and rust scale, mortar, oil, dirt, and of coatings of any character which would reduce or destroy the bond.

21-4 BENDING

Reinforcing steel shall conform accurately to the dimensions shown on the Plans. The term "standard hook" as used herein shall mean either:

- (a) A semicircular turn plus an extension of at least four (4) diameters but not less than two and one-half inches $(2\frac{1}{2}")$ at the free end of the bar, or;
- (b) A ninety degree (90°) turn plus an extension of at least twelve (12) diameters at the free end of the bar, or;
- (c) For stirrup and tie anchorage only, either a ninety degree (90°) or a one hundred thirty-five degree (135°) turn plus an extension of at least six (6) bar diameters but not less than two and one-half inches (2½") at the free end of the bar.

The diameter of bend measured on the inside of the bar for standard hooks, other than stirrup and tie hooks, shall not be less than the values of the following table, except that for sizes #3 to #11, inclusive, in Grade 40 bars with one hundred

eighty degree (180°) hooks only, the minimum diameter shall be five (5) bar diameters.

MINIMUM DIAMETERS OF BEND

Bar Size #3 through #8 #9, #10, and #11 #14 and #18 Minimum Diameter 6 bar diameters 8 bar diameters 10 bar diameters

Inside diameter of bends for stirrups and tie hooks shall not be less than one and one-half inches $(1\frac{1}{2}")$ for #3, two inches (2") for #4, and two and one-half inches $(2\frac{1}{2}")$ for #5.

Bends for all bars other than stirrups, tie hooks, and standard hooks shall have diameters on the inside of the bar not less than allowed by the above table.

21-5 PLACING

Reinforcing bars shall be firmly and securely held in place at the intersections by wiring with No. 14 or No. 16 wire and by using concrete or metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to hold the reinforcement in its proper place as the concrete is poured. These supporting devices and the wire shall be furnished by the Contractor at his own expense.

The clear distance between parallel bars shall not be less than two and onehalf $(2\frac{1}{2})$ diameters of the bar with a minimum of two inches (2"). Reinforcing bars shall have a minimum concrete cover of not less than twice the bar diameter and in no case less than one and one-half inches $(1\frac{1}{2}")$. The concrete cover of slab steel may be less than this minimum if so shown on the Plans.

Wire mesh used for reinforcement shall be rolled flat before placing concrete unless shown differently on the Plans. Mesh reinforcement shall be held firmly in place against vertical or transverse movement by means of devices satisfactory to the Engineer.

21-6 SPLICING

Reinforcing bars for beams and for longitudinal slab spans shall not be spliced, except as shown on the Plans. Splices of tensile reinforcement at points of maximum stress shall be avoided. Where bars are spliced, they shall be either lapped at least forty-five (45) bar diameters for No.8 and smaller and sixty (60) bar diameters for Nos. 9, 10, and 11 or butt welded at the option of the Contractor. Reinforcing bars Nos.14 and 18 shall not be spliced by lapping. No lapped splices will be permitted at points where the section is not sufficient to provide a minimum distance to two inches (2") between the splice and the nearest adjacent bar or the surface of the concrete.

In lapped splices, the bars shall be placed in contact and wired together in such a manner as to maintain a clearance of not less than the minimum clear distance to other bars and the minimum clear distance to the surface of the concrete surface of the concrete. Splices shall be staggered at least the length required for a lapped splice and not more than one-third (1/3) of the bars may be spliced at one location provided the specific clearances are maintained.

When splices are made by butt welding, a joint efficiency of one hundred percent (100%) shall be obtained. The bars shall be preheated and then welded using low-hydrogen electrodes. All welding operators shall be prequalified. Tack welding of reinforcement bars is not allowed.

Where wire mesh reinforcement is spliced, it shall be lapped at least the dimension of one (1) mesh.

21-7 PAYMENT FOR REINFORCING STEEL

Payment for reinforcing steel shall not be made separately unless so indicated by the Special Provisions, but shall be included in other bid items and shall include full compensation for furnishing all steel, for cutting and bending, for placing, for furnishing all wire, stirrups, hangers, and placement devices for cleaning the reinforcement, and for insuring the proper placement of the steel reinforcement in the finished structure.

Section 22

ASPHALTIC CONCRETE

22-1 ASPHALTIC CONCRETE TYPE AND MIX DESIGN

Asphaltic concrete shall be Type A (coarse) or B (medium), as designated on the Plans or specified in the Special Provisions, and shall conform to the provisions of Section 39 of the State Specifications.

Asphaltic concrete shall be produced in conformance with the requirements of a job-mix formula. The job-mix formula will take into consideration the quality of the aggregate, the type of asphalt binder material, the immersion compression retention index, the void relationships and other criteria, and said job-mix formula shall be the responsibility of the Contractor. The amount of asphalt binder material, as a percentage of the total weight of the mixture shall be determined by California Test 367.

The Contractor shall be responsible for designing a job-mix formula through an approved testing laboratory, and shall submit it to the Engineer for approval ten (10) working days prior to any mixing and/or placing of asphaltic concrete.

Said job-mix formula shall be determined using the specifications set forth herein and shall conform to the requirements of Section 39-2.02 of the State Specifications.

In order to meet the required gradation for mineral aggregate, the Contractor may be required to do any or all of the following:

Revise his crushing methods

Perform additional screening

Remove, wash and waste material.

If the Contractor elects to use any material, including blending material, other than those materials utilized in the mix design, he shall so inform the Engineer in advance of the production of asphaltic concrete and shall document the request through an approved testing laboratory.

During the production of either mineral aggregate or asphaltic concrete, the Contractor may request that adjustments be made in the job-mix formula. Such request shall be in writing and substantiated through an approved testing laboratory. Consideration will be given promptly to such request.

22 (1)

22-2 MATERIALS FOR ASPHALTIC CONCRETE

Coarse aggregate for asphaltic concrete will consist of crushed gravel. It shall be clean, hard, tough, sound, of uniform quality and free from deleterious material. The gravel shall be scalped on a screen of such size that the material retained on a two inch (2") sieve and the oversize up to at least ten inches (10") in greatest dimension shall be crushed to produce the required sizes. The material passing the two inch (2") sieve may be further scalped and crushed in a secondary crusher to produce smaller sizes of aggregate which will be blended with the product of the primary crushes.

Fine aggregate shall consist of hard, durable and sound sand. It shall be clean and free from decomposed materials, organic material and other deleterious substances. It shall not contain more than three percent (3%) of loam, clay or organic matter, or other earthly impurities, or mica in sufficient quantity to be detrimental.

The coarse and fine aggregate shall conform to the requirements set forth in Section 39-2.02 of the State Specifications.

Filler, if used, shall be finely powdered limestone, Portland Cement, or mineral dust. Filler, if used, must meet the approval of the Engineer in type and quantity used.

Paving asphalts shall meet the requirements of Section 10-15 of these Specifications.

Unless otherwise indicated on the Project Plans or specified in the Special Provisions, asphalt binder to be mixed with aggregate shall be steam-refined paving asphalt, viscosity grade AR-4000.

Prime coat; when specified, shall be liquid asphalt, SC-70, and shall be applied at the rate of 0.25 gallons per square yard. Prime coat shall be applied only so far in advance of surface placement as may be permitted by the Engineer. Prime coat application shall conform to Section 39-4.02 of the State Specifications.

Tack coat shall be asphaltic emulsion SS-1, and its application shall conform to the requirements of Section 39 of the State Specifications. The emulsion shall be mixed with equal parts of water and applied to the surface at an application rate of 0.10 gallons per square yard. Prior to applying tack coat, the street surface shall be swept clean by brooming or washed clean to the satisfaction of the Engineer. Tack coat shall not be applied to surfaces designated to receive a pavement reinforcing fabric. Tack coat shall be applied to all vertical faces of structures and gutter lips against which asphaltic concrete shall contact.

22-3 GRADATION OF AGGREGATES FOR ASPHALTIC CONCRETE

Gradation of aggregate material shall conform to the requirements of Section 39 of the State Specifications for three-quarter inch (3/4") maximum aggregate (coarse) or one-half inch $(\frac{1}{2}")$ maximum aggregate (medium) as designated on the Plans or specified in the Special Provisions.

22-4 MIXING EQUIPMENT FOR ASPHALTIC CONCRETE

Mixing equipment shall conform to that specified in Section 39 of the State Specifications.

The operation of driers, screens, and material handling equipment shall be such as to produce a proper asphaltic concrete mixture and the Engineer shall have the right to refuse acceptance of the material if such is not the case.

The aggregate shall be dried to the point that it shall not contain more than five tenths percent (.5%) of moisture and an indicating pyrometer shall be provided in order that the temperature of aggregate leaving the drier may be determined.

Scales must be equipped with locking devices. Scales must be accurate and meet all State requirements for weighing devices. An approved type of scale must be provided for weighing the liquid asphalt.

A thermometer shall be provided in the asphalt line to permit asphalt temperature to be determined.

22-5 MIXING

The hot aggregates shall be mixed in a pug mill mixer or drum dryer and paving asphalt shall be added at a temperature of not less than 250° F., nor more than 375° F. The mixer shall be equipped with a timing device and signal to indicate the lapse of proper mixing time. Mixing time shall not be less than forty-five (45) seconds.

22-6 PLACING

Placing of asphaltic concrete shall conform to the requirements of Section 39-5.01 of the State Specifications.

Before placing asphaltic concrete surface course on an asphaltic concrete base course, a tack coat of asphaltic emulsion shall be applied if so indicated in the Special Provisions. The material shall be brought to the site of the work in suitable vehicles so equipped that they will operate properly with the spreading equipment being used. The Engineer shall have the right to remove any vehicle from service which is not operating satisfactorily in the spreading of the material. Tarpaulins shall be provided for all trucks and shall be used whenever the Engineer may direct.

Asphaltic concrete shall not be placed on a wet base or subgrade, and the ambient air temperature shall be 45° F. and rising. The temperature of the mix shall not exceed 320° F. nor shall it be laid at a temperature below 250° F. unless specifically authorized by the Engineer.

When base course and surface course are used, the extent to which the base course may be laid ahead of the surface course shall be determined by the Engineer.

22-7 COMPACTING EQUIPMENT

The Contractor shall furnish a minimum of two (2) ten (10) ton steel wheel rollers and one (1) twelve (12) ton pneumatic tired roller unless otherwise approved by the Engineer. Pneumatic-tired rollers will not be required when approved vibratory rollers are furnished and used as specified herein.

Rollers used on the work must be in good mechanical condition. Uneven operation, repeated breakdowns. and other mechanical difficulty shall be cause for the Engineer to ask for the removal of the equipment from the work.

All rolling equipment shall be self-propelled and reversible.

Pneumatic-tired rollers shall be of the oscillating type having a width of not less than four feet (4') and equipped with pneumatic tires of equal size and diameter, having treads satisfactory to the Engineer. Wobble-wheel rollers will not be permitted. The tires shall be so spaced that the gap between adjacent tires will be covered by the tread of the following tire.

The tires shall be inflated to 90 pounds per square inch, or such lower pressure as designated by the Engineer, and maintained so that the air pressure will not vary more than 5 pounds per square inch from the designated pressure. Pneumatic-tire rollers shall be so constructed that the total weight of the roller can be varied to produce an operating weight per tire of not less that 2,000 pounds.

Vibratory rollers shall be approved by the Engineer. All rollers shall be equipped with pads and water systems which prevent sticking of asphaltic concrete mixtures to the pneumatic- or steel-tired wheels. A parting agent, which will not damage the asphaltic concrete surface, as determined by the Engineer, may be used to aid in preventing sticking or ravelling.

On base course rolling, the Contractor will have available at least two (2) rollers and two (2) roller operators for each asphalt paver unless otherwise approved by the Engineer. Rollers shall be two-axle tandem type weighing not less than ten (10) tons. Vibratory rollers may be substituted when approved by the Engineer.

The number and type of rollers required on the work when laying surface course shall be approved by the Engineer. The initial or breakdown rolling of surface course shall be followed by additional rolling consisting of three (3) complete coverages with a pneumatic-tire roller, while the temperature of the mixture is at or above 150° F. The final rolling of surface course shall be performed with a ten (10) ton, two (2) axle tandem roller. The Engineer may or may not require one operator for each roller required to be on the work when surface course is being laid.

22-8 COMPACTION OF ASPHALTIC CONCRETE

The rolling of the asphaltic concrete material shall commence immediately after its placement. Rolling shall continue until all ruts and surface imperfections are eliminated and the proper degree of compaction is achieved. Finish rolling shall be accomplished with a steel wheel tandem roller. A vibrating roller may be used as the finish roller provided that it meets the requirements for a finish roller as herein specified and is operated with the vibratory unit turned off. Rolling shall commence at the lower edge and shall progress toward the highest portion, except that when compacting layers which exceed 0.25-foot in compacted thickness rolling shall commence at the center and shall progress outwards.

At the commencement of the asphaltic concrete paving operations, the Contractor shall cooperate with City forces in establishing and agreeing upon a rolling pattern that will insure the obtainment of the maximum possible density in the compacted asphaltic concrete surface. Once the rolling pattern is established, the Contractor shall follow this pattern unless otherwise directed by the Engineer.

The City will perform compaction testing at no cost to the Contractor. The Contractor shall cooperate fully with City forces to take such tests, and shall make all provisions to allow the Engineer to sample the asphaltic concrete mixture from the completed surface immediately following placement by the lay-down machine.

When a straightedge twelve feet (12') long is laid on the finished surface and parallel with the center line, the surface shall not vary more than 0.01-foot from the lower edge of the straightedge. The transverse slope of the finished surface

shall be uniform to a degree such that no depressions greater than 0.02-foot are present when tested with a straightedge twelve feet (12') long laid in a direction transverse to the center line and extending from edge to edge of a twelve foot (12') traffic lane.

22-9 PAVEMENT REINFORCING FABRIC

Pavement reinforcing fabric shall be nonwoven polyester, polypropylene, or polypropylene/nylon materials conforming to the requirements of the below indicated ASTM Designations:

> Weight, Oz./sq.yd. ASTM Designation D1910

3.0 to 8.0

Grab Tensile Strength (1-inch grip), Pounds ASTM Designation D1117

90 min.

40 min.

Elongation at Break, Percent, ASTM Designation D1117

Fabric Thickness Mils., ASTM Designation D461

12 to 100.

The fabric shall retain the physical properties listed herein after being in contact with asphalt concrete at temperatures of up to 325° F. for five (5) minutes (±15 seconds).

Pavement reinforcing fabric shall be accompanied by a Certificate of Compliance signed by the manufacturer stating that the fabric complies with these Specifications. The fabric shall be protected from exposure to ultraviolet rays and kept dry until placed. Before spreading asphalt binder, large cracks, spalls and chuckholes shall be repaired as directed by the Engineer and such repair work will be paid for as extra work-force account as provided in Section 4-6 of these Specifications.

Immediately prior to placing the fabric, an asphalt binder shall be applied to the street surface. Asphalt binder for pavement reinforcing fabric shall conform to the provisions of Section 92-1.02 of the State Specifications and shall be Grade AR-4000.

Asphalt binder for pavement reinforcing fabric shall be applied at an approximate rate of 0.25 gallons per square yard of surface covered. The width of the asphalt binder spread shall be the width of the fabric mat plus three inches (3")

on each side. Asphalt binder shall be applied at a temperature of not less than 290° F.

The fabric shall be stretched, aligned and placed with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is one-half inch $(\frac{1}{2}")$ or more, the fabric shall be cut to remove the wrinkle then lapped in the direction of paving. Laps in excess of two inches (2") shall be removed.

If manual laydown methods are used, the fabric shall be unrolled, stretched, aligned and placed in increments of approximately thirty feet (30').

Adjacent borders of the fabric shall be lapped two to four inches (2-4"). The preceding roll shall lap two to four inches (2-4") over the following roll in the direction of paving at ends of rolls or at any break.

Seating of the fabric with rolling equipment after placing will be permitted. Turning of the paving machine and other vehicles shall be gradual and kept to a minimum to avoid damage.

A small quantity of asphalt concrete may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent fabric from being picked up by construction equipment.

Public traffic shall not be allowed on the bare reinforcing fabric, except that public cross traffic shall be allowed to cross the fabric, under traffic control, after the Contractor has placed a small quantity of asphalt concrete over the fabric.

Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary, exposed binder material shall be covered lightly with sand.

Full compensation for advance spreading of asphalt concrete over the fabric and for furnishing and placing the asphalt binder in accordance with the requirements of this Section shall be considered as included in the contract prices paid per ton for asphalt concrete surfacing and no additional compensation will be allowed therefor.

22-10 PAYMENT FOR ASPHALTIC CONCRETE

Payment for asphaltic concrete pavement shall be at a price per ton of delivered and placed material or at a price per square foot for finished pavement.

The method used on any work will be shown by the list of quantities on the Proposal and by the type of unit price requested in the Proposal.

Payment for asphaltic concrete pavement by either of the above two methods, as may be specified in the Proposal for that particular work, shall include full compensation for furnishing and placing the material without additional compensation. Tack coat, where required, shall also be furnished without additional compensation and as part of the price bid per ton or per square foot of asphaltic concrete pavement.

When there is a contract item for liquid asphalt (prime coat), the quantity of prime coat will be paid for at the contract price per ton for the designated grade of liquid asphalt (prime coat). When there is no contract item for liquid asphalt (prime coat) and the Special Provisions require the application of prime coat, full compensation for furnishing and applying prime coat shall be considered as included in the contract price paid per ton for the asphalt concrete, and no separate payment will be made therefor.

Payment for pavement reinforcing fabric shall be at the unit price bid per square yard of street surface actually covered as determined by the Engineer, and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in placing pavement reinforcing fabric, complete in place, as specified herein.

Section 23

SEAL COAT - ARMOR TOP

23-1 SEAL COAT - GENERAL

Seal coat shall consist of an application or applications of bituminous binder and screenings applied to pavements of surfaces as hereinafter specified. Seal coat shall conform to Section 37 of the State Specifications, except as modified herein. Seal coat shall be designated as follows on City work:

- "Class B-Single" shall consist of a CRS-2 type emulsion, applied at the rate of from .17 to .25 gallons per square yard of surface, and covered with fine screenings (4" X No. 10) spread at the rate of from 12 to 16 pounds per square yard of surface.
- (b) "Class B-Double" shall consist of two applications of a CRS-2 type emulsion with each application covered with screenings. The first application of asphalt shall be at the rate of .17 to .20 gallons per square yard of surface. This shall be covered with medium screenings (3/8" X No. 6) spread at the rate of from 23 to 28 pounds per square yard of surface. The second application of asphalt shall be at the rate of from .25 to .27 gallons per square yard of surface. The second application of screenings shall be fine screenings (¹/₄" X No. 10) spread at the rate of from 12 to 16 pounds per square yard of surface.
- (c) "Class C-Fine" shall consist of penetration type asphaltic emulsion, applied at the rate of .15 to .25 gallons per square yard of surface and covered with medium fine screening (5/16" X No.8) spread at the rate of 16 to 20 pounds per square yard or with fine screenings (‡" X No. 10) at the rate of 12 to 16 pounds per square yard as the Engineer so directs.
- "Class C-Double" shall consists of penetration type asphaltic emulsion applied in the same quantity and covered with screenings in the same quantity as set forth for "Class B-Double Seal."
- (e) "Class D-Seal" shall consist of a penetration type asphaltic emulsion applied at the rate of approximately .10 gallons per square yard of surface and covered with sand in the quantity as the Engineer may direct. Sand shall be of such a size that from ninety to one hundred percent (90 to 100%) will pass a No. 4 sieve, and not more than five percent (5%) will pass a No. 200 sieve.

23-2 MATERIALS IN SEAL COATS

The asphaltic emulsion in seal coats shall conform to Section 10-15 of these Specifications.

Screenings shall consist of crushed gravel and shall be hard, tough, durable, and sound. Crushed gravel shall consist of particles of at least ninety percent (90%) of which by weight shall have at least one fractured face. Screenings shall be clean and free from clay, earth, rock dust, or other deleterious material. Rattler and Cleanliness Value tests on aggregate shall conform to Section 37 of the State Specifications.

The screenings shall be uniformly graded from coarse to fine, shall be free from thin or elongated pieces, and shall conform to the percentage composition by weight grading requirements set forth in the following table:

Sieve	Coarse ¹ " X	Medium 3/8" X	Med. Fine 5/16" X	Fine 1" X
Size	<u>No. 4</u>	<u>No. 6</u>	<u>No. 8</u>	<u>No. 10</u>
3/4"	100			
1 ¹¹	90-100	100		
·3/8"	50-80	90-100	100	100
<u>1</u> "	10-45	45-70	70-90	90-100
No. 4	0-15	5-30	30-60	60-85
No. 8	0-5	0-10	0-15	0-25
No.16		0-5	0-5	0-5
No.30			0-3	0-3
No.200	0-2	0-2	0-2	0-2

PERCENTAGE PASSING SIEVES

23-3 PREPARATION OF BASE FOR SEAL COATS

Immediately before applying any bituminous binder the surface to be covered shall be thoroughly cleaned with power brooms supplemented by hand brooming where necessary. All dirt and loose material shall be cleaned from the surface.

The Contractor shall place screens in catch basins and street drains to prevent excess screenings from entering and clogging the inlets. Prior to beginning the sealing operation, the Contractor shall cover all manholes and water valves with building paper to prevent any oil and screenings from adhering to the covers. Immediately upon completion of sealing, building paper shall be removed to prevent sticking to covers.

23-4 APPLYING SEAL COAT MATERIAL

The temperature of asphaltic emulsion at the time of spreading shall be as specified in Section 94 of the State Specifications. Air temperatures shall be 65° F. or higher before spreading of asphaltic emulsion is permitted.

The screenings shall be spread immediately following the application of the asphaltic emulsion and while the emulsion is still brown.

Screenings shall be spread by approved spreading equipment in such a manner that proper cover is obtained without depositing of "heavy" spots or incompletely covering areas. On longitudinal joints, care shall be taken to avoid building up additional layers of material because of overlap of screenings and bituminous binder application.

23-5 FINISHING SEAL COATS

Screenings shall be spread uniformly. Piles of screenings shall be respread. Uncovered spots shall be covered. Initial rolling shall consist of one complete coverage performed with a steel-wheel tandem type roller and shall begin immediately behind the spreader. The roller shall weigh not less than five (5) tons and not more than ten (10) tons. Spreading of binder and screenings more than one thousand five hundred feet (1,500') ahead of completion of initial rolling operations will not be permitted. Rolling with a pneumatic-tired roller, conforming to Section 22-7 of these Specifications, shall begin immediately after completion of initial rolling. The amount of pneumatic-tired rolling shall be sufficient to adequately seat the screenings and in no case shall be less than two (2) complete coverages.

After the pavement is opened to traffic, the Contractor will be required to spread additional screenings, where "bleeding" occurs. After traffic has used the pavement for a reasonable period, as determined by the Engineer, all screenings which have been whipped off the surface shall be swept up, collected and removed. After further use by traffic, two (2) additional sweepings and disposal of loose screenings may be required by the Engineer. Screens on catch basins and street drains shall be removed upon completion of cleanup.

23-6 PAYMENT FOR SEAL COAT

Payment for seal coat will be in the manner set forth in the Special Provisions and may be either at a unit price per square yard or at a price per ton for bituminous binder and a price per ton for the screenings. Payment as above set forth shall include full compensation for cleaning the surface before seal coat application, furnishing and applying the bituminous binder and screenings, finishing the surface, and cleaning up all excess materials.

23-7 ARMOR TOPS

Armor tops shall be laid in the same manner as set forth for seal coats in these Specifications. The bituminous binder used shall be a CRS-2 type emulsion, unless otherwise set forth on the Plans or in the Special Provisions.

The rock and screenings used shall conform to the general requirements set forth in this section for screenings and the grading shall be in accordance with the following table:

•	Rock	Medium	Fine
Sieve	3/4" X	3/8" X	∔ " X
Size	3/8"	No. 6	<u>No. 10</u>
. 1"	100		
3/4"	95-100		
<u>1</u> "	25-60	100	
3/8"	0-15	90-100	100
<u>1</u> "		45-70	90-100
No. 4	0 ∸ 3	5-30	60-85
No. 8		0-10	0-25
No. 16		0-5	. 0-5
No. 30		·	0-3
No. 200	0-2	. 0-2	0-2

PERCENTAGE PASSING SIEVES

The applications of bituminous binder and aggregates shall be as follows:

1st Application - per square yard of surface; .15 to .20 gallons of bituminous binder, and 24 to 28 pounds of rock $(3/4" \times 3/8")$.

2nd Application - per square yard of surface .20 to .25 gallons of bituminous binder, and 30 to 40 pounds of rock $(3/8" \times No. 6)$.

3rd Application - per square yard of surface .15 to .20 gallons of bituminous binder, and 14 to 18 pounds of fine screenings $(\frac{1}{4}$ " X No. 10).

23-8 PAYMENT FOR ARMOR TOP

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Payment for armor top shall be at a price bid per ton for rock and screenings and per ton for bituminous binder. These unit prices when applied to the quantities furnished shall include full compensation for furnishing all material and doing all work necessary to construct the armor top.

23-9 SLURRY SEAL

Slurry seal shall consist of a mixture of asphaltic emulsion, mineral aggregate and water proportioned, mixed and spread on a surfacing or pavement where shown on the Plans or designated in the Special Provisions. Slurry seal shall conform to the requirements of Section 37-2 of the State Specifications, except as modified herein.

(a) Bituminous binder shall be a cationic type asphaltic emulsion CSS-1 conforming to Section 94 of the State Specifications.

Size	Percentage Passing
3/8"	100
No. 4	90-100
No. 8	65-90
No. 16	45-70
No. 30	30-50
No. 50	18-30
No. 100	10-21
No. 200	5-15

(b) Aggregate shall conform to the following grading:

(c) The slurry seal mixing machine shall be a continuous flow mixing unit and be capable of accurately delivering water and a predetermined proportion of aggregate and asphalt emulsion to the mixing chamber and to discharge the thoroughly mixed product on a continuous basis. The aggregate shall be prewetted immediately prior to mixing with the emulsion. The mixing unit of the mixing chamber shall be capable of thoroughly blending all ingredients together. No violent mixing shall be permitted.

The mixing machine shall be equipped with an approved fines feeder that provides an accurate metering device or method to introduce a predetermined amount of mineral filler into the mixer at the same time and location that the aggregate is fed. The fines feeder shall be used whenever added mineral filler is a part of the aggregate blend.

The mixing machine shall be equipped with a water pressure system and fog type spray bar, adequate for complete fogging of the surface preceding spreading equipment, with a maximum application rate of 0.05 gallons per square yard. A calibrated control for aggregate and asphalt emulsion shall be provided and shall be capable of proportioning accurately the materials.

The machine shall be capable of a minimum speed of sixty feet (60') per minute and shall not be allowed to exceed one hundred eighty feet (180') per minute while in operation. Sufficient machine storage capacity to mix properly and apply a minimum of five (5) tons of the slurry shall be provided.

(d)

Unless otherwise specified in the Special Provisions, slurry seal shall be spread at a rate of from 15 to 18 pounds of dry aggregate per square yard.

Attached to the mixer machine shall be a mechanical type squeegee distributor equipped with flexible material in contact with the surface to prevent loss of slurry from the distributor. It shall be maintained so as to prevent loss of slurry on varying grades and crown by adjustments to assure uniform spread. There shall be a steering device and a flexible strike-off. The spreader shall be capable of spreading at least a ten foot (10') wide path of slurry mixture.

The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when deposited on the surface and no additional components shall be added. Total time of mixing shall not exceed four (4) minutes. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that complete coverage is obtained and the maximum allowable speed shall be one hundred eighty feet (180') per minute.

Hand tools shall be available in order to remove spillage. Ridges or bumps in the finished surface will not be permitted.

The mixture shall be uniform and homogeneous after spreading on the road and shall not show separation of the emulsion and aggregate after setting.

Adequate means shall be provided to protect the slurry seal from damage from traffic until such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of vehicles. Start and finish of slurry applications shall be a straight line obtained by laying a strip of building paper or other approved material on the street surface which shall be used for starting and finishing operations. After application of slurry, the paper is to be removed leaving a straight edge. Excess material on the street at either end shall be removed by the Contractor.

23-10 PAYMENT FOR SLURRY SEAL

Payment for slurry seal shall be at a price per ton of delivered and placed material or at a price per square yard for finished surface. The method used on any work will be shown by the list of quantities on the Proposal and by the type of unit price requested in the Proposal.

The basis of figuring a price per ton shall be the weight of the aggregates alone with the weight of emulsion and water not considered.

Payment for slurry seal by either of the above methods, as may be specified by the Proposal on that particular work shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in constructing the slurry seal complete in place, including cleaning the surface before spreading slurry seal mixture, application of water prior to placing slurry mix, finishing surface and cleaning up all excess materials and protecting the seal from traffic damage until the mixture has cured sufficiently so that the material will not adhere to the tires of vehicles.

Section 24

CURBS, GUTTERS, SIDEWALKS, AND GUTTER DRAINS

24-1 FORMS FOR CURBS, GUTTERS, AND SIDEWALKS

In general, forms shall comply with the requirements set forth in Section 18 of these Specifications.

The forms for curb and gutter shall be of a width equal to the full depth of the curb and gutter and shall be two inches (2") thick if of wood. Warped forms and forms not having a smooth straight upper edge shall not be used. Benders, or thin plank forms, rigidly placed, may be used for returns and other curves. All forms must be carefully set to proper alignment and grades and shall be rigidly held in place by the use of not less than five (5) pairs of stakes to every twenty-foot (20') section, and other sections in proportion. Clamps, spreaders, and braces shall be freely used where required.

The forms for sidewalks shall be at least one and five-eighths inches (1 5/8") thick after being surfaced, with a smooth upper edge and a width equal to the full depth of the finished sidewalk. They shall be set with the upper edge true to line and grade and shall be rigidly held in place by stakes placed on the outside of the forms and set flush with the top edge of the form. The side forms shall not be removed for at least twelve (12) hours after the finishing has been completed.

Curbs, gutters, and sidewalks may be placed by using an extrusion machine as provided in Section 24-9 of these Specifications in lieu of using forms.

24-2 CONCRETE IN CURBS, GUTTERS, AND SIDEWALKS

Concrete in curbs, gutters, and sidewalks shall be Class "C", as specified in Section 10-5 of these Specifications; except that the maximum size of coarse aggregate may be one and one-half inches $(1\frac{1}{2}")$. The cement shall be Type II as set forth in Section 10-1 of these Specifications, unless otherwise provided by the Special Provisions.

Subgrade shall be prepared as specified in Section 14-6 of these Specifications.

Before placing concrete, the subgrade shall be well dampened. The concrete shall be placed in the forms in layers not to exceed six inches (6") and each layer shall be spaded and tamped until the concrete is thoroughly compacted. At the end of each day's pour, or if for other reasons the work should be terminated, the joint shall be vertical and square ended, and shall come at the point of an expansion joint.

24-3 EXPANSION JOINTS

In curbs, gutters, and sidewalks, an expansion joint shall be placed at the end of round corners and every twenty feet (20') therefrom and at other places as may be shown on the Plans. The joint material shall be three-eights inches (3/8") thick, a minimum of two and one-half inches $(2\frac{1}{2}")$ deep, and shall conform to Section 10-4 of these Specifications. Expansion joints must be at right angles to the line of the work. Deep score lines in conformance with Section 24-9 of these Specifications may be used in lieu of expansion joints upon approval by the Engineer.

24-4 FINISHING CONCRETE SURFACES

The top and exposed surface of the concrete curb shall be finished as follows:

A direct finishing method, whereby the curb shall be poured to exact form, double screeded, floated, troweled and smoothly finished, after which it shall be broomed with a fine hair push broom drawn over the surface transverse to the line of work. Water, if necessary, shall be applied to the surface immediately in advance of brooming.

Surfaces of sidewalks shall be finished by double screeding, which shall include working the concrete with a jitterbug until the coarse aggregate is forced down into the body of the concrete and a layer of mortar is thus forced to the top for floating, and troweling. The surface will then be marked as directed by the Engineer, and broomed as described in the paragraph above.

24–5 CURING OF CONCRETE

Curing of concrete in curbs, gutters, and sidewalks shall be with pigmented compound as set forth in Section 19-8 of these Specifications.

24-6 DAMAGE AND REPAIRS

All damage done or openings cut in concrete walks, curbs, or gutters during the progress of the work shall be repaired by the Contractor to the satisfaction of the Engineer. Patching of damaged areas shall not be allowed. Damaged areas shall be removed and replaced to the satisfaction of the Engineer without additional cost to the City.

24-7 SLOPE AND WIDTH OF SIDEWALKS

Unless otherwise shown on the Plans or indicated in the Special Provisions, sidewalks and planting strip between curb and sidewalk shall slope uniformly towards the street at a rate of one-quarter inch $(\frac{1}{4}")$ per foot of width. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.01-foot are present when tested with a straightedge laid in a direction transverse to the center-line and extending across the width of the sidewalk.

Unless otherwise shown on the Plans or by the Special Provisions, sidewalks shall be four and one-half feet $(4\frac{1}{2})$ wide and three and one-half inches $(3\frac{1}{2})$ thick.

24-8 CURB DOWELS AND REINFORCEMENT

Where required on the Plans or in the Special Provisions, curb dowels and reinforcement shall be installed. The dowels and reinforcement shall conform to Section 21 of these Specifications.

24-9 EXTRUDED CONSTRUCTION

At the Contractor's option, subject to the Engineer's approval, curbs, gutters, and sidewalks may be poured monolithically by an approved extrusion machine.

Extruded curb, gutter, and sidewalk shall conform to all requirements in Section 24 of these Specifications, except as modified by this Section 24-9.

Concrete shall be Class "D", three-fourths inch (3/4") Max. The grading limits shall be restricted if necessary to produce concrete that, after extrusion, has well defined web marks of water on the surface and is free from surface pits larger than three-sixteenths inch (3/16") in diameter.

The concrete shall be of such consistency that, after extrusion, it will maintain the shape of the curb section without support.

At the Contractor's option, extruded concrete curbs shall be anchored to existing pavement or base either by placing dowels and reinforcing or by using an approved adhesive. If an adhesive is used, in advance of placing the curbs on the existing pavement or base, the surface of the pavement or base shall be thoroughly cleaned and the adhesive shall be applied. The pavement or base shall be cleaned either by wire brushing or by blast cleaning. The cleaned surface shall be free from dust, loose material, or oil. The adhesive shall consist of two (2) components which shall be mixed together at the site of the work and shall be formulated primarily for use in bonding new Portland Cement concrete to old Portland Cement concrete.

The top and face of the finished curb shall be true and straight, and the top surface of curbs shall be of uniform width, free from humps, sags, or other irregularities. Grade tolerance of the gutter flowline, back of curb and gutter, and back of sidewalk shall not exceed plus or minus 0.05-foot in any twenty-five foot (25') length.

Concrete shall be fed to the machine at a uniform rate. The machine shall be operated under sufficient uniform restraint to forward motion to produce a well compacted mass of concrete free from surface pits and requiring no further finishing, other than light brushing with a brush filled with water only. Finishing with a brush application of grout will not be permitted.

The requirements of Section 24-3 of these Specifications shall be modified for allowable extruded construction so that deep-score lines may be placed in curbs, gutters and sidewalks in lieu of expansion joints. Deep-score lines shall be one and one-half inches $(1\frac{1}{2}")$ deep, one-eighth inch to one-quarter inch $(1/8" - \frac{1}{4}")$ in width and placed every twelve feet (12') with a standard four foot (4') bite score in between. Expansion joints in conformance with the requirements of Section 24-3 of these Specifications shall be placed at sixty foot (60') maximum spacing, and at curb returns, light poles, fire hydrants, both sides of driveways, and other fixed objects, or as directed by the Engineer. Deep-score lines and bite scores shall conform to the details shown in Section 38 of these Specifications. In addition, dowels or keyways shall be placed at the end of each day's pour, with a deep-score line placed at the cold joint.

24-10 CURB RAMPS AND DRIVEWAYS

Curb ramps for the physically handicapped and driveways shall be constructed to the dimensions, lines, grades and details shown on the Plans or specified in the Special Provisions. Curb ramps and driveways shall conform to all requirements in Section 24 of these Specifications.

24-11 GUTTER DRAINS

Cast iron gutter drains of the type indicated on the Plans shall be installed at points designated on the Plans. The numbers of Standard City of Sacramento Gutter Drains are provided in Section 38 of these Specifications.

24 (4)

Gutter drains shall be set in and cemented flush with the surface of the concrete gutter. The connection of the gutter drain to the manhole or sewer shall be with six inch (6") or eight inch (8") vitrified clay pipe and elbows shall have a minimum nominal centerline radius of thirty inches (30"). The joints shall be as specified in Section 10-34 of these Specifications. The elbow shall be carefully cemented to the neck of the gutter drain and shall rest on a concrete pad three inches (3") thick. Concrete shall extend down and around the elbow with an encasement of at least three inches (3").

Gutter drains in ditch installations shall conform to the details shown in Section 38 of these Specifications.

Existing gutter drains will be moved if so indicated on the Plans. Reset gutter drains will be placed with new vitrified clay pipe and elbows.

24-12 RECONSTRUCTION OF CURBS AND GUTTER TO ACCOMMODATE DRIVEWAYS

Where curbs are removed for the purpose of constructing a driveway, the entire curb and gutter shall be removed and the gutter rebuilt.

24-13 PAYMENT

On unit price Proposals, unit prices will be required as set forth in this paragraph. The price bid on each of the items shall include full compensation for furnishing all material, labor, and equipment necessary to construct the completed work as shown on the Plans.

(a) Concrete Curb and Gutter

The Contractor shall bid a price per lineal foot for concrete curb and gutter which will include full compensation for finishing the subgrade, dampening the subgrade, including the furnishing of water so used; furnishing, placing, and later removing necessary forms and form work; finishing the concrete; curing the concrete; furnishing the concrete; furnishing and placing expansion joint material; furnishing and placing dowels and reinforcement; and doing such other work as may be necessary to construct the curb and gutter complete in place as shown on the Plans.

If curbs and gutters of more than one type are specified on one job, then separate unit prices will be requested for each type specified. The Contractor shall bid a price per square foot for sidewalk which will include full compensation for finishing the subgrade; dampening the subgrade, including the furnishing of water so used; furnishing, placing, and later removing necessary forms and form work; furnishing the concrete; furnishing and placing expansion joint material; finishing the sidewalk surfacing; curing the sidewalk and doing such other work as may be necessary to construct the sidewalk as shown on the Plans.

If sidewalk thickness varies on a job, then separate unit prices will be given for each different thickness specified.

(c) Curb Ramps and Driveways

Payment for constructing curb ramps and driveways shall be considered as included in the price paid for sidewalk and the type of curb or curb and gutter involved and no separate payment will be made, unless otherwise indicated in the Special Provisions.

(d) Gutter Drains

The Contractor shall bid a price per unit for setting gutter drains. This price will include full compensation for furnishing and installing the cast iron drain; furnishing and installing the vitrified clay elbow; furnishing and installing the concrete pad foundation and elbow encasement; necessary excavation; and all other work necessary to install the drain as shown on the Plans.

Vitrified clay pipe between the elbow and the manhole or collecting sewer will be paid for under a separate item.

When gutter drains of different types are used on the same job, separate unit prices will be given on each type. When gutter drains are required to be reset, a separate unit price will be given for resetting each drain.

(e)

Driveways - Removal of Existing Curb and Gutter

Where curb and gutter is removed and rebuilt to accommodate a driveway or existing curb and gutter is removed, a unit price per lineal foot shall be given for such removal which will be in addition to the price bid for the new curb and gutter which will replace it. Driveway construction will be paid for as under (c), above.

Section 25

MANHOLES AND FLUSHER BRANCHES

25-1 STANDARD MANHOLES

City standard manholes shall conform to this Section 25, and to the drawings shown in Section 38 of these Specifications. Unless otherwise shown on the Plans or called for in the Special Provisions, the standard manholes shall be used on City work.

25-2 MANHOLE CASTINGS

Castings for manhole heads and manhole covers shall conform to Section 10-27 of these Specifications.

Dimensions of manhole heads and covers shall be as shown in Section 38 of these Specifications.

25-3 CONSTRUCTION OF MANHOLES (NEW OR RECONSTRUCTED)

Manholes shall be watertight structures constructed by placing precast concrete sections on a poured, or precast concrete base.

Precast concrete sections shall conform to ASTM Designation C76 for Class III pipe or C478, for precast reinforced concrete manhole sections. Elliptical single line reinforcement will not be permitted. Single line circular reinforcement will be permitted, and the minimum steel area shall equal the minimum steel area required for the inner cage reinforcement. Tapered sections, risers, cones, flat tops, and grade rings shall conform to the requirements of ASTM Designation C478.

Concrete manhole bases may be either cast in place or pre-cast of a type and manufacture as approved by the Engineer. Cast in place concrete bases shall be Class "A" concrete as set forth in Section 10-5 of these Specifications. Cement shall be Type II, as set forth in Section 10-1 of these Specifications. Cast in place concrete bottoms shall have a shaped channel pipe flowline construction. Precast concrete bases and their details shall have the prior approval of the Engineer and shall conform ASTM Designation C478. Relative elevations of all flow lines and base dimensions shall be as shown on the Plans. A minimum of two foot (2') of Type C clean crushed rock conforming to Section 10-14 of these Specifications shall be placed and compacted to provide a smooth, foundation for the base. Compaction shall conform to Section 14-4 of these Specifications and

25 (1)

shall be not less than ninety percent (90%) relative compaction. Openings in the base shall align true with all inlet and outlet pipes and shall be made using a "Core-Bore" technique or other method approved by the Engineer. Reducers and increasers will not be permitted. All connections to the base shall be watertight and for pipe sizes up to and including fifteen-inches (15") within one-foot (1') of the manhole invert, the connections shall be made with a flexible, watertight coupling, "Cor-n-Seal", or approved equal. Openings in the base that are not connected to pipe shall be sealed with a grout plug.

When grout is used for jointing, all joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned and wet down immediately before setting of the precast sections. All precast section joints shall be set in grout. Both the inside and outside of these joints shall be plastered with grout and the inside brushed to a smooth finish with a wet brush. The grout shall conform to Section 10-37 of these Specifications.

When preformed plastic sealing compound is used for jointing, all joint surfaces shall be thoroughly cleaned immediately prior to placing the sealing compound. The sealing compound shall be protected from dirt during placing. Ends of the compound shall be joined end-to-end and not joined by overlapping. Sufficient compound shall be used to cause a visual "squeeze-out" of compound material when adjacent sections are seated. Squeeze-out on the inside of the manhole shall be neatly trimmed flush with the inside surface.

The preformed plastic sealing compound shall conform to Section 10-37 of these Specifications.

Manholes not constructed in streets shall have three (3), six inch (6") adjusting rings placed between the top of the cone and the bottom of the manhole head. Top of head to be six inches (6") above the ground surface.

Manholes constructed in streets shall have the top of the cone within twelve inches (12") to eighteen inches (18") of final street grade.

There shall be a minimum of four inches (4") of concrete placed around the head after it is set to the final street grade. The concrete shall extend from two inches (2") below the top of the manhole cone to a point two inches (2") below the pavement grade. After the concrete has hardened, the remaining two-inch (2") space will be filled with asphaltic concrete carefully raked and compacted by approved powered tampers.

Where sewer lines pass through manholes, the pipe shall be laid continuously as a whole pipe. After the manhole base and precast sections have been placed and sufficient time has elapsed to allow all concrete and grout to set, the top half of

25 (2)

the pipe within the manhole shall be carefully cut off and the sides mortared as shown on Standard Drawing CE 54. All channels so formed shall be a smooth flowing channel at all flow depths. All connections of pipe to the manhole shall be made using an acceptable sealing gasket system as denoted within these Specifications.

25-4 ADJUSTING MANHOLE HEADS

Existing manholes in streets shall be adjusted to grade when shown on the Plans or called for in the Special Provisions.

Manhole heads shall be raised by wiring the frame to two 2" X 4"s of sufficient length to span the excavation. The space between the old manhole and the bottom of the head will then be filled with a cement mortar, conforming to Section 10-37 of these Specifications, poured against a suitable form on the inside of the structure. Concrete will then be poured around the head to a point two inches (2") below the top of the head. Concrete shall be Class "A" concrete, conforming to Section 10-5 of these Specifications. After the concrete has hardened, the remaining two-inch (2") space will be filled with asphaltic concrete carefully raked and compacted by approved powered tampers.

When adjusting a manhole head will result in less than six inches (6"), or more than eighteen inches (18") between the top of the cone and final street grade, the cone shall be removed and forty-eight inch or sixty inch (48" or 60") diameter risers shall be added or removed so that the top of the cone is within six to eighteen inches (6" to 18") of final street grade.

Manhole heads that need to be lowered shall be removed as directed by the Engineer to a depth that will allow the manhole to be reconstructed with the proper cone and to the lines and elevation shown on the Plans. Manholes that require lowering shall be indicated on the Plans or Special Provisions as manholes to reconstruct. Manholes that require raising shall be indicated on the Plans or Special Provisions as manholes to raise.

When manholes are required to be adjusted in a street that is open to traffic, all work involved in adjusting shall be fully completed during the work day so as to permit full use by traffic at 4 p.m. of the same day. Should the Contractor be unable to fully complete a manhole by the above time, a temporary asphaltic cutback surface shall be placed in any depression so as to provide a smooth traveling surface until the manhole can be fully completed. The use of barricades around incomplete manholes during night hours is not permitted.

25-5 FLUSHER BRANCHES

Flusher branches shall conform to the details shown in Section 38 of these Specifications. Castings for the ring and cover assembly shall conform to Section 10-27; vitrified clay pipe shall conform to Section 10-16 of these Specifications, and polyvinyl chloride pipe shall conform to Section 10-22 of these Specifications.

25-6 PAYMENT FOR MANHOLES AND FLUSHER BRANCHES

On unit price Proposals, payment for manholes shall be at the unit price bid per manhole. This price shall include full compensation for all necessary excavation, for all form work, for all concrete, for necessary castings including heads and covers, and for doing all work necessary and furnishing all material necessary to construct the manholes complete in place to the dimensions shown on the Plans or in these Specifications.

If shown in the list of bid quantities, the Proposal may require separate unit prices on standard manholes of various depths but if only a single item is shown for standard manholes, then manholes of all depths will be included and shall be paid for at the price bid.

Special manholes, that is, those which may be shown on the Plans which are separately detailed and do not conform to standard manhole details shall be paid for under a separate item or items of the Proposal. The price bid per special manhole shall include full compensation for doing all work and furnishing all material necessary to construct the special manhole as shown on the Plans.

Payment for raising or reconstructing manholes shall be at a unit price bid, which shall include full compensation for doing all work and furnishing all material necessary to raise or reconstruct the manholes as shown on the Plans or Special Provisions. On overlay projects, raising of cones will be considered as Extra Work and shall be paid for according to the terms and conditions of Section 4-6 of these Specifications.

Payment for flusher branches shall be at a unit price bid which shall include full compensation for constructing the flusher branch complete in place, including the ring and cover assembly, concrete, and necessary vitrified clay or polyvinyl chloride pipe to and including the forty-five degree (45°) bend.

Section 26

LAYING SEWER AND DRAIN PIPE

26-1 EXCAVATION

Trench excavation for all sewer and drain pipe options shall conform to the following requirements:

Trench width shall not exceed the outside diameter of the pipe barrel plus sixteen inches (16"), measured at the top of the pipe. The Contractor shall substitute stronger pipe or increase bedding requirements, subject to approval of the Engineer, at no extra cost, if the specified trench width is exceeded. Excavation shall be three inches (3") below the outside diameter of the barrel or one inch (1") below the outside diameter of the bell, whichever is greater.

No tunnels shall be allowed, except when, in the opinion of the Engineer, it is impossible or impracticable to prevent tunneling.

The Contractor shall comply with the requirements set forth in Section 6-7, "TRENCH SAFETY PLANS", of these Specifications.

Trenches shall be excavated only as far in advance of pipe laying as can be backfilled in the same day. The maximum total length of open trench shall be five hundred feet (500'). Under no condition shall more than fifty feet (50') of trench remain open overnight. A trench in an existing roadway which is not to be regraded is defined as open until backfilled and paved with temporary surfacing, ready for traffic. Other trenches are defined as being open until backfilled to subgrade or the original ground line. Temporary surfacing is defined in Section 26-8 of these Specifications.

Whenever the bottom of the trench is soft, yielding or unsuitable for a foundation for the pipe, sufficient clean crushed rock of the type directed by the Engineer shall be placed in the trench bottom to insure a proper foundation, as determined by the Engineer. No additional payment will be made for overexcavation or placement of clean crushed rock unless so indicated in the Special Provisions or approved by the Engineer.

When an existing lateral sewer or house connection must be cut or is damaged during trench excavation, the details for utility crossings in Section 38 of these Specifications shall apply.

26-2 LAYING PIPE

Sewer and drain pipe shall conform to Sections 10-16, 10-18, 10-19, 10-20, 10-21 and 10-22 of these Specifications. The type, class and size of pipe shall be shown on the Plans and in the list of quantities contained within the Proposal.

After the trench for pipe has been brought to the proper line and grade, the pipe shall be laid in the following manner:

Pipe laying shall proceed upgrade with the bell or groove end of the pipe placed upstream. Each section of pipe shall be laid true to line and grade and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be cleared of all dirt and debris as the work progresses. Pipe shall not be laid when the condition of the trench or the weather is unsuitable, in the opinion of the Engineer, because of water or mud which may interfere with proper jointing. All open ends of pipe and fittings shall be adequately and securely closed whenever the work is discontinued.

Circular reinforced concrete pipe with elliptical reinforcement shall be placed with the minor axis of the reinforcement in a vertical position.

The pipe shall be laid in strict conformity to the prescribed line and grade with grade bars set and each pipe length checked to the top grade line. Three (3) consecutive points on the same grade of slope shall be used at all times to detect any variation from a straight grade. In case any discrepancy exists, the work shall be stopped and the discrepancy immediately reported to the Engineer. In addition, when requested by the Engineer, a string line shall be used in the bottom of the trench to insure a straight grade and alignment of the pipe.

At the option of the Contractor, grade and alignment controlled by a laser beam system which complies with OSHA requirements may be used in lieu of "top line" and batter board. The laser system shall have good visibility when used with suitable target material. The laser system must be of the self-leveling type so that the laser beam is automatically compensated for minute grade disturbances.

The laser system must also have an early warning system that instantly warns the pipe layer when the laser is off grade. The laser system is to be provided by the Contractor and shall have a minimum accuracy of ± 0.01 foot per one hundred feet (100') on line; and a minimum visible range of one thousand feet (1000').

Grade tolerance of the flow line of pipe shall not exceed plus or minus 0.05 feet. In addition, the total variation plus and minus from flow line grade shall not exceed 0.05 feet in any twenty-five foot (25') length. Both joint surfaces shall be

cleaned before the joints are made. Care shall be used to prevent chipping or cracking of either end of the pipe during installation.

Pipe shall be placed on firm bed of imported granular material, conforming to the requirements for initial backfill in Section 26-6 of these Specifications, except that where asbestos-cement pipe is called for on the Plans or in the Special Provisions, the bedding material shall consist of sand conforming to the requirements of Section 10-11; RIVER SAND, of these Specifications. The bedding material shall provide uniform support of the full length of the pipe to a width of at least fifty percent (50%) of the pipe internal diameter. The Contractor shall place bedding material as specified herein by shovel slicing, tamping, or vibratory compaction in order to produce firmly compacted material under the haunches of the pipe. Care shall be used not to dislodge the pipe. No wedging or blocking of the pipe will be permitted. Minimum relative compaction of the bedding material shall be ninety percent (90%) when tested according to ASTM Designation D698. Ponding and jetting methods of achieving compaction shall not be allowed.

When using movable trench support, care should be exercised not to disturb the pipe location, jointing or its embedment. Removal of any trench protection below the top of the pipe and within two and one-half $(2\frac{1}{2})$ pipe diameters of each side of the pipe shall be prohibited after the pipe embedment has been placed and compacted. Movable trench supports shall only be used in either wide trench construction where supports extend below the top of the pipe or on a shelf above the pipe with the pipe installed in a narrow, vertical wall subditch. Any voids left in the trench wall or embedment material by support removal shall be carefully filled with bedding material which shall be adequately compacted. Removal of bracing between sheeting shall only be done where backfilling proceeds and bracing is removed in a manner that does not relax trench support. When advancing trench boxes or shield, there shall be no longitudinal pipe movement or disjointing.

Mortar or brick plugs shall be installed in existing manholes as directed by the Engineer in order to prevent surface water, ground water, and debris from entering existing sewer systems during construction. Inflatable plugs will not be permitted. Care shall be exercised in installing plugs to avoid interrupting service to existing sewer services. Plugs shall be removed upon completion of testing as provided in Section 26-7 of these Specifications.

26-3 SEWER AND DRAIN SERVICES

Sewer and drain services shall be installed at the points shown on the Plans. All services, where not connected shall be closed with a stopper or plug of proper size. Where services are carried from the main line to the property line, stoppers shall be place in the ends of the pipe. Before backfilling, a 2" X 2" redwood post shall be placed with its lower end at the end of the pipe, and its upper end extended vertically twelve inches (12") above the street grade. Where grade of sewer permits, the flow line of a sewer service at the property line shall be four feet (4') below the street grade.

In addition, where curb and gutter exists, or is to be constructed concurrently with sewer facilities, the location of each sewer service shall be permanently indicated by inscribing the letter "S" two inches (2") in height in the curb directly above the line when the service is perpendicular to the street centerline. Otherwise, the "S" mark for skewed or angling services shall be placed at a right angle to the end of the service. When sewer services are installed in an existing street, the curb mark shall be placed at the time the service is installed to assure proper location.

In new subdivisions when the sewer services are installed before the curb is constructed, it shall be the Contractor's responsibility to establish the exact location of each sewer service and to furnish this information to the Engineer.

In all alley improvements where a main is being replaced, all services to that main will be replaced and a clean-out installed as indicated on the Plans or specified in the Special Provisions.

26-4 PIPE JOINTS

Joints in pipe shall conform to Sections 10-21, 10-22, 10-35, 10-36 and 10-37 of these Specifications.

All joints for concrete pipe shall be rubber gasketed joints.

26-5 PROTECTIVE COVERING

Whenever sewer or drain pipe is laid in trenches at such an elevation that the top of the pipe bell is less than eighteen inches (18") below subgrade of the street, the pipe must be covered with a protective covering as shown in Section 38, Drawing C.E. 70, of these Specifications. The concrete used in making the covering shall conform to Portland Cement concrete Class "A", as denoted in these Specifications.

26-6 BACKFILLING PIPE TRENCHES

Backfill of all sewer and drain pipes shall conform to the following requirements:

Initial Backfill - Initial backfill shall be the material between the top of the bedding material and six inches (6") above the top of the pipe.

Unless otherwise indicated in the Special Provisions, initial backfill shall be granular material consisting of imported Type A, clean crushed rock, conforming to the requirements of Section 10-14 of these Standard Specifications except that where asbestos-cement pipe is called for on the Plans or in the Special Provisions, the initial backfill material shall consist of sand conforming to the requirements of Section 10-11; RIVER SAND, of these Specifications.

Initial backfill shall be placed immediately after pipe joints have been completed, inspected and passed by the Engineer. The material shall be carefully placed so as not to disturb or damage the pipe, and shall be brought up evenly on both sides. Initial backfill material shall be placed in layers not exceeding eight inches (8") in depth before compaction at or near optimum moisture content. Compaction shall be by mechanical pneumatic or vibratory compaction equipment approved by the Engineer. Ponding and jetting methods will not be allowed. The compacted material must achieve a relative compaction of at least ninety percent (90%) as determined by ASTM Designation D698.

When the bedding material for the pipe consists of crushed rock, sand shall not be used as initial backfill material.

Trench Backfill - Trench backfill shall be the material between the initial backfill and the top of trench or subgrade.

The material for trench backfill may be of job excavated, native material provided that such material is free of organic materials or other unsuitable materials as determined by the Engineer that may cause voids or depressions to develop during or after placement of the backfill. Rocks, stones and solid earth chunks exceeding three inches (3") in greatest dimension shall be removed from the trench backfill material.

Trench backfill material shall be placed in layers not exceeding eight inches (8") in depth before compaction at or near optimum moisture content. Until the total backfill above the top of the pipe exceeds three feet (3'), machine-placed backfill material shall not be allowed to "freefall" more than two feet (2').

Unless otherwise shown on the Plans or specified in the Special Provisions, compaction of all backfill material shall be by mechanical pneumatic or vibratory compaction equipment. Ponding and jetting methods shall not be allowed.

Unless otherwise indicated on the Plans or specified in the Special Provisions, trench backfill material shall be compacted to a relative compaction of not less than ninety percent (90%), as determined by ASTM Designation D1557. The top six inches (6") below the subgrade shall be compacted to a relative compaction of ninety-five percent (95%), except that trenches in easements outside the street

rights-of-way may be compacted to ninety percent (90%) relative compaction throughout the depth. Compaction testing will be performed by the Engineer and the cost thereof will be borne by the City, except that retests of areas which fail to meet the required compaction shall be charged to the Contractor and deducted from any payment due the Contractor for work performed under the terms of the Proposal.

Upon written request by the Contractor, and upon approval of the Engineer, the trench may be backfilled to subgrade with slurry cement backfill provided in conformance with Section 10-13 of these Specifications. For pipes and conduits two inches (2") and smaller, bedding, initial backfill and trench backfill shall be slurry cement backfill placed to within one and one-half inches $(1\frac{1}{2}")$ of finished grade.

26-7 TESTING OF PIPE

After laying, backfilling and compacting of sewer lines, including drain lines and force mains, they shall be tested for obstructions and leakage, unless otherwise specified.

- (a) Tests for Obstructions All lines or mains shall be cleaned by balling, and any obstructions or irregularities shall be removed or repaired by the Contractor. All testing, cleaning and repairing shall be done to the satisfaction of the Engineer. Water used in cleaning will not be permitted to enter existing sewer systems. The Contractor shall provide all necessary labor, materials, tools and equipment for the tests and shall dispose of all waste, including water at his own expense.
- (b)

Tests for Leakage - All or any sections of sewer lines, including drain lines and force mains which the Engineer may select, shall be tested by the Contractor by either of the following methods:

(1) Air Test for Leakage - The length of line tested at any one time shall be limited to the length between adjacent manholes. The test section shall be pressurized to 3.5 psi and shall be held above 3.0 psi for not less than five (5) minutes. Air shall be added if necessary to keep the pressure above 3.0 psi. At the end of this five (5) minute saturation period, note the pressure (must be 3.0 psi minimum) and begin the timed period. If the pressure drops 0.5 psi in less than the time given in the following table, the section of pipe shall not have passed the test.
	Minimum Time	
•	Required in	
Laterial Size	Seconds	
d" Dia	192	
	122	
6" Dia	184	
8" Dia	245	
10" Dia	306	
12" Dia	367	
15" Dia	460	

For larger diameter pipe use the following formula: Minimum time in seconds = 370 X pipe diameter in feet. If the time for the pressure to drop 0.5 psi is less than the time given in the table, the leakage shall be repaired and the line retested until found satisfactory to the Engineer.

When the prevailing ground water is above the pipe being tested, air pressure shall be increased 0.43 psi for each foot the water table is above the invert of the pipe.

House sewer services shall be considered part of the lateral to which they are connected and no adjustment of test time shall be allowed to compensate for the smaller diameter of the house services.

The pressure gauge used shall be supplied by the Contractor, shall have minimum divisions of 0.10 psi, and shall have an accuracy of 0.04 psi. Accuracy and calibration of the gauge shall be certified by a reliable testing firm at six-month intervals, or when requested by the Engineer.

When the air test is used, all manholes shall be tested by filling with water to the top of the manhole dome. If any appreciable loss of water, as determined by the Engineer, is found, the manhole shall be considered defective and suitable repairs shall be made.

(2)

Hydrostatic Test for Leakage - A section of line shall be prepared for testing by plugging the upper side of the downstream manhole and all openings in the upstream manhole except the downstream opening. Where grades are slight, two or more sections between manholes may be tested at once. Where grades are steep and excessive heads would result by testing from one manhole to another, test tees, the same size as the main, shall be installed at intermediate points so the maximum head on any section under test shall not exceed twelve feet (12').

A section of line prepared as above shall be tested by filling with water to an elevation five feet (5') above the top of pipe at the upstream end of the test section, or five feet (5') above the existing ground water elevation, whichever is greater. The water should be introduced into the test section at least four (4) hours in advance of the official test period to allow the pipe and joint material to become saturated with water. The water level should then again be brought to the five foot (5') mark. At the beginning of the test, the elevation of the water in the upper manhole shall be carefully measured from a point onthe manhole rim or test tee. After a period of four (4) hours, or less with the approval of the Engineer, the water elevation shall be measured from the same point on the manhole rim and the loss of water during the test period calculated. If this calculation is difficult, enough water shall be measured into the upper manhole to restore the water to the level existing at the beginning of the test, and the amount added taken as the total leakage.

The allowable leakage in the test section shall not exceed five hundred (500) gallons per mile per day per inch diameter of pipe tested at the five foot (5') test head, unless otherwise specified. If it is necessary or desirable to increase the test head above five feet (5'), the allowable leakage will be increased at the daily rate of eighty (80) gallons for each foot of increase in head.

Test sections showing leakage in excess of that allowed shall be repaired or reconstructed as necessary to reduce the leakage to that specified above.

Water used in testing will not be permitted to enter existing sewer systems.

Tests for Deflection

(c)

Where PVC and/or ABS pipe are installed as sewer or drain pipe, a deflection test shall be made by the Contractor upon completion and acceptance by the Engineer of all backfill operations and prior to the placement of the finished surface, if any. Deflection testing shall be conducted no sooner that thirty (30) days following completion and acceptance of all backfill operations, unless otherwise approved by the Engineer.

The deflection testing shall be witnessed by the Engineer and shall be conducted by the Contractor's forces and performed at the expense of the Contractor. One-hundred percent (100%) of all mainline PVC or ABS sewer and/or drain pipe installed shall be deflection tested for excessive vertical deflection using a pre-sized, rigid mandrel or "Go-No-Go" device approved by the Engineer. The mandrel size shall be clearly labeled and shall be sized so as to provide a diameter of at least ninety-five percent (95%) of the base internal diameter, as specified in ASTM D3034 and ASTM D2680 for PVC or ABS gravity sewer pipe, respectively.

The mandrel shall be drawn through the pipe using only the force that can be exerted by one man on the end of a rope, using no mechanical advantage. Under no conditions shall the mandrel device be attached to the cleaning ball.

Pipe exceeding five percent (5%) deflection shall be replaced at the Contractor's expense. Re-rounding or other attempts to reduce deflection beyond the allowable shall not be acceptable. All re-tests for deflections shall be made at the complete expense of the Contractor.

No direct payment will be made for the testing of pipe and the cost thereof shall be considered to be included in the prices bid for such item as the Bidder may consider appropriate.

26-8 REPAVING OF TRENCHES

Certain construction projects may require the cutting of existing pavements, the laying of pipe, backfilling and then repaving of the cut pavement. When the trench is in an existing paved area, the pavement shall be sawed or scored and broken ahead of the trenching operations. The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately to a neat and parallel line six inches (6") wider on each side than the trench width required. All cuts in Portland Cement concrete pavements shall be sawcut with approved equipment.

Where pavement cutting and repaying is not specifically covered by the Special Provisions, it will be required that the repaying is done in such a manner to as closely as possible replace the cut pavement with a similar type and thickness of pavement material. In no case shall the structural section be less than five and one-half inches $(5\frac{1}{2}")$ of asphaltic concrete for residential streets or four inches (4") of asphaltic concrete over twelve inches (12") of aggregate base for commercial or industrial streets.

Unless otherwise provided on the Plans or in the Special Provisions, pipeline trenches in unpaved portions of street rights-of-way shall have the top twelve inches (12") filled with aggregate base Class 2, conforming to Section 10-7 of these Specifications and compacted to ninety-five percent (95%) relative compaction as determined by ASTM Designation D1557.

In any case, where a trench is cut in existing pavement, or as directed by the Engineer, a temporary asphaltic plant mix cut back surface not less than two inches (2") in thickness shall be placed immediately after the top backfill has been completed and compacted and maintained at a level surface until removal.

Temporary surfacing material shall be removed just prior to placing the permanent surfacing material.

Payment for temporary paving shall be included in the price bid per foot of pipe placed, unless otherwise set forth in the Special Provisions.

26-9 PAYMENT FOR SEWER AND DRAIN PIPE

Payment for sewer and drain pipe will be at a price per lineal foot which shall include full compensation for excavation, bedding, backfill, furnishing and laying of pipe, and all other work necessary to construct the drain or sewer complete in place as shown on the Plans.

Measurement of such lineal footage shall be the total distance along the centerline of the pipe from manhole to manhole and shall include the straight run of all wyes and tees where used.

Payment for clean crushed rock or bedding material provided for use as set forth in Section 26-2 shall be considered as included in the price paid for laying pipe, unless otherwise indicated in the Special Provisions.

Payment for concrete used as protective covering shall be paid for at a separate price per lineal foot for protective covering in place, unless otherwise set forth in the Special Provisions.

Where wye or tee fittings are placed in a main sewer or drain line in connection with sewer or drain services, payment for the fittings shall be considered as included in the price per lineal foot for the main sewer or drain pipe and no deduction or addition will be made to the length of main line laid.

Placing of sewer and drain services will be paid for at the contract unit price bid per service, which price shall include full compensation for furnishing and placing all service pipe from the wye or the fitting in the main sewer or drain line to the property line, and furnishing and placing other necessary bends and stoppers to construct the service complete in place.

The cost of removing and replacing pavement over trenches shall be include in the price bid for the pipe in place, unless otherwise set forth in the Special Provisions.

Manholes are paid for as a separate item in accordance with Section 25-6 of these Specifications.

WATER DISTRIBUTION SYSTEMS

27-1 GENERAL

All water pipe, fittings, gate valves, fire hydrants, blow-offs, and other appurtenances shall be installed in accordance with the requirements of the American Water Works Association (AWWA) and as recommended by the manufacturer.

Pipe for water mains shall be placed along the horizontal alignment indicated on the Plans. The depth of placement of the pipe shall meet the cover requirements set forth in Section 27-3 of these Standard Specifications.

27-2 WATER PIPE

Pipe used for water mains four inches (4") through twelve inches (12") diameter in water distribution systems shall be made of cast iron, ductile iron, asbestos-cement, or polyvinyl chloride meeting the applicable requirements of Section 10 of these Standard Specifications. The Plans or Special Provisions may indicate a particular material type of pipe is to be used for water mains. In this case the use of an alternate type of pipe shall not apply.

Pipe used for water services two inches (2") in diameter or less shall be copper only as specified in Section 10-33 of these Standard Specifications. Pipe used for water services four inches (4") in diameter or larger shall be the same as specified above for water distribution mains.

27-3 TRENCHING FOR WATER PIPE

Trenches for water pipe including water distribution mains, fire hydrant branch leads, and water services shall be as specified herein unless otherwise indicated on the Plans or in the Special Provisions.

Water mains constructed in streets to be fully improved with curb, gutter, and sidewalk shall be installed with a minimum depth of cover of from thirty-six inches (36") to forty-two inches (42") measured from the top of the pipe to finish grade or pavement surface. The maximum depth of cover over the top of water mains in streets with full improvements (curbs, gutters, and sidewalks) shall range from forty-eight inches (48") to fifty-four inches (54"); measured from finish grade or pavement surface. Water mains constructed in unimproved areas or in existing streets lacking curb, gutter and sidewalk shall be installed with a minimum cover of from fiftyfour inches (54") to sixty inches (60"); measured from the top of the pipe to the existing ground or pavement surface.

To avoid conflicts with other utilities, particularly at street intersections, it may be necessary to deviate from the above minimum and maximum cover requirements. At locations where the crossing of water mains with other underground utilities result in grade conflicts, adjustment of the vertical alignment or profile of the water main may be required. The adjustment of the profile of the water main over or under the conflicting utility line crossed by the water main shall be made within eight feet (8') of the center of the utility line as detailed on Standard Drawing SD-7.

The width of the trench shall be adequate to allow the pipe for the water main to be placed and jointed properly and shall not exceed the outside diameter of the pipe plus sixteen inches (16").

In general, trenches for water pipe used for fire hydrant branch leads and water services shall meet the same requirements for water mains as given in these Standard Specifications.

Trenches for water mains shall be excavated to a depth of at least three inches (3") below the outside diameter of the pipe. At locations of joints or couplings the depth of over excavation shall be at least three inches (3") below the outside diameter of the pipe joint or couplings.

Trenches shall be excavated only as far in advance of pipe laying as permitted by the Engineer unless otherwise specified in the Special Provisions. All excavated material shall be piled in a manner that shall not endanger the work and shall not obstruct sidewalks and driveways. Open trench and piles of dirt shall be so marked and lighted as to provide safety to all vehicular traffic and pedestrian traffic.

All cut and abandoned pipes within the area of the trench, including existing water mains, that are not removed in accordance with Section 13-2(e) of these Standard Specifications shall be sealed by plugging or capping the exposed ends of the pipe.

In plugging pipes with concrete, the concrete plug shall extend at least two feet (2') into the pipe from the exposed end. Concrete used for the plug shall be Class "C" or Class "D" and shall meet the applicable requirements of these Standard Specifications.

Isolated lengths of pipe may also be filled with sand or other free flowing granular material, as approved by the Engineer.

27-4 LAYING WATER PIPES

Every precaution shall be taken to prevent any type of foreign material or small animals from entering the pipe while water pipe is being placed. The ends of the pipe shall be plugged when not under actual construction.

After the trenches for water mains have been excavated to the specified minimum depth along the alignment indicated on the Plans, pipe for water mains shall be placed on a firm bed of sand. The sand bedding material shall meet the requirements of Section 10-11; RIVER SAND, of these Standard Specifications. The individual sections of water main pipe shall be placed to form a water tight concentric joint with each length of adjoining pipe.

The interior of each length of pipe for water mains shall be cleaned of all dirt and debris prior to placement. Pipe for water mains shall not be placed during inclement weather or when the conditions in the trench shall interfere with proper jointing of the pipe. All open ends of water main pipe and fittings shall be adequately and securely closed whenever the work of placing the water main is discontinued.

The placement or installation of cast iron or ductile iron for water mains shall meet the applicable ANSI/AWWA standards for cast iron and ductile iron pipe as well as the recommendations of the manufacturer of the pipe. Cast iron and ductile iron pipe shall be as specified in Section 10-28 of these Standard Specifications.

Asbestos-cement pipe shall not be supported on blocks. Clearance shall be provided for all pipe joints so that bedding is located on the cylindrical portion of the pipe. Uniform bedding shall be provided for the cylindrical portion of the pipe to prevent pipe beam loading (joint supporting only). Pipe shall not be installed when trench conditions, weather, excess water or other conditions unsuitable for providing the desired end results are prevalent, except by permission of the Engineer. Asbestos-cement pipe laying shall conform to the requirements in AWWA C-603 and the pipe manufacturer's recommendations.

Placement of polyvinyl chloride (PVC) pipe for water mains shall meet the requirements of AWWA C900 and the pipe manufacturer's recommendations.

27-5 PLACING LOCATING WIRE WITH NON-CONDUCTIVE WATER MAIN PIPE

All runs of polyvinyl chloride and other nonconductive pipe shall have No. 10 solid, soft copper wire placed along the pipe to facilitate location after installation. Wire shall extend up inside valve boxes, and installed in accordance with Standard Drawings SD-1, SD-2, and SD-4.

27-6 THRUST BLOCKING AND RESTRAINED JOINTS

All plugs, caps, tees, or bends deflecting twenty-two and one-half degrees $(22\frac{1}{2}^{\circ})$ or more on water mains four inches (4") in diameter or larger shall be provided with concrete thrust blocks. Concrete thrust blocks shall be installed as detailed on Standard Drawing SD-7. The Contractor shall insure the nuts or bolt heads of bolted connections are not covered by concrete or form materials.

Mechanically restrained joints may be used in lieu of concrete thrust blocks when approved by the Engineer and shall be the type recommended by the manufacturer of the pipe.

27-7 SETTING FIRE HYDRANTS

Fire Hydrants shall conform to material requirements of Section 10-30 of these Standard Specifications. All hydrants shall be set plumb and installed in accordance with Standard Drawing SD-1.

In the branch leads that connect fire hydrants to the water mains only cast iron, ductile iron, or polyvinyl chloride pipe shall be used.

For streets to be fully improved with curb, gutter, and sidewalk, new or relocated fire hydrants shall be placed as follows:

(a) Where the sidewalk is contiguous with curb and gutter, fire hydrants shall be placed behind the sidewalk within the area between the sidewalk and the street right of way line.

In the event the street right of way line is greater than ten feet (10') from the face of curb, fire hydrants shall be placed within the sidewalk but behind the curb and gutter. In this instance the fire hydrants shall be set such that the distance between the face or nearest edge of the four and one half inch $(4\frac{1}{2}")$ fire hydrant nozzle caps and the back of curb is six inches (6").

(b) Where the sidewalk is separated from the curb and gutter by a planter or park strip or at locations where there are to be curbs and gutters but no sidewalks, fire hydrants shall be placed within the area behind the curb and gutter. The fire hydrants shall be set such that the distance between the face or nearest edge of the four and one half inch $(4\frac{1}{2}")$ hydrant nozzle caps and the back of curb is six inches (6") unless otherwise indicated on the Plans or in the Special Provisions.

In streets that are paved but lack curbs, gutters and sidewalks, new and relocated fire hydrants shall be placed at a location not to exceed ten feet (10') from the edge of pavement.

Fire hydrants shall be set to meet the bury line requirements of the manufacturer of the hydrant. Adjusting (raising or lowering) fire hydrants to grade shall be achieved by raising or lowering the hydrant branch leads. Adjusting fire hydrants to new grade may also be achieved by the use of extension kits provided by the hydrant manufacturer.

Where the Plans indicate existing fire hydrants are to be removed and salvaged the hydrants shall be removed intact and delivered undamaged to the City of Sacramento Corporation Yard at 5730-24th Street.

Fire hydrants placed at street intersections shall be installed at the beginning or end of round corners (curb returns) and not be positioned at the radius point of the round corner.

All fire hydrants shall be set such that:

- (a) On standard hydrants, the four and one-half inch $(4\frac{1}{2}")$ nozzle or outlet shall lie on a line perpendicular to the centerline of the street.
- (b) On double pumper hydrants, a line bisecting the angle between the two four and one-half inch $(4\frac{1}{2}")$ nozzles or outlets shall be perpendicular to the centerline of the street.

27-8 SETTING GATE VALVES

All gate valves shall meet the requirements of Section 10-31 of these Standard Specifications.

Gate valves with push-on joints may be connected directly to water main pipe. Gate valves which connect directly to elbows, tees, or cross fittings shall be provided with flanged joints.

27-9 BACKFLOW PREVENTION ASSEMBLIES AND SWING CHECK VALVES

Where the Plans indicate backflow prevention assemblies are required, the devices shall be installed in accordance with Standard Drawing SD-15.

The Water Division's "Cross Connection Control Policy" sets forth the requirements for the design, construction, installation, and maintenance of backflow prevention assemblies. Copies of the "Cross Connection Control Policy" are available from the Engineer and from the Administrative office of the Water Division.

Backflow prevention assemblies shall be placed above ground level unless otherwise indicated on the Plans or in the Special Provisions. Double check valve assemblies shall be installed according to the requirements of the Water Division's "Cross Connection Control Policy".

Swing check valves where specified on the Plans shall be installed in accordance with Standard Drawing SD-14.

27-10 BLOW-OFFS

Standard two inch (2") and four inch (4") blow-offs shall conform to and be installed in accordance with Standard Drawing SD-5.

27-11 PIPE BEDDING AND BACKFILLING OF TRENCHES

Pipe bedding and initial backfill for water mains, fire hydrant branch leads, and water services shall be furnished and placed according to the requirements contained herein and as detailed on Standard Drawing SD-16. The pipe bedding and initial backfill material shall consist of sand meeting the requirements as given in Section 10-11 of these Standard Specifications.

Pipe bedding, initial backfill and trench backfill for water mains shall be placed according to the following requirements and as detailed on Standard Drawing SD-16.

Bedding - Pipes for water mains shall be placed on a firm layer of sand bedding material. At least three inches (3") of sand shall be placed beneath the outside diameter of the pipe. In addition, a minimum of three inches (3") of sand shall be placed in contact with and beneath all pipe joint and couplings. The sand bedding material shall provide uniform support for the full length of the pipe to a width of at least one half of the outside diameter of the pipe. Initial Backfill - Initial backfill for water mains shall be sand material placed between the top of the bedding material to a depth of at least six inches (6") over the top of the pipe.

The sand initial backfill material shall be placed evenly along both sides of the pipe and compacted in a manner that will provide uniform support of the underside of the pipe. Care shall be taken not to dislodge or float the pipe out of design position. Support of the pipe by wedging or blocking shall not be permitted.

The sand initial backfill material shall be compacted to ninety percent (90%) of maximum dry density as determined by ASTM Designation D698.

The sand bedding and initial backfill material shall be consolidated beneath, around and over the top of the pipe by shovel slicing, tamping or vibratory compaction methods. Water jetting methods of compaction shall <u>not</u> be permitted.

Trench Backfill - Trench backfill shall consist of material placed between the initial backfill and subgrade in paved areas or to the top of the trench in unpaved areas, unless otherwise indicated on the Plans or in the Special Provisions.

Backfilling of water pipe trenches may be made with job excavated native material placed and compacted in lifts not to exceed eight inches (8") in thickness before compaction. Jetting of trench backfill shall not be permitted. The native backfill material shall be free of rocks or solid dirt clods greater than three inches (3") in size. The backfill material shall also be free of tree roots, rubbish, organic matter, or other deleterious material that would interfere with the placement and uniform compaction of the trench backfill.

Until the total backfill above the top of the pipe exceeds three feet (3'), including the upper six inches (6") of initial backfill, machine placed backfill shall not be allowed to "free-fall" more than two feet (2').

Trench backfill material shall be compacted to at least ninety percent (90%) of maximum dry density as determined by ASTM Designation D1557. In areas of pavement the upper six inches (6"), measured from subgrade, shall be compacted to a minimum relative density of ninety-five percent (95%).

Compaction testing shall be performed at the option of the Engineer and the cost thereof borne by the City. Retest of areas that fail to meet the required compaction shall be charged to the Contractor.

Imported granular material may be used to backfill pipe trenches in place of job excavated material. The imported granular material placed above the initial backfill shall be uniformly graded Class 2 aggregate base, meeting the requirements of Section 10-7 of these Standard Specifications.

The imported granular material shall be placed in lifts not to exceed six inches (6") after compaction. Compaction requirements for imported granular material shall be the same as required for compaction of job excavated native material.

27-12 REPAVING WATER PIPE TRENCHES

Repaving of trenches for water mains, fire hydrant branch leads, and water services shall be as specified in Section 26-8; REPAVING OF TRENCHES, of these Standard Specifications unless otherwise indicated on the Plans or in the Special Provisions. In no case shall the structural section used in repaving the trenches be less than five and one-half inches $(5\frac{1}{2}")$ of asphaltic concrete for residential streets, or four inches (4") of asphaltic concrete over twelve inches (12") of aggregate base for commercial or industrial streets.

Trenches for water mains or water services in streets or alleys paved with concrete shall be repaved with Portland Cement concrete matching the thickness of existing concrete pavement. In concrete paved alleys the minimum thickness of repaving of water main trenches shall be six inches (6").

Where trenches for water mains are located within twelve inches (12") of the edge of existing pacement or lip of the curb and gutter the existing pavement within this twelve inches (12") shall be removed. Repaving of the trench shall extend up to the original edge of pavement or lip of gutter.

27-13 WATER SERVICES

Materials for services shall meet the requirements specified in Section 10-33 of these Standard Specifications and installed in accordance with Standard Drawings SD-3 and SD-4.

The location of water services extending beneath curbs, gutters and sidewalks shall be denoted by imprinting a two inch (2") size Gothic letter "W" on the upper face of the curb, unless otherwise directed by the Engineer.

Curb stops for water services two inches (2") in diameter and smaller require a service box and riser as part of the curb stop installation. Service boxes and risers shall be in accordance with Standard Drawings SD-4 and SD-10. Gate values for water services four inches (4") through twelve inches (12") in diameter shall be installed within a box and riser. Boxes and risers shall be as specified in and installed in accordance with Standard Drawing SD-10.

Service saddles shall be bronze.

No fitting (tee, ell, etc.) shall be tapped to accommodate any service.

27-14 DISINFECTION OF WATER MAINS

In general, the intent of this section is to present procedures essential for the disinfection of newly constructed water mains and water distribution systems. The basic procedure consists of the following:

- (a) Preventing contaminating materials from entering the water mains during construction and removing any contaminants by flushing that may have entered the water main during construction.
- (b) Disinfecting any residual contamination that may remain.
- (c) Determining the bacteriological quality by laboratory testing after disinfection.

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination during the construction of the water distribution system.

Pipe delivered for construction shall be strung so as to minimize the entrance of foreign material. When pipe laying is not in progress, as for example, at the close of the day's work, all openings in the pipeline shall be closed by caps or plugs. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall be water tight and shall remain in place until the trench is dry.

Water distribution mains up to and including twelve inches (12") in diameter shall be disinfected using the Tablet Method. The Tablet Method shall employ the use of five (5) gram calcium hypochlorite tablets as a disinfectant and should give an average chlorine dose of approximately twenty-five (25) milligrams per liter. The five (5) gram calcium hypochlorite tablets shall contain at least sixty-five percent (65%) available chlorine by weight. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. These tablets shall meet the requirements of AWWA B-300, standard for hypochlorites.

Because preliminary flushing cannot be performed when tablets are used, cleanliness must be exercised during construction of the water main.

The calcium hypochlorite tablets shall be placed in each section of pipe and also in hydrants, hydrant branches, and other appurtenances. They shall be attached by an adhesive at the top of the pipe. If the tablets are fastened before the pipe section is placed in the trench, their position should be marked on the section to assist in keeping the tablet's position at the top of the pipe.

The adhesive shall be Permatex No. 1, or approved equal. There shall be no adhesive on the tablet except on the broad side next to the surface to which the tablet is attached. The tablets must be fastened to the pipe to prevent washing to the pipe end.

The number of calcium hypochlorite tablets* required for main disinfection is shown by the following table.

Pipe	13	18	20	30	40
Diameter	or less				
in.	Number of	<u>5 gram Calc</u>	ium Hypoch	lorite Tablets	
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

Length of Pipe Section (feet)

* Based on 3.25 grams of available chlorine per tablet. Any portion of tablet rounded to next higher number.

When the installation of the water distribution system has been completed, the main(s) shall be filled with water at a velocity of less than one foot (1') per second. During filling, air shall be released from all high points in the line. If required, the Contractor shall provide a corporation stop at high points to provide air vents and insure that all air is released.

In addition, as the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances.

The chlorinated water shall be allowed to stand in the pipeline at least twenty-four (24) hours. At the end of this period (prior to flushing), City personnel shall obtain water samples from a tap placed near the upstream end of the pipeline. All samples shall show no less than ten (10) milligrams per liter (mg/l) total residual chlorine or the disinfection procedure shall be repeated as directed by the Engineer.

27 (10)

When approved by the Engineer, the chlorinated water should be flushed from the pipeline until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the existing distribution system, or less than one mg/l total residual chlorine.

Before the water main is placed in service as part of the existing distribution system, a sample or samples shall be collected by City personnel. The Contractor shall notify the City at least twenty-four (24) hours in advance of the time that bacteriological samples are to be drawn for testing. The Contractor shall furnish and install temporary sampling devices in accordance with Standard Drawing SD-6. The devices shall be installed in locations indicated by the Engineer. Bacteriological examination of the samples shall meet the following criteria:

(a) Total Coliform less than 1 per 100 milliliters.

- (b) Total Plate Count less than 500 bacteria per milliliter.
- (c) If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated as directed by the Engineer.

The water shall also meet State and Federal drinking water standards; Title 22, California Administrative Code and the 1986 Amendments to the Safe Drinking Water Act of 1974, as issued by the United States Environmental Protection Agency (EPA).

Water mains shall not be placed in service for any purpose whatsoever until the City's Water Quality Laboratory has determined that the water main has been disinfected.

27-15 PRESSURE TESTING WATER MAIN INSTALLATIONS

After disinfection of the system and prior to making connections, the entire system shall be pressure tested by the Contractor independent of the existing system or systems to be connected.

Each section of the pipe to be tested shall be slowly filled with water, and all air shall be expelled from the pipe. The release of the air can be accomplished by opening fire hydrants and service line cocks at the high points of the system and blow-offs at all dead ends. The valve controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blow-offs. After the system has been filled with water and all air expelled, all the valves controlling the section to be tested shall be closed.

27 (11)

A pressure test of one hundred and fifty pounds per square inch (150 psi) shall be applied and held for a period of two (2) hours for each section of the system to be tested. Contractor shall provide the necessary pump and a clean calibrated container for measurement of make-up water required to replace leakage during this two (2) hour period.

Allowable leakage in the section during this test shall not exceed ten (10) gallons per mile per inch diameter of pipe tested. No leakage is allowed for welded steel pipe with welded joints.

All defective items discovered during the pressure test shall be repaired or replaced. Test shall be repeated after any repair until the system meets the above leakage requirement. The test will be witnessed by a representative of the Engineer.

27-16 CONNECTIONS TO EXISTING WATER MAINS

Connections to existing water mains, including but not limited to water main tie-in connections, fire hydrant branch leads, and water service taps, shall be performed by the Contractor unless otherwise indicated on the Plans.

Tie-in connections of new water mains to existing mains may be made by direct tap or by "cutting-in" a cross or tee fitting as indicated on the Plans.

All size on size water main taps (tap size same as size of main) will be installed by City Water Division crews.

All shutdowns of existing water mains as well as any water main tie-in connections and water service taps to be installed by City crews will be scheduled with the Water Division by the Engineer. The Contractor shall contact the Engineer at least forty-eight (48) hours in advance to schedule and coordinate such work. The Engineer will confer with the Water Division to schedule the work to be performed by City crews and so advise the Contractor. Work to be performed by Water Division crews will be completed within five (5) working days.

The work of making "cut-in" connections of new water mains to existing water distribution mains regardless of size may be performed by either the Contractor or by City Water Division crews as indicated on the Plans.

For a given project a maximum of three (3) water main shutdowns, water main tie-in connections (tap or "cut-in"), or combination thereof directly involving work by Water Division crews, shall be scheduled on any work day. Such work performed by City crews shall be between the hours of 9:00 am and 3:00 pm. Contractor requests for additional work shall be considered on a case by case basis with the final determination to be made by the City Water Division.

Without exception all opening and closing of valves on existing water mains will be performed by Water Division crews.

Connection of new water mains to existing mains shall be made only after the newly constructed water mains have been successfully disinfected and pressure tested.

All tapping sleeves for connection of new water mains or water services to existing water mains shall be of stainless steel construction including the body, side outlet and outlet flange, nuts and bolts, and all clamping elements. A stainless steel test plug, three fourths inches (3/4") in diameter positioned on the side outlet, shall be a part of all tapping sleeve assemblies.

The body of the tapping sleeve, side outlet and flange, nuts and bolts, sleeve clamping components, and test plug shall be fabricated from 18-8 stainless steel. The stainless steel flange shall be recessed to accept standard tapping gate valves and shall conform to AWWA C207 Class 8-ANSI 150 pound drilling.

The threads of the stainless steel clamping bolts shall be fluorocarbon coated. The bolts shall be five-eighths inch (5/8") diameter with NC threads. Washers composed of Nylatron GS or approved equal shall be provided with the stainless steel nuts.

All tapping sleeves shall be furnished with a full length full circle gasket having a gridded interior surface. The gasket shall be composed of virgin GPR compounded for water service meeting the requirements of ASTM Designation D2000 - 80M 4AA607. The gasket shall be provided with heavy gauge 18-10 stainless steel armor vulcanized to the gasket material.

Flexible coupling used for water mains shall be gasketed, sleeve-type couplings sized to fit the pipes to be connected. The components of the couplings shall consist of ductile iron sleeves and followers, and low alloy steel bolts and nuts. Natural or synthetic rubber wedge section gaskets suitable for drinking water applications shall be provided with the flexible coupling assemblies.

All tapping gate valves shall meet the requirements of AWWA C509. The tapping valves shall be epoxy coated inside and out. The epoxy coating shall meet the requirements of AWWA C550. The flange ends of the tapping valves shall meet the requirements of MSS SP-60.

The sleeves and followers making up the flexible couplings shall meet the appropriate ASTM requirements for ductile iron. The bolts and nuts shall be high strength low allow steel with heavy, semi-finished hexagon nuts meeting the requirements for ASTM Designation A325 Type 3. Finish shall be shopcoat enamel.

The couplings shall be capable of being assembled in a manner to insure permanently water right joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench bottom gradient, etc.

Unless otherwise indicated on the Plans or in the Special Provisions, the Contractor shall provide all excavations for taps, tie-in connections, and meter installations. The excavations shall be made in accordance with Standard Drawing SD-3. The Contractor shall furnish and install all pipe, fittings and valve boxes as required in these Standard Specifications.

In the connection of new water mains to existing mains, any offset in horizontal or vertical alignment between the exposed ends of new and existing water main pipes that is six inches (6") or greater shall be taken up by the use of elbow fittings. Deflection of the pipe joints and/or the use of flexible couplings shall not be permitted.

Unless otherwise indicated on the Plans or in the Special Provisions, the Contractor shall pay all fees for taps, tie-in connections, and meters. Fees for taps, tie-in connections, and meters shall be paid in advance at the Water Division Administration Office. Fees shall be paid after the "Notice to Proceed" has been issued, and prior to the work being done by the Water Division. For current fee information, call 449-5371.

27-17 SETTING, ADJUSTING AND LOCATING VALVE BOXES

For all new water valves installed, the Contractor shall furnish and install all valve boxes, covers, drop caps, and steel risers in accordance with Standard Drawings SD-8 and SD-9. In construction areas involving elevation changes or where existing valve boxes or risers are disturbed or as indicated on the Plans, the Contractor will furnish and adjust to final grade all existing valve boxes in accordance with Standard Drawings SD-8, SD-9 and SD-11 unless otherwise indicated on the Plans or in the Special Provisions. All non-steel risers shall be replaced with steel risers in accordance with Standard Drawings SD-8 and SD-11. Valve boxes of the Napa and Sacramento types and in undamaged condition may be reused by the Contractor when approved by the Engineer.

All water valve boxes removed for subsequent reinstallation to allow reconstruction of existing streets shall be temporarily replaced with a protective metal container such as five (5) gallon bucket or pail. The temporary metal container shall cover the riser over the valve and will assist in keeping the location of the valves visible during street reconstruction activities. The risers at each valve shall be kept free of debris and the valve operating nut left exposed.

Prior to construction the Contractor shall be required to furnish locations or swing ties to all existing valves within the streets to be resurfaced. A copy of the valve location measurements shall be provided for the Engineer prior to any street construction or resurfacing.

27-18 ADJUSTING AIR RELEASE VALVES

The Contractor shall install new or adjust existing air valve box or manhole head and cover in accordance with Standard Drawing SD-13.

All precast concrete sections used to construct the vaults or manholes for air release valves shall be set in Portland Cement grout or mortar. The mixing of the grout or mortar shall meet the requirements set forth in Section 10-37 of these Standard Specifications.

The interior and exterior surfaces of the joints of the precast concrete sections shall be coated with Portland Cement grout or mortar. The precast sections shall be cleaned and moistened immediately prior to setting the sections in the grout or mortar. A moistened brush shall be used to apply and smooth the grout or mortar to the interior and exterior joint surfaces of the precast concrete sections.

27-19 PAYMENT FOR FURNISHING AND INSTALLING WATER DISTRIBUTION SYSTEMS

Unless unit bid prices are required by the Special Provisions, payment for the item "Water Distribution System to construct" shall be made at the Contract lump sum price. Such payment shall be full compensation for furnishing all labor, material, tools, and equipment and doing all work involved in cutting, trenching, laying, blocking, making connections, disinfecting, testing, backfilling, and paving or repaving, as required herein, on the Plans or in the Special Provisions.

LAYING CULVERT AND DRAIN

28-1 LAYING METAL PIPE CULVERTS

Corrugated metal pipe culvert shall conform to Section 10-23 of these Specifications. Except as may be otherwise shown on the Plans or set forth in the Special Provisions, the laying of the pipe shall conform to the requirements of Section 66 of the State Specifications.

Field assembled plate culvert shall conform to Section 10-24 of these Specifications and shall also be placed as set forth in Section 67 of the State Specifications.

28-2 LAYING SUBSURFACE DRAINS

Vitrified clay drain tile shall conform to Section 10-17 of these Specifications and shall be laid as set forth in the State Specifications.

The price bid per foot shall include full compensation for furnishing and laying the pipe, furnishing and placing the filter material, excavation and backfill, and doing all work necessary to place the drain tile as shown on the Plans.

28-3 SPECIAL FOUNDATION TREATMENT

Whenever the bottom of the trench is soft, rocky or in the opinion of the Engineer otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed to a depth such that when replaced with a suitable material, it will provide a stable and satisfactory foundation. Suitable material for backfilling the trench below the pipe shall consist of select material approved by the Engineer compacted to a relative compaction of not less than ninety percent (90%). Alternate backfill materials and methods may be used with the approval of the Engineer.

28-4 PAYMENT

The price bid per foot for laying corrugated metal pipe culvert, field assembled plate culvert, or vitrified drain tile, shall include full compensation for furnishing and laying the pipe, furnishing, and placing filter material, excavation and backfill, special foundation treatment, and doing all work necessary to place the pipe as shown on the Plans.

MOVING OR CHANGING UTILITIES AND WATER SERVICES

29-1 UTILITIES AND FRANCHISES

In case it should be necessary to move the property of any owner of a public utility or franchise, such owner will be notified by the City Engineer to move such property within a specified reasonable time, and the Contractor shall not interfere with such property until after the expiration of the time specified and then, only with the permission of the Engineer.

The right is reserved to the City and to owners of public utilities and franchises to enter upon the street for the purpose of making necessary repairs or making changes in their property made necessary by the work.

29-2 PROVISION FOR UTILITY CONNECTIONS

The City of Sacramento reserves the right to construct or reconstruct any sewer or sewers and appurtenances, to lay or adjust any water mains and appurtenances, or install or adjust any public utility and to grant permits to lay gas mains, conduits, and other utilities and to make connections thereto, at any time during the work.

The Contractor shall not interfere with or place any impediment in the way of any person or persons who may be engaged in doing such work.

The City of Sacramento reserves the right to suspend the work on any part of an improvement at any time during the construction of the same, for the purpose above stated.

CAST-IN-PLACE CONCRETE PIPE

30-1 DESCRIPTION

Cast-in-place concrete pipe shall consist of Portland Cement concrete placed in a prepared trench at the locations shown on the Plans and as specified in these Specifications. The Engineer may deny the use of cast-in-place concrete pipe, if in his judgement local conditions make the use of such pipe undesirable.

30-2 PIPE MAKING EQUIPMENT

The pipe shall be constructed with equipment specially designed for constructing cast-in-place concrete pipe. The equipment shall be acceptable to the Engineer and the Contractor may be required to furnish evidence of successful operation on other work of the equipment he proposes to use. Equipment not suitable to produce the quality of work required for the pipeline will not be permitted to operate on the work.

30-3 TRENCH EXCAVATION

The trench shall be excavated to the lines and grades necessary so that the lines and grades of the completed pipe will be as shown on the Plans and within the tolerance specified in these Specifications. The trench shall be of the proper width and the bottom of the trench shall be shaped to the external diameter of the pipe to be constructed. The bottom of the trench shall be prepared to provide full, firm, uniform support by undisturbed earth or compacted fill over a minimum of the bottom one hundred eighty degrees (180°) of the outside of the pipe.

At the end of each working day, the maximum amount of trench open on any one (1) portion of the project shall be one and one half $(1\frac{1}{2})$ times the length of open trench necessary for placing pipe the next working day, plus the trench in which pipe was placed during the previous twenty-four (24) hours, unless otherwise directed by the Engineer. The remainder of the trench shall be backfilled and compacted.

The Contractor shall comply with the requirements set forth in Section 6-7, "Trench Safety Plans", of these Specifications.

30-4 SPECIAL FOUNDATION TREATMENT

Whenever the bottom of the trench is soft, rocky or in the opinion of the Engineer otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed to a depth such that when replaced with a suitable material, it will provide a stable and satisfactory foundation. Suitable materials for backfilling the trench below the pipe shall consist of select material approved by the Engineer compacted to a relative compaction of not less than ninety percent (90%). Alternate backfill materials and methods may be used with the approval of the Engineer.

30-5 CONCRETE

Concrete shall be Class "A" and shall conform to the requirements of Section 90 of the State Specifications, as modified herein. Type II cement shall be used.

1. Maximum Aggregate Size:

Pipe Size_ Maximum_Aggregate

 48" or less
 1"

 Over 48"
 $1\frac{1}{2}$ "

Gradation for combined aggregates shall conform to Section 90-3.04 of the State Specifications.

2.

Slump shall not exceed two inches (2") as determined by the slump cone method of ASTM Designation C143 or an equivalent slump as determined by California Test 533, unless otherwise permitted by the Engineer.

The minimum wall thickness for the various sizes of pipe shall conform to the following table:

Internal	Minimum Wall
<u>Diameter</u>	Thickness
24" thru 30"	. 3"
33" and 36"	3 <u>1</u> "
42"	4"
48"	5"
54"	5 1 "
60"	6"
66"	6 <u>1</u> "
72"	7".
78"	7 <u>±</u> "
84"	8
90"	8 <u>1</u> "
96"	9"
108"	10"
120"	12"
132"	14"
144"	15"

4. Compressive strength of the concrete shall not be less than 700 psi at one (1) day, not be less than 1400 psi at three (3) days, not less that 2100 psi at seven (7) days and not less than 3500 psi at twenty-eight (28) days, as determined by moist-cured test cylinders.

30-6 PLACING CONCRETE

3.

Prior to placing any pipe, the Contractor must secure the Engineer's approval of the excavated trench. The applicable provisions of Section 51-1.09 of the State Specifications shall govern the placing and vibration of the concrete. All surfaces against which concrete is to be placed shall be free from standing water, mud, debris and shall be firm enough to prevent contamination of the concrete by earth or other foreign material. Absorptive surfaces against which concrete is to be placed shall be moistened thoroughly so that the moisture will not be drawn from the freshly placed concrete.

An approved method or device shall be used when placing invert concrete to insure that thickness is maintained at not less than minimum wall thickness at any point. Approval of this method or device must be obtained from the Engineer prior to commencement of work. The cast-in-place pipe shall be constructed in one (1) placement around the complete periphery.

The temperature of concrete when it is being placed shall be not more than 90° F. and not less than 40° F. in moderate weather or not less than 50° F. in weather during which the mean daily temperature in the vicinity of the work site falls below 40° F. for more than one (1) day the concrete shall be maintained at a temperature not lower than 50° F. for at least seventy-two (72) hours after it is placed. Concrete shall be protected against freezing temperatures for three (3) days immediately following the seventy-two (72) hours of protection at 50° F. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90° F., the Contractor shall employ effective means, such as precooling of aggregates and mixing water and placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90° F.

30-7 START AND CLOSE SECTIONS

A starter section may be used at the beginning of each run of cast-in-place concrete pipe, such as beginning from an existing structure, or from a manhole, at a change in size or from a manhole at an angle point. Starter sections shall be approximately six feet (6') in length and of the same inside diameter as the castin-place concrete pipe, unless otherwise approved by the Engineer. The strength of the reinforced concrete starter section shall be as indicated on the Plans and shall be placed in accordance with the requirements of these Specifications.

A closing section shall be used when directed by the Engineer or where it is not possible to complete a run of cast-in-place concrete pipe because of lack of clearance ahead in the trench.

30-8 CONSTRUCTION JOINTS

If construction of the pipe stops short of a manhole or for a period of time exceeding twenty (20) minutes, the resulting construction joint shall be reinforced with a concrete collar. This collar shall extend one foot (1') either side of the joint and shall be a minimum thickness equal to that of the pipe. The resulting end of pipe shall be securely closed by a heavy canvas or equal to prevent excessive dehydration of the concrete already placed.

Joints shall be clean and damp when covered with fresh concrete or mortar. Cleaning of construction joints shall consist of removing all laitance, loose or defective concrete, coating and foreign material.

30-9 FINISH

Flowline elevations of the complete pipe shall not vary more than 0.05 feet from the design grade. Variations in the internal diameter shall not exceed one thirty-second inch (1/32") per diameter inch. (Example: for 24 inch pipe 1/32 X 24 inches = 3/4 inch. variation). Offsets at form laps shall not exceed the limits specified in the following table:

Pipe	Maximu	n
<u>Diameter</u>	Offset	
24" thru 30 "	·	3/8"
33" thru 42"	•	1 <u>1</u> "
48" thru 66"	••••••	5/8"
72" thru 90"	••••••••••••••	7/8"
96" and 108"	•••••	1"
120" and large	er	1-1/8"

The finished surface of the concrete pipe shall be substantially free of fractures, cracks and interior surface roughness.

The Contractor will be required to hand trowel the bottom ninety degrees (90°) of the inside of the pipe unless alternate provisions are made to provide a smooth interior surface satisfactory to the Engineer. The remaining interior surface of the pipe not covered by forms shall be equivalent to a steel screeded finish. All extraneous concrete shall be removed from the interior surface as soon as possible after placing. Any additional finish work or repair work required to be done on the pipe shall be completed within five (5) days after the pipe is placed.

If obvious segregation or honeycombing or inadequate wall thickness are encountered during inspection, the pipe may be rejected by the Engineer.

30-10 FORMS

Forms shall be strong enough to withstand the vibrating of the concrete and to permit workmen to place the concrete without causing distortion at any point. Form support systems shall be constructed so that previously placed concrete shall not be damaged. Form structure bearing plate indentations shall not exceed one-eight inch (1/8") and care shall be taken when removing the forms to prevent damage to the pipe. After removal of the forms, the inside of the pipe shall be inspected by the Engineer and any repairs made promptly, at the expense of the Contractor.

30-11 CURING

Immediately after finishing exposed exterior surfaces, the curing of these surfaces shall be undertaken by any one (1) or a combination of the following methods:

1. Pigmented sealing compound, blanketing, cotton mat, polyethylene film or spraying methods as specified in Section 90-7.01 of the State Specifications.

A six inch (6") layer of moist earth may be backfilled over the pipe. Care must be taken to avoid damage to the fresh concrete while placing the backfill. This backfill shall be kept moist for not less than seven (7) days.

During the curing period following placement of the concrete, the ends of the pipeline shall be securely closed with heavy canvas or by other methods approved by the Engineer.

30-12 QUALITY CONTROL

2

Field quality control for construction of a cast-in-place concrete pipe will be exercised by means of a representative of the Engineer being present for testing and inspection at all times while pipe is being constructed. No cast-in-place pipe may be constructed unless such representative of the Engineer is present.

A slump test will be made of each truck load of concrete before it is permitted to be placed in the pipe casting machine.

Any load whose slump exceeds the specified slump by more than one-half inch $(\frac{1}{2}")$ will be wasted. At least three (3) compressive test cylinders will be cast from representative portions of each load of concrete. Each cylinder shall have recorded the line, station number, date and batch ticket number. Compression tests will be made at the City's expense. Concrete compressive strength shall be determined from six inch by twelve inch (6" X 12") cylinders conforming to ASTM Designation C31, tested in conformance with ASTM Designation C39.

One (1) cylinder of each set will be tested after curing for two (2) days and seven (7) days, at the option of the Engineer. The other cylinder of the set will be held for testing in the event that the Engineer wishes to retest any batch.

If more than two (2) cylinders tested in any day's pour fall more than ten percent (10%) below the minimum specified compressive strength, cores will be taken from the pipe and tested for compressive strength at the expense of the Contractor. If cores indicate concrete strength more than twenty percent (20%) below the minimum specified compressive strength, that portion of pipe shall be removed and replaced with precast concrete pipe at the expense of the Contractor.

30-13 REIMBURSEMENT FOR FIELD QUALITY CONTROL

The City has determined that there is an additional special cost to the City for field quality control of cast-in-place concrete pipe over and above that required for other types of underground construction. This additional cost is fixed at the amount set forth below and shall be reimbursed to the City in order that bids received for various pipe materials and methods of construction will be comparable in total cost. This reimbursement shall be made by deducting from the monies due the Contractor the following amounts per foot of each size of cast-in-place concrete pipe for which payment is made to the Contractor:

Size	Amount Per Foot
24" thru 42" 48" thru 96" Over 96"	

30-14 BACKFILL

1. Initial Backfill - Initial backfill shall be the material placed between the top of the pipe shoulder in contact with the trench and a point twelve inches (12") above the top of the pipe. Initial backfill may be selected from job excavated material so as to be finely divided and free from debris, organic matter and pieces larger than one inch (1"). The material shall be placed immediately after the pipe has been completed, inspected and passed by the Engineer and permission to backfill has been obtained from the Engineer. The material shall be carefully placed so as not to disturb or damage the pipe and shall be brought up evenly on both sides.

The material shall be compacted to a relative compaction of at least ninety percent (90%) as determined by ASTM Designation D1557. Jetting will not be allowed during placement of initial backfill.

As an alternate to job excavated material, initial backfill may consist of imported crushed rock, of which one hundred percent (100%) shall pass a three-fourths inch (3/4") sieve and which shall have a minimum Cleanliness Value of fifty (50) as determined by California Test 227.

2. Intermediate and Final Backfill – Intermediate and final trench backfill shall conform to Section 26-6 of these Specifications.

30-15 LOADING DURING CURING

No backfill other than a six inch (6") layer permitted for curing purposes shall be placed until the tests designated have been made and permission to backfill has been obtained from the Engineer. Depth of backfill over the top of the pipe shall not exceed twelve inches (12") until the concrete compressive strength reaches 700 psi or the pipe has been in place twenty-four (24) hours, whichever is longer. Light traffic (axle load less than 6000 pounds) may be routed over the pipe when loosely backfilled and prior to jetting. Unrestricted traffic may be permitted over the pipe when the concrete strength reaches 1400 psi or the pipe has been in place for seventy-two (72) hours, whichever is longer. In all cases, the Contractor shall be responsible for correcting any damage to cast-in-place concrete pipe caused by premature or excessive loading prior to the end of a seven (7) day curing period.

30-16 OTHER REQUIREMENTS

Unless otherwise noted herein, the placement of case-in-place concrete pipe shall conform to the requirements of Section 26 of these Specifications.

30-17 PAYMENT FOR CAST-IN-PLACE CONCRETE PIPE

Pipe will be at a price per lineal foot which shall include full compensation for excavation, bedding material, backfill, special foundation treatment, furnishing equipment, materials, and construction of pipe, and all other work necessary to construct the cast-in-place concrete pipe as shown on the Plans.

CONSTRUCTION OF CHAIN LINK FENCE

31-1 MATERIAL IN FENCE

Chain link fence shall conform to Section 10-39 of these Specifications.

31-2 CONSTRUCTING FENCE

Chain link fence shall be constructed as shown on the Plans and a height therein specified. The line of the fence shall be cleared of all obstructions and surface irregularities and the bottom of the fence shall be to uniform grade as may be established by the Engineer. The posts shall be spaced not more than ten feet (10') apart and at points specifically shown on the Plans. Terminal posts and gate posts shall be set thirty-six inches (36") in concrete bases. Line posts shall be set thirty inches (30") in concrete bases. Concrete shall be Class "C" as set forth in these Specifications. Concrete bases for terminal, gate and line posts shall be allowed to cure for not less than seven (7) days before wire fabric is placed. Concrete bases on line posts shall cure not less than seven (7) days before wire fabric is placed. Stretcher bar and truss bands shall be spread and slipped on end, corner, pull, brace, and gate posts before installation of top rails. Extension joints shall be provided for rails at intervals of one hundred feet (100'). Bottom tension wire shall be seven (7) gauge galvanized coil spring steel.

The placing of the rails, braces, and the wire fabric shall be accomplished in such a manner that the finished fence shall be taut, true, and of precise workmanship throughout. The fabric shall be stretched so that no slack sections remain at any point. The fabric shall be securely tied to posts and rails in a manner so that the fabric will remain tight and immovable. Gates shall be so set that they are true and will swing freely in the direction indicated on the Plans.

31-3 REDWOOD SLATS

When shown on the Plans or specified in the Special Provisions, chain link fence shall be constructed with redwood slats. The slats shall be inserted vertically into each mesh of the wire fabric. The slats shall be fastened in position by the weaving machine which shall produce a bow knuckle at both ends of the slats. No staples in the slats are permitted. The slats shall be stained with a high quality stain to provide a permanent red color background.

31-4 PAYMENT FOR FENCING

Unless otherwise provided by the Special Provisions, payment for chain link fencing and chain link fencing with redwood slats shall be at a price per lineal foot. Gates shall be paid for separately at a price per lineal foot. Payment shall include full compensation for furnishing all fencing material, labor, equipment, concrete, or other materials needed to construct the fence at the location shown on the Plans.

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MISCELLANEOUS FACILITIES

32-1 TEMPORARY STREET SIGNS

Temporary street signs shall conform to this Section 32-1 and Section 38 of these Specifications. The signs shall be placed as shown on the Plans. Their exact location and orientation shall be designated by the Engineer.

The dimensions of the materials shall be as shown in Section 38. The post shall be either redwood or Douglas Fir. Douglas Fir shall be treated with a wood preservative in conformance with Section 58 of the State Specifications. The signboard shall be exterior plywood. Paint shall be a quality latex base for exterior wood.

The sign shall have black letters on a white background. Gothic letters similar to those in Section 38 shall be used. The lettering shall be four inches (4") in height with a stroke width of no less than one-half inch $(\frac{1}{2}")$ or more than three-fourths inch (3/4"). Numeral suffixes, i.e., st, nd, rd, and th, shall be two inches (2") in height with a stroke width of no less than one-fourth inch $(\frac{1}{4}")$ or more than three-eighths inch (3/8"). The back of the sign-board and the post shall also be painted white.

Each sign-board shall be fastened to the post by bolts. The bottom of the sign shall be no less than seven feet (7') above the ground.

Payment for temporary street signs shall be the Contract price bid per each complete in place.

32-2 STREET BARRICADES

Street barricades shall conform to this Section 32-2 and Section 38 of these Specifications. The barricades shall be placed where shown on the Plans or designated by the Engineer.

Wood members shall be either redwood or Douglas Fir. Douglas Fir shall be treated with a wood preservative in conformance with Section 58 of the State Specifications.

A fully reflectorized sign 18 inches by 18 inches $(18" \times 18")$ (2.25 square feet) shall be placed on the barricade with bolts, nuts, and washers, and shall face on-coming traffic to designate dead end streets. All barricades shall be painted

32 (1)

white in color, with two (2) applications of a quality latex base paint for exterior wood.

Payment for street barricades shall be at a unit price for each barricade constructed. This price will include full compensation for constructing street barricades complete in place as shown on the Plans.

PNEUMATICALLY APPLIED MORTAR (Guniting)

33-1 GENERAL

This section refers to a premixed sand and cement, pneumatically applied by suitable mechanism and competent operators, and to which mixture water is added immediately previous to its expulsion from the nozzle. The pneumatically applied mortar shall be of thickness as shown on the Plans or called for in the Special Provisions. The resulting surface shall be uniform and free from humps or depressions.

33-2 MATERIALS

Cement shall conform to the requirements of Section 10-1 of these Specifications. Cement shall be Type II, unless otherwise specified in the Special Provisions.

Sand shall be clean, sharp, and free from clay, silt and loam. It shall be well graded and suitable for the purpose intended with no particles larger than threeeighths inch (3/8") in diameter.

The sand shall contain not less than three percent (3%) nor more than five percent (5%) moisture by weight.

33-3 PROPORTIONS

The proportion of cement to sand shall be based on dry and loose volume and shall not be less than one part Portland Cement to four and one-half parts sand. The water content shall be maintained at a practical minimum and not in excess of three (3) gallons per sack of cement as placed.

33-4 MIXING

Before being charged into the machine the cement and sand shall be thoroughly mixed dry in an approved power batch mixer equipped with a device for accurately measuring the quantity of sand and timing the mixing operation. The mixture shall be mixed for at least one and one-half $(1\frac{1}{2})$ minutes during which time the mixer shall rotate at a peripheral speed of two hundred feet (200') per minute. The dry mixed materials shall be used promptly after their preparation and any material which has been mixed for more than forty-five (45) minutes shall be wasted. Rebound shall not be used on any portion of the work.

33 (1)

33-5 PREPARATION OF SURFACE

When gunite is to be placed on an earth slope for embankment protection, the earth surface shall be cleaned of grass, roots, and other deleterious matter. The surface shall be made smooth and shall be well watered and compacted. Header board shall be placed as indicated on the Plans. All surfaces shall be damp, but not wet to the extent that free water may exist at the time of application.

When gunite is applied to steel or concrete structures the surface must be cleaned of all loose material and be damp, as above specified at the time of application of the material.

33-6 PLACING

The velocity of the material as it leaves the nozzle shall be such that minimum rebound occurs. Velocities of the material must be kept constant. The nozzle shall be held in such position and at such distance that the stream of flowing material will impinge at approximately right angles to the surface being covered and so that excessive impact will be avoided.

Pneumatic pressure at the machine shall not be less than thirty pounds per square inch (30 psi) when the length of hose does not exceed one hundred feet (100'). Pressure shall be increased five pounds per square inch (5 psi) for each additional fifty feet (50') of hose or fraction thereof. Water used for hydration at the nozzle shall be supplied at pressure of not less than fifteen pounds per square inch (15 psi) greater than the air pressure. The mortar must have uniform consistency at all times.

After the mortar has been applied to the surface as nearly as practicable to finished grade, the surface of the mortar shall be checked by screed. Low spots will be raised by additional application of mortar. The final surface of the mortar shall be finished with a wood float.

33-7 CURING AND PROTECTION

Curing shall be accomplished as set forth in Section 19-7 or Section 20-11 of these Specifications. The Contractor's attention is directed to Section 7-8, "Protection of Work, Persons, and Property Against Damage", of these Specifications.

The gunite shall be protected after placement in accordance with the requirements of Section 20-12 of these Specifications.
33-8 REINFORCEMENT

Reinforcement of the type shown on the Plans or called for by the Special Provisions shall be placed in the mortar as it is applied. Reinforcement shall be not less than one-quarter inch $(\frac{1}{4}")$ from unexposed faces and three-quarters inch (3/4") from exposed faces.

33-9 EXPANSION JOINTS

Expansion joint filler as described in Section 10-4 of these Specifications shall be used if so indicated of the Plans.

33-10 PAYMENT FOR GUNITING

Unless otherwise set forth in the Special Provisions, payment for placing mortar by this method shall be made at a price per square yard for doing all work and furnishing all labor, material, and equipment necessary to prepare the surface, to place the mortar and the reinforcement. This will include full compensation for furnishing cement, sand, water, reinforcement, and all other necessary materials. It will include compensation for necessary finishing of the mortar surface and for curing the same. No additional compensation will be allowed for rebound.

Section 34

ELECTRICAL

34-1 GENERAL

The electrical work to be done consists of furnishing all labor, materials, transportation, tools, equipment and appurtenances required for the complete installation of all electrical systems shown on the Plans, and as specified in these Specifications and the Special Provisions.

All equipment, materials and supplies shall be new and currently manufactured unless otherwise specified. All equipment shall be complete and in operation to the satisfaction of the Engineer at the time of acceptance of the work.

All incidental parts which are not shown on the Plans or specified herein and which are necessary to complete the traffic signal and street lighting systems shall be furnished and installed as though such parts were shown on the Plans or specified herein.

34-2 RULES AND REGULATIONS

Electrical equipment furnished shall conform to the standards of the National Electrical Manufacturers Association, the Underwriters' Laboratories, Inc., or the Electronic Industries Association, wherever applicable. All material and work shall conform, where applicable, to the requirements of the National Electrical Code; Title 8, California Administrative Code, Electrical Safety Orders; Rules for Over Head Electrical Line Construction, General Order No. 95 of the Public Utilities Commission; Standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI); and City of Sacramento ordinances governing such types of construction.

34-3 EQUIPMENT LIST AND DRAWINGS

Unless otherwise permitted in writing by the Engineer, the Contractor shall, within twenty (20) days following notification of award of the Contract, submit to the Engineer for approval a listing of equipment and material which he proposes to furnish and install. The list shall be complete as to name of manufacturer, size and catalog number of unit, and shall be supplemented by other data, including detailed scale drawings and wiring diagrams. A minimum of five (5) copies of the above data shall be submitted to the Engineer for review and approval.

The Contractor shall submit to the Engineer a statement from each vendor supplying electrical equipment, including but not limited to, traffic signal controllers, signal heads, standards, luminaires, service pedestals and all other electrical equipment indicating that the orders for the materials required for this contract have been received and accepted by said vendor. The confirmed date of delivery to the Contractor shall be indicated on the statement.

Prior to acceptance of the work, the Contractor shall submit to the Engineer a "Record Drawing" showing in detail all construction changes, especially location and depth of conduit and completed schematic circuit diagram. All construction changes, if any, shall be entered onto the Record Drawing by the Contractor at the end of each work day and the plan shall be available for inspection by the Engineer at any time.

34-4 SCHEDULING OF WORK

The Contractor shall not perform any electrical work above ground at any location until all electrical materials for that location have been received by the Contractor and are on the project site. The Contractor may place electrical service pedestals and underground materials such as conduit, pull boxes and foundations prior to receiving all electrical materials, upon approval of the Engineer.

34-5 MAINTENANCE OF TRAFFIC AND PUBLIC SAFETY

The Contractor shall furnish all labor, materials, tools, equipment and incidentals required for the maintenance of traffic and public safety to adequately safeguard the general public and the work in accordance with the requirements of Section 6-9 of these Specifications.

34-6 PROTECTION OF EXISTING IMPROVEMENTS

Existing improvements, utility and adjacent property shall be protected from damage resulting from the Contractor's operations. All trees, shrubbery, fences, walls and other improvements including existing pavements, sidewalks, street improvements and underground utilities and other improvements not to be removed under this contract shall be protected from damage by the Contractor throughout the construction period.

The Contractor shall notify the Traffic Signal Maintenance Section of the Transportation Division twenty-four (24) hours prior to key cutting or planing within three hundred feet (300') of any signalized intersection to enable location of buried detector or signal interconnect wiring to be identified. All painted or other disfiguring markings on the pavement, sidewalk or gutters shall be removed by the Contractor before acceptance of the work.

The Contractor shall be liable for costs or repairing damage to existing improvements.

34-7 MAINTAINING EXISTING ELECTRICAL FACILITIES

All existing electroliers shall be maintained in operation until replacement electroliers are energized, as directed by the Engineer.

All traffic signal heads and pedestrian signal heads installed but not operational shall be entirely covered with burlap and securely tied to prevent exposure of signal head face to vehicular or pedestrian traffic.

The modification of existing traffic signal intersections may require the temporary shutdown of the traffic signals. The Contractor shall take all steps necessary to keep traffic signal intersection downtime to a minimum. The work shall be scheduled so that the downtime of each intersection shall be four (4) hours maximum and shall occur during the hours of 9 A.M. and 3 P.M. The Contractor shall notify the Engineer five (5) working days prior to a traffic signal intersection shutdown.

34-8 FOUNDATIONS

Foundations for posts, standards, pedestals and other appurtenances shall be Class "A" Portland Cement concrete conforming to Section 10-5 of these Specifications.

Foundations for standards shall be poured monolithically. The bottom of the standard shall be one to two inches above the top of the foundation. Grout shall be placed from the top of the foundation to the bottom of the standard. The exposed portion of the foundation shall be formed to present a neat appearance. Tops of foundations for posts and standards, except special foundations, shall be finished to curb or sidewalk grade as shown on the Plan or as directed by the Engineer.

When a foundation is to be abandoned in place, the top of foundation, anchor bolts and conduits shall be removed to a depth of two feet (2') below the surface of sidewalk or unimproved ground. The resulting hole shall be backfilled with material equivalent to the surrounding material.

34-9 EXCAVATING AND BACKFILLING

The excavations required for the installation of conduit, foundations and other appurtenances shall be performed in such a manner as to cause the least possible injury to the streets, sidewalks and other improvements. All lawns or improvements disturbed in excavating shall be replaced or reconstructed with the same kind of material as found on the work or with materials of equal quality. The trenches shall not be excavated wider than necessary for the proper installation of the electrical appurtenances and foundations. Excavating shall not be performed until immediately before installation of conduit and other appliances.

The material from the excavation shall be placed in a position that will not cause damage or obstruction to vehicular and pedestrian traffic nor interfere with surface drainage.

Permission to cut or disturb the pavement in any street must be obtained from the Engineer. The removal of existing pavement and concrete walks or driveways shall be by sawing the edges of the areas to be removed to a minimum depth of one and one-half inches $(1\frac{1}{2}")$ and digging out the old pavement or concrete. Whenever a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged, the entire square or slab shall be removed and replaced.

Backfill material shall be placed in six inch (6") layers. Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than ninetyfive percent (95%). Compacting of backfill material by pounding or jetting will not be permitted.

As soon as the backfill is completed at each location where pavement was cut, the Contractor will place the necessary temporary surfacing and later the permanent paving at the expense of the Contractor. The reconstruction of the concrete walks and driveways shall be as specified in Section 24 of these Specifications. The type of concrete used and its color shall match the adjacent concrete construction. The cost of said concrete work will be at the expense of the Contractor. Concrete sidewalks shall have a minimum thickness of three and one-half inches $(3\frac{1}{2}")$ and the minimum thickness of concrete driveways shall be six inches (6").

All surplus excavated material shall be removed and disposed of within forty-eight (48) hours by the Contractor. All sidewalks and gutters shall be washed down and swept clean.

34-10 CONDUITS

Conduits to be installed shall be either mild steel, rigid, hot dipped galvanized conduits or Schedule 40 polyvinyl chloride conduit. The same type of conduit shall be used for the entire system.

A. REQUIREMENTS FOR MILD STEEL, RIGID CONDUIT

The rigid steel conduit shall be thoroughly cleaned and all burrs removed. The use of thin-wall conduit and sheradized conduit is specifically prohibited for underground installation.

Exterior and interior surfaces of all conduit and fittings shall be uniformly and adequately zinc coated by the hot-dipped galvanizing process. The interior as well as the exterior of a six inch (6") sample cut from the center of a standard length of conduit when tested, shall not show a fixed deposit of copper after four, one-minute immersions in the standard copper sulphate solution.

The interior of the conduit shall have a continuous coating of lacquer or enamel. Each length shall bear the label of Underwriters' Laboratories, Inc. Installation shall conform to appropriate articles of the Code.

Rigid steel conduits shall be not less than one and one-half inches $(1\frac{1}{2}")$ in diameter. It will be the privilege of the Contractor, at his own expense, to use larger size conduit if desired. Where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted in any run. All conduit bends, except factory bends, shall have a radius of not less than six (6) times the inside diameter of the conduit. Where factory bends are not used, conduit shall be bent, with approved hydraulic bender, without crimping or flattening, using the longest radius practicable. All conduit ends shall be threaded and capped until wiring is started. When caps are removed, conduit ends shall be provided with approved conduit bushings.

Conduit stubs, caps, exposed threads and all standard screw joints shall be painted with zinc rich paint or an equal rust preventive paint.

в.

REQUIREMENTS FOR SCHEDULE 40 POLYVINYL CHLORIDE CONDUIT

Polyvinyl chloride conduit (PVC) shall be ninety degrees (90°) C rated and listed by the Underwriters Laboratories. Conduit shall be fabricated from polyvinyl chloride and shall conform to NEMA Standards. It shall be in conformance with Article 347 of the National Electrical Code. Conduit, fittings and cement shall be produced by the same manufacturer, who shall have at least five (5) years experience manufacturing the product. Material shall have a minimum tensile strength of 7,000 psi at $73.4^{\circ}F$; flexural strength of at least 11,000 psi and a minimum compressive strength of 8,600 psi. All joints shall be solvent welded in accordance with the manufacturer's recommendations.

All PVC conduits shall be not less than one and one-half inches $(1\frac{1}{2}")$ in diameter. It will be the privilege of the Contractor, at his own expense, to use larger size conduit if desired. Where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted in any run. All conduit ends shall be sealed in an approved manner until wiring is started. Unless otherwise specified, all PVC conduits shall contain one No. 10 green ground conductor.

C. REQUIREMENTS FOR CONDUIT INSTALLATION

The installation of conduit in lawn areas shall be done by approved boring method or by trenching. If trenching is used, Contractor shall first remove the sod before trenching. The removal of sod over jack holes or over trenches shall be done by a sod cutting machine. Removal of sod by other means will not be accepted. Each strip of sod removed shall be rolled into a neat roll without damage. All sod removed shall be replaced within fortyeight (48) hours.

The installation of conduits in paved streets shall be by approved jacking, drilling or trenching methods.

In sidewalk areas, conduit shall be laid to a depth of not less than eighteen inches (18") below the sidewalk grade. In all other areas, conduit shall be laid to a depth of not less than thirty inches (30") below the finished grade.

Conduit runs shown on the Plans to be located in the street, under street pavement, shall be installed in the street within a minimum of twelve inches (12") and a maximum of eighteen inches (18") of and parallel to the curb, by using the "Trenching Installation of Conduit in Paved Streets" method. Installation of conduits at street crossings may also be installed according to the said trenching method. All pull boxes shall be located behind curb in the sidewalk unless otherwise noted on the Plans.

When a conduit is shown on the Plans as lying in a straight line parallel to the curb line, sidewalk, or pavement edge, it shall not deviate more than six inches (6") to either side of the designated straight parallel line.

In order to determine that conduit is laid to the correct depth and in as straight a line as possible, the Contractor shall cause test or pilot holes to be dug at a spacing of not over seventy-five feet (75') and no such hole shall be backfilled until approved by the Engineer or his representative.

The bending of PVC conduit shall be by a hot box bender, and in lieu of jacking or boring, PVC conduit shall be installed by the drill rod method in which a drill rod is first installed and the PVC is pulled into the cavity made by the drilling rod as the rod is removed. At locations where conduit is not installed by the said trenching method, the conduit shall be installed by the drill rod method.

Before any wire is pulled in the conduit system, all conduit shall be swabbed out to remove any foreign material that is in the conduit. The removal of foreign material from the conduit with compressed air is approved.

Conduit entering controller cabinet or service cabinet shall be sealed to prevent the entrance of gases by the use of paraffin or other sealing compound approved by the Engineer.

Five inch (5") conduit nipples shall be attached by use of a coupling to any conduit run which terminates inside any signal standard. Top of nipple shall be two inches (2") above the finished grade of the signal standard foundation.

D.

TRENCHING INSTALLATION OF CONDUIT IN PAVED STREETS

Conduit shall be placed under existing pavement in a trench approximately two inches (2") wider than the outside diameter of the conduit to be installed. Trench shall not exceed six inches (6") in width. Conduit depth shall not exceed twelve inches (12") or conduit trade diameter plus ten inches (10"), whichever is greater, except that at pull boxes the trench may be hand dug to a required depth. The top of the installed conduit shall be a minimum of nine inches (9") below finish grade.

The outline of all areas of pavement to be removed shall be cut to a minimum depth of three inches (3") with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter outside the removal area. The trenching machine shall be shielded to prevent loose material from being thrown away from the machine. Loose material deposited on the pavement behind the cutting machine shall be removed from the pavement immediately and the pavement cleared to allow the passage of traffic. Only those traffic lanes occupied by the cutting machine and the cleanup operation shall be closed and they shall be opened as soon as the work has moved sufficiently to clear them.

The conduit shall be placed in the bottom of the trench and the trench shall be backfilled with commercial quality concrete containing not less than 564 pounds of Portland Cement per cubic yard to not less than 0.10 foot below the pavement surface. The concrete shall be tamped or vibrated to provide a dense material free from excessive voids and rock pockets.

The top 0.10 foot shall be backfilled with asphalt concrete produced from commercial quality paving asphalt and aggregates, and approved by the Engineer.

Spreading and compacting of asphalt concrete shall be performed by any method which will produce an asphalt concrete surfacing of uniform smoothness, texture, and density.

Excavation, installation of conduit and concrete backfill shall be completed within the same working day. Asphalt concrete backfill shall be completed within twenty-four (24) hours after excavation of trench.

Upon completion of all contract work, the trenches cut through existing pavement will be inspected and, if found necessary by the Engineer, they will be brought to grade with an appropriate asphaltic concrete mix. In addition to bringing the trenches to grade, the Engineer may require a twelve inch (12") wide fog seal centered over the trench pavement or between the trench pavement and the existing street pavement.

34-11 PULL BOXES

Pull boxes shall be installed in the sidewalk at the locations shown on the Plans or at locations designated by the Engineer at site of work. Contractor may, at his own expense, install such additional pull boxes as may be desired to facilitate the work.

Pull boxes shall be precast reinforced concrete boxes, unless otherwise noted. Each box shall be set in concrete with at least six inches (6") of concrete

on all four sides. The six inch (6") thick sides shall be not less than twelve inches (12") deep.

For signal systems, or combined signal and low voltage lighting systems, reinforced concrete covers shall be inscribed "Traffic Signals" and for lighting systems, reinforced concrete covers shall be inscribed "Street Lighting." ("High Voltage" where applicable). Covers shall be provided with two three-eighths inch (3/8") brass holddown bolts with brass washers and nuts. Nuts shall be recessed below the surface of the cover. If pull boxes are set in an area subject to vehicle traffic load they shall have a steel cover of suitable design to withstand such loads.

The bottom of all concrete boxes shall be left open and at least twelve inches (12") of crushed rock shall be placed below the box for drainage as shown on Plans or as directed by the Engineer. The crushed rock shall be installed prior to the installation of the conductors.

Unless otherwise specified, all pull boxes shall be CALTRANS Standard No. 5 size.

Pull box extension shall be furnished and installed where called for on the Plan. Where a pull box extension is to be installed over the ends of existing conduits, the conduit ends shall be raised or lowered so they will be a minimum of five inches (5") and a maximum of seven inches (7") below the underside of the pull box cover.

34-12 CONDUCTORS

Unless otherwise specified, conductors shall be single conductor, solid or stranded copper of the gauge shown on the Plans. Wire sizes shall be based on American Wire Gauge (AWG). Copper wire shall conform to the applicable portions of ASTM Designations B3 and B8. Contractor shall use color coded wires, using a different color for each circuit with continuous color maintained throughout each circuit. Color coding shall be as required by the Engineer or as detailed on the Plans or Special Provisions. Where permitted by the Engineer, conductor of the same color may be used on different circuits. These conductors shall be identified with approved metal tags.

Traffic signal and multiple circuit lighting conductors shall be rated for 600 volt operation. Unless otherwise specified, the insulation for the conductors shall be Type THW or Type THWN.

34-13 WIRING

Pulling wires shall be done with special care to avoid injury to the insulation. Hand power only shall be employed in pulling wire. Only powdered soapstone, graphite, or other inert lubricant shall be used. Wire and cable entering fixtures and boxes shall have definite drip loops arranged to prevent the carrying of water to current-carrying parts or to other conduits. Loops or bends in wires in the base of standards and pull boxes shall not be made less than a radius of five (5) times its diameter, to insure the safety of the insulation. At least thirty-six inches (36") of slack in each wire shall be left in each standard base and pull box.

Wires are not to be drawn into underground conduit until standards have been delivered and ready for erection.

All connections to wires shall be made as rapidly as possible after wires are drawn in. All cut ends shall be taped immediately. Care shall be taken to avoid injury to exposed ends of wires.

Conductor splices shall be jointed by a pigtail splice using a wirenut. The use of electrical spring connector of appropriate size is approved. All splices shall be taped in a manner approved by the Engineer. All splices shall be left with ends pointed up to allow water to run off of splice.

Soldering of pressure connectors may be omitted provided the connectors are applied with a ratchet type crimping tool which will not release the connector until the crimping operation is completed. The sleeve shall be compressed on each end.

34-14 BONDING AND GROUNDING

All metal conduit systems, standards, pedestals, ballast and transformer cases, service equipment, anchor bolts, etc., shall be made mechanically and electrically secure to form a continuous system and shall be effectively grounded. Grounding shall be in accordance with all applicable codes and regulations. Bonding and grounding jumpers shall be copper wire or copper strap with a minimum cross sectional area equivalent to a No. 8 AWG.

Bonding wire or strap shall be secured to the lower section of metal standard by brass or bronze bolts three-sixteenths inch (3/16") or larger.

In conduit systems where rigid steel conduit and PVC conduits are mixed, the following requirements apply:

- 1. The rigid steel conduit shall have an approved grounding bushing installed at the conduit end(s).
- 2. The green No. 10 grounding conductors in the PVC conduit shall be attached to a grounding bushing which shall be attached to the rigid steel conduit.

34-15 PAINTING

Existing equipment to be reused shall be painted in accordance with State Standard Specifications, Section 86-2.16 "Painting"; except that all existing painted standards, pedestals, controller cabinets, and other equipment shall be painted with two (2) applications of Aluminum Paint, Finish coat as specified in Section 91-2.08 of State Standard Specifications.

34-16 ELECTRIC SERVICE

The locations of service points shown on the Plans are approximate only. Contractor shall determine the exact locations from the Sacramento Municipal Utility District. Service conduits, service conductors, service grounds, metering and transformer pads where required shall be installed in accordance with the Utility District's requirements. Service equipment and enclosure shall be furnished and installed as detailed on the Plans and/or specified in the Special Provisions.

34-17 PANELBOARDS

Panelboards shall be of the type called for on the Plans. Each circuit breaker shall be permanently marked with its trip rating. Multipole breakers shall be of the common trip with single handle. Unless otherwise specified, each circuit breaker shall be equipped with a device for padlocking the breaker in the "on" or "off" position. Panelboards shall be equipped with copper bus bars with sizes based on a current carrying capacity of not over one thousand (1000) amperes per square inch of cross section.

Unless otherwise specified, enclosures of panel board shall be fabricated from code gauge galvanized metal or stainless steel. Enclosures shall be provided with a factory applied rust resistant prime coat and an enamel finish coat.

34-18 STANDARDS

The locations of standards for traffic signals and street lights shown on the Plan are approximate only. The exact location of each standard will be determined by the Engineer prior to installation. Each standard shall be anchored to the concrete foundation by galvanized steel anchor bolts, nuts, leveling nuts and washers in accordance with the Plans and the standards shall be installed in a true vertical position.

34-19 FIELD TEST

Prior to acceptance of the work, the Contractor shall cause the following tests to be made:

- 1. For continuity of each circuit.
- 2. For grounds in each circuit.
- 3. A megger test on each circuit.
- 4. A functional test in which it is demonstrated that each and every part of the system functions as specified or intended herein.

34-20 TRAFFIC SIGNAL CONTROLLER AND INTERSECTION TURN ON

Prior to the initial traffic signal intersection turn on, the Contractor shall perform the following functional tests in the presence of the Engineer:

- 1. All vehicular and pedestrian indications shall individually be turned on momentarily and proper operation and phasing shall be checked.
- 2. The controller shall be turned on with the vehicle and pedestrian indications turned off, all pedestrian pushbuttons and inductive loop detectors shall be checked for proper operation and phasing.
- 3. All vehicular and pedestrian signal heads shall be properly adjusted and covered.

If any system component or circuit does not operate properly, it shall be repaired and retested prior to traffic signal intersection turn on. After the successful completion of all tests, the Contractor shall request through the Engineer, a time and date for turn on.

Traffic signal intersection turn on may occur only between the hours of 9 A.M. and 3 P.M. on Tuesday, Wednesday or Thursday on a week with no scheduled holidays. The Contractor shall give the Engineer at least five (5) working days notice prior to the traffic signal intersection turn on.

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The intersection turn on date shall be subject to the approval of the Engineer. Contractor shall arrange to have a signal technician qualified to work on the controller and employed by the controller manufacturer or his representative present at the time of traffic signal intersection turn on.

In addition, Contractor shall provide sufficient personnel and equipment for the timely completion of the traffic signal intersection turn on. If in the opinion of the Engineer the Contractor has not provided sufficient personnel and equipment, the Engineer, at his discretion, may postpone the traffic signal turn on until such time as sufficient personnel and equipment are provided.

34-21 TRAFFIC SIGNAL CONTROLLER FUNCTIONAL TEST

A functional test shall be made on the new controller after installation. Contractor shall schedule the test upon the approval of the Engineer.

Prior to the functional test, Contractor shall first determine that all equipment as shown on the Plans or called for under these specifications are installed and operable.

The functional test shall not begin on a Friday or on the day preceding a legal holiday. The test shall be made between 9 A.M. and 2 P.M. by the Contractor in conjunction with the service engineer of the controller manufacturer in the presence of the Engineer and representatives of the City Traffic Engineer and Traffic Signal Maintenance Section of the Transportation Division.

Included as a part of the functional test is the continuous satisfactory operation of the signal system for a period of not less than five (5) working days. During the five (5) day test period, the Contractor and the authorized service engineer of the controller manufacturer shall be available at the job site within four (4) hours after notification to correct any malfunction which might develop in the signal system or the controller.

34-22 INSPECTION

In order to facilitate inspection by the Engineer, Contractor must observe the following procedure:

- 1. An electrical inspection permit must be obtained by the Contractor before work is started. No fee will be required.
- 2. Prior to final electrical inspection, Contractor must ascertain that:

(a) All standards are tightly secured.

34 (13)

- (b) All standards are true.
- (c) All standards are grounded with copper ground wire or strap with brass bolts and washers.
- (d) All conduit studs are bonded.
- (e) All exposed threads are painted.
- (f) All splices are taped and insulated in accordance with these Specifications.
- (g) Circuits are tagged with metal tags where required.
- 3. Concrete pull box covers shall be protected during construction. Damaged covers must be replaced with new covers by the Contractor.
- 4. The final coat of paint on standards, pedestals, service can, and other appliances shall be applied after the electrical system has been finally inspected and after all corrections to the electrical system have been made.

34-23 SALVAGE

All salvageable material and equipment removed from present installation which is not to be re-installed shall be delivered in good condition to the City Corporation Yard at 5730 24th Street, Sacramento, California.

The Contractor shall remove all signal heads, mounting brackets, luminaires, mast arms and appurtenances from all salvaged traffic signal and street lighting standards prior to delivery to the City Corporation Yard.

The Contractor shall provide for the safe transfer with no damage to the salvaged equipment. Any equipment broken or lost by the Contractor shall be replaced with equipment of equal quality at the expense of the Contractor.

Section 35

LANDSCAPE PLANTING

35-1 GENERAL

Landscape planting shall consist of preparing and planting areas as shown on the Plans, as specified in these Specifications and the Special Provisions and as directed by the Engineer or Landscape Architect.

35-2 CERTIFICATE OF COMPLIANCE

A Certificate of Compliance must be furnished to the Engineer with each lot of material delivered to the work and the lot so certified must 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 Plans and Specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

35-3 MEASUREMENT OF QUANTITIES

Measurement of Quantities shall be determined by the Engineer based on delivery tags presented at time of delivery. The Contractor shall give twenty-four (24) hours notice of all delivery dates and times. Materials delivered at such times that the Engineer is not present will not be counted.

35-4 MATERIALS

Materials shall conform to the provisions of Section 10 of these Specifications.

35-5 PREPARING PLANTING AREAS

The work involved in preparing planting areas shall be so conducted that existing flow lines will be maintained.

Material displaced by the Contractor's operations which interferes with drainage shall be removed and disposed of as directed by the Engineer.

Soil shall be cultivated until the condition of the soil is loose and finetextured to a depth of six inches (6").

The top two inches (2") shall be cleared of all stones and debris.

Rock and other debris, larger than one inch (1") in diameter, which are brought to the surface during soil preparation shall be disposed of outside the project limits by the Contractor.

Finish grade of all planting areas shall be reviewed and approved by the Engineer before proceeding with planting.

After the irrigation system has been installed and approved for use, and after the finish grade for all planting areas has been reviewed and approved by the Engineer, no further work shall be done in the areas except that the soil shall be kept wet for a period of fourteen (14) days to permit germination of weeds. The soil shall be evenly moist; not soggy, or with any standing water present.

After the fourteen (14) days, the area shall be allowed to dry to a condition that any spray equipment will not damage the existing grades.

Weeds shall be sprayed with an approved chemical, which controls both broadleaf plants and grasses, but which will not contaminate the soil, such as "Round-up". Substitutes shall be approved by the Landscape Architect.

The use of rubber-tired equipment will be permitted for cultivating operations, provided that any compaction caused by the equipment used is completely eradicated, to the satisfaction of the Engineer.

Soil in lawn areas adjacent to curbs or paved areas shall be graded so that after settlement, the soil will be one-half inch $(\frac{1}{2}")$ below the top of the curb or paving.

Holes shall be excavated and prepared in accordance with the following provisions. Water shall not be used for preparation of holes. Backfill material for the hole shall be mixture of soil amendment, iron sulfate and soil. The proportion of material per hole shall be one-half pound $(\frac{1}{2}$ lb.) of iron sulfate, the quantity of soil amendment as designated on the Plans, and sufficient soil so that after settlement, the backfill material in the hole will be even with finish grade. The materials shall be thoroughly mixed to the bottom of the hole so that they are evenly distributed and without clods or lumps.

35-6 WEED CONTROL

Bermuda grass and other weeds in the areas to be planted with shrubbery and groundcover shall be completely killed and then shall be removed. After planting above areas shall be treated with "Pre-Emergent", or approved equal.

Before applying any chemicals, the Contractor shall obtain from the Landscape Architect written approval of the materials to be used, the rate of application, method of application, name of applicator and area to which material is to be applied. If special permits are required for the materials to be used, they shall be obtained from the County Agricultural Commissioner and submitted with the request for the use of the materials.

35-7 PLANTING PLANTS AND SEED

Plants shall be planted in accordance with the following provisions and as directed by the Landscape Architect:

No planting will be allowed until all soil amendment delivery tags are received and quantities used are approved by the Landscape Architect. No planting shall be done in any area until the area concerned has been prepared in accordance with these Specifications and the Special Provisions and presents a neat and uniform appearance satisfactory to the Landscape Architect.

Planting will not be allowed in any area which in the opinion of the Landscape Architect is too wet or too dry or that is in any other way unacceptable for planting.

Where vines are to be planted against walls or fences, the plants shall be planted as close as possible to the wall or fence as shown on the Plans.

Where shrubs are shown on the Plans to be planted in groups, the outer rows shall be parallel to the nearest pavement or fence. Adjustment in the number or alignment of plants shall be made between the outer rows.

No more plants shall be placed at planting locations on any day than can be planted and watered on that day.

Containers shall be cut and plants shall be removed from the containers in such a manner that the ball of earth surrounding the roots remains intact, and they shall be planted and watered as hereinafter specified immediately after removal from the containers. Containers shall not be cut prior to delivery of the plants to the planting area. Roots of plants not in containers shall be kept moist and covered at all times, and shall not be exposed to the air except while actually being placed in the ground.

Plants shall be set in the backfill material in flat bottomed holes to such depth that after the soil has settled the top of the plant ball will be one inch (1") above the bottom of the basin or even with the surrounding soil where there is no basin. Plants shall be planted in such a manner that the roots will not be restricted or distorted. Soil shall not be compacted around the roots or ball of the plant during or after planting operations.

Any plants which have settled deeper or stand higher than specified in the above paragraph shall be adjusted to the required level or replaced at the option of the Contractor.

Groundcover plants in areas equipped with an irrigation system shall be planted in blocks which conform to the design of the irrigation system. The area covered by one unit of the irrigation system shall be as completely planted as possible, and then watered. Not more than one (1) hour shall elapse from the time any groundcover is planted until it has been watered, unless otherwise specified in the Special Provisions or authorized by the Landscape Architect or Engineer.

Groundcover plants shall be planted in moist soil and in neat, straight rows parallel to the nearest pavement or fence.

Plants shall be spaced as indicated on the Plans or in the Special Provisions. Plants in adjacent rows shall be staggered. Groundcover plants shall not be planted closer than three feet (3') to trees or shrubs nor closer than eighteen inches (18") to curbs, paved areas and fences, unless otherwise shown on the Plans.

Planting areas that have been compacted for any reason, either before or after planting, shall be recultivated by the Contractor, at his expense.

Trees, shrubs and vines in groundcover areas shall be planted before groundcover plants or cuttings are planted.

At the time the plants are planted, stakes shall be placed at certain plants and the plants shall be tied thereto. The plants to be staked and the size of stake and number of ties to be installed shall be as shown on the Plans or specified in the Special Provisions. Stakes shall be placed against, but not through, the plant ball and shall be placed on the side toward the prevailing wind, unless otherwise directed by the Landscape Architect. Ties shall be a cotton webbing material one inch (1") wide and approximately one-eighth inch (1/8") thick, or rubber ties, and shall be placed as shown on the plans. The tree tie shall form a figure eight by crossing the tie between the plant and stake. Each end of the tie then shall be wrapped one and one-half $(1\frac{1}{2})$ turns around the stake and securely tied.

Sow grass seed at the rate of twelve (12) pounds of pure viable seed per 1,000 square feet, sowing one-half $(\frac{1}{2})$ of the amount in each direction.

An even finish grade shall be maintained during seeding operations to insure proper surface drainage with ridges and depressions removed.

No seeding will be allowed between October 15 and March 15, without approval of the Landscape Architect.

Soil shall be watered so that the soil is moist, not soggy, or dried out.

When the grass reaches three inches (3") in height, Contractor shall mow it to a height of one and one-half inches $(1\frac{1}{2})$, on a weekly basis, if necessary.

From the time any plants are planted until the beginning of the plant establishment period, plants shall be watered, trash and debris shall be removed, weeds shall be controlled and replacements shall be made.

Full compensation for such work will be considered as included in the contract unit prices paid for landscape planting.

At the time of planting, commercial fertilizer shall be applied to all trees, shrubs, vines, groundcover areas and lawn areas as specified in the Special Provisions.

35-8 START OF MAINTENANCE PERIOD INSPECTION

After all planting work is completed, the Contractor shall schedule an inspection with the Engineer. The Landscape Architect shall test the irrigation system for coverage and review all plant materials for proper installation. The written approval of the completed work by the Engineer shall establish the beginning of the maintenance period. No partial approvals will be given.

35-9 WATERING

Water from facilities within the limits of the project may be obtained free of charge.

All plants shall be watered immediately after planting. Water shall be applied in a moderate stream until the backfill soil around and below the roots or ball of earth around the roots of each plant is thoroughly saturated.

Precautions shall be taken to prevent water from wetting vehicles, pedestrians and pavement. Any erosion or slippage of the soil caused by watering shall be repaired by the Contractor, at his expense.

Compliance with the provisions in this section shall not relieve the Contractor of his responsibility for the replacement of plants. Any additional watering measure required to maintain the plants in a growing condition shall be furnished by the Contractor, at his expense.

35-10 REPLACEMENT

All plants or lawn areas that show signs of failure to grow at any time or which are injured or damaged as to render them unsuitable for the purpose intended as determined by the Landscape Architect shall be removed and replaced. The Landscape Architect will inspect the work once each week or at longer intervals at his discretion and will mark or otherwise indicate all plants or lawn areas to be replaced. The Contractor shall complete replacement of unsuitable plants or lawn areas within one (1) week of such inspection.

Replacement plants shall be furnished and planted by the Contractor, at his expense. The Contractor and Landscape Architect may agree to the substitution of alternative species of plants to be used as replacements.

Any damage to the finish grading caused by re-planting operations and/or vandalism shall be repaired and re-planted by the Contractor, at his expense. Damage caused by premature or heavy use of facilities before final acceptance will be determined by the Engineer.

Lawn damage caused by vandalism or premature use shall be repaired and reseeded before final inspection but will not cause extension of the maintenance period.

Lawn failure caused by improper maintenance practices and/or weather shall be re-planted, and the maintenance period shall be extended to thirty (30) days after the re-planting, or as required by the Landscape Architect.

35-11 PLANT ESTABLISHMENT

Plant establishment work shall consist of caring for the landscape planting portion of the project.

Plant establishment period shall be thirty (30) calendar days and shall begin after all landscape work has been completed. Plant establishment shall continue until final acceptance of the work.

The time required for plant establishment work shall be considered as included in the total time limit specified for the Contract.

The Contractor will be required to fill trench settlement, adjust sprinkler heads, water plants, replace unsuitable plants and lawn areas, do weed, rodent and other pest control work as determined necessary by the Landscape Architect or Engineer.

Lawns shall be mowed when grass is three inches (3") high and shall be cut to a height of one and one-half inches $(1\frac{1}{2})$.

Lawn shall be mowed as often as necessary to maintain a maximum height of one and one-half inches $(1\frac{1}{2}")$.

Weed control, as specified in this section shall be performed as often as required to maintain the project in a neat and uniform condition at all times, as determined by the Engineer.

At the time of final acceptance of the work, all planted areas shall be in a weed free and/or neatly mowed condition and shall receive a second application of fertilizer as may be specified in the Special Provisions.

Surplus earth, papers, trash and debris, which accumulate in the planted areas shall be removed and disposed of and the planted areas shall be so cared for as to present a neat and clean condition at all times.

35-12 PRE-FINAL INSPECTION

Three (3) weeks after the start of maintenance inspection, the Engineer and the Landscape Architect will conduct a pre-final inspection. The City Parks Superintendent and the maintenance personnel who will be responsible for the project will be present to acquaint them with the operational requirements of the project. At this time, all systems will be tested, and a punch list will be prepared and presented to the Contractor.

35-13 FINAL INSPECTION

One (1) week after the pre-final inspection, or at a later date as requested by the Contractor, a final inspection will be held. If all items listed on the punch list are corrected and no other problems have developed, the project will be accepted and the Contractor will be relieved of responsibility for the work, except for warranties or guarantee. The Contractor shall schedule the final inspection with the Engineer, giving him two (2) working days notice.

At the time of acceptance of the project, all lawn areas shall be in a neatly mowed condition. All planting areas shall fertilized as specified in the Special Provisions.

35-14 PAYMENT

Payment shall be at the contract lump sum bid price for landscape planting which payment shall include full compensation for all labor, tools, equipment, materials and incidentals necessary to complete the item.

Section 36

IRRIGATION SYSTEM

36-1 GENERAL

Irrigation system shall include all appurtenances, incidentals and accessories required for proper installation and operation of the system.

36-2 MANUFACTURER'S WARRANTIES

Manufacturer's warranties, guarantees, instruction sheets and parts lists which are furnished with certain articles or materials incorporated in the work, shall be delivered to the Engineer before acceptance of the Contract.

36-3 GUARANTEE

The entire sprinkler system shall be guaranteed for a period of one (1) year from date of completion. Should any trouble develop within the time specified above due to faulty workmanship or materials, the trouble shall be corrected by the Contractor, without expense to the City.

Any settling of backfilled trenches which may occur during the one (1) year period after completion shall be repaired by the Contractor, without expense to the City, including the complete restoration of all damaged property.

36-4 RECORD DRAWINGS

The Contractor shall furnish the Engineer with "as built" drawings showing any changes in plans, location of pipe and valves, depth, etc. The irrigation system will not be accepted until "as-builts" are furnished and accepted.

36-5 WATER TAPS ON CITY MAINS

Unless otherwise set forth in the Special Provisions, all taps on existing City mains will be made by the City at the Contractor's expense. When such taps are made within the City street section, the City will do all work necessary to bring the water service to the edge of the right-of-way.

When taps are made in any location other than street sections, all excavations and backfill necessary for the connection shall be done by the Contractor. The Contractor shall make the necessary arrangements with the Water Division of the City to have City crews available to make the connection. No taps will be made until tap fees have been paid to the Water Division.

36-6 CONNECTIONS TO EXISTING PARK MAINS

Unless otherwise set forth in the Special Provisions, all connections to existing park mains including labor, excavation, cutting and furnishing necessary materials to do the work shall be done by the Contractor.

The Contractor will notify the Engineer twenty-four (24) hours prior to proposed connections.

City forces will make necessary shut-downs of existing facilities for the Contractor.

36-7 SALVAGE

Unless otherwise specified, all salvageable material and equipment removed from present installations which are not to be reinstalled shall be delivered in good condition to the Recreation and Parks Shop at the City Corporation Yard.

36-8 CONDUIT

Conduit shall conform to Section 34-10 of these Specifications, except that conduit for 24 volt irrigation control wire installed under pedestrian walks and paved areas within landscape project limits may be PVC Class 200 solvent weld pipe conforming to Section 10-45 of these Specifications.

36-9 BACKFLOW PREVENTION ASSEMBLIES

Backflow prevention assemblies shall conform to Section 10 of these Specifications.

Installation shall be in the location indicated on the Plans and shall conform to the drawings shown in Section 38 of these Specifications, unless otherwise shown on the Plans.

36-10 IRRIGATION PIPE AND FITTINGS

Pipe and fittings used in irrigation systems shall be in accordance with Section 10 of these Specifications.

The Special Provisions may designate that a particular type of pipe shall be used in which case the use of an alternate type of pipe shall not apply.

36-11 ELECTRIC AUTOMATIC CONTROLLERS

Electric automatic controllers shall be of the type shown on the Plans or specified in the Special Provisions and shall conform to Section 10 of these Specifications.

Installation shall be in the location indicated on the Plans or in the Special Provisions and shall conform to the drawings in Section 38 of these Specifications, unless otherwise indicated on the Plans.

Electrical service of electric automatic controllers shall conform to Section 34 of these Specifications.

36-12 ELECTRIC CONTROL CONDUCTORS

Irrigation control conductors shall conform to Section 10 of these Specifications and shall be installed in conformance with Section 34 of these Specifications and as amended in this section.

Conductors shall be buried directly in the ground a minimum of eighteen inches (18") below the surface and shall follow irrigation supply lines whenever possible, except that where conductors pass under paved areas, conductors shall be installed in conduit conforming to the provisions in Section 36-8 of these Specifications.

Conductors shall be run continuous without splices from controller enclosure to the valve boxes. Splices shall be clamped and sealed with waterproof connectors.

At least one foot (1') of slack shall be left in each conductor at each splice.

Conductors from controllers to valves shall be wrapped together with electrical tape at ten foot (10') intervals.

36-13 IRRIGATION CONTROL VALVES AND VALVE BOXES

Irrigation control valves and valve boxes shall be of the type shown on the Plans or specified in the Special Provisions and shall conform to Section 10 of these Specifications.

Installation shall be in the location indicated on the Plans and shall conform to the drawings shown in Section 38 of these Specifications, unless otherwise shown on the Plans or called for in the Special Provisions. Valves shown in groups may be installed in one large valve box or in individual boxes at the Contractor's option.

Valve boxes indicated to be installed at grade shall include valve box extensions as required.

36-14 VALVE MANIFOLDS

Valve manifolds shall be constructed of PVC Schedule 80 nipples and galvanized fittings.

36-15 TYPE B SPRINKLER RISER ASSEMBLIES

Type B Sprinkler Riser Assemblies shall be constructed as indicated on the drawings. Risers and cells shall be galvanized steel. Adapters shall be Class 1 or 2, PVC Schedule 40. The horizontal nipple shall be Flexible PVC complying with ASTM D2287 and D2466. This unit shall be equal to Excalibur Flexible PVC Nipple.

36-16 SWING JOINT ASSEMBLIES

Swing joint assemblies shall be constructed of galvanized steel pipe and marlex fittings conforming to Section 10 of these Specifications. All joints of swing joint assemblies shall be tightened one (1) turn beyond hand tight.

Installation shall conform to the drawings shown in Section 38 of these Specifications.

36-17 SPRINKLERS

Sprinklers and bubbler heads shall be of the type shown on the Plans or specified in the Special Provisions.

Sprinklers "Type B, C and D" shall be made theft resistant by applying "Loctite Retaining Compound No. 3, Catalog No. 35-31" on all pipe threads down to the first elbow underground. Mating threaded surfaces shall first be primed with "Locquic Primer T". This compound shall only be applied on male threads to prevent excess compound from entering the working mechanism of the sprinklers.

Sprinklers "Type C and D" including risers and stakes shall be painted gray.

Installation shall conform to the drawings shown in Section 38 of these Specifications.

36-18 QUICK COUPLING VALVES

Quick coupling valves shall conform to Section 10 of these Specifications.

Installation shall conform to the drawings shown in Section 38 of these Specifications.

36-19 TRENCHING FOR IRRIGATION PIPE

Trenches shall be dug to an even laying grade and to a depth sufficient to provide twenty-four inches (24") of cover over all pipe on the supply side of the irrigation valve and eighteen inches (18") of cover over all pipe on the discharge side of the irrigation valve. Trenches shall be excavated only as far in advance of pipe laying as is permitted by the Engineer. Excavated material shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Open trenches and piles of dirt will be so marked and lighted as to provide safety to all pedestrians and to vehicular traffic.

Trenches shall be of sufficient width to permit snaking of all plastic pipe not connected by rubber ring-tite fittings. Pipe connected with ring-tite fittings need not be snaked.

Trenches for plastic pipe shall be smooth and free of jagged rubble or sharp objects which will cause abrupt bending stress and uneven weight distribution during backfilling operation.

Rock, pavement and other debris encountered during trenching operation shall be removed and disposed of outside of the project limits at the Contractor's expense. The size and quantity of material to be disposed of will be determined by the Engineer.

36-20 INSTALLATION OF IRRIGATION AND POTABLE PIPE

Installation of irrigation and potable pipe shall be as shown on the Plans and in accordance with these Specifications and the Special Provisions.

Plastic pipe, including fittings, shall be installed according to the Manufacturer's directions and as directed by the Engineer.

Portland Cement concrete thrust blocking conforming to Standard Detail SD-7 shall be provided at each change in alignment and at the ends of plastic pipe (ring-tite) supply lines. Concrete for thrust blocking shall be Portland Cement concrete Class "C" and shall conform to Section 10-5 of these Specifications. The quantity of concrete used shall be as required to provide contact with undisturbed soil.

Plastic irrigation pipe shall be placed in trenches on level, undisturbed or well compacted earth and shall be snaked from side to side in the trench at intervals of approximately fifty feet (50'). Pipe shall be held down between joints with a small mounds of earth to prevent movement.

Foreign material shall be prevented from entering the irrigation system during installation. Immediately prior to assembling all pipes, valves and fittings, all valves shall be plugged or capped pending the attachment of additional pipe or fittings. All lines shall be thoroughly flushed out prior to attachment of terminal fittings.

Pipe shall be cut with a fine tooth hacksaw and any burrs shall be removed. The outside surface of the pipe and the inside surface of the fittings shall be wiped with a clean cloth to remove all dirt and moisture before the cement solution is applied. The cement solution shall be applied to the pipe and fitting socket with a brush having a width approximately three-quarters (3/4) of the depth of the socket. The cement solution shall be applied freely with a light wiping action to spread the cement uniformly over the surface. The pipe surfaces or fitting socket shall not be rubbed with the brush any more than is necessary to spread the cement. If the cement thickens, it shall be discarded. Solvent weld connections on the supply side of valves shall first be cleaned with Weld-on Solvent No. 660, or equal. Cement solution shall be Weld-on Solvent No. 715, or approved equal.

Immediately after the cement has been applied to the surface to be joined, the pipe shall be inserted into the fitting with a twisting motion to the full depth of the fitting socket. Immediately after joining is completed, any excess cement shall be thoroughly wiped from the pipe and fitting. The jointed members shall be allowed to cure for at least five (5) minutes before they are handled. An additional fitting or pipe section may be added to the completed joint within three (3) minutes if care is exercised in handling so that strain is not placed on the previous joint.

The male pipe threads of all threaded connections on PVC plastic pipe shall be coated with a joint compound suitable for use with plastic pipe.

36-21 TESTING OF IRRIGATION SYSTEM

After laying and before backfilling and compacting of irrigation main and laterals, they shall be tested for leakage and for sprinkler coverage.

A. Leakage Test for Irrigation Main - The section of main to be tested shall be flushed to remove all air from the line, capped and tested under full static pressure for a minimum of four (4) hours. Any leaks which develop in the portion of the system being inspected shall be repaired and all defective material shall be replaced.

At the Contractor's option a one (1) hour pressure test of one hundred pounds per square inch (100 psi) may be substituted for the above test.

The Contractor shall provide the necessary pump and equipment required for this test.

- B. Leakage Test for Irrigation Laterals Laterals shall be tested as specified above, except that the test period shall be a minimum of one (1) hour. The pipe shall be plugged or capped where sprinklers are to be installed while making this test.
- C. Sprinkler Coverage Test The risers for sprinklers on slopes shall be set approximately perpendicular to the slope. Each series of sprinklers shall be installed and test operated. Nozzles of all sprinklers and bubblers shall be adjusted for proper rate of flow and coverage. Sprinklers or bubblers shall be relocated as required to produce uniform coverage.

Extra sprinklers or bubblers required to produce uniform coverage as determined by the Engineer shall be paid for as extra work.

36-22 STERILIZING PLASTIC POTABLE PIPE

Sterilization of plastic potable pipe shall conform to Disinfection of Water Mains, Section 27-14 of these Specifications.

36-23 BACKFILL OF IRRIGATION PIPELINES

Backfill in street sections shall be as specified in Section 27-10 of these Specifications. Sand backfill is not required in planting areas.

Special backfill requirements may be set forth in the Special Provisions.

36-24 REPAVING

Repaying over trenches shall be as specified in Section 26-8 of these Specifications, unless otherwise set forth on the Plans or in the Special Provisions.

36-25 PAYMENT FOR IRRIGATION SYSTEM

Unless unit prices are required by the Special Provisions, payment for the item "Irrigation System" shall be made at the contract lump sum price. Such payment shall be full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in installing and testing of the Irrigation System as required herein, in the Special Provisions, on the Plans or by the Standard Details.

Section 37

BORING AND JACKING

37-1 GENERAL

All conductor pipe, pipe to be conducted and fittings shall conform to the applicable portions of these Specifications.

The equipment, method and sequence of operation and conductor pipe grades shall be approved by the Engineer before proceeding with the work.

Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing and shoring shall be adequate to protect workmen and any adjacent structure or roadbed. Special backfill requirements may be specified in the Special Provisions for pipe installed in the area excavated for the boring operations.

Unless expressly specified otherwise, the Contractor may elect to either jack out reinforced concrete pipe directly or place it in a conductor in conformance with these Specifications.

37-2 DIRECT JACKING OF REINFORCED CONCRETE PIPE OR REINFORCED CONCRETE PIPE SEWER

Only pipe using double-rubber gasket, fiberglass reinforced epoxy collar, or approved equal type joints may be jacked directly. The pipe must be designed to safely bear all loads imposed by jacking in addition to the design D-loads. Guide rails shall be accurately set to line and grade to insure installation within tolerances allowed. Maximum length of direct jacking shall be one hundred feet (100'). The diameter of the hole shall not be more than 0.1 foot greater than the outside diameter of the reinforced concrete pipe.

37-3 INSTALLATION OF CONDUCTOR

The conductor shall closely follow the boring operation. The bored hole shall not be more than 0.1 foot larger in diameter than the outside diameter of the conductor. Guide rails shall be accurately set to line and grade to insure installation of the conductor within allowable limits. Conductor diameter shall be sufficient to allow adjustment of line and grade of the conducted pipe to meet allowable tolerances and to allow sand to be placed between the conductor and the conducted pipe. Minimum conductor diameter shall be six inches (6") larger than the outside diameter of the conducted pipe joints.

37-4 PLACING PIPE IN CONDUCTOR

Conducted vitrified clay pipe, of which any part of the joint is larger in diameter than the barrel of the pipe, shall be strapped to two (2) redwood skids twenty-four to thirty inches (24" to 30") in length with steel straps. The redwood skids shall be near the center of each pipe section and shall be large enough to prevent any part of the joint from bearing on the conductor. Each joint of conducted water pipe or asbestos cement pipe shall be strapped to two (2) pairs of redwood skids, twenty-four to thirty inches (24" to 30") in length, centered at points approximately one-fifth (1/5) the pipe length from each end.

Conducted pipe with joints not larger than the pipe barrel shall be slid into place on two (2) redwood skids which have been securely fastened to the invert of the conductor or strapped to the barrel of the pipe, at locations herein before specified.

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Pipe sections shall be joined outside the conductor and then slid into place. The space between the conducted pipe and conductor shall be completely filled with clean, dry sand blown into place. The method of placing sand shall be subject to the Engineer's approval. Necessary adjustments in grade shall be made by adjusting the height of the skids.

37-5 BACKFILL OF VOIDS

Whenever, in the opinion of the Engineer, the nature of the soil indicates the likelihood of ground loss which would result in a greater space between the outer surface of the conductor or direct jacked pipe than herein allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least eighteen inches (18") from the leading edge of the conductor. The jacking head shall cover the upper two-thirds (2/3) of the conductor and project not more than one-half inch $(\frac{1}{4}")$ beyond the conductor outer surface.

Excavation shall not be made in advance of this jacking head.

Voids greater than allowable shall be filled with sand, soil cement, or grout as directed by the Engineer. Where voids are suspected, the Engineer may direct the Contractor to drill the conductor, to pressure inject grout to refusal, and then to repair the drilled hole. Grouting pressure shall not exceed fifty pounds per square inch (50 psi) at the nozzle.

37-6 TOLERANCES

Extreme care shall be exercised by the Contractor to maintain line and grade during jacking operations. Maximum deviation from stated line and grade of conductor pipe shall be such that line and grade of the conducted pipe can be adjusted a sufficient amount within the conductor pipe to achieve the line and grade shown on the Plans. This adjustment shall be made to all pipe deviating from line and grade and not merely to the sections of pipe nearest the end of the conductor.

Directly jacked reinforced concrete pipe will be allowed a maximum deviation of 0.25 foot per one hundred feet (100') from intended line and grade unless more stringent tolerances are shown on the Plans or directed by the Engineer.

37-7 BORING UNDER CURB, GUTTER AND SIDEWALK

Portions of sanitary sewers, house connections, drainage lines, and water mains which pass beneath curbs and gutters, sidewalks, and other obstructions may be placed by boring. If under the curb, gutter and sidewalk, the bore shall begin at the lip of the gutter and continue to slightly past the property line. The end of the pipe shall then be capped or plugged and the pipe pushed into the hole. If the length of bore is less than ten feet (10'), the property line end of the bore need not be exposed, in the case of a house connection. However, care should be taken to assure that the end of the house connection extends to the property line. The terminus of all house connections which are bored a distance of ten feet (10') or more shall be exposed, or bored to an excavation in order to determine final line and grade and to place the locating stake.

If the connection is vitrified clay pipe or asbestos-cement pipe it shall be plain end pipe connected with compression type couplings. The bore shall be just large enough to pass the couplings and need not be backfilled. The maximum length of bore shall be fifteen feet (15'), unless otherwise specified.

Boring shall not be used on house connections when the required slope is such that probable deviation of the bore from the intended line would result in a final slope of less than one-quarter inch $(\frac{1}{4})$ per foot.

37-8 DRILLING WITH BENTONITE

When required by the Special Provisions or permitted by the Engineer, conductor pipe may be placed by drilling with bentonite. Equipment, methods, sequence of operations, and proportions of bentonite, water, and soil shall be approved by the Engineer prior to drilling. The maximum drilled hole diameter shall be fourteen inches (14"); the minimum diameter shall be two inches (2"). The minimum wall thickness of the bentonite slurry shall be one inch (1"). Undermining of pavement or softening of the subgrade shall not be permitted. Voids shall be filled by injecting a bentonite slurry into the cavity. In soils where the clay content is high, other chemicals may be substituted for water in a quantity that will establish a workable mixture.

37-9 PAYMENT

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing by boring and jacking the respective sizes and types of pipe as indicated on the Plans and in the Proposal. Where specified or permitted, the pipe shall be placed in a conductor. The unit price bid per lineal foot of bored and jacked pipe shall include the conductor pipe, if specified or permitted, the pipe to be placed in the conductor, all excavation, backfill, and all other tools, material, labor, and equipment to complete the installation in accordance with the Plans and these Specifications.

Section 38

STANDARD DETAILS

CITY OF SACRAMENTO

STANDARD SPECIFICATIONS

FOR

PUBLIC WORKS CONSTRUCTION

STANDARD DRAWINGS

DRAWING NO.	TITLE
C.E. 1	Standard Curb and Gutter Details
C.E. 2	Driveway Details
C.E. 3A	Double Handicapped Ramp - C. and G. No. 4
C.E. 3B	Single Handicapped Ramp - C. and G. No. 4
C.E. 4	Handicapped Ramp - C. and G. No. 13
C.E. 5	Under Sidewalk Drain Detail
C.E. 6	Concrete Survey Monument
C.E. 7	Temporary Street Sign
C.E. 8	Street Barricade
C.E. 9	Sidewalk Barricade
C.E. 10	Pavement Widening Signs/Barricades
C.E. 11	Chain Link Fence and Gate
C.E. 12	Backfill and Resurfacing in Paved Areas

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C.E. 50	Type "B" Drop Inlet
C.E. 51	Modified Type "B" Drop Inlet
C.E. 52	Ditch Box
C.E. 53	Type "B" Grate
C.E. 54	Standard Manhole No. 3
C.E. 55	Standard Manhole No. 3A
C.E. 56	Standard Manhole No. 4
C.E. 57	Saddle Type Manhole
C.E. 58	Inside Drop Connection
C.E. 59	Standard Manhole Head 1, Cover A
C.E. 60	Standard Manhole Head 3, Head 4, Cover B
C.E. 61	Standard Manhole Head and Cover 1-C
C.E. 62	Gutter Drain No. 20
C.E. 63	Gutter Drain No. 21
C.E. 64	Gutter Drain No. 22
C.E. 65	Gutter Drain No. 24
C.E. 66	Optional Gutter Drain Grate
C.E. 67	Gutter Drain Ditch Installation
C.E. 68	Utility Crossing
C.E. 69	Flusher Branch
C.E. 70	Concrete Protective Covering

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SD 1	Fire Hydrant Installations
SD 2	Pipe Locating Wire for Non-conductive Water Mains
SD 3	Standard Water Service Taps 1" thru 2" and Tap Excavation Requirements
SD 4	Water Service Connections 1" thru 2"
SD 5	Standard 2" and 4" Blow-off
SD 6	Temporary 2" Sampling Device and Blow-off
SD 7	Changes in Main Elevation & Thrust Blocking for Water Mains
SD 8	Standard Valve Box Installation for City Streets, Alleys and Easements
SD 9	Standard Valve Box and Drop Cap
SD 10	Service Box Installations
SD 11 .	Standard Procedures for Raising Valve Boxes and Drop Caps
SD 12	Water Service Box and Covers
SD 13	1" and 2" Air and Vacuum and Air Release Valve Installation
SD 14	Valve Requirements for Dual Feed Water Service
SD 15	Backflow Prevention Assemblies
SD 16	Bedding, Initial and Trench Backfill for Water Mains 4" - 12"
LA 1	Installation of Sprinkler Controller
LA 2	Installation of Quick Coupling Valve
LA 3	Installation of Control Valve
LA 4	Installation of Sprinkler Heads

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GROOVING DETAIL





NOTES

- I. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH 1/4" GROOVES APPROX. 3/4" O.C. SEE GROOVING DETAIL. THE SURFACE OF RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SUR-ROUNDING SIDEWALK EXCEPT WHEN LOCATED IN CENTER OF CURB RETURN.
- 2. WHEN RAMP IS LOCATED IN CENTER OF CURB RETURN IT SHALL BE GROOVED IN A HERRINGBONE PATTERN WITH 1/4" GROOVES APPROX. I ¹/2" O.C. SEE GROOVING DETAIL. GROOVES SHOULD BE ALIGNED PARALLEL TO CROSSWALK STRIPES TO DIRECT BLIND PEDESTRIANS . INTO APPROPRIATE CROSSWALK.
- 3. ALL DIMENSIONS TYPICAL UNLESS OTHERWISE INDICATED.



<u>27'-0"</u> 21'-10"

20'-0"

I'-10"

GUTTER DRAIN WHERE SHOWN ON PLANS

1/4" GROOVES

5'- 2"

4'- 6"



SECTION A-A

NOTES

- I. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH 1/4" GROOVES APPROX. 3/4" O.C. SEE GROOVING DETAIL. THE SURFACE OF RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SUR-ROUNDING SIDEWALK EXCEPT WHEN LOCATED IN CEN-TER OF CURB RETURN.
- 2. WHEN RAMP IS LOCATED IN CENTER OF CURB RETURN IT SHALL BE GROOVED IN A HERRINGBONE PATTERN WITH 1/4" GROOVES APPROX. 1 1/2" O.C. SEE GROOVING DETAIL. GROOVES SHOULD BE ALIGNED PARALLEL TO CROSSWALK. STRIPES TO DIRECT BLIND PEDESTRIANS INTO APPRO-PRIATE CROSSWALK.



RAMPS TO BE CONSTRUCTED AT CENTER OF CURB RETURNS OR AS INDICATED ON PLANS

REV NO	DATE	DESCR.
CITY	OF SACR	
HANDICA	PPED RAMP	P-C8 G NO.13
APPROVED BY	Y. 1989	SCALE: NONE DWG. NO. C.E. 4



UNDER SIDEWALK DRAIN DETAIL

SCALE: NONE DWG. NO. C.E. 5

APPROVED BY A.D. C.A.



NOTES

- 1. MONUMENT COVERS AND FRAMES SHALL BE FORNI "IRON SIDES", TYPE 80-60-03; PHOENIX, TYPE P-2001, OR APPROVED EQUAL. EACH COVER SHALL BE GROUND OR OTHERWISE FINISHED SO THAT IT WILL FIT ITS FRAME WITHOUT ROCKING. BRONZE PLAQUE NOT TO EXTEND MORE THAN 1/4" ABOVE CONCRETE BASE. MONUMENT TO BE SET BY A REGISTERED LAND SURVEYOR OR PROFESSIONAL ENGINEER.
- 2. UNLESS OTHERWISE SPECIFIED, 4"MIN. CLEARANCE OF CONCRETE OVER WATER MAINS.
- 3. ALL CONCRETE IN CONFORMANCE WITH SEC. 10 OF STANDARD SPECIFICATIONS.

REV NO.	DATE	DESCR.	
CITY	OF SACR	AMENTO	
ENGINEERING DIVISION			
CONCRE	TE SURVEY	MONUMENT	
AFPROVED BY	M. Dag	SCALE: NONE	
DULC: DUNDUH	, 1989	DWG. NO. C.E. 6	



1.

MATERIALS

1-4"X 4"X 10' POST S4S REDWOOD OR TREATED DOUGLAS FIR CONFORMING TO SEC. 56-2.02 OF CALTRANS STANDARD SPECIFICATIONS. 2-1/2"X6" X 24" MIN. A/C EXT. PLYWOOD SIGN-BOARD. WHITE PAINT TO CONFORM TO SEC. 91-3.02 OF CALTRANS STD. SPECS. ALL HARD-WARE .GALVANIZED.

DESIGN

ESIGN THE SIGN SHALL HAVE BLACK GOTHIC LETTERS SIMILAR TO THOSE SHOWN ON A WHITE BACKGROUND. MIN. TWO (2) COATS OF PAINT ON SIGN-BOARD (BOTH) AND ON POST. LETTERING SHALL BE FOUR INCHES IN HEIGHT WITH A STROKE WIDTH OF NO LESS THAN ONE-HALF (1/2) INCH NOR MORE THAN THREE-FOURTHS (3/4) INCH. NUMERAL SUFFIXES (ST, ND, RD, TH) SHALL BE TWO INCHES IN HEIGHT WITH A STROKE WIDTH OF NO LESS THAN ONE-FOURTH (1/4) INCH NOR MORE THAN THREE-EIGHTS (3/8) INCH.

INSTALLATION SIGN-BOARD SHALL BE FASTENED TO POST BY 2-1/4"X41/2"BOLTS. THE BOTTOM OF THE SIGN SHALL BE NO LESS THAN SEVEN FEET ABOVE THE GROUND IN WHICH THE POST IS SET.

LOCATION

THE LOCATION AND ORIENTATION IS TO BE DESIGNATED BY THE ENGINEER.

47TH ST ſ٤

LBACK OF SIDEWALK

REV. NO.	DATE	DESCR.
· · · · · · · · · · · · · · · · · · ·		
	OF SACR	
TEMPORARY STREET SIGN		
APPROVED BY DATE JANUAR	Y. 1989	



NOTES

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I. MATERIALS 2 - 2"X6"XIB'WOOD PLANKS - DOUGLAS FIR \$4\$ 2 -6"X6"X7'-0" WOOD POSTS - CONST. HEART GRADE REDWOOD 1-I8"X18" TYPE N (RED) REFLECTORIZED SIGN. I-I8"X18" TYPE N (RED) REFLECTORIZED SIGN.

2. INSTALLATION

PLANKS SHALL BE FASTENED TO POSTS WITH 5/16" CARRIAGE BOLTS, CUT WASHERS, AND SAFETY NUTS. ALL HARDWARE GALVANIZED 3. LOCATION

. 5

THE LOCATION SHALL BE AS SHOWN ON THE PLANS OR DESIGNATED BY THE ENGINEER.

4 PAINT

20

- TWO COATS OF EXTERIOR GRADE WHITE PAINT CONFORMING TO CALTRANS STANDARD SPECIFICATIONS SECTION 91-3.02 SHALL BE APPLIED TO ALL EXPOSED WOOD SURFACES.
- 5. BARRICADE MUST BE FULL WIDTH BETWEEN FACES OF CURBS WHERE REQUIRED.

REV. NO.	DATE	DESCR.
CITY OF SACRAMENTO		
STREET BARRICADE		
APPROVED B DATE: JANUAI	Y: M. D. Ser	- SCALE: NONE DWG NO. CE. 8





STREET ENDING IN CUT WHERE SLOPE NOT OBTAINABLE

NOTES

- I. SIDEWALK BARRICADE TO BE ERECTED AT EACH LOCATION WHERE SATISFACTORY PROVISION CANNOT BE MADE FOR PEDESTRIANS TO CONTINUE BEYOND THE TERMINUS OF A SIDEWALK.
- ALL EXPOSED SURFACES TO BE PAINTED WITH TWO (2) COATS OF WHITE PAINT. 6° TRAFFIC HI-INTENSITY ORANGE CHEVRONS AT 45° WITH 6° SPACING. ALL PAINT TO CONFORM TO SEC. 91-3.02 OF CALTRANS STANDARD SPECIFICATIONS.
- 3. ALL MATERIAL USED IN CONSTRUCTION OF BARRICADE SHALL BE REDWOOD OR TREATED DOUGLAS FIR IN CONFORMANCE WITH SEC. 56-2.02 OF CALTRANS STANDARD SPECIFICATIONS.

REV NO.	DATE	DESCR.
CITY	OF SACR	
SIDEWALK BARRICADE		
APPROVED BY DATE: JANUAR	1. 1989 Y, 1989	SCALE NONE DWG. NO. C.E. 9

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 REV. NO.
 DATE
 DESCR.

 CITY OF SACRAMENTO ENGINEERING DIVISION

 CHAIN LINK FENCE & GATE

 APPROVED BY
 SCALE: NONE DATE: JANUARY, 1989



NOTES

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- A PRIME COAT SHALL BE APPLIED TO AGGREGATE BASE PRIOR TO A.C. PAVING. STD. SPEC. 22-2. ١.
- A TACK COAT OF ASPHALTIC EMULSION OR PAVING GRADE ASPHALT SHALL BE APPLIED TO EXISTING AC PAVEMENT AT ALL CONTACT SURFACES PRIOR TO PERMANENT A.C. PAVING. 2. STD. SPEC. 22-2.
- PERMANENT PAVEMENT SHALL CONFORM IN QUALITY AND THICKNESS TO THE TYPE OF PAVEMENT REMOVED; BUT IN NO CASE SHALL BE LESS THAN FOUR INCHES (4") OF ASPHALTIC CONCRETE ON TWELVE INCHES (12") OF AGGREGATE BASE (AB). 3.
- EXISTING PAVEMENT SHALL BE SAWCUT AND REMOVED IN SUCH A MANNER SO AS NOT TO TEAR, BULGE OR DISPLACE ADJACENT PAVEMENT. EDGES SHALL BE CLEAN AND VERTICAL. ALL CUTS SHALL BE PARALLEL OR PERPENDICULAR TO STREET CENTERLINE, WHEN PRACTICAL. 4.
- 5.
- ALL EXCAVATION AND BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF CITY STANDARD SPECIFICATIONS.
- R.C. RELATIVE COMPACTION AS DETERMINED BY ASTM 6. DESIGNATION D 1557
- UNLESS OTHERWISE INDICATED ON PLANS OR IN PERMIT OR 7. SPECIAL PROVISIONS.

REV. NO.	DATE	DESCR.
CITY	OF SACF	
BACKFILL AND RESURFACING IN PAVED AREAS		
APPROVED BY DATE: JANUAR	M. D. Com. Y, 1989	SCALE: NOME DWG. NO. C.E.12



4. OPEN-BACK HOOD SHALL BE CAST IRON.

APPROVED BY Contract SCALE: NONE DATE: JANUARY, 1989 DWG. NO. CE.50





- 2. CAST-IN-PLACE CONCRETE INLETS SHALL CONFORM TO SECTION CAST-IN-PLACE CONCRETE INLETS SHALL CONFORM TO SECTION 20 OF THE STANDARD SPECIFICATIONS. A. MINIMUM WALL THICKNESS' 6" B. REINFORCEMENT' 4 BARS AT 12"OC. EACH WAY WITH 2" MIN. COVER FROM INSIDE FACE; ALL WALLS. C. BOTTOM OF INLET SHALL BE PLACED AT SAME TIME AS SIDE WALLS, UNLESS OTHERWISE APPROVED.
- 3. PRECAST INLETS TO BE RATED FOR H20 LOADING AND SHALL BE PRE-APPROVED BY THE ENGINEER.

REV NO.	DATE	DESCR.
CITY OF SACRAMENTO		
DITCH BOX		
APPROVED B DATE: JANUA	Y 11.10 Barrier RY, 1989	SCALE: NONE DWG. NO. C.E.52



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3.

SCALE: NONE DWG.NO. C.E.53

































REV. NO.	DATE	DESCR.
CITY	OF SACR	
FI	LUSHER BF	RANCH

APPROVED BY: M.D. SCALE: NONE DATE JANUARY, 1989 DWG. NO, C.E. 69








































NOTE

UNLESS OTHERWISE INDICATED ON THE PLANS OR SPECIFIED IN THE SPECIAL : PROVISIONS, ALL VALVE BOXES & LIDS SHALL BE TRAFFIC RATED FOR H-20 LOAD RATING, CHRISTY G5 OR APPROVED EQUAL.



MANUAL VALVE









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