CITY OF COLUSA

TECHNICAL SPECIFICATIONS

FOR PUBLIC WORKS CONSTRUCTION

November 2024

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FOR PUBLIC CONSTRUCTION

City of Colusa
California

Adopted by City Council

_____ 2024
By

Resolution ___-____

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Section 1

DEFINITIONS AND TERMS

Unless expressly indicated otherwise, the following terms or abbreviations used in these Specifications, or in any other Contract Documents, are defined as follows:

1-1 "A.A.S.H.T.O." The American Association of State Highway and Transportation Officials.

1-2 "Addendum" means a document issued prior to the execution of the Agreement, that modifies or interprets any of the Contract Documents, by additions, deletions, clarifications, or corrections.

1-3 "Agreement" means the written agreement executed by Contractor and City, that constitutes one of the Contract Documents.

1-4 "A.S.T.M." The American Society for Testing Materials.

1-5 "A.W.W.A." The American Water Works Association.

1-6 "Bid" means a response to a request or invitation for bids or proposals. A "formal" Bid means a Bid submitted for a Contract required to be awarded by the Colusa City Council pursuant to the Colusa City Code, and "formal" bidding means the bidding process used for such Contracts.

1-7 "Bid Form" means the approved form upon which the City requires formal Bids for the Work to be prepared and submitted.

1-8 "Bid Security" means the bid security 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 if awarded the Contract.

1-9 "Bidder" means any individual, partnership, corporation, or other entity or combination thereof, submitting a Bid, whether acting directly or through a duly authorized representative.

1-10 "Change Order" means an amendment to a Contract issued after the effective date of the Contract.

1-11 "City" means the municipal corporation known as the City of Colusa, in the State of California.

1-12 “City Council” means the City Council of the City of Colusa or any other board, body, official or officials, to which or to whom the power belonging to the City Council may pass.

1-13 “City Manager” means the City Manager of the City of Colusa acting either directly or through properly authorized representatives acting within the scope of their authorized duties.

1-14 “Completion Date” means the date for completion of the entire Work as defined in Section 9 of the Agreement.

1-15 “Contract” shall mean the written Contract Documents covering the performance of the Work including the furnishing of labor, materials, tools, and equipment.

1-16 “Contract Documents” means the various documents that make up the Contract, which are identified in Section 1 of the Agreement.

1-17 “Contract Price” means the total dollar amount of the Contract.

1-18 "Contractor” means the individual, partnership, corporation, or other entity or combination thereof, or its duly authorized representative, that has entered into a Contract with the City.

1-19 “Controlling Operation” means an item of Work on the project’s critical path whose duration time directly affects the date that the entire Work can be completed.

1-20 “Critical Path Method Schedule” or “CPM Schedule” means a schedule with a consecutive sequence for completion of the Work with the least amount of float period(s).

1-21 “Day” means a working day, unless otherwise expressly defined in the Special Provisions.

1-22 “Date of signing” means the date upon which the Contract, properly executed by Contractor and delivered to the City, was executed by the City.

1-23 “Director” means the Director of the City Department administering the Contract.

1-24 “Division Manager” means the Division Manager of the City department and division administering the Contract, or other City employee

designated by such Division Manager to perform any duties assigned to the Division Manager in these Specifications.

1-25 "Engineer" means the Director, the Director's subordinates, or other City representative(s) who have been duly authorized to exercise control and supervision of the Work. The Engineer typically is, but is not required to be, either a professional engineer architect, or landscape architect, depending on the nature of the Work.

1-26 "Federal Specifications" means the Standard Specifications of the United States Government designated in the Contract Documents.

1-27 "Field Order" means a written instruction from the Engineer to Contractor made in the field.

1-28 "Finance Director" means the Director of the Department of Finance of the City of Colusa.

1-29 "Fixed cost" means a cost that remains constant regardless of the quantity of work done.

1-30 "Float period" means such period(s) of time as may be shown on Contractor's schedule(s) that are not allocated to the performance and completion of the Controlling Operation(s) of the Work.

1-31 "Inspector" means an engineering or construction inspector acting within the authorized scope of the particular duties and authority delegated to such inspector by the City.

1-32 "Laws or Regulations" means any and all applicable laws, rules, regulations, ordinances, codes, resolutions, requirements and/or orders of any and all governmental bodies, agencies, authorities and courts, including but not limited to provisions of the Colusa City and City Code.

1-33 "Liquidated damages" means the sum or sums prescribed in the Contract Documents, 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 Contractor for delay beyond the time allowed in the

Contract Documents for completing the whole, or any specified portion, of the Work.

1-34 "Landscape Architect" means a Landscape Architect of the City of Colusa assigned to the Work.

1-35 "Payment Bond" has the same meaning as in Section 3096 of the California Civil Code, and refers to the approved form of security furnished by Contractor and its Surety to guarantee the payment in full of all bills, accounts and related costs for labor and materials used in construction of the Work.

1-36 "Performance Bond" means the approved form of security furnished by Contractor and its Surety to guarantee Contractor's performance and completion of the Work in accordance with the terms of the Contract.

1-37 "Plans" means the official Project Plans and Standard Drawings, profiles, typical cross sections, general cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Director, that show the location, character, dimensions and details of the work to be performed. All such documents are part of the Plans whether or not reproduced in the Special Provisions. In this definition, the terms "Standard Drawings" and "Project Plans" mean:

(1) "Standard Drawings": The Standard Drawings or Standard Drawing as set forth in these Specifications. "Standard Drawing(s)" means "Standard Detail(s)".

(2) "Project Plans": The Project Plans or Plans include specific details and dimensions peculiar to the Work and that are supplemented by the Standard Drawings as they may apply.

1-38 "Project Estimate" means the list of estimated quantities of Work to be performed that is included in the Notice to Contractors

1-39 "Proposal" means the offer of the Bidder, including a Bid, for performance and completion of the Work when properly completed, executed, guaranteed and submitted on the Bid form.

1-40 "Special Provisions" means the specific clauses setting forth conditions or requirements peculiar to the Work and supplementary to these Specifications.

1-41 "Specifications" means the directions, provisions, and requirements contained herein. In the Contract Documents, including the Special

Provisions, these Specifications may also be referred to as the "Standard Specifications".

1-42 "State Specifications" means the Standard Specifications of the State of California, Department of Transportation, as currently approved and in effect and as thereafter amended or renumbered.

1-43 "Subcontractor" means any person or firm of any tier directly or indirectly utilized by Contractor to perform any portion of the Work.

1-44 "Substantially complete" means that the Engineer has determined that all of the Work has been performed, but there are minor deficiencies, as determined by the Engineer, that do not prevent the Work from being fully functional nor pose any risk to the public health, safety or welfare or public or private property, as determined by the Engineer. The Work shall be considered substantially complete on the date that the Engineer issues a punch list to Contractor as specified in Section 8-4 of these Specifications.

1-45 "Supplier" means any person or firm directly or indirectly supplying any materials or equipment for performance of, or incorporation in, the Work.

1-46 "Work" means all actions and activities that Contractor is contractually required to undertake and perform as specified, indicated, shown, or implied in the Contract, including all duly authorized Change Orders.

1-47 "Working day" means any day, except for the following:

(1) Saturdays, Sundays and legal holidays, unless otherwise indicated in the Special Provisions.

(2) Days on which Contractor is prevented from proceeding with the current Controlling Operation(s) of Work for at least (5) hours per day due to inclement weather, or conditions resulting immediately therefrom, as determined by the Engineer.

(3) Days on which Contractor is specifically required pursuant to the Contract Documents or by operation of law to suspend the Controlling Operation or Operations of Work, except in cases where such requirement applies due to the failure on the part of Contractor or any Subcontractor to carry out orders or to perform any provision of the Contract.

Section 2

BID/PROPOSAL REQUIREMENTS AND CONDITIONS

2-1 NOTICE TO CONTRACTORS

"Notice to Contractors" is published by the City for formally bid contracts in accordance with Colusa City Municipal Code. Among other provisions, the Notice to Contractors makes reference to Section 1770 et seq. of the Labor Code relating to determinations regarding prevailing wages. Contractor shall pay prevailing wages according to the rates established by these determinations. Copies of these determinations are on file in the Office of the Director and shall be made available to any interested party on request, and also may be retrieved from the internet at www.dir.ca.gov/dlsr.

A summary of the labor compliance requirements will be presented at the pre-construction meeting. Each contractor and subcontractor (at all levels/tiers) is required to submit certified payrolls and labor compliance documentation electronically at the discretion of and in the manner specified by, the City of Colusa.

Electronic submittal will be through a web-based system, accessed on the World Wide Web by a web browser.

Use of the system may entail additional data entry of weekly payroll information including; employee identification, labor classification, total hours worked and hours worked on this project, wage and benefit rates paid, etc. The contractor's payroll and accounting software may be capable of generating a 'comma delimited file' that will interface with the software. If the 'comma delimited file' option does not work, it is still the responsibility of the contractor and subcontractors to manually enter their data into the system specified by City of Colusa, meeting the required deadlines for those documents.

Every lower-tier subcontractor and vendor is required to provide labor compliance documentation.

2-2 BID FORM

A Bid Form shall be made available to each prospective Bidder.

2-3 PROJECT ESTIMATE

The quantities included in the Project Estimate in the Notice to Contractors, Bid Form 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, as provided in the Contract Documents.

2-4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK

All Bidders shall carefully inspect the site of the contemplated Work, and carefully review the Plans, Specifications, the Proposal and the other Contract Documents. The submission of a Bid is conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, the character, quality, quantity and scope of Work to be performed, the quantities of materials to be furnished, and the requirements of the Contract Documents, and that the Bidder is aware of no material discrepancy between such conditions, the character, quality, quantity and scope of Work to be performed, the quantities of materials to be furnished, and the requirements of the Contract Documents. 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 set forth below, where such investigations have been made, prospective Bidders or Contractor may, upon written request, inspect the records of such investigations. Any inspection of the records shall be made at such place or places that may be specified in the Special Provisions or by the Engineer.

The records of such investigations are not part of the Contract and are shown solely for the convenience of prospective Bidders or Contractor. The Engineer and the City assume no responsibility whatsoever in respect to the sufficiency or accuracy of such investigations, the records of the investigation, or any interpretation in the investigation 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 of the investigations 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 a waiver of the provisions of the first paragraph of this Section and all prospective Bidders and Contractor are cautioned to make such independent investigations

and examinations as each of them may consider necessary to sufficiently inform itself 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 interpretations made by the Engineer relieves any prospective Bidder or Contractor from any risk or from properly fulfilling the terms of the Contract.

2-5 PREPARATION OF PROPOSAL

Bid Forms and the plans and specifications are available on the City's website. Bids not presented on the Bid form shall be rejected.

Proposals must set forth in clearly legible figures, an item price and a total for each item in the respective spaces provided, and must be signed by the Bidder, who shall fill out all blanks in the Bid Form.

2-6 DETERMINATION OF AMOUNT BID – MATHEMATICAL ERROR

In determining the amount bid by each Bidder, the City may disregard computations that contain obvious mathematical errors in addition, subtraction, multiplication, and division that appear on the face of the Proposal. When such a computational error appears on the face of the Proposal, the City may, but is not obligated to correct any such error and 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. However, the City has no responsibility or liability to any bidder if the City determines which Bidder has submitted the lowest bid without doing so.

When an item price is required to be set forth in the Proposal, and the total price for the item is not consistent with the figure that 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 the item.

If the Proposal contains neither the item price nor the total price for the item, then it shall be deemed non-responsive and will 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, changes that make the Proposal illegible, or contain irregularities.

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 Colusa prior to opening Bids or submitted with the Proposal; otherwise, the Proposal shall be rejected as non-responsive. The City reserves the right to waive any informalities or minor irregularities in the Bids.

2-8 BID SECURITY

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 a surety insurer admitted and duly authorized to transact business in the State of California, made payable to the City.

No Bidder's Bond shall be accepted unless it substantially conforms to the Bond form included in the Special Provisions. Bidder's Bond forms may be obtained from the Engineer. The Engineer may waive the requirement to furnish Bid Security for Contracts that may be awarded without City Council approval pursuant to the Colusa City Code.

2-9 SUBCONTRACTORS

Each contractor or subcontractor performing any work for the City of Colusa, must be currently registered with the California Department of Industrial Relations (DIR), as specified in Labor Code Section 1725.5. Labor Code Section 1771.1 (enacted by SB 854) provides that a Contractor or subcontractor is not qualified to bid on, or be listed in a Proposal (subject to the requirements of Section 4104 of the Public Contract Code), or engage in the performance of any Work, unless currently registered and qualified pursuant to Labor Code Section 1725.5.

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

1. The name and location of the place of business and the California contractor license number for 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 or, in the case of bids for the construction of streets or highways, including bridges, in excess of one-half of one percent of the prime Contractor's total bid or $10,000, whichever is greater.

2. The portion and dollar amount of the work that will be done by each such Subcontractor. The prime Contractor shall list only one Subcontractor for each such portion as is defined by the prime Contractor in the Bid.

3. Every Bidder shall list the Contractor's current DIR registration number and the current DIR registration number of all listed subcontractors, on the Subcontractor and Local Business Enterprise (LBE) Participation Verification Form included in the contractor's bid.

In addition to the above requirements, Contractor shall perform with its own organization and with the assistance of workers under its immediate superintendence, work of a value not less than twenty percent (20%) of the value of all Work in the Contract. The dollar amount of subcontracted work that is specifically indicated by the Bidder on the form provided by the City shall be used to determine the value of work being subcontracted, as well as the value of LBE Subcontractor participation for purposes of determining compliance with LBE participation requirements, unless the Engineer determines such value to be significantly misstated. The Bidder shall provide such bidding information as may be requested by the Engineer to make this determination.

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. 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 that are not properly marked may be rejected. The Proposal cannot be withdrawn or modified after the time specified for opening of the Bids, except as may be authorized under Section 2-12 below.

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 may be present.

2-12 RELIEF OF BIDDERS

A Bidder may request relief from its Bid, pursuant to the provisions of Public Contract Code Section 5100 et seq.

2-13 DISQUALIFICATION OF BIDDERS

City shall not consider more than one Proposal from an individual, partnership, corporation, or other entity 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 a Proposal in which the bid(s) submitted for one or more items are obviously unbalanced, as reasonably determined by City.

2-14 LICENSING OF BIDDERS

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 that 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 its license number and class in the space provided for that purpose on the Bid Form.

The City shall specify the classification of license that a Contractor must possess at the time a Contract is awarded. This shall be included in the Plans and Notice to Contractors (Public Contract Code Section 3300).

2-15 PREQUALIFICATION OF BIDDERS

The City may establish prequalification requirements for Bidders on one or more Contracts consistent with applicable provisions of the City Code, and other applicable laws or regulations. The City may establish prequalification requirements for Bidders on one or more Contracts consistent with applicable provisions of the City Code, and any other Laws or Regulations if applicable.

2-16 JOINT VENTURE BIDS

If two or more prospective Bidders desire to bid as a joint venture on a project, the prospective Bidders must first file an affidavit of joint venture with the City on a form approved by the Engineer. The affidavit of joint venture is valid only for the specific project for which it is filed. If an affidavit of joint venture is not filed and approved by the Engineer prior to Bid opening, the joint bid shall be rejected. On projects for which pre-qualification is required, each party to the joint venture must separately pre-qualify in order to file a joint venture affidavit. Joint venture bidders must comply with the California Business and Professions Code, sections 7029 and 7029.1. A joint venture is not required to have a current DIR registration number until after contract award, so long as the prospective partners in the joint venture each have current DIR registration numbers at the time of Bid opening. And a joint venture shall not be qualified as a Local Business Entity unless the prospective partners in the joint venture would separately qualify as Local Business Entities at the time of bid opening.

2-17 AGREEMENT TO ASSIGN

If a Bid is accepted, the Bidder 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 Professions Code), arising from purchases of goods, materials, or services by the Bidder pursuant to the Contract. The assignment is effective at the time the City tenders final payment to the Bidder without further acknowledgement by the parties (Cal. Govt. Code §4552).

Section 3

AWARD AND EXECUTION OF CONTRACT

3-1 AWARD OF CONTRACT

Unless otherwise provided in the Special Provisions, or otherwise authorized by the City Council in accordance with applicable provisions of the Colusa City Code, the award of a formally bid Contract, if it is awarded, will be to the lowest responsible Bidder (as defined in the Colusa City Municipal Code) whose Bid complies with the specific requirements of the Contract Documents. The City Council reserves the right to reject any and all Proposals.

3-2 TIME OF AWARD

The award of a formally bid Contract, if made, will be made within sixty (60) calendar 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, will be made within ninety (90) calendar 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, will be made within one hundred and twenty (120) calendar days after the opening of the Proposals.

The periods of time specified above within which the award of the Contract may be made, may be extended by written agreement between the Engineer and the applicable Bidder.

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 Section 2-6 of these Specifications.

3-4 PERFORMANCE AND PAYMENT BONDS

The successful Bidder shall provide Performance and Bonds to the City, each for a sum equal to one hundred percent (100%) of the Contract Price. Each

Bond shall be executed by a surety insurer admitted and duly authorized to transact business in the State of California. If the Contract Price is increased by Change Order, Contractor shall increase the Performance and/or Payment Bond amount(s) if and to the extent required by the Engineer.

Notwithstanding the foregoing, for any Contract awarded for a Contract Price of $25,000.00 or less, no Performance Bond or Payment Bond is required unless specifically required in the Special Provisions, except as otherwise required by any laws or regulations.

3-5 RETURN OF BID SECURITY

After bids have been received and reviewed, Bid Security will be returned to the respective Bidders except those submitted by the three lowest responsible Bidders. The Bid Security of the three lowest responsible Bidders will be returned after the Contract is executed, subject to the provisions of Section 3-7 below.

3-6 EXECUTION OF CONTRACT

The Contract shall be executed by the successful Bidder and returned to the City together with the Performance and Payment Bonds, not later than fifteen (15) calendar days after the date the Contract is awarded.

3-7 FAILURE TO EXECUTE CONTRACT

Failure of the lowest responsible Bidder, the second lowest responsible Bidder, or the third lowest responsible Bidder to execute a formally bid Contract and file acceptable Bonds and insurance as provided in the Contract Documents shall be just cause for the City Council to void the Contract award to that Bidder and utilize that Bidder's Bid Security to recover the City's cost as provided below.

If the lowest responsible bidder refuses or fails to execute the Contract as required herein, the City Council may award the Contract to the second lowest responsible Bidder. If this occurs, the amount of the lowest responsible Bidder's Bid Security shall be applied by the City to the difference between the lowest 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 the Contract to the third lowest responsible Bidder. If this occurs, in addition to application of the lowest Bidder's Bid Security as provided above, the amount of the second lowest responsible Bidder's Bid Security shall be applied by the City to the difference

between the second lowest Bid 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 its authorized representative, specifying that the Bidder will refuse to execute the Contract if presented. 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 prescribed above.

3-8 FORM OF AGREEMENT AND SURETY BONDS

The form of the Agreement and the form of the Payment and Performance Bonds required to be executed by the successful Bidder shall be approved by the City Attorney.

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 that 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 shall be used. Unless otherwise specified, 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

Contractor shall not allow the site of the Work to become littered with trash, debris, garbage or waste material, and shall maintain the site in a neat, orderly, safe and healthful condition until completion and acceptance of the Work. Before final inspection of the Work, Contractor shall clean the work site and all ground occupied by Contractor 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. Contractor shall implement a program of proper cleaning and "housekeeping" practices, employee training and other measures as needed to consistently maintain a clean Work site and shall at all times take all measures necessary to protect work in place and materials and equipment stored on site from contamination by dust, dirt, debris or mold. Full compensation for cleaning up and protection of work, materials and equipment 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 and protection of work, materials and equipment.

4-3 LINES AND GRADES

All Work done under this Contract shall be done to the lines and grades shown on the drawings. Contractor shall keep the Engineer informed, at least 2 working days in advance, of the times and places at which Contractor 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 delay to Contractor.

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

4-4 CHANGES IN THE WORK

The City reserves the right to make such alterations, deviations, additions to or deletions from the Work or any of the Contract Documents, including the right to increase or decrease the quantity of any item or portion of the Work or to eliminate any item or portion of the Work, as may be deemed necessary or advisable by the Engineer, and to require such extra work as may be determined by the Engineer to be necessary for the proper completion or construction of the whole Work.

Any such changes shall be set forth in a Change Order that shall specify, in addition to the work to be done or omitted in connection with the change made, the adjustment of Contract time, if any, and the increase or decrease in Contractor's compensation, if any, for that work. A Change Order issued by the Engineer shall not be deemed approved and effective until signed by Contractor (or otherwise deemed approved by Contractor as provided in this Section) and approved by the City in accordance with applicable approval requirements of the Colusa City Code. The City's payment in accordance with the provisions for compensation set forth in an approved Change Order shall constitute full compensation for all work included in or required by the Change Order, including all direct, indirect and consequential costs incurred or claimed by the Contractor.

Contractor may contest the terms or conditions of a Change Order issued by the Engineer by submitting a written protest to the Engineer within 15 calendar days after Contractor's receipt of such Change Order. The protest shall state the points of disagreement, the applicable Contract Document references, and the quantities and costs involved. If a written protest is not submitted within the 15 calendar day period; (1) payment shall be made as set forth in the Change Order, and Contractor shall not be entitled to any additional compensation for all work included therein or required thereby; and (2) the Change Order shall be deemed to have been approved and executed by Contractor.

Upon receipt of an approved Change Order, Contractor shall proceed with the ordered work. In those instances where the Work would be delayed by waiting for City to issue and/or approve a Change Order, the Engineer may direct work to be done by issuing a written Field Order, and Contractor shall proceed with the work so ordered prior to actual receipt of an approved Change Order. In those cases, the Engineer shall, as soon as practicable, issue a Change Order for the ordered work.

Increases or decreases in the quantity of a unit price bid item of Work shall be determined by comparing the total quantity of that item of Work with the bid quantity. If the total quantity of a unit price bid item of Work is increased, the Engineer shall determine in the Engineer's sole discretion whether to pay for the additional quantity of the item (i) at the Contract unit price for the item, (ii) at a different unit price or in a lump sum, if such price or sum is agreed to by Contractor, or (iii) by cost and percentage, as provided in Section 8-10 below. If the total quantity of any item of Work required under the Contract is decreased, the Engineer shall determine the reduction in compensation for the item based on the Contract unit price for the item; provided that if the compensation for any "major item" (defined below) is reduced by more than 20% of the cost bid for that item, the Engineer may agree to pay Contractor for lost overhead resulting from such reduction, if any, as determined by the Engineer in the Engineer's sole discretion; provided, further, that if the Engineer eliminates in its entirety an item of the Work, the reduction in compensation therefore shall be determined in accordance with Section 4-5 below.

As used in this Section and Section 4-5, "major item" means an item of the Work with a cost, computed on the basis of the bid quantity for the item, that exceeds the following percentages of the Contract price:

1. 10 % of the original Contract price, for Contracts originally awarded for a price of less than one million dollars.

2. 8 % of the original Contract price, for Contracts originally awarded for a price of at least one million dollars but less than five million dollars.

3. 6 % of the original Contract price, for Contracts originally awarded for a price of at least five million dollars but less than ten million dollars.

4. 5 % of the original Contract price, for Contracts originally awarded for a price of ten million dollars ($10,000,000.00) or more.

For extra work that does not constitute an increase of a unit price bid item of the Work, the Engineer shall determine, in the Engineer's sole discretion, whether to pay for the extra work (i) at a unit price or lump sum agreed to by Contractor, or (ii) by cost and percentage, as provided in Section 8-10.

4-5 ELIMINATED ITEMS

Notwithstanding any other provision of the Contract Documents, the Engineer may at any time, in writing, entirely eliminate any item(s) of the Work if the Engineer determines, in the Engineer's sole discretion, that the item is

unnecessary to the project or will be performed by the City's own personnel. Any elimination of Work is not a waiver or invalidation of any of the conditions or provisions of the Contract. If any item of Work is entirely eliminated, Contractor shall not receive any compensation for the eliminated item, except for actual costs incurred in connection with the eliminated Contract item if reasonably incurred prior to the date of notification in writing by the Engineer of the elimination. The payment by City for actual costs reasonably incurred by Contractor, if any, prior to elimination of an item as provided in this Section shall be computed in the same manner as if the work were to be paid by cost and percentage as provided in Section 8-10 of these Specifications. In addition, if any major item is entirely eliminated, the Engineer may agree, in the Engineer's sole discretion, to pay Contractor for lost overhead resulting from the elimination.

If material acceptable to the City is ordered by Contractor for the eliminated item prior to the date of notification of the elimination by the Engineer, and if orders for that material cannot be canceled, the material shall be paid for at the actual cost to Contractor. If so, the material paid for shall become the property of the City. If the material is returnable to the vendor and if the Engineer so directs, the material shall be returned and Contractor shall be paid for the actual cost of charges made by the vendor for returning the material.

4-6 EXTRA WORK

Work is considered extra work only when the Engineer determines that the work is not covered by any of the various items for which there is a bid price or by combinations of those items. Contractor shall perform extra work and furnish labor, material and equipment for extra work upon receipt of a Change Order or other written order of the Engineer (including a Field Order) directing Contractor to perform such extra work, in accordance with the provisions of Section 4-4 above. Extra work must be authorized in writing by the Engineer before the work is started. No payment shall be made for extra work performed prior to Engineer's prior written authorization.

4-7 GENERAL

The parties intend that differences between the City and Contractor, arising under 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 City and Contractor agree to initially strive to resolve all disputes amicably and in an informal manner. Any dispute resolved informally shall be documented by the Engineer, and if the dispute resolution involves a change in the Contract Work, increase or decrease in the compensation due the Contractor, or adjustment in the time of completion

of the Work, then the informal dispute resolution shall be confirmed by a Change Order pursuant to the Contract and Section 4-4 above. Informal discussions or negotiations with the Engineer or other City representatives concerning informal resolution of a dispute shall not suspend the claim filing and other deadlines provided below, unless so provided by the Engineer in writing.

4-8 COMPLIANCE REQUIRED

Except as specifically otherwise provided in these Specifications, Contractor shall not be entitled to payment of any additional compensation or damages for any cause, including, but not limited to, any act or failure to act, by the Engineer or the City, or any officer, employee, agent or contractor of the City, the presence or discovery of any condition, or the happening of any event or occurrence, unless Contractor gives the Engineer timely written notice of and supporting data for any such potential claim and complies with the dispute procedure as specified below. If the Contractor fails to timely file a written Claim in accordance with Section 4-10 below, then the Contractor shall be deemed to have waived any right or remedy to thereafter pursue the claim against the City in any administrative, arbitration or litigation proceeding.

4-9 DEFINITION OF CLAIM

A "Claim" means a separate demand by the Contractor for: (a) a time extension (including a demand for relief from damages or penalties for delay assessed by the City under the Contract); (b) payment of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or the Contractor is not otherwise entitled to; or (c) payment of an amount that is disputed by the City.

The procedures and remedies set forth in sections 4.7-4.11 shall not apply to: (i) any claim by the City against the Contractor or its surety or sureties (unless the City, in its sole discretion, opts to proceed hereunder); (ii) any claim or dispute relating to stop notices; or (iii) any claim relating to the approval, refusal to approve or substitution of any subcontractor, regardless of tier, pursuant to Public Contract Code section 4700, et seq.

4-10 REQUIREMENTS FOR FILING CONTRACT CLAIM; CONTENTS; FILING DEADLINE

The Contractor may file a Claim with the Engineer. A Claim must: (a) be in writing; (b) be labeled or clearly indicated as a Claim under the Contract; (c) set forth in detail the reasons why the Contractor believes additional compensation or a time extension is or may be due, the nature of the costs involved, and, insofar as possible, the amount of the Claim; (d) include documents that support and substantiate the Claim; and (e) include the following

certification, properly completed and executed by Contractor or any officer of Contractor:

I, _____BEING THE _____(must be an owner or officer) OF _____(CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND I DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND THE CLAIM IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT AND/OR CONTRACT TIME EXTENSION REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE OWNER IS LIABLE; AND FURTHER, THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTON 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650, ET SEQ., PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT, AND OTHER SEVERE LEGAL CONSEQUENCES.

A Claim must be submitted to the Engineer within the following claim filing deadlines: (a) if the Claim relates to extra, additional or unforeseen work for which the Contractor intends to demand additional compensation, a time extension, or both, notice shall be given to the Engineer prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation or time extension, and Contractor shall not proceed with that work until so directed by the Engineer in writing; and (b) for all other Claims not included within (a) such as matters covered by the liquidated damages provisions of the Contract or a Claim that is based directly and solely on differences in measurements or errors in computation of Contract pay quantities, the claim must be filed on or before 15 days after the date of the occurrence, event or circumstance giving rise to the Claim. In no event shall a Claim be filed later than the date of final payment.

Any additional data supporting the Claim must be given to the Engineer not later than 30 days after the date of such written notice, unless the Engineer, in writing, allows an additional period of time to ascertain more accurate data supporting the claim. This data shall be accompanied by Contractor's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which Contractor is entitled as a result of such condition, act, failure to act, event, thing or occurrence.

4-11 ALL CLAIMS SUBJECT TO PUBLIC CONTRACT CODE SECTION 9204; PROCEDURE

This procedure applies to the handling and resolution of all Claims sent to the City, whether or not by registered mail or certified mail with return receipt

requested in accordance with Public Contract Code section 9204(c)(1). With respect to all Claims submitted to the City in accordance with this procedure, the provisions of Public Contract Code section 9204 shall apply. Pursuant to Public Contract Code section 9204(f), the City has prescribed reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of section 9204 that do not conflict with or otherwise impair section 9204's timeframes and procedures.

1. Upon receipt of a properly submitted Claim, the Engineer shall conduct a reasonable review of the Claim and, within a period of 45 calendar days, provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a Claim, the Engineer and Contractor may, by mutual agreement, extend the 45-calendar day time period.

2. The Contractor shall furnish reasonable documentation to support the claim consistent with the requirements of Section 4.10.

3. If the Contractor disputes the Engineer's written response, the Contractor may request in writing an informal conference to meet and confer for settlement of the issues in dispute. Such request by Contractor shall be made within 15 calendar days from the date of the written statement given by the Engineer. Upon receipt of a request in writing, the City shall schedule a conference within 30 calendar days for settlement of the dispute. The informal conference shall be conducted by the Division Manager for the purpose of resolving the dispute.

4. Written notice of the date, time and location of the conference shall be provided to Contractor not less than ten calendar days prior to the date of the conference. On such date, or such other date to which the parties may agree, Contractor shall be afforded a reasonable opportunity to present Contractor's position on and substantiation for the Claim. The conference shall be conducted in an informal manner, and no record shall be made of the proceedings, except that any written materials submitted by the City or Contractor shall be preserved by the Division Manager until the Work is finally accepted by the City.

5. Within ten days following the conclusion of the conference, if the Claim or any portion of the Claim remains in dispute, the Division Manager shall provide the Contractor a written decision identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any decision by the Division Manager to pay additional compensation to the Contractor shall be contingent upon approval of a change order authorizing such compensation by the Colusa City Council, unless City Council approval of the change order is not required under the

Colusa City Code. Payment due on an undisputed portion of the claim shall be processed and made within 60 calendar days after the Division Manager issues the written decision.

6. If the Contractor disagrees with the Division Manager decision, the Contractor shall, within 14 calendar days after the Contractor receives the Division Manager's decision, file a written request with the City to submit the disputed portion of the claim to nonbinding mediation, with the City and the Contractor sharing the associated costs equally. Contractor hereby expressly waives all Claims not timely submitted to mediation in accordance with this Section. The City and Contractor shall mutually agree to a mediator or mediators within 10 days after the disputed portion of the claim has been identified in writing. As part of the process of evaluating a proposed mediator, each party may request that the proposed mediator(s) disclose any prior or existing financial relationship with either party. If the parties cannot agree upon a mediator or mediators, each party shall select a mediator and those mediators shall select a qualified neutral third party or parties to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures set out in subsection 9 below.

7. The mediator, using advice and input from the parties, shall set the time of each mediation session, as well as the mediation protocol (i.e., submission of briefs, statement of damages, etc.). The mediation will be held at any convenient location agreeable to the mediator and the parties, as the mediator determines. All reasonable efforts will be made by the parties and the mediator to schedule the first session within 30 calendar days after selection of the mediator.

8. The mediation may be terminated: (a) by the execution of a settlement agreement by the parties; (b) by a written declaration of the mediator to the effect that further efforts at mediation are no longer worthwhile; or (c) by a writing on behalf of a party or parties to the effect that the mediation proceedings are terminated.

9. If, at the termination of the mediation proceedings pursuant to Section 4.11.8, the Claim(s), or any portion thereof, remain(s) in dispute, the City's position shall constitute its final decision with regard to the Claim(s). Any litigation arising out of the Claim(s) and the Contract Documents shall be brought in the Colusa County Superior Court, and Contractor expressly waives the removal provisions of California Code of Civil Procedure Section 394.

4-12 CONTRACT WORK PENDING CLAIM RESOLUTION

In the event of any dispute between the City and Contractor, or during the pendency of any Claim(s) or associated proceedings under this Section or the Contract Documents, Contractor shall not stop, or delay performance of, the Work, but shall prosecute the Work diligently to completion in the manner directed by the Engineer.

4-13 DISPUTES INVOLVING DESIGN PROFESSIONALS

If any Claim(s) asserted by the Contractor arise from or is/are related, in any manner, to conduct or actions for which a design professional may be responsible, the parties acknowledge and agree that the City may, in its sole discretion, require the participation the design professional in any dispute proceeding under this Section. This right shall remain solely within the discretion of the City, and Contractor shall have no rights under the Contract Documents to require or seek to compel the participation the design professional in any dispute proceeding under this Section or elsewhere under the Contract Documents.

4-14 ATTEMPT TO COMPROMISE AND SETTLE

All communications, statements, correspondence, information and other evidence, whether documentary or oral, made or presented at, or in anticipation of, the dispute resolution procedures set forth in sections 4.7-4.11 shall be deemed an attempt to compromise and settle the Contractor's claim under California Evidence Code section 1152, and as such will be inadmissible for any reason in any litigation that may arise pertaining to the Claim or the Contract.

Section 5

CONTROL OF WORK AND MATERIALS

5-1 AUTHORITY OF ENGINEER

As defined in Section 1 of these Specifications, "Engineer" may mean either the Director or the representatives authorized by the Director to exercise control and supervision of the Work. Much of the actual supervision and control of the project may be by subordinate representatives designated as "Engineer." However, whenever in these Specifications, Plans or Special Provisions, the Director is designated as the authority in any matter, it will mean only the Director and not subordinates working under the Director's supervision. Whenever the word "Engineer" is used in these Specifications, Plans or Special Provisions, then either the Director's subordinates assigned to the supervision and control of the Work or the Director will exercise such authority.

The Engineer will decide any and all questions as to the quality and acceptability of materials furnished, work performed, and rate of progress of the Work. The Engineer will decide all questions as to the interpretation of the Specifications, Plans or Special Provisions, the fulfillment of the Contract on the part of Contractor, and the rights of different contractors on the project. The Engineer will determine the amount and quality of the Work performed and materials furnished, for payment under the Contract.

Whenever, in these Specifications, or upon the Plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, the direction, requirement, permission, order, designation, or prescription of the Engineer is intended. Similarly, the words "approved," "acceptable," "satisfactory," or words of like import, mean approved by, or acceptable to, or satisfactory to the Engineer, subject in each case to the final determination of the Director or the City Council.

5-2 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces shall conform to the lines, grades, cross-sections, and dimensions shown on the approved Plans and working drawings, unless a deviation from the Plans is authorized in writing by the Engineer.

5-3 COORDINATION OF CONTRACT DOCUMENTS

These Specifications, the Plans, Special Provisions, and all supplementary Plans, drawings, and other Contract Documents are essential parts of the Contract, and a requirement occurring in one is just as binding as though occurring in all. These documents are intended to be integrated to describe and

provide for a complete Work. Whenever a reference is made in these Specifications to a Section or subsection of another agency's Specifications, such reference shall be deemed to include the General Provisions of such other Specifications of which the Section or subsection is a part, to the extent pertinent to the reference and not inconsistent with the other Contract Documents. In the event of a conflict in the Contract Documents, unless expressly indicated otherwise, the governing priorities are as follows:

1. A Change Order.
2. The Agreement.
3. Addenda. Subsequent addenda shall govern over prior addenda only to the extent specified.
4. In case of conflict between the Specifications and the Special Provisions, the Special Provisions shall govern.
5. In case of conflict between Plans and Specifications, the Plans shall govern in matters of quantity and the Specifications shall govern in matters of quality.
6. In case of conflict within the Plans involving quantities and quality, Contractor shall furnish the greater quantity and quality material and procedure.
7. In case of conflict within a plan sheet involving figured or numerical dimensions the profile shall govern over the layout.
8. In case of conflict within the Specifications involving quality of material or procedure, Contractor shall furnish the higher quality material and procedure.
9. Specific notes shall govern over other notes and other portions of the Plans except Schedules.
10. Larger scale drawings shall govern over smaller scale drawings.
11. Detail plans shall govern over standard plates bound within the Specifications.
12. Figured or numerical dimensions shall govern over dimensions obtained by scaling.
13. Where provisions of codes, safety orders, Contract Documents, referenced manufacturers' specifications or industry standards are in conflict, the more restrictive and higher quality shall govern.

Contractor shall not take advantage of any error, discrepancy or omission in any of the Contract Documents if such error, discrepancy or omission was or should have been apparent to Contractor. As soon as Contractor discovers any apparent error, discrepancy or omission, Contractor shall immediately notify the Engineer, so that the Engineer may make a determination on the matter, which determination shall be final, subject to Contractor's right to submit a claim in accordance with applicable provisions of the Contract Documents.

The Work shall be performed and completed according to the meaning and intent of the Contract Documents.

In addition to the drawings made a part of this Contract at time of signing, by incorporation or reference, the Engineer may 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, Plans, Special Provisions and other Contract Documents and Contractor shall make its Work conform to all such drawings.

Should it appear that the Work to be done or any of the matters related to the Work are not sufficiently detailed or explained in the Contract Documents, Contractor shall provide the Engineer with a request for information (RFI) requesting such information or explanations as may be necessary to complete the Work. The City shall respond to RFIs within 20 calendar days of receipt, unless the Engineer reasonably determines that a longer time period is necessary to provide the information requested by Contractor. The City response (but not Contractor's RFI) shall become part of the Contract, and Contractor shall be responsible for conforming its activities and operations, including the activities and operations of all subcontractors and suppliers, to all applicable requirements, terms and conditions of the City's response.

5-4 COOPERATION OF CONTRACTOR

After all necessary signatures by City, City will supply Contractor a copy of the Plans, Special Provisions, and the fully executed Agreement. City will also make available to Contractor at least five (5) copies of the Plans and Special Provisions for Contractor's use in prosecuting the Work. If Contractor requests additional copies of the Plans or Special Provisions, the City or its designated reprographics firm will supply such additional copies at Contractor's expense.

Contractor shall give the Work the constant attention necessary to facilitate the satisfactory progress of the Work. Contractor shall cooperate with the Engineer, inspectors and with other contractors in every way possible. Contractor shall at all times have a competent Superintendent at the site of the Work. Contractor's Superintendent shall be fully authorized as Contractor's agent on the Work. The Superintendent shall be capable of reading and understanding all of the Contract Documents. Unless otherwise approved by the Engineer, the Superintendent shall be an employee of Contractor responsible for providing continuous on-site supervision of the Work and shall be fully authorized to receive and follow any instruction given by the Engineer and to sign Change Orders on behalf of Contractor. Unless specifically called for by the Special Provisions, Contractor is not required to provide an office for use by the Engineer.

If requested by the Engineer, Contractor shall provide daily reports signed by Contractor's Superintendent indicating the location and description of operations and details of the equipment and labor used to perform the items of Work. Such details shall include the description of the items of Work, names and classifications of laborers, hours worked, description of equipment used, equipment numbers, and hours equipment are in use, and hours equipment may be idle.

5-5 CONSTRUCTION STAKES

The Engineer will 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. Contractor shall provide the Engineer with the City's standard Survey Request Form at least three (3) working days before construction stakes are required. The Engineer may reject any unreasonable or incomplete Survey Request Form and require Contractor to resubmit. Contractor shall have no claim for any costs, damages or extensions of time arising from any delay caused by Contractor's submittal of an unreasonable or incomplete Survey Request Form.

Such stakes and markings as the Engineer may set for either the City's or Contractor's guidance shall be preserved by Contractor. In the event that the stakes or marks placed by the Engineer are destroyed through carelessness or negligence on the part of Contractor or any Subcontractor and the destruction of these stakes or marks causes a delay in the Work, Contractor shall have no claim for damages or extensions of time. Additionally, the City reserves the right to charge Contractor or deduct from the progress payments the costs to the City for any re-staking or remarking required as a result of carelessness or negligence on the part of Contractor or any Subcontractor.

5-6 PERMANENT SURVEY MONUMENTS

Contractor is responsible for verifying that the arrangements have been made for preserving and perpetuating all permanent survey monuments that will be affected by the Work. Contractor is responsible for preserving all permanent survey monuments that are not proposed to be disturbed. Contractor shall provide a minimum of ten (10) working day notice to Engineer prior to disturbance or removal of any permanent survey monument, and shall coordinate with the Engineer to reset monuments or provide permanent witness monuments and file the required documentation with the County Surveyor pursuant to Business and Professions Code Section 8771.

5-7 SUBMITTALS

Contractor shall supply all submittals required by the Special Provisions or the Engineer. Unless otherwise specified herein, Contractor shall deliver five (5) copies of the submittals to the Engineer when required by the Contract Documents or the Engineer. Within twenty (20) calendar days after receipt of a submittal, the Engineer will return two (2) marked copies of the submittal to Contractor indicating one of the following four (4) actions taken by the Engineer, in the Engineer's sole discretion:

1. If the Engineer's review indicates no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN." Contractor may immediately incorporate the material and equipment covered by the submittal into the Work.

2. If the Engineer's review indicates limited corrections are required, copies will be returned marked "MAKE CORRECTIONS NOTED." Contractor may immediately incorporate into the Work the material and equipment covered by the corrected submittal, with the corrections noted by the Engineer.

3. If the Engineer's review indicates insufficient or incorrect data has been submitted, copies will be returned marked "REVISE AND RESUBMIT." No work may begin on incorporating the material and equipment covered by this submittal into the Work until the submittal is revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

4. If the Engineer's review indicates the material and equipment submittal is unacceptable, copies will be returned marked "RESUBMIT." No work may begin on incorporating the material and equipment covered by this submittal into the Work until a new submittal is submitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

After approval by the Engineer, submittals (including any corrections noted by the Engineer) shall become a part of the Contract, and the work shall be done in conformity with such approved submittals. No work shall be started or material or equipment purchased until the submittals have been approved. Submittals furnished to the Engineer shall include finished drawings, if required, that are neat, legible, to scale, and drawn to as large scale as reasonably possible.

5-8 RECORD DRAWINGS

Contractor shall maintain a neatly and accurately marked set of record drawings showing the final locations and layout of all facilities as-built. Drawings shall be kept current weekly, with all work instructions and Change Orders, accommodations, and construction adjustments. Drawings are subject to the inspection by the Engineer at all times, and progress payments, or portions of progress payments, may be withheld if drawings are not accurate and current. Prior to City's acceptance of the Work, Contractor shall deliver to the Engineer one (1) set of neatly marked record drawings, accurately showing all the information required above. If the Engineer does not approve the record drawings, Contractor shall revise and resubmit the record drawings as necessary to obtain the Engineer's approval. If Contractor fails to comply with the requirements of this section, the City may deduct and retain the cost of preparing the record drawings from the Contract.

5-9 SUGGESTIONS TO CONTRACTOR ADOPTED AT CONTRACTOR'S OWN RISK

Contractor is solely responsible for determining whether to follow or utilize any plan or method of work suggested by the Engineer to Contractor in whole or in part, and Contractor shall assume all risks for this determination. The Engineer and City will assume no responsibility or risk.

5-10 REQUEST FOR MODIFICATION OF WORK

Should conditions occur during the progress of the Work that make it impossible for Contractor to comply strictly with the terms of the Contract with respect to a portion of the Work, Contractor shall make written request to the Engineer for a modification of such portion of the Work, provided that any modification is not detrimental to the Work or create any additional cost to the City. If the modification is acceptable to the Engineer, Contractor will be notified in writing, consistent with any conditions specified by the Engineer. If a modification is not acceptable to the Engineer, Contractor shall determine some other method of performing such portion of the Work that is acceptable to Engineer.

Such approved modifications do not affect or alter the application of any provision of the Contract to any portion of the Work for which no modification is approved by the Engineer.

5-11 RIGHT TO PERFORM EXTRA WORK

In case of neglect or refusal by Contractor to perform any extra work as directed by the Engineer pursuant to Section 4-6 of these Specifications or to make satisfactory progress in the execution of extra work, the City may employ

any person or persons to perform such work, and Contractor shall not in any way interfere with the person or persons so employed.

5-12 PROVISIONS FOR EMERGENCIES

If, 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 and immediate action is necessary in order to protect the public, any person or any property or property interest ("emergency work"), the Engineer, with or without notice to Contractor, may, but is not obligated to, take such action or obtain or provide for such work and material as the Engineer may consider necessary and adequate to furnish such protection.

The City's cost to perform, obtain or provide for such action, work and material shall be paid by Contractor, and may be deducted by City from any payment due or to become due to Contractor.

The performance of emergency work under the direction of the Engineer shall in no way relieve Contractor from its responsibility or liability for any damages that may occur while or after any actions are or have been taken by the Engineer.

5-13 SUSPENSION OF WORK TO PROTECT HEALTH, SAFETY OR WELFARE OF PERSONS OR PROPERTY

If the Engineer determines, in the Engineer's sole discretion, that a situation exists where continuation of the Work is illegal or endanger the health, safety or welfare of persons or property on or affected by the Work, the Engineer may order Contractor in writing to delay or suspend the Work in whole or in part for a period of time equal to the period of time while such situation exists. Any order given to Contractor to suspend or delay the Work shall identify the situation that makes the suspension or delay necessary.

Such order of the Engineer does not modify or invalidate in any way any of the provisions of this Contract, and Contractor is not entitled to any damages or compensation from City on account of such delay or suspension.

5-14 RIGHT TO RETAIN IMPERFECT WORK

If any portion of the work done or material furnished under this Contract is defective and not in accordance with the Contract Documents, and if the defect is not of sufficient magnitude or importance to make the Work or any portion of the Work dangerous or undesirable, the Engineer may, but is not obligated to, retain the defective work instead of requiring the work to be removed and reconstructed. The Engineer may make such deduction from the

payments due or to become due to Contractor as determined appropriate by the Engineer to account for the defector pay the City's costs of removal and reconstruction.

5-15 STORAGE OF MATERIALS AND EQUIPMENT

Contractor is solely responsible for protecting work in place and materials and equipment stored on-site or off-site from contamination by dust, dirt, debris or mold. Materials and equipment shall be stored so as to ensure the preservation of their quality and fitness for the Work. Stores of equipment and materials shall be located to facilitate inspection by the City. Contractor is responsible for all damages that occur in connection with the care and protection of all materials and equipment to be incorporated in the Work until the completion and final acceptance of the Work by the City.

Prior to storing any materials or equipment on private property not owned by Contractor, Contractor shall obtain written permission from the property owner and, if different than the property owner, the occupant of the property. Contractor is solely responsible for obtaining such permission and complying with any and all conditions and requirements of the property owner or occupant.

Contractor is solely responsible for maintaining adequate security and warning signs and controlling dirt, debris and dust within the limits of Contractor's storage areas at all times. Contractor shall take all steps necessary or required by the Engineer to prevent and eliminate blowing dust.

Prior to commencing the Work, Contractor shall submit a written "Storage of Materials and Equipment Plan" for approval by the Engineer. The Plan shall specify the location, entry date and exit date for all locations where Contractor will store materials or equipment, and a site maintenance plan for all locations. Additionally, this Plan shall describe the measures that Contractor will undertake to minimize impacts to driveways, residents and the general public in the vicinity of such storage locations during work and non-work hours. If this Plan is not approved by the Engineer, Contractor shall revise and resubmit the Plan as necessary to obtain the Engineer's approval.

5-16 MANUFACTURER'S DIRECTION

Manufactured articles, material, and equipment shall be applied, installed, connected, erected, adjusted, tested, used, cleaned, maintained, and conditioned as recommended by the manufacturer. Copies of the manufacturer's installation instructions and procedures shall be submitted, in accordance with Section 5-7 of these Specifications.

5-17 QUALITY OF MATERIALS AND WORKMANSHIP

If the Contract provides 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 their intended use. The work performed shall fully conform with the intent to secure the best standard of construction and equipment for the Work as a whole or in part.

5-18 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 its catalogue information. Unless the trade or manufacturer name is expressly designated as the only brand that will be accepted, for one or more of the purposes specified in Public Contract Code Section 3400(b), such designation is deemed to include the words "or equal," so that the use of an alternative article or material of equal quality and possesses the required features and 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 is upon Contractor, who shall furnish all relevant information as required by the Engineer. The Engineer will be the sole judge as to the quality and suitability of alternative articles or materials. The Engineer's decision will be final.

If the Contract Documents permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of the 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 within thirty (30) days after award of the Contract.

5-19 DUTIES AND POWERS OF INSPECTORS

Inspectors are representatives of the City with respect to the duties and powers entrusted to them, subject to any limitations on their authority specified by contract or under any Laws or Regulations. Their duty is 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 deviations from the Contract Documents. If an inspector deems it necessary, the

inspectors may order Contractor to stop the Work until the Engineer determines and orders that the Work may proceed.

5-20 INSPECTION

All work and materials furnished pursuant to this Contract are subject to inspection and approval or rejection by the Engineer and such assistants as the Engineer deems necessary. Contractor shall notify the Engineer of the time and place of any factory tests 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, that the Engineer notifies Contractor the Engineer wishes to inspect.

Contractor shall give notice not less than three (3) 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 the inspection or testing, if such inspection and testing or witnessing are deemed beneficial by the Engineer or are required by the Contract.

If the Engineer considers it proper and practicable, the Engineer will, 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 the Engineer's authorized representative(s) will 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. Notwithstanding the foregoing, the City shall have 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 is completed or in progress shall be subject to inspection. If required by the Engineer, 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 such inspection and removing any defective work and performing any necessary reconstruction.

5-21 REMOVAL OF REJECTED MATERIALS AND STRUCTURES

Contractor shall remove from the site of the Work, without delay, all rejected materials or structures brought to or incorporated in the Work. If Contractor fails to do so, or to make satisfactory progress in doing so within

forty-eight (48) hours after the service of a written notice from the Engineer, the rejected material or work may be removed by City and the City may deduct the cost of such removal from any payments that are due or may become due to Contractor. No such rejected 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 material in the performance of the Contract.

5-22 APPROVAL OF SOURCES OF SUPPLY OF MATERIALS

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

Even though a source of supply has been approved, the 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 any of the Contract Documents.

5-23 PREPARATION FOR TESTING

Contractor shall maintain proper facilities and provide safe access for inspection by City of all parts of the Work and of the shops or other locations where any portion of the Work is prepared. 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 written notice to the Engineer of its readiness for inspection unless the written approval of the Engineer for such testing or covering is first obtained.

5-24 METHODS OF SAMPLING AND TESTING

Contractor shall furnish samples of materials for testing as 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 Contract Documents. References made in these documents to standard methods of testing materials shall by such reference make such standards a part of the Contract.

5-25 REFERENCE TO STATE, FEDERAL OR NATIONAL SPECIFICATIONS

Whenever a reference is made in the Contract Documents to a specification or test designation either of the A.S.T.M., the A.A.S.H.T.O., the A.W.W.A., the 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 was 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 or Regulations that affect those engaged or employed in the Work, or the material or equipment used in or upon the site of the Work, or the conduct of the Work. Any misunderstanding or ignorance on the part of Contractor of such Laws or Regulations shall not in any way relieve Contractor of any responsibility under the Laws or Regulations or the Contract or otherwise modify the Contract.

Contractor shall observe and comply with all Laws or Regulations affecting the conduct of the Work, and Contractor and its Sureties shall defend, indemnify and hold harmless City and all of its officers, agents, and employees against any claim for liability arising from, based upon, or resulting from a condition created as a result of, the violation of any such Law or Regulation, whether by Contractor or any Subcontractor or Supplier or any of their respective officers, employees or agents.

6-2 CERTAIN LAWS AFFECTING THE WORK

This list is not a comprehensive inventory of applicable Laws and Regulations, but is a summary of a few selected State laws and City ordinances applicable to the Work.

1. State Laws

a. Labor Discrimination

Contractor shall not discriminate in the employment of persons on any ground listed 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 Division 2 of the Labor Code.

b. Fair Labor Standards Act

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

c. Contractor Licensing

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

d. Subcontractors

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

e. Underground Service Alert

Prior to conducting any excavation, Contractor shall contact the Underground Service Alert – Northern California as required by Government Code Section 4216.2, and shall take any and all other actions necessary to comply with and shall be subject to the provisions of Government Code Sections 4216.2 through 4216.9, inclusive.

2. Local Ordinances

a. Prevailing Wages

Pursuant to the Colusa City Municipal Code, Contractor shall pay not less than the prevailing rate of wages as determined by the Director of the California Department of Industrial Relations pursuant to Labor Code Section 1773. The wage rate determinations may be viewed on the Internet at http://www.dir.ca.gov/dlsr/. Withholdings and penalties shall be as set forth in the Colusa City Municipal Code and applicable Labor Code provisions.

For Federally funded projects, Contractor shall pay the higher of the Federal Davis Bacon Wage Rate, that is published with the Contract, or the rate specified herein for each trade or work classification employed. Contractor is responsible for submitting all required original signed payroll documents to the City for itself and all Subcontractors. The 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 required under the Contract.

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 apply to any contract advertised for bids prior to the expiration date and are good for the life of the contract. 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 predetermined. If

Work under the Contract will extend past this date, Contractor and its Subcontractors will be required to pay the new rate after such expiration date.

Contractor should contact the Prevailing Wage Unit, Division of Labor Statistics and Research (DLSR), (415-703-4780), to obtain predetermined wage changes for rates designated by a double asterisk (**) after the expiration date. The possibility of wage increases is one of the elements to be considered by Contractor in determining its bid, and shall not under any circumstances, be considered as the basis of a claim for additional compensation or damages against the City under the Contract.

b. Hours of Labor

Contractor shall comply with the provisions of the Colusa City Municipal Code and State Law regarding the maximum hours of labor. Withholdings and penalties shall be a set forth in the Colusa City Municipal Code and applicable Labor Code provisions.

c. Apprentices

Contractor shall comply with the provisions of the Colusa City Municipal Code, as well as any other applicable Laws or Regulations.

d. Grading, Erosion, and Sediment Control

Contractor shall be responsible for the implementation and maintenance of erosion, sediment and pollution control measures, otherwise known as Best Management Practices (BMPs) within the limits of the Work site and all areas impacted by the project at all times during the course of construction, including evenings, nights, weekends and holidays in addition to the normal working days in accordance with the provisions of the Colusa City Municipal Code.

e. Storm Water Management and Discharge Control

Contractor shall be responsible for the implementation and maintenance of all BMP measures necessary to effectively prevent the discharge of sediment, construction debris, trash, and all associated construction pollutants from discharging to a river, creek, roadside ditch, canal, basin and/or the storm water conveyance system in accordance with Colusa City Municipal Code and State Water Board Laws and Regulations.

f. Work Affecting the Public Right-of-way

Contractor shall be responsible for obtaining City approval of and complying with a traffic control plan, providing for the maintenance of construction areas affected by the Work, protecting existing facilities in the Work area, repairing any existing facilities damaged by Contractor's operations, and notifying the public prior to performing the Work in accordance with the provisions of Colusa City Code.

g. Noise Regulations

Contractor shall comply with the provisions of the Colusa City Municipal Code.

h. Dust Regulations

Contractor shall take reasonable cautions to prevent and control the movement of dust created by Contractor's Work activities in accordance with Colusa City Municipal Code. Proposed and implemented measures shall be in compliance with sections d and e. The Engineer may stop Work activities during conditions of high winds that may carry dust from the Work-site.

3. Amendments and Ordinance Changes

The statute and ordinance citations set forth above shall be deemed to refer to future amended or renumbered versions of the statute or ordinance cited.

6-3 PERMITS, LICENSES AND FEES

Unless otherwise indicated in the Special Provisions, Contractor shall at Contractor's 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 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 patented, copyrighted, trademarked or other similarly protected materials, equipment, devices, or processes used on or incorporated in the Work and shall defend, indemnify and hold harmless the City of Colusa together with all of its

officers and employees, and their duly authorized representatives, from any and all claims and actions, including claims and actions for violation of intellectual property rights, arising on account of the use of any such materials, equipment, devices, or processes by Contractor or any Subcontractor or Supplier. Before final payment is made on the Contract, if requested by Engineer, Contractor shall furnish acceptable proof of a proper release from all claims, costs, and liabilities arising from the use of such materials, equipment, devices, or processes used on or incorporated in the Work.

6-5 SANITARY REGULATIONS

Contractor shall comply with all Laws or Regulations governing sanitation and public health, and shall defend, indemnify and hold harmless the City of Colusa together with all of its officers and employees, and their duly authorized representatives, from any and all claims, actions or other liabilities arising on account of any failure to do so by Contractor or any Subcontractor or Supplier.

Contractor shall construct and maintain 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 these facilities 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 required by any Laws or Regulations or as the Engineer may deem necessary.

6-6 PUBLIC CONVENIENCE AND SAFETY

Contractor shall protect and preserve the safety of the public during the progress of the Work. Contractor shall not unnecessarily cause inconvenience to the public during the progress of the Work and shall minimize the inconvenience caused by Contractor's operations. Such operations include, but are not limited to, work performed on or adjacent to the Work site, traffic lane and pedestrian closures and deliveries of material and equipment.

Materials shall be stored on the work site so that no hazard to the public and no damage to public property will result. Damage to property caused by Contractor shall be repaired at Contractor's expense to the satisfaction of the Engineer. Spills resulting from hauling operations along or across any public traveled way shall be removed immediately by Contractor at Contractor's expense. Water or dust palliative shall be applied as necessary or if ordered by the Engineer for the alleviation or prevention of dust. Contractor shall insure that all utility services to customers in the project area are maintained.

Applicable Public Utilities Commission regulations are in effect at railroad grade crossings. Contractor shall not interfere with or impair railroad operations. If the Work could affect railroad operations, Contractor shall contact the railroad prior to construction and comply with all requirements pertaining to railroad operations or facilities.

6-7 HOUSEKEEPING PRACTICES

Contractor shall implement good housekeeping practices during all construction activities until completion and final acceptance of the Work. In addition to practices specified elsewhere in the Contract Documents, Contractor shall implement, at a minimum, the following housekeeping practices: solid waste management, material storage and delivery area, concrete waste management, trash management, and spill prevention and control.

Solid Waste Management: Contractor shall maintain a clean construction site and provide designated areas for waste collection. The waste collection areas shall contain leak-proof disposal containers with lids or covers. Site trash shall be collected daily and placed in the disposal containers. Contractor shall make arrangements for regular waste collection and regularly inspect the waste disposal areas to determine if potential pollutant discharges exist.

Material Storage and Delivery Area: Contractor shall provide one central material storage and delivery area (MSDA) for the duration of the Work. This area shall be fenced or otherwise protected such that runoff will not leave the MSDA site. Contractor shall regularly inspect the MSDA site to ensure that any hazardous or non-hazardous materials have not spilled.

Concrete Waste Management: Contractor shall arrange for off-site disposal of concrete wastes or disposed of in one designated area. Concrete wastes, including left-over concrete and material from washing out the concrete truck, shall not be disposed to the storm drain system via curb and gutter or otherwise. If a designated area is provided, the area shall be bermed and protected from the elements to allow the concrete to dry. The dried concrete waste shall be removed and disposed of properly by Contractor at Contractor's expense. Proof of proper disposal may be required by the City inspector or engineer.

Spill Prevention and Control: Contractor is responsible for instructing employees and Subcontractors about preventing spills of hazardous materials and controlling spills if they occur. Proper spill control and cleanup materials shall be kept on-site near the MSDA and updated as materials change on site. If a significant spill has entered the City's drainage system, Contractor shall contact the City's drainage maintenance supervisor to ensure the discharge has not impacted a body of water or drainage facility.

More information about required BMPs can be obtained by referring to the City of Colusa's Administrative and Technical Procedures Manual for Grading, Erosion and Sediment Control available online at: https://www.cityofColusa.org/-/media/Corporate/Files/DOU/Specs-Drawings/Sediment-control-manual.pdf?la=en

6-8 TRENCH SAFETY PLANS

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

When required on the Plans or by the Engineer, 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 Contractor intends to begin work on the trench. If the Plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety, the Plan shall be prepared by a registered civil or structural engineer. Nothing in this provision allows the use of shoring, sloping or protective systems less effective than that required by the Construction Safety Orders of the Division of Industrial Safety.

Contractor's bid for any item requiring excavation shall include all costs to furnish, install, maintain and remove adequate sheeting, shoring and bracing, and any other measures necessary to maintain adequate worker protection and conform to all applicable safety orders.

6-9 COMPLIANCE WITH OSHA

Contractor is responsible for strict compliance with applicable requirements of the California Occupational Safety and Health Act (Labor Code Sections 6500 et seq.). This includes, but is not limited to, all applicable Construction Safety Orders issued by the State of California, Division of Industrial Safety, under Title 8 of the California Code of Regulations.

6-10 TRAFFIC CONTROL REQUIREMENTS

Contractor is solely responsible for furnishing, installing and maintaining all warning signs and devices necessary to safeguard the public and the Work, and to provide for the proper and safe routing of vehicular, bicycle, and pedestrian traffic during the performance of the Work. This requirement is for the duration of the project, and is not limited to working hours. The use of

flagmen, barricades, and construction signing shall comply with the current edition of the California "Manual on Uniform Traffic Control Devices."

Contractor shall submit a traffic control plan showing proposed traffic control measures and detours for vehicles and pedestrians a minimum of ten (10) working days prior to the start of any Work within or affecting the street right of way. The traffic control plan shall include the following information pursuant to City Code these standards and include the following:

1. The name and business address of the applicant.
2. Diagram showing:

    a. The location of the proposed work area;
    b. The location of areas where the public right-of-way will be closed or obstructed; and
    c. The placement of traffic control devices necessary to perform the work.

3. The proposed phases of traffic control in a narrative format including a description and dates for the beginning and ending of each phase.
4. The time periods when the traffic control will be in effect.
5. A statement that the applicant will comply with the City's noise ordinance during the performance of all work.
6. A statement that the applicant understands that the plan may be modified by the director at any time in order to eliminate or avoid traffic conditions that are hazardous to the safety of the public.

Contractor shall not work until a City-approved traffic control plan is on file with the Engineer. If the Engineer determines at any time that actual traffic conditions render the approved plan inadequate to ensure public safety, the Engineer may require the plan to be immediately modified. If a hazardous condition cannot be eliminated by plan modification the Engineer may require work under the plan to be stopped, and the plan suspended, until the safety hazard is remedied. Contractor is not entitled to any costs, damages or extension of Contract time arising from any stop work order issued by the Engineer under this Section.

Contractor shall provide safe pedestrian, bicycle, and disabled access through or around the construction area. It construction activities will block or limit access to a Class IV bikeway, as designated in the City Bicycle Master Plan, Contractor may be required to provide a minimum Class II bike lane as an alternative in the traffic control plan to provide continuity in the protected bicycle network. Sidewalk closure shall comply with the "Policy for Sidewalk Closures" established by the City of Colusa's Department of Public Works pursuant to federal and state disability access laws and regulations. Contractor

shall provide access to all existing driveways, adjacent parking areas, and buildings at all times unless other arrangements are made with the property owner and approved by the Engineer. Access for emergency vehicles shall be clear at all times.

Contractor shall use skid resistant steel plates to cover all excavations permitted to remain open in the roadway during non-working hours. Steel plates shall be placed in a safe and proper manner that does not impede the passage of pedestrians, bicycles, and the disabled community.

All Work within public streets and right-of-way shall be done in an expeditious manner so as to cause as little inconvenience to the public as possible. Unless otherwise approved, Contractor shall maintain at least one travel lane in each direction at all times on two-way Primary Streets (defined below), and at least two travel lanes at all times on one-way Primary Streets.

On working days, between 7:00 a.m. and 8:30 a.m. and 4:00 p.m. to6:00 p.m., Contractor shall maintain the number of lanes normally available on all Primary Streets unless otherwise approved in writing by the City Traffic Engineer. In addition to the foregoing, on working days, Contractor shall maintain the number of lanes normally available on J Street between Interstate 5 and 16th Street between the hours of 7:00 a.m. and 6:00 p.m. unless otherwise approved in writing by the City Traffic Engineer.

Measurement and Payment: The contract lump sum price paid for "Traffic Control System" will include full compensation for furnishing all labor (including flagging costs), materials (including traffic control and construction area signs), Traffic Control Plan, tools, equipment, and incidentals and for doing all the work involved in placing, removing, storing, maintaining, and moving to new locations, replacing, and disposing of the components of the traffic control system, as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer.

6-11 HOLIDAY SEASON CONSTRUCTION MORATORIUM

During the holiday season, construction will be suspended on Holiday Season Moratorium Streets (defined below) unless otherwise approved in writing by the City Traffic Engineer. "Holiday season" means the period of time beginning on Thanksgiving Day and ending on the first regular working day following New Year's Day.

No new work that would interfere with traffic during the holiday season shall begin on any Holiday Season Moratorium Streets after November 1. All existing conditions within any Holiday Season Moratorium Streets shall be restored to their original or better condition prior to the start of the holiday season, and all unauthorized steel plates, barricades, and barriers shall be

removed from all traffic lanes.

Contractor may submit a written request to work within any Holiday Season Moratorium Streets during the holiday season. The request shall specify the time, date, and description of the work to be performed in the Holiday Season Moratorium Streets and the full extent of Contractor's proposed lane and sidewalk closure. The City Traffic Engineer will decide whether to approve, conditionally approve or deny such request, in whole or in part, in the City Traffic Engineer's sole discretion.

Emergency repairs to any Holiday Season Moratorium Streets are permitted during the holiday season, provided that Contractor notifies the Engineer at least one (1) hour in advance during working hours. If the emergency arises during non-working hours, Contractor shall notify the Engineer before 9:00 a.m. the following workday. Any emergency repairs performed by Contractor shall otherwise comply with the Contract Documents and all applicable Laws or Regulations.

6-12 CONTRACTOR NOT AN AGENT OF CITY

During the term of the Contract, Contractor shall be an independent contractor and shall not under any circumstances be considered an employee, agent, or other representative of the City. Contractor is not authorized to bind City to any obligation. Nothing in this Contract creates 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 has 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 City's right of supervision does not reduce or abrogate Contractor's liability for any and all damage or injury to persons, public property or private property that may arise directly or indirectly from Contractor's performance of the Work.

6-13 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 does not relieve Contractor of responsibility for any errors and is not an assumption of risk or liability by City or any City officer or employee. Contractor has no claim under the Contract on account of the failure or partial failure or inefficiency of any plan or method so approved. Such approval by the Engineer merely means that the Engineer has no objection to Contractor's using, at Contractor's sole responsibility and risk, the plan or method Contractor proposes.

6-14 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 performance of the Contract, without prior written consent of the Engineer.

6-15 PROPERTY RIGHTS IN MATERIALS

Contractor is not vested with 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. 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.

6-16 USE OF EXPLOSIVES

Explosives shall not be used on the Work unless permission to use them is granted by the Engineer in writing, and only then under such conditions as may be prescribed by the Engineer and in compliance with all applicable Laws or Regulations.

6-17 CONTRACTOR'S LEGAL ADDRESS

At Contractor's on site office, Contractor shall provide a representative authorized to receive drawings, samples, notices, letters, instructions, explanation or other communications or articles from City. Drawings, samples, notices, letters, instructions, explanations, or other articles or communications may be mailed or personally delivered either to Contractor's address given in the Proposal, or to Contractor's representative at the site of the Work, or to Contractor's office at the site of the Work. The delivery at any of these places of any such item from City to Contractor shall be deemed sufficient service upon Contractor, and the date of such service shall be the date of mailing or personal delivery. The address given in the Proposal may be changed 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, instruction, explanation, article or communication to or upon any authorized representative of Contractor personally.

6-18 ON STREET PARKING REMOVAL

In performing the Work, Contractor shall minimize the inconvenience to the public and shall only place "No Parking" signs in areas where parking clearly needs to be removed to safely perform the Work. "No Parking" signs shall be 11" by 17" inches, with red letters on white construction paper or other material approved by the Engineer, and shall comply with all applicable Laws or Regulations. "No Parking" signs shall be neat and clean, and clearly indicate the specific times and dates when parking is to be prohibited. "No Parking" signs shall be securely

fastened to barricades, and not placed on trees, utility poles, or other facilities not approved by the Engineer.

Contractor shall maintain the "No Parking" signs and barricades prior to and during the course of the Work. Contractor shall verify three days prior to commencing the Work, and continuously during the course of the Work, that the signs and barricades are adequately visible and properly placed.

The Engineer may arrange for vehicles that interfere with the Work to be towed. No vehicles parked in a "No Parking" area will be towed without acceptable documentation that the signs and barricades are properly placed, and no towing is allowed unless the Engineer determines that a reasonable person would have been able to determine that parking is not allowed. If Contractor requests towing of a vehicle, Contractor shall include in such request written documentation indicating that the "No Parking" barricades were placed at least seventy-two (72) hours in advance of the start of Work, and Contractor shall provide a photograph of the vehicle to be towed, showing the nearest "No Parking" sign. Contractor shall reimburse City for any payment of a claim filed against the City for the towing of any vehicle without the Engineer's approval or acceptable documentation as provided herein.

In Non-Metered Areas

Seventy-two (72) hours prior to the start of Work, Contractor shall place "No Parking" signs on approved barricades at fifty (50) to sixty (60) foot intervals.

In Metered Parking Areas

Contractor shall obtain permission to remove parking stalls from the City Parking Division not less than three (3) working days before the start of construction and shall be responsible for the payment of parking removal fees pursuant to applicable provisions of the Colusa City Code. It is recommended that Contractor consult with the City's Parking Division to obtain an estimate of the fees.

If Contractor pays the applicable fees and the removal of parking stalls is approved by City, seventy-two (72) hours prior to the start of Work, Contractor shall place "No Parking" signs adjacent to every third parking stall to be removed, when an entire block of parking is to be removed. Contractor shall move these signs into every third parking stall at the beginning of the workday, in conjunction with the covering of parking meters for all stalls to be removed. If Contractor only needs to remove a portion of parking stalls on a block, every stall removed shall be barricaded with a "No Parking" sign in conjunction with the covering of parking meters for all stalls to be removed. Contractor shall comply with any other conditions specified by the City for such parking stall removals.

In addition to the foregoing, Contractor shall comply with all applicable requirements of the Colusa City Code pertaining to on-street parking removal.

6-19 MAIN AND TRUNKLINE UTILITIES

The City is a member of the Underground Service Alert (U.S.A.) one-call program. Contractor or any Subcontractor must notify the U.S.A. at least two (2) working days, but not more than fourteen (14) calendar days, in advance of performing excavation work as provided in Government Code Section 4216.2, and Contractor shall comply with all other applicable requirements specified in Article 2 of Division 5 of the Government Code, commencing with Section 4216.

Contractor is responsible for the timely removal, relocation or protection of any existing main or trunkline utility facilities located on the Work site and identified on any of the Contract Documents in their approximate location (defined below). Subject to the provisions of this Section, City is responsible for the timely removal, relocation or protection of any existing main or trunkline utility facilities located on the Work site that are not identified in any Contract Documents in their approximate location. This does not require City to indicate the presence of existing service laterals or appurtenances whenever the presence of existing service laterals on the site 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, on, or adjacent to, the Work site. Contractor is responsible for the timely removal, relocation or protection of such service laterals.

If existing main or trunk line utility facilities on the Work site need to be located or repaired, or removed and relocated, or protected, and the subsurface main or trunk line utility facilities were not identified in any of the Contract Documents at their approximate location, and any damage occurring to such main or trunk line facilities was not due to the failure of Contractor or any Subcontractor to use reasonable care, City shall pay for the cost of locating and repairing, or removing and relocating, or protecting such main or trunk line utility facilities. A subsurface main or facility is deemed to be in the "approximate location" shown on the Contract Documents if the main or facility or any portion of it is located within a strip of land extending twenty-four inches (24") on either side of the location for the exterior surface of the main or facility shown on any of the Contract Documents. "Approximate location" does not refer to the depth of the subsurface main or facility.

The City's obligation to pay in instances of a discovery of main or trunk line facilities on site in the circumstances described above is limited strictly to the costs described above and for any equipment on the site of the Work necessarily idled as a result of such circumstances.

In the event the completion of the project is delayed by (1) City's failure to provide for the repair, removal, relocation or protection of an existing main or trunk line utility facility not identified in its approximate location on any of

the Contract Documents, or (2) failure by another owner of an existing main or trunk line utility facility to provide for the repair, removal, relocation or protection of such main or facility, except in cases where Contractor is responsible under the Contract for causing such repair, removal, relocation or protection to occur, then such delay shall be an Excusable Delay as that term is defined in the Contract Documents.

Nothing in this section relieves a utility from a contractual or legal obligation to pay the cost of removal or relocation of existing utility facilities. For facilities owned by a public utility, the public utility has the sole discretion to perform repairs or relocation work or permit Contractor to do such repairs or relocation work at a reasonable price. Nothing in this section precludes City from pursuing any appropriate remedy against the utility for delays that are the responsibility of the utility.

If, after commencing the Work, Contractor discovers existing main or trunk line utility facilities located on the site of the Work that were not identified on any of the Contract Documents in their approximate location, Contractor shall immediately notify the Engineer and the owner of the utility facility in writing by the most expeditious means available.

6-20 ITEMS CONTAINING TRADE SECRETS OR PROPRIETARY RIGHTS PROHIBITED

Neither Contractor nor any Subcontractor shall furnish any item or combination of items to which, or in which, Contractor or any Subcontractor or Supplier claims any trade secret or proprietary right. City shall own without restriction all items furnished under this Contract. Such items shall include but not be limited to, any item assembly, combination of items, process, electrical or mechanical or electro-mechanical or microprocessor process or program, or any combination or sequence of these items. 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, that may be withheld or conditioned in anymanner determined to be in the best interest of the City by the Engineer in the Engineer’s sole discretion.

Section 7

PROSECUTION AND PROGRESS

7-1 ASSIGNMENT

The Contract may be assigned only upon written consent of the City, and also with the consent of Contractor's Sureties.

7-2 WORK SCHEDULE AND ADEQUATE RESOURCES

Contractor shall perform the Work under this Contract with all materials, tools, machinery, apparatus, and labor necessary to the complete and timely execution of everything described, shown or reasonably implied under this Contract on or before the Contract Completion Date.

Contractor shall give full information to the Engineer as to Contractor's plans for carrying on any part of the Work before commencing that Work. Contractor shall submit to the Engineer prior to the pre-construction meeting or as otherwise required in the Special Provisions a detailed achievable schedule for the various items of Work and for completion of the Work as a whole, using the critical path method (CPM) or other format acceptable to the Engineer. If such schedule is not accepted in writing by the Engineer, Contractor shall revise and resubmit the schedule as necessary to obtain the Engineer's written acceptance. If at any time during performance of the Work the Engineer notifies Contractor that its latest accepted schedule is not reasonable or does not accurately reflect the current progress or sequence of Work, Contractor shall revise and resubmit an updated schedule within five (5) working days of the Engineer's notification. If such updated schedule is not accepted in writing by the Engineer, Contractor shall revise and resubmit the schedule as necessary to obtain the Engineer's written acceptance. Notwithstanding any contrary provision of the Contract Documents, Contractor is not entitled to claim any damages or compensation for any delay caused by the City unless Contractor's claim of City-caused delay is substantiated by an accurate CPM schedule accepted by the Engineer indicating the Controlling Operation(s) and sequence of Work, that Contractor submitted to the City prior to the occurrence of the delay.

The schedule(s) required by this section shall show the order in which Contractor proposes to carry out the Work, the total float period, the logical relationships between Work activities, the critical path, the dates on which Contractor will commence the different tasks comprising the Work (including procurement of materials, plant, and equipment), and the contemplated dates for completing such tasks.

The schedule(s) submitted shall be consistent in all respects with the completion time requirements and any order of work requirements indicated in the Contract.

Subsequent to the time that submittal of a schedule is required in accordance with these Specifications, no progress payments will be made for any Work until such 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 Contractor's 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 its facilities or methods, and Contractor shall promptly comply with such orders at no cost to the City; but neither compliance with such orders nor failure of the Engineer to issue such orders shall relieve Contractor from its obligation to secure the degree of safety, the quality of the Work, and the rate of progress required of Contractor under the Contract Documents. Contractor alone is responsible for the safety, adequacy, and efficiency of its plant, equipment, and methods.

7-3 WORK UNDER UNFAVORABLE WEATHER AND OTHER ADVERSE CONDITIONS

During unfavorable weather and other adverse conditions, Contractor shall pursue only such portions of the Work as will not be damaged by the weather or other adverse conditions. If the quality or efficiency of any portions of the Work will be affected by any unfavorable conditions, such portions shall not be performed while those conditions exist, unless Contractor can overcome these conditions by special means or precautions approved by the Engineer.

7-4 SATURDAY, 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 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 or as specified in the Special Provisions.

Notwithstanding the foregoing, if Contractor first requests and obtains the written permission of the Engineer, Contractor may establish different hours of work as a regular procedure, as specifically approved by the Engineer. However, the Engineer may revoke such permission at any time for any reason. If such off-period work is approved, Contractor shall comply with any and all conditions established for such work by the Engineer at Contractor's own cost and expense, and Contractor shall pay any and all costs incurred by the City in

connection with such off-period work, including but not limited to the City's costs to inspect such work.

7-5 SEPARATE CONTRACTS

City reserves the right to let other contracts in connection with the 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 Contractor's 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 or results. Contractor's failure to inspect and report any defects in the work 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 not arising from the Contractor's Work that may develop in the other contractor's work after the execution of Contractor's Work.

7-6 REMOVAL OF UNSATISFACTORY EMPLOYEES

Contractor and Contractor's Subcontractors shall, on the site of the Work, employ only competent persons skilled in their respective lines of work. Whenever the Engineer notifies Contractor that any person employed by or representing Contractor or any Subcontractor on the Work is, in the Engineer's opinion, incompetent, unfaithful or disorderly, or refuses to carry out the provisions of this Contract, or uses threatening or abusive language to or otherwise threatens or abuses any City employee or representative or any member of the public, or is otherwise unsatisfactory, Contractor shall remove or require its Subcontractor to remove the person from the Work and shall not return that person to the Work unless approved by the Engineer.

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

Contractor shall protect the Work, all materials incorporated or to be incorporated in the Work and all equipment used in connection with the Work, whether located on or off the Work-site, and all public and private improvements and facilities within the site of the Work, from damage due to the nature of the Work, the action of the elements, trespassers, vandalism, fire or any other cause whatsoever, until the completion and City acceptance of the Work. The City does not have or assume any responsibility for collecting indemnity from any person or persons causing damage to the work or property of Contractor. Any and all costs incurred by Contractor to protect the Work, materials, equipment, improvements and facilities as provided above shall be included in Contractor's

Proposal and Contractor shall not be entitled to any additional compensation or damages from City.

Contractor shall furnish such guards, fences, warning signs, walks, and lights as is necessary, or as may be ordered by the Engineer, and shall take all other necessary precautions to prevent damage or injury to persons or property. Existing public and private improvements including utilities and adjacent properties shall be protected from potential damage resulting from the operations of Contractor or any Subcontractor. Typical improvements to be protected include, but are not limited to: trees, shrubbery, fences, walls, existing pavement, sidewalks, street improvements and underground utilities that are either to be, or not to be, removed under the Contract.

All existing street signage, markings and striping damaged as a result of construction shall be replaced in kind by Contractor, to the satisfaction of the Engineer. In the case of partial damage, the whole stripe or marking in its entirety shall be replaced. Temporary marking and striping shall be installed within 3 working days of any damage.

All painted or other markings, such as Underground Service Alert (USA) markings, on the pavement, sidewalk or gutters used for constructing the project shall be removed by Contractor before final acceptance of the Work.

If public or private improvements are damaged by the operations of Contractor or any Subcontractor, the damaged improvements shall be replaced or restored at Contractor's expense to pre-damage condition.

Any underground facility not shown on the Plans does not relieve Contractor of the responsibility to appropriately notify USA in order to determine the location of underground facilities, or to exercise sound judgment when working in the vicinity of known, visible or reasonably ascertainable underground facilities. It is Contractor's responsibility to ascertain the location of those underground facilities that may be subject to damage by reason of Contractor's operations.

7-8 TIME OF COMPLETION

Contractor shall complete all Work within the time set forth in the Agreement.

Contractor shall not be charged for a working day on which the Engineer determines, that as a result of inclement weather or conditions resulting from the weather, Contractor is or was prevented from engaging in the current Controlling Operation or Operations of the Work with its normal labor and effort for at least five (5) hours of the day.

The current Controlling Operation or Operations mean any feature of the Work (e.g., an operation or activity, or a settlement or curing period) that, if delayed or prolonged, will necessarily delay the time of completion of the entire Work, as determined by the Engineer based on Contractor's most recent schedule that has been accepted by the Engineer.

The Engineer will furnish 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, if any, except when working days are not being charged in accordance with the provisions in Section 7-9 "Temporary Suspension of Work." Contractor is allowed 15 calendar days from the date of the Engineer's issuance of the weekly statement of working days in which to file a written protest of the Engineer's determination of working days; otherwise the weekly statement is deemed accepted by Contractor as correct.

7-9 TEMPORARY SUSPENSION OF WORK

The Engineer has the authority to suspend the performance of the Work wholly or in part, for such period as the Engineer deems 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 the Engineer may deem necessary due to the failure on the part of Contractor or any Subcontractor to carry out orders, or to satisfactorily perform any provision of the Contract. 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 or methods are corrected, as ordered or approved in writing by the Engineer.

If a suspension of Work or any portion of the Work is ordered by reason of the failure of Contractor or any Subcontractor to carry out orders or to satisfactorily perform any portion of the Contract, or by reason of weather conditions being unsuitable for performing any item or items of Work, which items, in the opinion of the Engineer, could have been performed prior to the occurrence of such unsuitable weather conditions had Contractor diligently prosecuted the Work in accordance with the Contract when weather conditions were suitable, Contractor shall perform at its own expense all the work necessary to (i) preserve and protect the Work and related facilities and improvements from weather and other environmental conditions during the period of suspension, (ii) repair any damage to the Work and/or related facilities and improvements occurring before, during or after the period of suspension, and (iii) provide a safe, smooth, and unobstructed passageway through construction for use by public traffic and any other public use during the period of suspension.

In the event Contractor fails to timely perform such Work, the City may perform such work and the cost of the Work will be paid by Contractor or will be deducted from moneys due or to become due Contractor under the Contract.

Except as may be provided otherwise in the Contract Documents, if the Engineer orders a suspension of all or a portion of the Work, or a portion of the Work that is the current Controlling Operation or Operations, by reason of unsuitable weather conditions, and in the opinion of the Engineer the suspension is not due to the failure of the Contractor or any Subcontractor to carry out orders or to satisfactorily perform any portion of the Contract nor due to the Contractor's failure to diligently prosecute the Work in accordance with the Contract prior to such suspension, Contractor shall perform all work necessary to (i) preserve and protect the Work and related facilities and improvements from weather and other environmental conditions during the period of suspension, and (ii) provide a safe, smooth, and unobstructed passageway through construction for use by public traffic and any other public use during the period of suspension, provided that the cost of such work shall, upon approval by the Engineer, be paid for as extra work as provided in Section 4-4 above, or, at the option of the Engineer, all or a portion of such work shall be performed by the City at no cost to Contractor.

If the Engineer orders a suspension of all of the Work, or a portion of the Work that is the current Controlling Operation or Operations, due to unsuitable weather or due to such other conditions that the Engineer considers unfavorable to the suitable prosecution of the Work, and in the opinion of the Engineer the suspension is not due to the failure of the Contractor or any Subcontractor to carry out orders or to satisfactorily perform any portion of the Contract nor due to the Contractor's failure to diligently prosecute the Work in accordance with the Contract prior to the suspension, 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 a current Controlling Operation or Operations, but subsequently becomes the current Controlling Operation or Operations, the determination of working days will be made on the basis of the current Controlling Operation or Operations.

If a suspension of all or a portion of the Work is ordered by the Engineer, due to the failure on the part of Contractor or any Subcontractor to carry out orders given or to satisfactorily perform any provision of the Contract, or by reason of weather conditions being unsuitable for performing any item or items of Work, which items, in the opinion of the Engineer, could have been performed prior to the occurrence of such unsuitable weather conditions had Contractor diligently prosecuted the Work in accordance with the Contract when weather conditions were suitable, the days on which the suspension order is in effect shall be considered working days unless such days are not working days pursuant to Section 1-48(1) of these Specifications.

A suspension of Work under any of the conditions set forth in this Section shall not relieve Contractor of its responsibilities under the Contract Documents. This Section 7-9 does not apply to any suspension of work to protect the health, safety, welfare or condition of persons or property pursuant to Section 5-13 of these Specifications.

7-10 DETOURS

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, if not addressed there, at the Contract prices for the items of work involved if such prices are specified in the Contract. If not addressed in the Special Provisions and no such prices are specified in the Contract, all detours shall be constructed and removed at no additional charge by Contractor.

Contractor shall pay all costs of repairing damage to detours caused by public traffic.

When public traffic is routed through the Work, Contractor's obligation to provide for a safe passageway through construction operations shall not be considered to constitute construction or maintenance of a detour and Contractor shall not be entitled to any additional payment therefor, unless otherwise specified in the Special Provisions.

Detours constructed by Contractor exclusively for Contractor's or any Subcontractor's own use and convenience for hauling materials and equipment shall be constructed and maintained by Contractor at its own expense.

The failure or refusal of Contractor to construct and maintain adequate detours at the proper time and in satisfactory condition for use by public traffic shall be sufficient cause for closing down the Work until the Engineer determines that such detours have been constructed and are in satisfactory condition for use by public traffic. Contractor is solely responsible for all costs incurred to repair any damage to any detour caused by Contractor's or any Subcontractor's hauling or other activity.

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 the Engineer's assistants. In computing quantities, the length, area, solid content, 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 relation to the original undisturbed condition.

8-2 SCOPE OF PAYMENT

The compensation provided by the Contract constitutes full payment for all materials, supplies, equipment, tools, labor, and all incidentals necessary to complete the Work; for performing all work and services contemplated and implied by the Contract; for loss or damage arising from the nature of the Work, or from action of the elements; from unforeseen difficulties that may be encountered during the performance of the Work; for all risks of every description connected with the performance of the Work, and for any infringement of patent, trademark, or copyright; and for completing the Work according to the Contract Documents.

For unit price items, payment for those items at the unit price bid by Contractor constitutes full payment for all work and services related to such items, except as otherwise specified in the Contract Documents. For any work or services required to perform the Work that are not specifically described in the Contract Documents, Contractor will include payment for such work and services under the bid of any item(s) that Contractor deems appropriate and City shall not pay additional compensation for any such work or services. No payment shall be made for materials stored on- or off-site until such materials are properly installed and incorporated in the 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 COMPLETION OF WORK AND FINAL PAYMENT

1. Issuance of Punchlist

A punch list may be issued when the Engineer determines as provided below, that the work is "substantially complete" as that term is defined in Section 1 of these Specifications. The Engineer may issue a punch list on the Engineer's own initiative or in response to Contractor's request. If Contracto4r believes the Work is substantially complete and requests issuance of a punch list, the following provisions shall apply:

a. Contractor shall submit to the Engineer a written request for issuance of a punch list. Contractor also shall provide any information relating to the Work that may be requested by the Engineer after receiving Contractor's request. The Engineer shall request such information, if any, not later than five (5) working days after receiving Contractor's request for issuance of a punch list.

b. After reviewing the request and information and performing such other investigations, inspections or reviews necessary to ascertain the condition or status of the Work, the Engineer, in the Engineer's sole discretion, shall either (1) issue a punch list, or (2) notify Contractor in writing that the Work is not yet substantially complete, and include a list of items of the Work that are not yet complete and have more than minor deficiencies. Unless otherwise agreed by the parties, the Engineer shall take one of the above actions within ten (10) working days after receiving Contractor's request for issuance of a punch list, or, if the Engineer requests information, within ten (10) working days after the Engineer receives such information. Any subsequent requests by Contractor for issuance of a punch list shall be made in accordance with the provisions of this Section.

The City may issue one or more punch lists, as determined necessary or appropriate by the Engineer. The issuance of a punch list is solely for purposes of identifying items of the Work that have minor deficiencies, and shall not modify or otherwise affect the meaning, application or operation of any provision of the Contract Documents, including but not limited to any warranty, liquidated damages or termination provisions.

2. Final Acceptance of the Work

Final acceptance occurs when the Engineer determines that the entire Work is complete. The Engineer may make this determination on the Engineer's

own initiative or in response to Contractor's request. If Contractor believes the entire Work, including all punch list work, is complete and requests final acceptance, the following provisions shall apply:

a. Contractor shall submit to the Engineer a written request for final acceptance. Contractor shall provide any information relating to the condition or status of the Work as requested by the Engineer. The Engineer shall request such information, if any, not later than five (5) working days after receiving Contractor's request for final acceptance.

b. After reviewing such request and information and performing such other investigations, inspections or reviews as may be necessary to ascertain the condition or status of the Work, the Engineer, in the Engineer's sole discretion, shall either (1) issue final acceptance establishing the date of completion of the entire Work, or (2) notify Contractor in writing that the entire Work is not yet complete, and include a list of items of the Work that are deficient. Unless otherwise agreed by the parties, the Engineer shall take one of the above actions within ten (10) working days after receiving Contractor's request for final acceptance, or, if the Engineer requests information, within ten (10) working days after the Engineer receives such information. Any subsequent requests by Contractor for final acceptance shall be made in accordance with the provisions of this Section. The date of completion of the entire Work determined by the Engineer shall be specified in any Notice of Completion filed pursuant to Civil Code Section 3093.

Completion of the Work shall not be deemed to occur under the Contract for any purpose until the Engineer determines the date of completion as provided above.

3. Final Payment

After determining the date of completion, the Engineer shall make a final estimate of the amount and value of Work performed under the Contract If necessary, the Engineer shall prepare a balancing Change Order. The Engineer shall send the final estimate to Contractor with a balancing Change Order, if required, for Contractor's review and signature.

Not later than fifteen (15) calendar days after receiving the final estimate and balancing Change Order, if any, Contractor shall either (1) sign the final estimate and balancing Change Order, if any, and return them to the Engineer, or (2) notify the Engineer in writing of any disagreement with the final estimate. If Contractor fails within this time period to either return the signed

final estimate and balancing Change Order, if any, or notify the Engineer in writing of any disagreement with the final estimate, this is deemed acceptance by Contractor of the Engineer's final estimate and balancing Change Order (if any).

After Contractor's signature or acceptance of the final estimate and balancing Change Order, if any, the City may approve the final payment amount and execute the balancing Change Order, if any, in accordance with applicable approval requirements of the Colusa City Code. If Contractor timely notifies the Engineer in writing of a disagreement with the final estimate, if such disagreement is not resolved fifteen (15) calendar days after the Engineer receives such notification, the City may unilaterally approve a final payment amount and execute a balancing Change Order, if required, in accordance with applicable approval requirements of the Colusa City Code. The unilateral approval by the City does not affect Contractor's right to seek additional compensation, if any, but only to the extent authorized under other provision(s) of the Contract Documents.

The City's final payment consists of the entire sum found to be due by the Engineer after deducting all previous payments and all amounts charged against or withheld from Contractor under any provision of the Contract Documents or any Laws or Regulations, and all amounts retained under the provisions of the Contract. All prior partial estimates and payments are subject to correction in the final estimate and payment. The City's release of any amounts charged, withheld or retained at the time of final payment are not considered a "final payment" as the term is used herein.

No payment made under the Contract constitutes acceptance by City of any defective work or improper materials.

8-5 ASSIGNMENT OF CLAIMS

Contractor shall not assign any right to any portion of the moneys that may become due or may be claimed to become due to Contractor under the Contract without the written approval of the City. No person other than the party signing the Contract shall have any claim arising from the Contract, except as specifically provided in these Specifications.

8-6 PAYMENTS BY CONTRACTOR

1. Contractor shall provide all labor, services, materials, and equipment necessary to perform and complete the Work under the 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 at least 90% of the cost off all materials, tools, and other expendable equipment, on or before the 10th day after payment by City of any progress payment relating to those costs.

2. In the absence of other provisions in the Contract applicable to any Subcontractor, Contractor shall pay each Subcontractor, within ten (10) days after each payment City makes Contractor, the sum allowed in such payment for and on account of the Work performed by the Subcontractor, to the extent of the Subcontractor's interest therein, as required by Section 7108.5 of the California Business and Professions Code.

3. In addition to other responsibilities specified in the Contract Documents, Contractor is responsible for payment of:

a. Restaking costs resulting from loss of stakes and survey markers due to Contractor's or any Subcontractor's negligence;

b. Repeat testing of soils and materials when the previous testing results failed to meet the requirement(s) specified in the Contract Documents; and

c. Overtime inspection costs when the Engineer determines the overtime inspection was performed primarily to benefit Contractor.

8-7 RELEASE AT TIME OF FINAL PAYMENT

If requested by City, as a condition precedent to final payment, Contractor and each assignee under any assignment approved in accordance with the Contract Documents and in effect at the time of final payment, shall execute and deliver a release in form and substance satisfactory to City that discharges City, its officers, agents and employees of and from all liability, obligations and claims arising under the Contract, provided that disputed Contract claims in stated amounts may be specifically excluded by Contractor from the operation of the release pursuant to Public Contract Code Section 7100, but only to the extent that Contractor has complied with all procedures and requirements applicable to the presentation and processing of such claim(s) under the Contract Documents.

8-8 EXTRA WORK A PART OF THE CONTRACT

If extra work is ordered or authorized by the City in accordance with the Contract, such work is a part of the Contract and subject to each and all of its terms and conditions.

8-9 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 the Contract, the powers reserved in the Contract to the City, or any right of City to damages or to reject work in whole or part. No waiver of any breach of the Contract constitutes a waiver of any other or subsequent breach. All remedies provided in the Contract are cumulative and in addition to all other rights and remedies that may exist at law or in equity.

8-10 PAYMENT BY COST AND PERCENTAGE

Payment by cost and percentage shall be made as follows:

1. For all materials purchased by Contractor and used in the specific portion of the Work, Contractor 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.

2. For all labor of any class including foremen engaged in the specific portion of the Work, Contractor shall receive the prevailing wage and fringe benefits (not including payroll taxes) paid for each hour such 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)]

3. For any Contractor-owned machine, power machinery and equipment deemed necessary and desirable to use on the specific portion of the Work, Contractor is allowed a rental price equivalent to the current Caltrans rental rate (less any state mark-ups) +15%. For machines and equipment rented by Contractor, a rental price, fully maintained, must be agreed upon by City and Contractor in writing before the specific work is begun, for each hour such machines and equipment are used, to which shall be added no percentage. If a rental price is not agreed to in writing as specified herein the current Caltrans rental rate shall be used.

4. Where extra work under cost and percentage is being performed by a Subcontractor, Contractor is allowed a five percent (5%) surcharge on the combined total of (1), (2), and (3) above for work performed by the Subcontractor. This surcharge is only allowed to Contractor and not to any Subcontractors.

Contractor shall keep and present to the City in such form as the Engineer may direct, complete and correct documentation of the net cost of all labor and materials subject to the provisions of this Section.

No claim for payment for extra work, whether done by cost and percentage or otherwise, can be honored unless the Engineer has given prior written authority and permission for such work.

Section 9

MOBILIZATION

Mobilization shall conform to the provisions in Section 9-1.16D, "Mobilization," of the Standard Specifications and to these Special Provisions.

Mobilization shall include the obtaining of all permits, moving onto the site of all equipment, and other construction facilities as required for the proper performance and completion of the work.

Mobilization shall include but not be limited to the following principal items:

1. Signed Contract by the City and the Contractor.

2. Completion of all tasks and submittal of all documents (bonds, insurance, schedule, etc.) required as conditions of issuing the Notice to Proceed.

3. Moving onto the site of all Contractor's equipment required for operations.

4. Installing temporary construction water supply, power, wiring and lighting facilities, as required.

5. Providing field office trailers if needed by the Contractor.

6. Providing all on-site communication facilities, including telephones and radio pagers.

7. Obtaining all required permits.

8. Having all OSHA required notices and establishment of safety programs.

9. Attendance at Pre-Construction Conference of Contractor's principal construction personnel.

10. Physical verification (potholing) of existing utilities

11. Beginning work on the project or at the subject site as applicable.

12. Project signage per State Revolving Fund Requirements

Measurement and Payment: Mobilization will be measured by the **lump sum**. Mobilization will be measured and paid for on a lump sum basis in accordance with the provisions of Section 9-1.16D, "Mobilization" of the Standard Specifications.

No payment for mobilization, or any part thereof will be approved for payment under the contract until all applicable mobilization items listed above have been completed.

Section 10

CONSTRUCTION MATERIALS

This Section describes various classes and types of materials used in public construction within the City of Colusa. Materials to be used for 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 C 150 and these Specifications, and shall be Type II, unless otherwise specified herein.

ASTM C 150, 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 than 0.60 percent by weight of alkalies, calculated as the percentage of Na_2O plus 0.658 times the percentage of K_20.

When directed by the Engineer, 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 C 33, 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 PREFORMED EXPANSION JOINT FILLER

Unless otherwise specified in the Special Provisions, preformed expansion

joint filler material shall conform to ASTM D 1751.

10-5 PORTLAND CEMENT CONCRETE

1. Composition:

Portland cement concrete (referred to herein as concrete) shall be composed of Portland Cement, fine aggregate, coarse aggregate, admixtures if used, and water.

Concrete 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 (1½").

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 one inch (1")

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 (¾").

When approved by the Engineer, fly ash conforming to ASTM C 618 may be used to replace up to 20 percent of the Portland cement requirement for Class A and B concrete except that fly ash shall not replace Portland cement for concrete used to pave alleys.

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.

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

10-5 PORTLAND CEMENT CONCRETE (cont.)

2. Proportioning:

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

Sieve Size	Designation and Nominal Size Percentage Passing Sieves					
	Primary Aggregate Sizes			Combined Aggregate Sizes		
	1½x ¾"	1" x No. 4	Fine	1½" Max.	1" Max.	¾" Max.
2"	100	--	--	100	--	--
1½"	88-100	100	--	90-100	100	--
1"	1-59	88-100	--	50-86	90-100	100
¾"	0-17	37-100	--	45-75	55-100	90-100
⅜"	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.

10-5 PORTLAND CEMENT CONCRETE (cont.)

3. Mixing:

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, except where 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 C 94.

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 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, 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

10-5 PORTLAND CEMENT CONCRETE (cont.)

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.

A ticket showing volume of concrete and the mix number shall accompany each batch of transit-mixed concrete delivered to the job site. The ticket shall also show the time of day at which the materials were batched.

4. Placing:

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.

5. 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 C 143, except that the ratio of weight of water (water cement ratio) shall not exceed 0.55 unless otherwise approved by the Engineer.

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

a. concrete paving and reinforced structures (heavy sections), not more than three inches (3");

b. 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.

10-5 PORTLAND CEMENT CONCRETE (cont.)

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.

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 Colusa, except that, if tested concrete does not meet required standards, the cost of additional testing shall be borne by Contractor.

No concrete shall be used which has partially set, and no concrete shall be re-tempered 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 conform to the requirements of Section 90, "Concrete," of the State Specifications.

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 (¾") maximum aggregate for Class 2 aggregate base, unless otherwise specified in the Special Provisions. Aggregate may include material processed from reclaimed asphalt concrete, Portland cement concrete, lean concrete base, cement treated base or a combination of any of these materials. The amount of reclaimed material may constitute up to 100% of the total volume of the aggregate used.

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 D 1557. 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 ton or 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 AGGREGATE SUBBASE (GRADED)

Aggregate subbase shall conform to the requirements of Section 25 of the State specifications. Aggregate subbase shall be Class 1, unless otherwise approved by the Engineer.

Payment for aggregate subbase 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 D 1557. 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 or cubic yard 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 conform to the requirements of 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 ton or cubic yard of cement treated base complete in place as so indicated in the Special Provisions.

10-10 LIME STABILIZATION

Lime stabilization shall conform to the requirements of Section 24 of the State Specifications, except as modified herein.

Unless otherwise specified in the Special Provisions or approved by the Engineer the amount of lime to be added shall constitute a minimum of four and one-half percent (4.5%) by unit weight of the material to be stabilized.

10-11 TREATED PERMEABLE BASES

Treated permeable bases shall conform to the requirements of Section 29 of the State Specifications.

10-12 GEOGRID

Geogrid may be used in areas requiring soil stabilization, such as unsuitable subgrade, or as specified in the Special Provisions, or as approved by the Engineer. Geogrid material shall conform to the following requirements unless otherwise specified in the Special Provisions.

The reinforcement material shall be biaxially oriented geogrid with high tensile modulus in relation to the material being reinforced, with large apertures, thick ribs and junctions to permit significant mechanical interlock with the material being reinforced, and with high continuity of tensile strength through all ribs of the structure.

The geogrid shall maintain its reinforcement and interlock under normal construction practices, and be resistant to both ultraviolet degradation and all forms of biological degradation normally encountered in the material being reinforced. Geotextiles shall not be accepted as reinforcing material. The geogrid shall be installed per the manufacturers recommendations and as specified in the Special Provisions. Grid ties shall be installed a maximum of twenty feet apart and overlaps shall be a minimum of two feet, unless otherwise approved by the Engineer.

The geogrid shall be a single-layer grid that meets the dimensions and properties outlined below. Multi-layered grids fastened together shall not be acceptable. The biaxial geogrids shall conform to the property requirements listed below:

Property	Test Method	Units	Value
Mass	ASTM D 5261-92	oz/sy	8.75 (nom)
Tensile			
Peak Tensile MD (a)	GRI GG1	lb/ft	1,200 (min)
Tensile at 5% MD	GRI GG1	lb/ft	810 (min)
Peak Tensile CMD (b)	GRI GG1	lb/ft	1,970 (min)
Tensile at 5% CMD	GRI GG1	lb/ft	1,340 (min)
Stiffness			
Torsional Stiffness	Corps of Engineers	cm-kg/deg	6.5 (min)
Flexural Stiffness True Initial	ASTM D 1388	mg-cm	750,000 (min)
Modulus in Use MD (c)	GRI GG1 (b)	lb/ft	20,500 (min)
True Initial Modulus in Use CMD (c)	GRI GG1	lb/ft	30,000 (min)
Interlock			
MD dimension	I. D. Calipered	in	0.75-1.50
CMD dimension	I. D. Calipered	in	0.75-1.50
Open area (d)	COE Method Modified	%	70 (min)
Junctions			
Efficiency	GRI GG2	%	90 (min)
Strength MD	GRI GG2	lb/ft	1,080 (min)
Strength CMD	GRI GG2	lb/ft	1,778 (min)

(a) MD - Machine Direction which is along roll length
CMD - Cross Machine Direction which is across the roll width.
(b) Resistance to in-plane rotational movement measured by applying a 20 cm-kg moment to the central junction of a 9" x 9" specimen restrained at its perimeter. (U.S. Army Corps of Engineers Methodology).
(c) True resistance to elongation when initially subjected to a load measured via GRI-GG1 without deforming test materials under load before measuring such resistance or employing “secant” or “offset” tangent methods of measurement so as to overstate tensile properties.
(d) Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.

Stress transfer capability through junctions (i.e. material overlaps). The value of the Peak Tensile Strength CMD multiplied by Junction Efficiency shall be greater than 1,080 lb/ft.

10-13 BEDDING SAND

Bedding Sand shall have a minimum sand equivalent of 50. Ninety to one hundred percent (90-100%) shall pass the #4 sieve and a maximum of fifteen percent (15%) shall pass the #200 sieve. Sand material shall be of a good quality with a minimum resistivity of 5,000 ohm-cm., a minimum pH of 6.0, a maximum chloride concentration of 300 ppm and a maximum sulfate concentration of 1,000 ppm.

Chemical Analysis	ASTM Method
Conductivity	D 1125
Sulfate	D 516A (SM 4500)
PH	D 2976/D 4972/G 51
Chlorides	D 512C

10-14 CRUSHED SCREENINGS

In these Specifications, in the Special Provisions, or on the Plans, the use of crushed screenings 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 screenings shall conform to the requirements for Class 1 Permeable Material Type A as set forth in Section 68 of the State Specifications.

10-15 SLURRY CEMENT BACKFILL

Slurry Cement Backfill specified herein for use as trench backfill shall conform to the requirements of Section 19 of the State Specifications and must be a fluid workable mixture of aggregate, cement, and water.

Slurry cement backfill may be used as structure backfill only for pipe culverts.

10-16 CONTROL DENSITY FILL (CDF)

Control Density Fill (CDF), also known as Controlled Low Strength Material (CLSM) or Ready Mixed Flowable Fill (RFF) as processed and distributed by the National Ready Mixed Concrete Association and referred to herein as CDF type materials), may be used as an alternate initial backfill and/or trench backfill material, if approved by the Engineer, or if specified in the Special Provisions. CDF type materials may only be used as an alternate trench backfill material above the initial backfill material if approved in writing by the engineer and the material supplier submits strength tests performed in accordance with either ASTM C31 & C39 or ASTM D4832 that show the mix consistently has a 28-day compressive strength not exceeding 150 psi. Separate approval by the Engineer of CDF type materials as specified herein is not required for filling abandoned pipelines.

Hand Excavatable: Material shall be a hand excavatable mixture of cement, aggregate, entrained-air admixture, and water mixed in accordance with ASTM C 94. The 28-day compressive strength shall not exceed 150 psi unless otherwise directed or approved in writing by the Engineer when used for trench backfill above the initial backfill zone.

Flowable: Material shall be flowable with a high slump, non-segregating consistency that readily flows and fills voids, congested areas, difficult to reach places, and that may additionally be used for pipe abandonment, structure backfill, and structure cavity fill as directed.

Rapid Set: Material shall obtain early strength gain, to allow traffic load or other live loads on the fill in less than one (1) day after placing the material.

Cement: Shall be type I or II in accordance with ASTM C 150. Mix designs consisting of up to equal parts cement and Type F pozzolan conforming to ASTM C618 may be submitted for consideration.

Pozzolan: Shall be added to improve flowability and shall be type F in accordance with the requirements of ASTM C 618.

Aggregate: Coarse aggregate, if used, shall consist of well graded mixture of crushed rock with a maximum size aggregate of ⅜ inch. 100% shall pass the ½-inch sieve. Not more than 30% shall be retained by the ⅜ inch sieve and not more than 12% shall pass the number 200 sieve. Mix designs consisting of sand only with no coarse aggregate may be submitted for consideration. All aggregate shall be free from organic matter and not contain more alkali, sulfates, or salts than the native materials at the site of work.

Admixtures: Air entrainment admixture shall be added (minimum of 8%, maximum of 20%) to improve workability in accordance with ASTM C 260.

Water: Shall be potable, clean, and free from silty organic matter, alkali, salts, or other impurities.

Compressive Strength: The minimum 28 day compressive strength shall be 20 psi and the maximum shall be 150 psi.

Mixing, transporting and placing CDF type materials shall be in accordance with ACI 304 and ACI 304.6R. Prior to placement, the trench shall be free of loose soil and the trench bottom shall be stable and non-yielding with no excess moisture. The pipe haunch areas shall be clear so that the CDF type material will readily flow around the pipe. Place CDF type material simultaneously on both sides of the pipe to minimize potential lateral displacement of the pipe. Also, pipe sections may need to be secured against floating during CDF type material placement, or place the material in lifts to reduce the potential for flotation. Commence placement of granular trench backfill above CDF type initial backfill only when overlying material placement and compaction will not cause deformation of the initial backfill.

10-17 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.

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 ⅜-inch sieve shall contain at least fifty percent (50%) of particles having three (3) or more fractured faces. 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
1½"	--	--	100	--
1"	--	100	90-100	--
¾"	100	70-100	30-60	0-17
½"	90-100	30-60	0-20	--
⅜"	20-60	0-20	0-6	0-7
No. 4	0-15	0-5	0-5	--
No. 200	0-2	0-2	--	0-2

10-18 ASPHALT BINDERS AND ASPHALTIC EMULSIONS

Asphalt binders and asphaltic emulsions as required by these Specifications or by the Special Provisions shall mean respectively the asphalt binders as specified in Section 92 of the State Specifications and asphaltic emulsions as specified in Section 94 of the State Specifications.

10-19 SEWER AND DRAINAGE PIPE

1. Joints

Unless otherwise specified herein, sewer and drain pipes shall have elastomeric gasket joints providing a water tight seal. An exception to this requirement is fusion welded solid wall HDPE. Any leakage in solid wall, fusion jointed HDPE means that a joint is faulty and must be repaired at the contractor's expense.

2. Manhole Connections

Unless otherwise specified, connecting a 24 inch or smaller inside diameter pipe, not cast into the base of a manhole, shall be accomplished by using a coring machine. The annular space between the outside of the pipe and the manhole wall shall be sealed by using a flexible annular space filler such as "Kor-N-Seal Cavity O-Ring" by NPC Inc. or approved equal. Such connection shall be made in conformance with manufacturer's recommendations.

Unless otherwise specified, connecting a pipe with an inside diameter greater than 24 inch to a manhole shall be accomplished by cutting a hole into the manhole and grouting in the pipe. The hole shall be no more than the pipe outside diameter plus the thickness of the manhole wall. The annular space between the outside surface of the pipe and the hole in the wall shall be filled with non-shrink grout and the pipe shall be properly installed with an approved water stop.

In the connection of the pipe to a drop inlet, the use of a coring machine and flexible annular space filler are not required.

3. Deflection

For all flexible pipe and fittings, the minimum pipe stiffness at 5% deflection shall be 46 PSI according to ASTM D 2412. All flexible conduits shall be tested with a mandrel 5% smaller than the average inside diameter of the pipe no sooner than 96 hours after placement of the backfill. Mandrel tests may be performed by the City after a 6 month period of time at which time a maximum deflection of 7-1/2% from the base I.D. will be allowed. The mandrel

used shall be the PHOS PVC Sewer Pipe Deflection Gauge or other deflection gauge approved by the Engineer.

4. Drainage and Sewer Pipe Requirements

The requirements for the various types of pipe are summarized in the following paragraphs:

a. Acrylonitrile-Butadiene-Styrene (ABS)

ABS gravity sewer pipe and fittings in sizes 4" & 6" shall conform to ASTM D 2661. Eight inch (8") and larger in diameter shall conform to either ASTM D 2751, SDR 23.5 or ASTM D 2680 (ABS composite pipe).

Joints shall be solvent cemented (SC). All Service connections shall be installed with "Tee" 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 flexible adapter manufactured by FERNCO, or approved equal.

b. Closed Profile Poly Vinyl Chloride (CPPVC)

CPPVC pipe with integral bell and spigot joints shall conform to ASTM F 1803. Joints shall be of the bell and spigot type with elastomeric seals conforming to the requirements of ASTM D 3212. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe. Gasket material shall conform to ASTM F 477 and shall be capable of the same water tightness requirements as smooth or solid wall PVC pipe.

c. High Density Polyethylene (HDPE) Solid Wall Fusion Jointed

HDPE pipe shall be as manufactured by Phillips Drisco pipe, a division of Phillips Petroleum company, or equal. The material shall be listed by PPI (Plastic Pipe Institute, a division of the Society of the Plastics Industry) in PPI TR-4 with a 73.4°F hydrostatic design basis of 800 psi. The PPI listing shall be in the name of the pipe manufacturer and shall be based on ASTM D 2837 and PPI TR-3 testing and validation of samples of the pipe manufacturer's production pipe.

Material Requirements - Pipe shall be high molecular weight, high density polyethylene pipe and shall have a standard dimension ratio of 32.5 (SDR 32.5). The material shall have a standard PE code designation of PE 3408 and have a cell classification of 345434C as described in ASTM D 3350. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe

The pipe shall be homogeneous throughout and free of visible cracks, bubbles, holes, foreign inclusions or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties and produced to the dimensions and tolerances specified in ASTM F 714. The inside and outside surfaces shall be semi-matte or glossy in appearance. Any pipe not meeting these criteria shall be rejected.

The polyethylene pipe manufacturer shall provide certification that stress regression testing has been performed on the specific product. The said certification shall include a stress life curve per ASTM D 2837. The stress regression testing shall have been done in accordance with ASTM D 2837, and the manufacturer shall provide a product supplying a minimum Hydrostatic Design basis (HDR) of 1,600 psi, as determined in accordance with ASTM D 2837.

The manufacturer's certification shall state that the pipe was manufactured from one specific resin in compliance with these specifications. The certification shall state the specific resin used, its source, and list its compliance to these specifications.

Joints - All joints for the buried polyethylene pipe shall be of the thermal butt fusion type or bolted flanges reinforced with stainless steel.

Fittings - Polyethylene fittings shall be of the same material as the pipe and manufactured by the pipe manufacturer.

d. Polyvinyl Chloride (PVC)

PVC drain pipe and fittings, with at least eighteen inches (18") of cover to sub-grade, shall conform to ASTM D 3034 and ASTM F 679 and shall be SDR 26 pipe with elastomeric gasket joints providing a watertight seal.

PVC drain pipe and fittings, with less than eighteen inches (18") of cover to sub-grade, shall be class 100 SDR 25 or 26 pipe conforming to AWWA C 900.

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" 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 F 477.

e. Reinforced Concrete Pipe (RCP)

Reinforced concrete pipe shall conform to ASTM C 76 Class 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.

Joint materials for concrete pipe shall be rubber gasket joints conforming to the requirements of ASTM C 443 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.

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

f. Vitrified Clay Pipe (VCP)

Vitrified clay pipe shall conform to the specifications for extra strength clay pipe as set forth in ASTM C 700.

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.

Joint materials for vitrified clay pipe shall be an approved type of factory-made mechanical compression joint conforming to the requirements of ASTM C 425. Banded rubber couplings and sleeves conforming to ASTM C 425 are acceptable.

g. Corrugated Metal Pipe

Corrugated metal pipe may only be used for driveway culverts and shall conform to ASTM A 760, Type 1 or 1R. Minimum depth of cover shall be 6 inches.

h. Corrugated HDPE Pipe

Corrugated High Density Polyethylene (HDPE) pipe may only be used for driveway culverts. HDPE pipe shall have smooth interior and shall be Type S conforming to AASHTO M 252 for four inch (4") through ten inch (10") diameter pipe and to AASHTO M 294 for twelve inch (12") and larger pipe. Provide Grade 2A2 gasketed joints in conformance with ASTM D 1056. Installation shall be in accordance with manufacturer's standards

and ASTM D 2321. Minimum depth of cover shall be 12 inches.

i. Glass-Fiber-Reinforced Thermosetting-Resin Pipe

Unless indicated otherwise in the Special Provisions, Glass-Fiber-Reinforced Thermosetting-Resin Pipe shall conform to the requirements of ASTM D 3262 with a pipe stiffness designation C (36 psi).

10-20 SUBSURFACE DRAINS

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

10-21 RESERVED

10-22 FIELD ASSEMBLED PLATE CULVERT

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

10-23 REINFORCING STEEL

Reinforcing steel shall conform to Section 52, "Reinforcement", in the State Specifications. Unless otherwise provided by the Special Provisions, bar reinforcement shall be deformed Grade 60 conforming to ASTM A 615, "Deformed Billet-Steel Bars for Concrete Reinforcement".

Welded steel wire fabric for concrete reinforcement shall conform to ASTM A 185. The gauge of the wire and the dimensions of the mesh will be as shown on the Plans or indicated in the Special Provisions.

10-24 CURB DOWEL AND TIE BARS

Dowel and tie bars for curbs shall conform to ASTM A 615. Grade 60 or Grade 40 may be used at Contractor's option.

10-25 CASTINGS FOR MANHOLES, COVERS, ETC.

Casting 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 ASTM A 48/A 48M, 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.

Alternate Castings for manhole covers

Where specified, casting shall be constructed of ductile iron in conformance with ASTM A536A, Class 60-45-12. Castings shall match the dimensions shown in City of Colusa Improvement and Design Standards Sections 7 & 9. Cover shall be hinged and may or may not be gasketed. Gasket shall be mechanically fitted to frame such that removal and attachment can be accomplished without the use of tools and glue, per manufacturer's instructions. Lid shall have a rated capacity in excess of H20 loading per AASHTO.

10-26 WATER PIPE – Distribution (12 inch diameter & smaller)

Water Distribution System pipe shall be of the material type as indicated on the Plans or specified in the Special Provisions and shall comply with AWWA standards and NSF/ANSI Standard 61. All pipe shall be the regular product of a firm which has successfully manufactured comparable pipe for at least three (3) years.

Unless otherwise directed or approved:

- 12-inch diameter buried pipe shall be ductile iron only, and
- 12-inch diameter and smaller pipes placed on bridges shall be liquid-epoxy lined and coated welded steel per AWWA C200 and AWWA 210.

1. Ductile Iron Pipe

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

a. AWWA C 104 (ANSI A21.4), “Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water,” if cement-mortar lined.

b. AWWA C 111 (ANSI A21.11), “Rubber-Gasket Joints for Ductile-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, for Water.”

Pipe shall comply with the following requirements:

a. Size – 4, 6, 8, 12 inch diameter only

b. Laying Condition – Type 5

c. Minimum Depth of Cover – Three (3) feet for improved; four and

one-half (4 -1/2) feet for unimproved

d. Working Pressure-150psi

e. Laying Length – Minimum eighteen (18) foot nominal lengths with allowable trim pipe lengths in accordance with AWWA C 151 and special shorter lengths provided as required by the drawings.

f. Joints – Push on or mechanical

g. Restrained Joints – Bolted flanged connections, push-on locking gasket such as "Field-Lok" gaskets as manufactured by U.S. Pipe, push-on joint restraint such as "TR-Flex" as manufactured by U.S. Pipe, wedge action joint mechanism such as "Megalug" as manufactured by EBAA Iron, Inc. or approved equal.

h. Gasket Lubricant – Minimum required plus 10% additional

i. Pressure Class-350

j. Linings–Standard thickness of cement w/ asphalt seal coat.
Coatings–Minimum one (1) mil thick petroleum asphaltic material.

k. Certification by Manufacturer Required

2. Polyvinyl Chloride Pipe

All polyvinyl chloride pipe in sizes ranging from four through eight inch (4"-8") shall conform to AWWA C 900 "Polyvinyl Chloride (PVC) Pressure Pipe," or AWWA C 909 "Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe". Pipe shall be manufactured with cast iron outside diameters (CIOD) for all sizes.

Pipe shall comply with the following requirements:

a. Size – 4, 6, 8, 12 inch diameter only

b. Class 150

c. Dimension Ratio – 18

d. Laying Length – 20 feet

e. Joints – Integral bell and spigot joints conforming to the requirements ASTM D 3139 with factory supplied elastomeric gaskets meeting the requirements of ASTM F 477.

f. Restrained Joints – Bolted flanged connections, Wedge action joint mechanism such as "Megalug" as manufactured by EBAA Iron, Inc. or approved equal.

g. Gasket Lubricant–Minimum required plus 10% additional

h. Each pipe length shall be marked showing the nominal pipe size and O.D. base, the AWWA pressure class, the AWWA specification designation, and the seal of the testing agency that verified the suitability of the material.

10-27 WATER PIPE FITTINGS – Distribution (12 inch diameter & smaller)

Water pipe fittings shall be of the material type as indicated on the Plans or specified in the Special Provisions and comply with AWWA standards and AWSI 61. All fittings shall be the regular product of a firm which has successfully manufactured comparable fittings for at least three (3) years. All water pipe fittings shall be Ductile Iron and shall conform to the following AWWA Standards:

1. AWWA C 104 (ANSI A21.4), "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water," if cement-mortar lined.

2. AWWA C 110 (ANSI A21.10), "Ductile-Iron and Gray-Iron Fittings for Water."

3. AWWA C 111 (ANSI A21.11), "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings."

4. AWWA C 153 (ANSI A21.53) "Ductile-Iron Compact Fittings for Water Service."

5. AWWA C 116 (ANSI A21.16) "Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior surfaces of the Ductile-Iron and Gray-Iron Fittings for Water Supply Service," if fusion-bonded epoxy lined or coated.

Fittings shall comply with the following requirements:

1. Pressure Rating – 250 psi minimum.

2. Coatings – Exterior: Minimum one (1) mil thick petroleum asphaltic material coated. Interior: Lined with standard thickness cement and asphaltic seal coated. Or, exterior and interior: Minimum eight (8) mil thick fusion bonded epoxy coated.

3. Joints – Push-On, mechanical, or flange

4. Certification by manufacturer

5. Dimensions – AWWA C 153 Compact Fittings are approved.

6. Bolts shall be carbon steel ASTM A 307, Grade B. Nuts shall be heavy hex

nuts conforming to ASTM A 563, Grade C3.

7. Rubber gaskets for flanged joints shall be full faced with a thickness of eight of an inch (⅛"). The material used for the rubber gaskets shall be hardness (Shore A) 70 to 85 suitable for a minimum of one hundred and fifty pounds per square inch (150 psi), cold water service.

10-29 FLEXIBLE COUPLINGS

2. Flexible Couplings

Flexible couplings suitable for water main applications shall be as manufactured by Smith Blair, Inc., Series 411 or 413, or Dresser Industries, Inc., Style 38 or 162, or an approved equal. The steel middle ring of the flexible coupling shall be lined and coated with fusion bonded epoxy per AWWA C 213.

The flexible couplings shall be installed with provision for thrust restraint ties attached to the water main pipe. The thrust restraint ties on the pipe shall be welded lugs, lugs cast integrally with the pipe, or friction collars. Anchor studs placed perpendicular to the long axis of the pipe are unacceptable. Resistance to hydraulic thrust shall be adequate to sustain a force developed by a test pressure of two hundred and twenty five pounds per square inch (225 psi).

Flanged coupling adapters shall be Smith Blair 913, Romac Style FC400 or equal for steel piping with insulating gasket. Couplings shall be provided with thrust ties attached to the pipe with welding lugs, cast-in-place lugs, or friction collars. Lugs shall have a minimum thickness equal to that of adjacent flange and shall have holes the same size as those on the flange. Anchor studs placed perpendicular to the longitudinal axis of the pipe are unacceptable.

10-30 APPURTENANCES

i. Air Vacuum and Release Valves

Combination air vacuum and release valves for water transmission mains shall be two (2") or four inches (4") in size. The air vacuum and release valves shall have cast iron bodies and be equal to APCO Valve and Primer Corporation, Model 145C for the two-inch (2") valve and Model 149C for the four-inch (4") valve.

ii. Blind Flanges and Dished Heads

Blind flanges and dished heads for water transmission mains shall conform to the requirements of AWWA C 207 and NSF/ANSI 61. Design pressure classification shall be equivalent to that of the immediately adjacent pipe, valve, or appurtenance. Blind flanges and dished heads shall be epoxy coated. The epoxy coating shall have a minimum thickness of eight (8) mils and shall conform to the requirements of AWWA C 213. Temporary blind flanges and dished heads

that are used during construction of the transmission main do not need to be coated when approved by the Engineer.

10-31 VALVES

1. Gate valves shall be cast iron, bronze disc, parallel seat, and non-rising stem with a two inch (2") square operating nut. Valves shall conform to AWWA C 500. All interior and exterior ferrous surfaces shall be and coated with factory applied epoxy in accordance with AWWA C 550. Minimum thickness shall be eight (8) mils.
2. Resilient – Seated gate valves shall be cast iron, non-rising stem with a two inch (2") square operating nut. Valves shall conform to AWWA C 509. All interior and exterior ferrous surfaces shall be and coated with factory applied epoxy in accordance with AWWA C 550. Minimum thickness shall be eight (8) mils.

3. Valves provided shall open left (counter clockwise), and shall have bonnet and valve body markings in accordance with the indicated AWWA standards. Unless otherwise directed, furnish valves with flange, mechanical, and/or push-on joints in accordance with the plans and special provisions. Provide valve operating nut extensions in accordance with Standard Drawing 8-19 in City of Colusa Improvement and Design Standards when installed valve operating nut is in excess of thirty inches (30”) below finish grade.

4. Swing check valves are contained on an approved listing maintained by the Department of Utilities. Alternate swing check valves shall be added to this list upon review, test and acceptance by the Utility Department.

5. Bolts shall be carbon steel ASTM A 307, Grade B. Nuts shall be heavy hex nuts conforming to ASTM A 563, Grade C3.

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

Valve boxes and valve box covers for streets and alleys, and drop caps in public utility easements shall conform to Standard Drawing 8-15. The castings shall be ductile iron with a minimum tensile strength of twenty five.

thousand pounds per square inch (25,000 psi). Riser sections shall be (8”) diameter SDR 35 PVC pipe.

Service valve boxes shall be in conformance with Standard Drawings 8-16 and 8-18. The riser portion shall be as shown.

10-33 WATER SERVICE CONNECTION MATERIALS

Water service material shall be either copper or polyethylene tubing. The Department of Utilities maintains a listing of approved water service connection fittings which establish a standard of material quality. Fitting used shall be limited to those on the list. Alternate material may be added to this list upon review, testing and acceptance by the Department of Utilities.

Copper service tubing shall conform to ASTM B 88, Type K, soft tempered.Polyethylene tubing shall be two hundred pounds per square inch (200 psi), SDR-9 conforming to ASTM D 2737 and AWWA C 901 standards. Tubing shall be copper tube size and shall be manufactured for use with compression or Mueller Insta-tite fittings. Stainless steel insert stiffeners shall be used at all compression joints. Insert stiffeners shall be flared at one end and beveled at the approximately forty five degrees (45°) at the other end. Stiffeners shall be supplied by the fitting manufacturer. Tubing shall be clearly marked showing manufacturer's trade name, nominal size, type of material, pressure rating, and the seal of approval of an accredited testing laboratory.

Threads for underground water service connection fittings shall conform to AWWA C 800 Threads for Underground Service Line Fittings.

10-34 JOINT MATERIALS FOR CLAY PIPE

Joint materials for vitrified clay pipe shall be an approved type of factory-made mechanical compression joint conforming to the requirements of ASTM C 425. Banded rubber couplings and sleeves conforming to ASTM C 425 are acceptable.

10-35 JOINT MATERIALS FOR CONCRETE PIPE

Joint materials for concrete pipe shall be rubber gasket joints conforming to the requirements of ASTM C 443 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 70º F. or less, and in no case shall the rubber gaskets be exposed to the direct rays of the sun. 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 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 (1½") diameter, Federal Specification SS-S-210A.

10-38 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 D 2241.

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. 2" or smaller shall be PVC-1120 Schedule 40 solvent weld pipe.

2. 2½" or larger shall be PVC-1120 Schedule 40 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 200 solvent weld pipe.

10-39 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 D 2241. Plastic potable pipe one and one-half inches (1½") and smaller shall be PVC Class 315 solvent weld; two inches (2") and larger shall be Schedule 40 PVC.

10-40 PLASTIC IRRIGATION PIPE FITTINGS

Fittings for PVC plastic pipe shall be rigid polyvinyl chloride, Schedule 80 high impact fittings upstream of the automatic control valve and Schedule 40 fitting downstream from the automatic control valve. Fitting 2" and less shall be solvent weld type fitting, fittings 2 ½" and larger shall be ring-tite fittings. 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.

1. 2" or smaller shall be PVC-1120 Schedule 40 solvent weld pipe.2½" or larger shall be PVC-1120 Schedule integrally molded ring-tite pipe, or approved equal.

10-41 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 Customer Service Office of the Utilities Department. Alternate backflow devices shall be subject to approval by the City Cross-connection Control Specialist.

Metal Backflow Enclosures shall be an insulated enclosure and lockable per Placer Waterworks, Inc. or approved equal.

10-42 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 D 638, tensile strength 3400 psi and impact strength of 1.5 pounds per inch. All plastic valve box lids shall have a bolt to secure the lid to the box.

Valve box extensions shall be of the same type as the valve box and all covers shall be lockable and be legibly marked “Water or Irrigation.”

10-43 QUICK COUPLING VALVES

Quick coupling valves shall be brass or bronze construction, single slot type with one inch (1") threaded pipe connection and one inch (1") 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. Installed per the plans.

10-44 GROUT

This section specifies grout for uses other than masonry.

1. All grouts shall conform to applicable portions of the following:

ASTM C 33	Concrete Aggregates
ASTM C 40	Organic Impurities in Fine Aggregates for Concrete
ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	Material Finer Than 75 um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	Portland Cement
ASTM C 289	Potential Reactivity of Aggregates (Chemical Method)
ASTM C 494	Chemical Admixtures for Concrete
ASTM C 881	Epoxy-Resin-Base Bonding Systems for Concrete
ASTM D 2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM E 329	Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction
CRD-C621	Corps of Engineers Specification for Nonshrink Grout

a. These provisions shall pertain to dry pack, cement, non-shrink, pressure and epoxy grouts, including adhesive capsules and polymer concrete.

b. Portland cement portion of grout shall be ASTM C 150 Type II or Type V, low alkali, containing less than 0.60 percent alkalies. Aggregate in grout shall be non-reactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing grout work.

10-55 GROUT (cont.)

c. The fine aggregate portion of grout shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C 33 as modified herein. When tested in accordance with ASTM C 136, gradation shall be such that one hundred percent (100%) by weight will pass a standard No. 8 mesh sleeve and no less than forty-five percent (45%) by weight will pass a standard No. 40 mesh sieve.

d. Variation from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the permissible variation

listed below:

U.S. standard sieve size	Permissible variation in individual tests, percent
30 or coarse	2
50 or finer	0.5

e. Other tests shall be in accordance with the following specifications:

Test	Test Method	Requirements
Organic Impurities	ASTM C 40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C 117	3% maximum by weight
Soundness	ASTM C 88	10% maximum loss with sodium sulfate
Reactivity	ASTM C 289	Innocuous aggregate
Sand Equivalent	ASTM D 2419	Minimum 80

2. Grout admixtures shall conform to the following:

a. Admixtures shall be compatible with the grout. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the grout mix. Water reducing retarder shall be ASTM C 494 Type D and shall be Master Builders Pozzolith 300-R, Sika Corporation Plastiment, or equal. Lubricant additive for cement pressure grouting shall be Intrusion Prepakt Intrusion Aid, Sika Intraplast N, or equal.

b. Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalies, and organic materials; shall not contain more than 1000 mg/1 of chlorides as Cl, nor more than 1300 mg/1 of sulfates as SO_4; and shall not contain an amount of impurities that may cause a change of more than twenty-five percent (25%) in the setting time of the cement nor a reduction of more than five percent (5%) in the compressive strength of the grout at fourteen (14) days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the grout.

3. Drypack Grout

a. Drypack grout shall be used for built-up surfaces, setting miscellaneous metal items and minor repairs and shall be a mixture of approximately one (1) part cement, 1-1/2 to two (2) parts sand, water reducing retarder, and sufficient water to make a stiff workable mix.

b. Surfaces required to be built up with drypack grout shall be roughened with a wire brush, cleaned, and immediately coated with an acrylic bonding agent such as Burke Acrylic Bondcrete, or equal, at the rate of 200 sq. ft. per gallon. Follow with placement of the grout after a minimum of one hour and after the film is dry to the touch. Install bonding agent in strict accordance with manufacturer's instructions. The drypack grout shall be applied in bands or strips to form a covering of the required thickness. The covering shall be smooth. Construction joints in the grout shall be sloped and shall be cleaned and wetted before application is resumed.

c. Drypack grout shall be cured as for Cast-In-Place Concrete. Grout shall not be placed during freezing weather unless adequate protection is provided.

4. Cement Grout

a. Cement grout shall be used for filling nonbearing portions of equipment pads and pressure grouting and shall be a mixture of one (1) part cement, two (2) parts sand, proportioned by volume, admixtures for pressure grouting, and sufficient water to form a workable mix.

b. Except for the specialized equipment for pressure grouting, mixing, and placing apparatus shall be similar to that normally used for cast-in-place concrete. Grout shall be mixed for a period of at least one (1) minute. Diluted grout shall be agitated to keep ingredients mixed.

5. Nonshrink Grout

a. Nonshrink, nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates and bearing plates. Nonshrink metallic aggregate grout shall be used for setting anchor bolts and grouting reinforcing steel holes. Nonmetallic aggregate grout shall be Five Star Products, Inc.

Five Star Grout, Master Builders Masterflow 928, Burke Company Non-Ferrous, Non-Shrink Grout, or equal. Grout shall meet the requirements of ASTM C1107 and shall be placed in accordance with manufacturer's instructions.

b. Holes required for grouting shall be blown clean with compressed air and left free of dust or standing water. Horizontal holes for grouting shall be drilled at a slight downward angle to facilitate holding the grout until setting is complete. Bolts or reinforcing steel installed in horizontal grout holes shall be bent slightly accordingly.

6. Epoxy Grout

a. Epoxy grout shall be used for repairing cracks by pressure grouting or gravity flow, repairing structural concrete, and may be used for setting reinforcing dowels or anchor bolts into holes for grouting. Except as noted below, epoxy grout shall be a high modulus, two (2) component, moisture insensitive, one hundred percent (100%) solids, thermosetting modified polyamide epoxy compound. The consistency shall be a paste form capable of not sagging in horizontal or overhead anchoring configurations. Material shall conform to ASTM C 881 Type 1, Grade 3, such as Master Builder Concresive 1440 series, Sika Corporation Sikadur Hi-Mod Series, Adhesive Technology Corporation Solidbond 200 or equal, and shall have a heat deflection temperature in excess of 130 degrees F.

b. Epoxy for pressure grouting/crack injection shall be a two (2) component, moisture insensitive, high modulus, injection grade, one hundred percent (100%) solids, blend of epoxy-resin compounds. The consistency shall be as required to achieve complete penetration in hairline cracks and larger. Material shall conform to ASTM C 881 Type 1 Grade 1, such as Sika Corporation Sikadur 52, Master Builders Concresive LPL, Adhesive Technology Corporation SLV 300 series, or equal.

c. Concrete shall be primed in accordance with the grout manufacturer's instructions.

d. Use of epoxy grout for anchorage of bolts or reinforcing dowels shall be subject to the following conditions:

e. Use shall be limited to locations where exposure, on an intermittent or continuous basis, to acid concentrations higher than ten percent (10%), to chlorine gas, or to machine or diesel oils, is extremely unlikely.

f. Use shall be limited to applications where exposure to fire or exposure to concrete or rod temperature above the product's heat deflection temperature or 120 degrees F (whichever is less) is extremely unlikely. Overhead applications (such as pipe supports) because of the above concerns, shall be disallowed.

g. Approval from Engineer for specific application and from supplier of equipment to be anchored, if applicable.

h. Anchor diameter and grade of steel shall be per contract documents or per equipment supplier specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease, and oils. Embedment depth and hole diameter shall be as specified. Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill. Holes shall be blown clean with compressed air and be free of dust or standing water prior to application of grout. Anchor shall be left undisturbed and unloaded for full curing period. Anchors shall not be placed in concrete below twenty-five degrees (25°) F.

10-55 ADHESIVE CAPSULES FOR DOWEL ANCHORAGE

Adhesive resin capsules may be used for setting and anchoring reinforcing dowels or anchor bolts into predrilled holes in concrete.

Adhesive resin capsules shall consist of sealed glass capsules containing pre-measured amounts of a polyester or vinylester resin, quartz sand aggregate and a hardener contained in a separate vial within the capsule. Adhesive capsules shall be Hilti HVA Capsules, Molly Parabond Capsules, or equal.

Section 11

PRECONSTRUCTION PHOTOGRAPHS

Section 12

DEMOLITION

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 four inches (4") and greater measured at a height of four and a half feet (4'-6") 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 require a lump sum price for removal of all trees or a unit price per each tree.

12-2 CLEARING AND GRUBBING

1. 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 or as indicated on the plans which interferes with the work.

2. 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'). Contractor shall have a California, C61 license, allowing him/her to perform D49 tree work and an arborist certified by the International Society of Arboriculture (ISA) on staff. All work shall be supervised by an ISA Certified Arborist and shall comply with the American National Standards Institute (ANSI) Standard Practices for Tree Care Operations (ANSI A300), the American National Standards Institute (ANSI) Safety Requirements for Arboriculture Operations (ANSI z133) and the City of Colusa Tree Ordinance Title 12.56-12.. Trees, shrubbery, lawns, and other vegetation adjacent to the work that is not to be removed shall be protected from injury or damage resulting from Contractor's operations.

3. Existing Facilities

Existing facilities such as pavements, curbs, gutters, sidewalks, lawn sprinklers, mailboxes, fences, pipes, culverts, manholes, existing lift station at Public Works Yard and other items 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.

The existing sewer lift station "Screens Lift Station" at the City's Public Works Yard shall be demolished. It currently consists of a 12' x 12' shed constructed of light-gauge steel material, an open concrete channel approximately 9' deep, 20' wide and 24' long. The City will disconnect and remove the existing electrical to the building. The contractor shall demolish the building and fill in the channel with Class II Aggregate base, level with surrounding grade.

4. Disposal

Materials resulting from demolition and/or clearing and grubbing operations and that are not to be salvaged or otherwise used shall be disposed of outside the project limits at an appropriate site and at the expense of Contractor.

12-3 PAYMENT

The contract **lump sum** price paid for **"Demolition"** will include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of various miscellaneous items shown on the plans, removing trees, pruning/removing stumps of shrubs & trees, and disposing of pruning's, sewer manholes, pipe, existing lift station at Public Works Yard, as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer.

Section 13

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. Existing improvements, utilities, and adjacent property shall be protected from damage resulting from Contractor's operations. All trees, lawn, shrubbery, fences, walls, irrigation systems, and other improvements including, but not limited to, existing pavements, sidewalks, street improvements and underground utilities and other improvements not to be removed shall be protected from damage by Contractor throughout the construction period.

Contractor shall be responsible for repairing damage to existing improvements or replacing in kind at the Engineer's option.

All signs and street marking damage due to Contractor's operation shall be replaced in kind by Contractor. In the case of partial damage to lane stripes and traffic lettering the whole stripe or letter shall be replaced. Temporary markings and striping shall be installed within three (3) working days of damage. All painted or other disfiguring marks on the pavement, sidewalk or gutters shall be removed by Contractor before the work has been accepted.

13-2 MAINTAINING WATER, SEWER, AND DRAINAGE FLOWS

Contractor shall be responsible for maintaining all existing water, sewer, and drainage facilities within the limits of the project until new improvements are complete and functioning.

Contractor may elect to cut existing water service laterals and/or sewer services or tunnel beneath them. All water service laterals or sewer services cut by trench excavation or other construction activities shall become the responsibility of Contractor to repair. Maximum time of interruption of water service to any residence or business shall be four (4) hours. Any cut sewer services shall be replaced or repaired by nightfall of the same day per Standard Drawings 7-24, 7-26, and 7-28 of City of Colusa Improvement and Design Standards.

Should Contractor choose to cut existing water service laterals or sewer services, Contractor shall notify the Engineer at least three (3) working days in advance and shall give residences and businesses twenty-four (24) hour notice of interruption of service.

Should Contractor desire City forces to cut and repair existing water, sewer, or drain services, Contractor shall contact the Engineer at least three (3) working days in advance to schedule and coordinate the work. No compensation will be paid to Contractor for the repair by City crews of any water service laterals or sewer services accidentally or purposely cut by Contractor and all such work performed by City crews at the request of Contractor shall be at Contractor's expense. Any work performed or materials provided by City crews to repair and maintain existing drainage systems shall be at Contractor's expense or shall be deducted from amounts owed to Contractor.

Whenever, in the opinion of the Engineer, there arises an emergency situation within the limits of the project that involves maintenance of water, sewer, or drainage, or a situation that poses a danger to the public safety, or inconvenience and/or unreasonable nuisance to the general public, City's forces may be called upon to perform any work necessary to relieve the emergency. Contractor's attention is directed to Section 5-12 "Provisions for Emergencies."

If such emergency is the result of negligence by Contractor, the cost of any corrective measures taken or work performed by City crews shall be billed directly to Contractor or may be deducted from any payments owed to Contractor. The performance of such emergency work by the City forces shall not relieve Contractor of any responsibilities, obligations, or liabilities under the contract for the project.

Should it become necessary for Contractor to temporarily divert or convey flows carried by existing water, sewer, or drainage systems (which include, but are not necessarily limited to, pipelines, channels and pump stations), Contractor shall prepare a detailed, effective plan including, at minimum, the quantity of flow to be conveyed and/or the volume to be impounded, the number, size, and material type of any pipes, the size and configuration of any channel, the size and configuration of any impoundment basin, all pumping information (if applicable), the point of discharge and discharge details.

The plan shall be submitted to the Engineer for approval a minimum of ten (10) working days prior to the start of any work affected thereby and Contractor shall not begin such work until the plan is approved and is on file with the Engineer.

No separate payment will be paid to Contractor for maintenance of existing facilities; the cost of this work shall be included in the various contract items of work.

13-3 REMOVING/RELOCATING

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.

1. 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. Where the edge of the pavement removal is within two (2) feet of existing building, curb and gutter, or existing pavement edge, the remaining pavement shall also be removed and replaced. The exact limit of the asphalt and concrete to be removed shall be determined in the field by the Engineer. Any temporary surface placed shall be marked with the Contractor's name until such time as final restoration has been placed to the City's satisfaction.

2. 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 pressure treated Douglas fir posts conforming to the provisions of Section 82, "Signs and Markers" of the State Specifications. The mailboxes shall be suitably mounted on a platform which shall be set three and one-half feet (3½') 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 mailbox 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.

3. Fences

Fences shall be relocated where shown on the Plans or as directed by the Engineer. Fence shall be relocated to provide three foot

(3') minimum clearance from relocated or new fire hydrants. Replace only deteriorated fence parts.

The intent of this specification is for 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 Contractor will be required to replace. Contractor shall submit a unit price per lineal foot of fence to replace regardless of type or quantity.

4. Sprinklers and lights

Lawn sprinkler system pipes, heads, and yard lighting systems shall be relocated and re-plumbed to insure continued operation to an equal or better condition.

5. Pipes and Culverts

Pipes and culverts that are no longer to be used shall be removed if they are within two feet (2') of sub-grade. Such pipes that are lower than the aforementioned, shall be removed or the ends shall be plugged with concrete at the option of Contractor. Concrete plugs installed in the ends of abandoned sewer or storm drain lines shall be Class "C" or "D" concrete that extends at least two feet (2') into the pipe from the exposed end. Refer to Section 27-3 for capping the ends of water mains.

6. Abandonment of water service

Abandon the water service by closing corporation stop and crimping and cutting water service adjacent to the distribution main.

7. Existing Utilities

Unless otherwise noted, the location, alignment, and depth of existing underground utilities as shown on the Plans is taken from public records and no responsibility is assumed for the accuracy thereof. For the most part, underground utility services are not shown on the Plans. Attention is directed to the provisions in Section 6-19, "Main and Trunk line Utilities." The cost of relocating existing overhead and/or underground utilities not specified on the plans to be relocated, but which Contractor elects to relocate or cut and reconnect at his/her own convenience shall be borne by Contractor.

13-4 PAVEMENT FOR TRENCH SURFACE RESTORATION

Contractor shall restore surfaces in kind (using the same material as existing) unless otherwise noted on the Plans or Special Provisions.

Any temporary surface placed shall be marked with the Contractor's name until such time as final restoration has been placed to the City's satisfaction.

Asphalt pavement surface restoration for trenches shall conform to the applicable provisions of Sections 10, 22, 26 and 27.

Restoration of existing concrete pavement shall consist of a minimum of six (6) inches of Portland cement concrete. Portland cement concrete pavement and its placement shall conform to the requirements of Sections 10 and 19.

13-5 PAYMENT

There will be no separate payment for existing utilities work as described in this section, but full compensation will be considered as included in the bid for items of work Contractor deems appropriate.

13-6 ADJUSTMENT OF EXISTING UTILITY COVERS AND FRAMES

Water valves and storm drain frame and covers shall be adjusted to the final pavement grade, complete and in place in accordance with the details on the plans and to the City's standards.

Waste materials generated while adjusted frames and covers to grade shall be completely removed and disposed of in accordance with Section 5-1.20B(4), "Contractor-Property Owner Agreement" of the Standard Specifications.

Concrete used for collars shall conform to the specifications in Section 10 and the provisions in Section 90-2, "Minor Concrete," of the Standard Specifications. Portland Cement Concrete shall contain no less than 590 pounds of cementitious material per cubic yard and have a minimum compressive strength of 3,000 psi.

13-7 PAYMENT OF ADJUSTMENT OF EXISTING UTILITY COVERS AND FRAMES

1. Full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in adjusting frame and cover to grade as herein specified, including, but not limited to excavation, backfill, concrete, additional grade rings if required, pavement and mortar, furnishing location of existing covers to be adjusted to grade, removing silt and debris will be measured per each from actual count as shown on the plans, as specified in

these Special Provisions and as directed by the Engineer and paid at the contract unit price for Adjust Storm Drain Manhole Frame and Cover to Grade and no additional compensation will be allowed.

2. Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in adjusting water valve frame and cover to grade as herein specified, including, but not limited to, excavation, backfill, concrete, grade rings, pavement and mortar will be measured per each from actual count as shown on the plans, as specified in these Special Provisions and as directed by the Engineer and paid at the contract unit price for Adjust Water Valve Frame and Cover to Grade and no additional compensation will be allowed.

Section 14

EARTHWORK, EXCAVATION, EMBANKMENT AND SUBGRADE

14-1 ROADWAY EXCAVATION AND BACKFILL

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 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 is to assure all necessary surveys, cross sections, and measurements which may be required for determining the quantities removed are performed.

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 AND BACKFILL

All compaction test results and test agent information shall be submitted to the Engineer for review and approval. Placement of forms, foundations, or footings shall not begin until the City has received written verification that the compaction test results meet the requirements of this specification.

Structure excavation shall consist of excavation performed to place structures such as footings, walls, manholes, junction boxes, **etc**. 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 therefore.

Excavation for placement of manholes will be paid for under the price bid for manholes, complete in place.

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 AND BACKFILL

Trench excavation shall consist of the excavation required to install pipelines **and** its cost will not be paid for separately but compensation will be included in the price bid for placing pipe.

Before excavation of the pipe trench in fill areas of roadway embankments, the fill area or embankment shall be completed to a height above the pipe invert grade line of not less than twice the internal pipe diameter or to final fill or embankment subgrade, whichever is lower, but in no case less than twelve inches (12") above the top of the pipe. Such embankment shall be compacted to a minimum relative compaction of ninety percent (90%) for a distance on each side of the pipe equal to a least two (2) pipe diameters. The remainder embankment shall be compacted as specified elsewhere in these Specifications for the type of construction being pre-formed, or as specified in the Special Provisions or the Plans.

Backfill shall be placed as shown on Standard Drawing 4-20, shall be provided by Contractor and shall be placed in accordance with these Technical Specifications and the pipe manufacturer's recommendations. Initial backfill shall be the material between the top of the bedding material and six inches (6") above the top of the bell or barrel if the pipe does not have a bell.

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. Contractor shall place initial backfill—by shovel slicing, tamping, and/or vibratory compaction in order to produce firmly compacted material under the haunches of the pipe. Compaction shall be by mechanical pneumatic or vibratory compaction equipment approved by the Engineer. Care shall be used to avoid dislodging the pipe. No wedging or blocking of the pipe shall be permitted. Ponding and jetting methods of achieving compaction shall

not be allowed. The compacted material must achieve a relative compaction of at least ninety percent (90%) as determined by ASTM D 698.

When the bedding material for the pipe consists of crushed rock, sand shall not be used as initial backfill material.

Unless otherwise approved by Engineer, trench backfill, as shown on Standard Drawing 4-20, shall be provided, and placed to grade by Contractor, in accordance with these Technical Specifications and the pipe manufacturer's recommendations. Trench backfill shall be the material between the initial backfill and the top of trench or sub-grade. 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.

Unless otherwise indicated on the Plans or specified in the Special Provisions, 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 trench backfill material shall be by mechanical pneumatic or vibratory compaction equipment. Minimum relative compaction of trench backfill material shall be ninety percent (90%) when tested according to ASTM D 1557, except that the top six inches (6") below the subgrade shall be compacted to a relative compaction of ninety-five percent (95%). 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 will be charged to Contractor and deducted from any payment due Contractor for work performed under the terms of the Proposal.

Ponding and jetting methods of achieving compaction are not allowed.

Refer to Section 10-16 Controlled Density Fill (CDF) regarding approval and mix design requirements for use of CDF, CLSM, and/or RFF as an alternate to granular material for initial backfill and trench backfill materials.

14-4 DEWATERING

Contractor shall be responsible for the control, removal, and disposal of any groundwater that may be encountered in the course of excavating and

backfilling trenches or placing manholes. Whenever water or over-saturated soil conditions exist which may interfere with proper installation, trenches shall be dewatered to a level twelve inches (12") below the trench bottom before placement of any pipe or material. Per details on the plans, when groundwater is encountered, a nonwoven geotextile fabric shall be placed and a two foot (2') layer of 3/4" crushed rock place over top the fabric. Fabric is to be wrapped around the rock to create a bench for the manhole to site on top.

Unless approved in writing by the Engineer, groundwater and/or water from trench dewatering shall be free of sediment and other construction materials before entering the City storm drain system. A dewatering plan, including a water de-sedimentation plan, shall be submitted to engineer.

14-5 TEMPORARY PAVING

Unless stated otherwise in Contract documents, at the end of the day and prior to opening to traffic, trenches shall be temporarily paved to provide a smooth riding surface. The paving material may be asphalt concrete or temporary paving, "cut back" or other Engineer approved material. Contractor may use non-skid plates to cover trenching when approved by the Engineer. Contractor shall nail down plates, and at edges Contractor shall create and maintain a uniform taper using temporary paving to ensure a smooth traveling surface over the plate.

Cutback shall be placed on the completed aggregate base course, constructed per the Plans and Special Provisions and shall be placed so that the compacted thickness is not less than two inches (2").

Compaction of temporary paving shall be performed using steel wheel rollers or mechanical equipment approved by the Engineer. Compaction by wheel rolling with backhoes or other rubber tire construction equipment shall not be allowed. The temporary paving shall be placed and maintained so that the maximum deviation does not exceed one-half inch (½") using a ten (10) foot straight edge placed in any direction. If, in the opinion of the Engineer, the temporary paving is not properly maintained, Engineer may direct Contractor to install permanent asphalt concrete pavement at no additional cost to the City of Colusa.

14-6 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:

1. ASTM D 1557 laboratory test for maximum dry density at optimum moisture

2. ASTM D 2922 field test for in-place wet density by nuclear methods.

3. ASTM D 3017 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.

14-7 SUBGRADE

Sub-grades 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 ±.05 feet. The top six inches (6”) of sub-grade immediately prior to placing subsequent material thereon shall have a relative compaction of not less than ninety-five percent (95%). The sub-grade shall be free of segregated material and shall be smooth and true to the required grade and cross section. Contractor shall repair, at his expense, any damage to a prepared sub-grade caused by his operations or by use of public traffic. No material shall be placed upon the prepared sub- grade until it is in a condition meeting the requirements specified. Unless otherwise provided by the Special Provisions, the finishing of sub-grade will not be paid for as a separate item but this work will be included by Contractor under such items as Contractor deems appropriate.

14-8 PAYMENT

There will be no separate payment for earthwork, excavation, embankment and sub-grade, but the price therefore shall be considered included in whatever items Contractor deems appropriate.

Section 15

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 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, sub-base, 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 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 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, 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 Department of Utilities, 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 sub-grade, 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 Department of Utilities "Water Hydrant Policy". A copy of said policy is available at Customer Services, 1395-35th Avenue.

15-2 PAYMENT

There will be no separate payment for water used during construction, but the price therefore shall be considered included in whatever items Contractor deems appropriate.

Section 16

STORMWATER QUALITY CONTROL

16-1 WASTEWATER AND GROUND WATER DISCHARGES

Contractor shall be responsible for the control, removal, and disposal of any groundwater that may be encountered in the course of excavating and backfilling trenches, placing pipe, or constructing any other improvements associated with the project. Unless approved in writing by the Engineer, groundwater and/or water from trench dewatering shall be free of sediment and other construction materials before entering the City sewer or storm drain system. Approval from the City will need to be obtained prior to any pumping or discharging of water to the City storm drain or sewer system.

Issues which require the regulation of groundwater discharges include: influence on existing or unknown contaminate plumes, exceeding sewer and drainage capacity, excessive demands on facility infrastructure, pumping costs, and maintenance worker safety.

It is the responsibility of the contractor to verify that groundwater is free of contamination through a regular monitoring program.

All Groundwater discharges within the City of Colusa must be arranged through the Public Works Department.

DISCHARGE TO SEWER SYSTEM

If 25,000 gallons of water per day, or more, is discharged to the City's Sewer System, Contractor will be required to obtain a discharge permit from the State Water Board. The City will reimburse Contractor for fees paid to the State to obtain a discharge permit, but Contractor shall be responsible to pay any fines levied if Contractor does not comply with the permit requirements.

All new discharges to the City of Colusa's sewer system must be regulated and monitored by the City Utilities Department. No Groundwater discharges are allowed to the City's sewer system.

DISCHARGES TO THE STORM DRAINAGE SYSTEM

Any discharges to the storm drainage system must be secured with an individual National Pollutant Discharge Elimination System (NPDES) permit from the Central Valley Regional Water Quality Control Board (Water Board) and an MOU from the City. The NPDES permit must be received prior to the City issuing an MOU to discharge to the City's storm drainage system.

16-2 STORMWATER QUALITY

These requirements consist of regulations contained in the National Pollution Discharge Elimination System (NPDES) Municipal Stormwater Permit issued to the City and the City's Stormwater Management and Discharge Control Ordinance.

Contractor shall comply with all City and County of Colusa air pollution control rules, regulations, ordinances, and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances, and statutes, specified in the Government Code. Contractor shall be responsible for the control of dust within the limits of the project at all times including weekends and holidays in addition to normal working days. Contractor shall take whatever steps are necessary or required by the Engineer to eliminate the nuisance of blowing dust to prevent sediment, debris, or litter from entering the City storm drain system.

16-3 EROSION, SEDIMENT, AND POLLUTION CONTROL

Contractor shall be responsible for the implementation and maintenance of erosion, sediment and, pollution control measures, otherwise known as Best Management Practices (BMPs), within the limits of the Work site and all areas impacted by the project at all times during the course of construction, including evenings, nights, weekends and holidays in addition to the normal working days, in accordance with the provisions of Colusa City Municipal Code.

Contractor shall provide the following erosion, sediment, and pollution control Best Management Practices (BMPs) when and where applicable:

Contractor shall place Filter Bags in and Gravel bags around any storm drain inlets which receive runoff from the limits of the construction zone, including storage and staging areas. Alternative storm drain inlet protection BMPs may be used with approval of the Engineer. (City of Colusa Improvement and Design Standards, drawings 11-2 and 11-9)

Contractor shall cover all stockpiles prior to a forecasted rain event and/or place gravel berms (or approved equal) around material piles as required to prevent migration of material to gutters or storm drains.

Contractor shall keep gutter flowlines unimpeded and free of soil, debris, and construction materials at all times.

Contractor shall install and maintain an effective construction entrance at any soil to concrete/asphalt interface used by Contractor vehicles and equipment in accordance with City of Colusa Improvement and Design Standards, drawing 11-1.

Contractor shall place silt fences, fiber rolls or approved equal at any soil to concrete/asphalt interface at which soil may be washed onto the concrete/asphalt in accordance with City of Colusa Improvement and Design Standards, drawings 11-3 and 11-4.

Wash water, slurry and sediment from concrete or asphalt saw-cutting operations shall not be allowed to enter the City storm drain system, but instead must be collected and disposed of, by Contractor, in a manner approved by the Engineer.

Contractor is required to implement, at a minimum, the following housekeeping practices:

Site Cleanup:

Contractor shall be responsible for the control of dust, mud and debris resulting from Contractor's operations within the limits of the project at all times including weekends and holidays in addition to normal working hours. Contractor shall take whatever steps are necessary or required by the Engineer and daily clean up throughout the project shall be required as Contractor progresses with the work.

Daily or as needed, all paved areas within the limits of the project shall be cleaned and free of sediments, asphalt, concrete and any other construction debris. Contractor shall not clean sediment and debris from the street by using water to wash down streets.

Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public traveled way shall be removed immediately by Contractor at their expense. If site is not kept sufficiently clean, the City will take measures to clean it and subtract the cost thereof from payments owing the Contractor.

Solid Waste Management:

Contractor shall maintain a clean construction site. Contractor shall provide designated areas for waste collection. The waste collection areas shall be leak-proof containers with lids or covers. Site trash shall be collected daily and placed in the disposal containers. Contractor shall make arrangements for regular waste collection. Contractor shall also regularly inspect the waste disposal areas to determine if potential pollutant discharges exist.

Hazardous Material Storage and Delivery Area:

Contractor shall provide one central hazardous material storage and delivery area (HMSDA) for the duration of the project. Examples of hazardous

materials include pesticides and herbicides; fertilizers; detergents; petroleum products; acids; lime; glues; paint; solvents and curing compounds. This area shall be protected such that polluted runoff will not be allowed to leave the HMSDA site. Contractor shall regularly inspect the HMSDA site to ensure that any hazardous or non-hazardous materials have not spilled.

Concrete Waste Management:

Contractor shall arrange for concrete wastes to be disposed of off-site or in one designated on-site area. Concrete wastes, including left-over concrete and material from washing out the concrete truck, shall not be disposed or washed into the storm drain system. A designated on-site concrete waste containment area shall be provided. The site shall be bermed and lined to keep concrete waste from leaving the containment area. The dried concrete waste shall be removed and disposed of properly by Contractor at their expense.

Spill Prevention and Control:

Contractor shall be responsible for instructing employees and sub-contractors about preventing spills of hazardous materials such as equipment fuel, and about controlling spills if they occur. Proper spill control and cleanup materials and procedures shall be kept on site near the storage and equipment fueling areas and updated as materials change on site. Contractor is strictly responsible for the prevention, clean-up and consequences of any hazardous materials spills.

Throughout the duration of the project, Contractor shall inspect and maintain, in effective condition, all erosion, sediment, and pollution control BMPs before and after each storm event and as needed. Contractor shall immediately correct or replace any ineffective BMPs.

More information about required Best Management Practices and proper Housekeeping Practices can be obtained by referring to the City of Colusa's Administrative and Technical Procedures Manual for Grading, Erosion and Sediment Control available at https://www.cityofColusa.org/-/media/Corporate/Files/DOU/Specs-Drawings/Sediment-control-manual.pdf?la=en

Contractor shall prepare and submit an erosion, sediment and pollution control plan (ESC Plan) to the Engineer for review. The submittal shall include a description of all pollutants to be managed during construction, and all activities that could potentially impact a waterway. Detail plan of areas to be disturbed and staging areas. All proposed BMP measures to be implemented to mitigate pollutants and activities listed. The ESC Plan shall be submitted a minimum of 48 hours prior to start of the work. **Contractor shall not begin work until an accepted ESC Plan is on file with the Engineer**. The erosion, sediment and

pollution control plan shall be updated as necessary and re-submitted to the Engineer.

16-4 ENFORCEMENT

Per City Code, Contractor shall be subject to Notice of Violations (NOVs) resulting in possible Stop Work Orders and Administrative Penalties for non-compliance of this section of the Special Provisions.

Per the State's Porter Cologne Water Quality Act, Contractor shall also be subject to inspection by Staff from the Central Valley Regional Water Quality Control Board who have the authority to issue Notices of Violation (NOVs) and Penalties of up to $10,000 per day for non-compliance. Contractor shall be liable for any fines issued to the project by the State or Federal Government for NPDES non-compliance due to Contractor negligence.

The City reserves the right to take corrective action and withhold the City's costs for corrective action from progress payments or final payment in accordance with Section 7, Retention of Sums Charged against Contractor, of the Agreement. Any fines, including third-party claims, levied against the Agency as a result of Contractor's non-compliance are Contractor's sole responsibility and will be withheld from progress payments or final payment in accordance with Section 7, Retention of Sums Charged against Contractor, of the Agreement.

16-5 PAYMENT

There will be no separate payment for Water Quality Control and the cost therefore shall be considered included in whatever item Contractor deems appropriate.

Section 17

LAYING AGGREGATE BASE

17-1 LAYING AGGREGATE BASES

Aggregate bases shall be placed on the prepared sub-grade to such a depth that when thoroughly compacted it will conform to the grades and dimensions shown on the Plans, specifically Sta 20+88 to 23+44. 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. Material shall be placed and compacted in layers not to exceed six inches (6”).

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. 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.

Areas inaccessible to the roller shall be compacted by power tamping until the base material is compacted to a relative compaction of at least 95 percent.

Aggregate bases shall be compacted to a minimum relative compaction of ninety-five percent (95%) in accordance with the testing requirements of Section 14-5 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.

17-2 PAYMENTS

Payment for Aggregate Base- Class II shall be at the contract price bid per ton 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 allowances 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 D 1557. 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.

Section 18

DEWATERING WELLS

18-1 DEWATERING WELLS

In the event the Contractor is unable to dewater the trench pursuant to the contract documents herein, he shall provide a bid alternate for dewatering described herein. Contractor shall be responsible for the design, installation, operation, maintenance, and removal of any temporary dewatering system required to perform the Work. Whenever groundwater or saturated soil conditions exist which may interfere with excavation, trench stability, placement of pipe, structures, bedding, or backfill, Contractor shall lower the groundwater to a minimum of one foot (1') below the bottom of the excavation and maintain such level until the pipe, structures, bedding, and backfill have been placed and compacted.

Contractor shall select the dewatering method best suited for the field conditions. Acceptable methods include wellpoints, deep wells, eductor wells, sump pumps used in conjunction with groundwater lowering systems, or other methods approved by the Engineer. Open pumping from the trench alone shall not be permitted where it results in pumping of soil, loss of fines, unstable trench conditions, or disturbance of the trench bottom.

Contractor shall provide all pumps, piping, standby equipment, power, water treatment, sediment control, permits, monitoring, and other incidentals necessary to maintain a stable excavation and comply with all applicable Federal, State, and local regulations. Groundwater discharged from the project shall be free of sediment and other construction materials prior to entering any storm drain or other approved discharge point.

A dewatering plan shall be submitted to the Engineer for review prior to beginning excavation below the groundwater table. The dewatering plan shall include the proposed dewatering method, estimated pumping rates, discharge location, sediment control measures, and emergency procedures. Review of the dewatering plan by the Engineer shall not relieve Contractor of responsibility for the adequacy or performance of the dewatering system.

18-2 PAYMENTS

Payment shall be made at the Contract lump sum price bid for "Dewatering Wells." The lump sum price shall include furnishing all labor, materials, equipment, pumps, wells, wellpoints, piping, standby equipment, generators, monitoring, water treatment, permits, discharge, removal of the dewatering system, abandonment of temporary wells, restoration of disturbed areas, and all incidental work necessary to complete the dewatering work.

Section 19

PORTLAND CEMENT CONCRETE PAVEMENT, JOINTS AND CURING

Section 20

CONCRETE IN STRUCTURES

20-1 GENERAL

"Concrete in structures" shall mean concrete placed in structures such as culverts, headwalls, retaining walls, drop inlets, pump sumps, drain inlets, slabs, foundations and other concrete structures. Concrete in structures shall be Class "B" unless otherwise indicated. Concrete in pavements, curbs, gutters, and sidewalks, shall be specifically excluded from this section.

The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of publications in effect at the time of bid shall govern.

American Concrete Institute (ACI) Standard:

ACI SP-15	Field Reference Manual: Standard Specifications for Structural Concrete with Selected ACI and ASTM references.
ACI 211	Recommended Practice for Selecting Proportions for Concrete.
ACI 301	Structural Concrete for Buildings.
ACI 302	Guide for Concrete Floor and Slab Construction.
ACI 304	Guide for Measuring, Mixing and Placing Concrete.
ACI 305	Hot Weather Concreting.
ACI 306	Cold Weather Concreting.
ACI 309	Consolidation of Concrete.
ACI 318	Building Code Requirement for Reinforced Concrete, with Commentary.
ACI 347	Guide to Formwork for Concrete
ACI SP-4	Publication 4 Formwork for Concrete

American Society for Testing and Materials (ASTM) Standards:

ASTM C 31	Method of Making and Curing Concrete Test Specimens.
ASTM C 33	Concrete Aggregates.
ASTM C 39	Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 94	Ready Mixed Concrete.
ASTM C 143	Slump of Portland Cement Concrete.
ASTM C 150	Portland Cement.
ASTM C 171	Sheet Materials for Curing Concrete.
ASTM C 172	Method of Sampling Freshly Mixed Concrete.
ASTM C 192	Making and Curing Concrete Test Specimens in the Laboratory.
ASTM C 227	Test for Potential Alkali Reactivity of Cement-Aggregate Combinations.
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method.
ASTM C 260	Air Entraining Admixture for Concrete.
ASTM C 289	Test of Potential Reactivity of Aggregates.
ASTM C 295	Petrographic Examination of Aggregates.
ASTM C 309	Liquid Membrane Forming Compounds for Curing Concrete.
ASTM D 98	Calcium Chloride.
ASTM D 1785	Poly (Vinyl Chloride 40, 80 and 120.) PVC Plastic Pipe, Schedules
ASTM C 138	Unit Weight, Yield and Air Content of Concrete
ASTM C 173	Air Content of Concrete by the Volumetric Method

U.S. Dept. of Commerce, National Bureau of Standards Publications, Product Standards:

PS1	Construction and Industrial Plywood

West Coast Lumber Inspection Bureau (WCLB) Standard:

No. 16	Standard Grading and Dressing Rules for Douglas Fir, Western Hemlock, Western Red Cedar, White Fir, and Sitka Spruce Lumber.

National Forest Products Association (NFPA):National Design Specification for stress grade lumber and its fastening.

Western Wood Products Association (WWPA): Western Lumber Grading Rules.

Concrete shall also conform to Section 10 of the Technical Specifications.

Notes pertaining to concrete on the Plan sheets are a part of these Specifications.

Contractor shall submit the following in accordance with Section 5-7:

1. Proposed mix designs, including admixtures and curing material

2. Certificate of Compliance that concrete meets the specified requirements and delivery tickets for all concrete delivered to the project site.

3. Shop Drawings including:

a. Formwork:

Drawings of all formwork showing form plywood patterns, formwork, and ties.

b. Concrete placement:

Vertical limits of concrete placements horizontal lifts, and construction joints.

c. Shoring:

Drawings and structural calculations showing members, connections, and anchorage of the proposed shoring system. Calculations and drawings shall be stamped by a Civil Engineer currently licensed in the State of California.

20-2 FOOTINGS

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

20-3 DRAIN INLETS

Drain Inlets shall conform to the Standard Drawings contained within City of Colusa Improvement and Design Standards.

Concrete for drain inlets shall be Class "A" or "B", and shall conform to Section 10 of these Specifications. The concrete box portion of the drain inlet shall be cast to the proper grade in a maximum of two (2) placements of concrete. Use of grout to adjust the drain 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 Contractor, drain 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 CONCRETE FORMWORK

Forms shall be designed, constructed, and maintained so as to insure that after removal of forms, the formed concrete will have true surfaces free of offset, waviness or bulges, and will conform accurately to the indicated shapes, dimensions, lines, elevations, and positions.

Form shall be provided with accessories and openings in forms as required for placement of equipment and materials. Remove forms after concrete has cured.

Unless otherwise specified or approved by the Engineer, form materials shall be as follows:

1. Plywood:

PS 1, B-B Plyform Class 1, EXT-APA, edge-sealed, 5/8" thick when studs are spaced 12" on center and 3/4" thick when studs are spaced 16" on center. As an alternate OSB may be used, of equal quality, strength and dimensions.

2. Wood strips for forming reveals, chamfers and quirks:

Any close grain hardwood or softwood, free of knots.

3. Framing lumber:

Douglas Fir "Standard" grade, sized to uniform width and depth.

4. Sheathing:

Douglas Fir "Construction" grade boards and sheathing, 10" maximum width.

Form accessories shall be as follows:

1. Form Ties:

Ties for concrete building structures, exposed to view shall be adjustable type, arranged to leave no metal within 1" of surface. They shall have no lugs, cones, or other devices that will leave holes larger than 1" diameter in exposed concrete surfaces. In all other instances, “Snap” ties and spreaders shall be used with approved clamps or separate metal spreaders. Do not use wood spreaders or wire ties.

2. Form Coatings:

Burke Concrete Accessories, Inc.'s "Burke Release", Nox-Crete, or approved equal. Apply per manufacturer's printed instructions.

Contractor shall provide openings for mechanical and electrical work and work of other sections shall place items to be incorporated in concrete and support on formwork and shall seal forms around openings to prevent concrete seepage.

The design and engineering of all formwork, falsework and shoring, as well as its construction and protection, is Contractor's responsibility and shall conform to ACI 347 unless otherwise directed or approved.

Forms for exposed concrete surfaces shall be designed and constructed so that the formed surface of the concrete does not undulate excessively in any direction between studs, joists, form stiffeners, form fasteners, or wales. Undulations exceeding either 3/32 inch or 1/270 of the center to center distance between studs, joists, form stiffeners, form fasteners or wales will be considered to be excessive.

Forms shall be constructed to provide concrete conforming to dimensions shown, and to tolerance limits listed in ACI 301 "Specifications for Structural Concrete for Buildings".

Installation of forms shall conform to ACI 301, 347, P4 and this section. Forms shall be designed for easy removal. Contractor shall not pry against face of concrete, shall use wooden wedges only, and, in order that reused forms will not contain patches resulting from alterations, forms for concrete exposed-to-view shall be reused only on identical sections.

Forms shall not be used if there is any evidence of surface wear or tear which would impair the quality of the exposed-to-view concrete. Forms shall be thoroughly cleaned and re-lubricated before reuses. Formwork for exposed-to-view concrete shall be observed continuously while concrete is being placed to see that there are no changes of elevation, plumbness, or camber. If, during construction, any weakness develops and the falsework shows any undue settlement or distortion, the work shall be stopped, the affected construction removed, if permanently damaged, and the falsework strengthened.

Forms shall be substantial, true to line and level, sufficiently tight to prevent leakage and shall conform to indicated dimensions. Locate form ties for exposed concrete in straight horizontal and vertical lines and as indicated on Drawings and specified herein. Provide cleanout holes at bottom of forms. Remove debris before concrete is placed. Construct forms for exposed surfaces so that joints in forms are either horizontal or vertical and are located to the pattern indicated.

External corners on all concrete shall be formed with chamfer strips in corners of forms to form bevel at external angles. All form joints in forms for exposed-to-view concrete shall be sealed with specified form tape to prevent leakage. Camber soffits to accommodate anticipated deflections caused by wet concrete and construction loads. Provide positive means of adjustment for shores and struts. Take up settlement as concrete is placed.

20-5 REMOVAL OF FORMS

Remove forms, shoring and bracing carefully to avoid damage to fresh concrete, but not before concrete is capable of self support and support of

construction loads. Do not pull tie rods until concrete is hard enough to permit withdrawal without damage to concrete. Pull ties that are entirely withdrawn from wall toward inside face.

Regardless of strengths attained by concrete, leave forms in place for following periods when supporting:

1. Vertical surfaces: 3 days minimum

2. Slabs, on grade: 7 days minimum

3. Beams, girders and elevated slabs: 15 days minimum, but do not remove vertical support until concrete has reached its 28-day strength.

Before reuse of plywood forms, thoroughly clean, sand and recoat them with form coating. Do not reuse plywood that has torn grain, patches, worn edges, damaged phenolic resin covered surfaces, or other defects which would impair texture of finished surface. Other wood forms shall be prepared for reuse by thorough cleaning and recoat with form coating. Repair damaged forms and replace loose or damaged boards.

Live loading of new construction while reshoring is under way is not permitted. Do not over stress new construction by over tightening reshores. Leave reshores in place until concrete has reached its specified 28-day strength. Reshore floors that support shores under wet concrete, or leave original shores in place. Reshores shall have at least half the capacity of the shores above and be distributed in approximately the same pattern. Leave these reshores in place until freshly placed concrete has reached 75% of its specified 28-day strength.

For concrete exposed-to-view in completed structures use specified "B-B" or better plyform plywood or phenolic resin covered form board.

For concealed concrete, plywood, lumber or steel is acceptable. Footings may be poured directly against earth banks where soil conditions are such that vertical banks will remain stable during placing operations. Earth forms at walls are not permitted.

20-6 REINFORCEMENT

Reinforcement shall conform to Section 21 of the Technical Specifications.

20-7 DESIGN OF MIXES

Contractor shall be responsible to design concrete mixtures resulting in

the required 28-day compressive strength and other required characteristics. Design of mixes shall be in accordance with Section 10.

20- 8 PREPARING TO PLACE CONCRETE

Contractor shall provide inserts, required or shown on the Plans: embedded items, including installation of work built into concrete such as waterstop sleeves, anchor bolts, wood nailers, reglets, frames and sleeves for piping, conduit and fittings. Forms shall be cut and reinforced as required to accommodate them. No concrete shall be placed until all inserted items are installed in their proper locations, secured against displacement, cleaned, inspected and approved. Furnish ties and supports necessary to keep embedded items in place when concrete is placed.

Contractor shall remove excess water from forms before concrete is deposited, and shall remove hardened concrete, debris, and foreign materials from interior of forms and from surfaces of mixing and conveying equipment.

Prior to placing concrete, Contractor shall wet wood forms sufficiently to tighten up cracks and shall wet all other materials sufficiently to reduce suction and maintain concrete workability.

Contractor shall lightly dampen subgrade no more than 24 hours in advance of concrete placement, but do not muddy. Reroll where necessary for smoothness and remove loose earth material.

Set screeds for flatwork placement at walls and at maximum of 8-foot horizontal distance between adjacent screeds.

Concrete shall not be placed during rainy weather unless approved measures are taken to prevent damage to concrete.

20- 9 FLATNESS TOLERANCE FOR FLOOR SLABS

Finish slabs monolithically. Uniformly slope floor slabs to provide positive draining of indicated areas. Special care shall be taken so that a smooth, even joint is obtained between successive pours.

Finished surfaces shall be true plane surfaces with no deviation in excess of 1/8 inch measured using a 10 feet long straight edge.

Replace or repair any slab which fails to meet this standard. If slabs fail to drain as indicated, remove drains and faulty floor section and refinish topping so that it drains according to the Drawings. No deviations will be allowed.

20-10 PLACING CONCRETE

Place concrete only after subgrade, forms, and reinforcement have been approved. Limit free vertical drop in concrete walls or columns to three (3) feet. In other concrete, limit the drop to five (5) feet. Deposit concrete in horizontal layers not more than 18" deep and continue pouring until section is completed. Control rate of pouring and depth of layers so that each layer will be covered within one hour after it is poured. Pour columns to top and allow to settle two (2) hours before additional concrete is placed. Place concrete continuously between pour joints.

Grout mix shall be regular concrete mix with ½ the large aggregate omitted. Use to cover the following before additional concrete is placed:

1. Flat form surfaces next to congested steel.

2. Construction joints.

3. Top of column and wall footings.

4. On surfaces where concrete has set.

Vibration and tamping shall be performed as concrete is placed in forms, to work concrete around reinforcing steel, built-in items and into corners and angles. Extra care shall be given to work architectural concrete around inserts, reveals, quirks, corners and plastic cones of ties to preclude rock pockets, air pockets, and other defects, and to produce sharp corners, edges and smooth surfaces. Provide mechanical vibrators operated by experienced workers for agitating concrete in forms. Vibrate thoroughly within five (5) minutes after layer is placed. Carry vibration well into previous layer. Vibrators shall not be used to transport concrete inside forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when submerged in concrete. Supplement vibration by suitable methods to eliminate voids along forms for full depth of layer as directed. Do not allow vibrators to strike overlaid plywood surfaces. Do not use vibrators to work concrete along forms. Keep at least one spare vibrator on job at all times while concrete is being placed. Comply with ACI Committee 309 Consolidation of Concrete, Committee Report.

Upon completion of a pour and after concrete has partially hardened, wash scum or laitance off concrete surface with stiff brush and stream of water. When work is resumed, brush clean with wire brushes or sandblast, then place fresh concrete.

The following applies when pumping concrete:

1. General:

Do not use aluminum or aluminum lined pipe. Prevent concrete from contacting aluminum fittings

2. Mix:

Do not add more water to mix unless approved by the Engineer. Check that the mix design entered on delivery ticket complies with that ordered.

20-11 CONSTRUCTION JOINTS

The location and design of joints not shown or specified are subject to approval of the Engineer prior to placement of concrete.

Where Horizontal joints occur in exposed concrete, set smooth painted wood strips in form to provide a straight and level joint in which upper pour laps lower pour. Place concrete level with, but not above top of pour joint strip as shown on Drawings. Allow 24 hours before concrete is placed over horizontal joints. Remove loose material and laitance. Clean by sandblasting, or wire brushing. Allow enough time between placing of adjacent pour sections to provide for initial shrinkage. Horizontal joints will not be allowed in beams, girders and slabs unless otherwise indicated.

Vertical joints not shown on the Drawings shall be so made and located as to least impair the strength of the structure and shall be approved by the Engineer prior to placement of concrete.

20-12 EXPANSION JOINTS AND RUBBER WATERSTOPS

When premolded 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.

Neoprene or rubber water stops shall be placed where shown on the Plans, and shall conform to the requirements of Section 51, “Concrete Structures,” of the State Specifications.

20- 13 CURING OF CONCRETE

Concrete shall be cured in accordance with Section 90, “Concrete,” of the State Specifications.

20- 14 SURFACE FINISHES OF CONCRETE STRUCTURES

The ordinary surface finish required on concrete structures shall be that obtained by careful forming, proper consolidation and even texture of concrete.

Immediately after forms have been removed, all form bolts shall be cut off one inch (1") below the finished surface of the structure or snap ties removed. Remove honeycombed and other defective concrete to sound concrete, but not less than 1" deep. Make the walls of the cut area perpendicular to the surface. Do not feather out the edges. Dampen the patch area and the adjacent area six (6) inches around the patch area. Brush the patch area with a bond of neat cement and water paste and apply patching mortar when the water sheen is off the bond. The holes remaining shall be filled with cement mortar using one (1) part cement to two (2) parts sand with the least water required to produce a workable mass. Rework this mortar until it is the stiffest consistency that will permit placing. After entirely filling voids, strike off the mortar slightly higher than the surrounding surface, let set for one hour and finish flush with the surrounding surface.

Any defects in the concrete surface caused by poor material in the forms, poor form construction, or by voids or pockets in the concrete, yet are not sufficiently severe to cause rejection of the pour, will be repaired and finished to make the surface finish uniform. The Engineer will direct 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 called out on the plans or by the Special Provisions.

20-15 FINISHING FORMED SURFACES

Finish formed surfaces by removing any and all fins. The tolerances of finished formed surfaces shall conform to ACI 301.

20-16 FLATWORK

Place floor slabs on grade in alternate strips. Place each unit against construction joint forms with formed control joints perpendicular to the poured strips. Pour slabs-on-grade against a moist subgrade. Wet the subgrade the day before placing concrete. Moisten subgrade just ahead of concrete as it is placed. Do not place concrete in standing water. Provide new, clean cut, sharp-edged wood headers at construction joints of suspended slabs. Deposit concrete evenly, consolidated with mechanical vibrators, particularly at side forms, and screed to indicated elevations and contours. Maintain full indicated thickness of slab over all parts of cambered support. Concrete shall be compacted with a grid tamper to eliminate voids and pockets and to produce a uniformly dense

slab. Where ground slabs are left to receive deferred finishes, provide protection against contamination from time of placing concrete until time of placing finish. Remove contamination mechanically leaving a clean surface.

Joint location and detail shall be as indicated. Tooling is required at control and pour joints.

Control joints

After concrete surface is screeded, cut concrete with a cutting bar, or other approved tool, approximately 1/4" thick x 2" deep. Form straight clean lines. After slot is formed in stiff concrete, insert 1/8" thick x 1-1/2" strip of tempered hardboard or plastic joint form zip strip. Butt strips neatly to line and flush with concrete surface. Finish slab flush with top of hardboard strips without tooling.

2. Construction joints:

Form construction joints with 2" nominal dressed lumber, or approved steel forms. Provide enough stakes to prevent sagging and misalignment under construction loads. Leave forms in place as long as possible and remove without chipping the edge of the slab. Protect the slab edge until the adjacent slab is placed.

3. Expansion joints

Provide sponge neoprene joint filler where shown on the Drawings. Place filler to provide space for sealant as indicated. Seal joints with specified sealant per manufacturer's printed instructions. Thickness of filler material is indicated.

Contractor shall apply a medium broom finish just after final troweling to all flat slabs not specified to receive another finish.

Where wood float finish is indicated, screed slabs to elevations indicated. Compact with motor driven disk type compactor float and bull float to smooth, even surface. Perform final finishing with wood hand floats to give finished surface uniform, slightly roughened texture.

Where steel trowel finish is indicated, tamp fresh concrete with a grid tamper enough to raise a thin bed of mortar to surface. Before finishing, remove any excess water. Level and compact with motor drive disk type compactor float. Immediately after floating, the surface shall be further leveled and compacted with a motor driven rotary trowel with flat-pitched blades. Final troweling shall be done with steel hand trowel after surfaces have become hard enough to produce a hard, dense, smooth, burnished surface.

20-17 GROUTING AND DRYPACKING

Grout shall consist of one (1) part cement, two (2) parts sand and sufficient water that the grout will just flow under its own weight. Water reducing and workable agent may be added at Contractor's option.

Drypack shall consist of one (1) part cement, 2 parts sand, with just enough water to bind the materials together.

Dampen surfaces before grouting and slush with neat cement. Force grout into place and rod so as to fill all voids and provide uniform bearing under plates. Provide smooth finish on exposed surfaces and damp cure for at least three (3) days.

Non-shrink grout shall be used exclusively under structural steel base plates in accordance with manufacturer's printed instructions.

When concrete overlay bonding is required, the surface of the existing concrete is to be roughened by sandblasting to remove loose material, rust and oils. Sufficient cement matrix should be removed to expose surface aggregates and to form a roughened surface for bonding. Clean with a high pressure water jet and allow to surface dry. Immediately apply an acrylic bonding agent such as Burke Acrylic Bondcrete at the rate of 200 sq. ft. per gallon and follow with placement of the concrete overlay after a minimum of one hour and after the film is dry to the touch. Install bonding agent in strict accord with manufacturer's instructions.

20-18 WEEP HOLES IN WALLS

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

20-19 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.

20-20 QUALITY CONTROL

The Engineer will be responsible for the routine quality control testing of concrete mixes. Contractor shall assist the Engineer in obtaining samples of fresh concrete.

Slump Test: Slump test shall be performed at the job site by the Engineer in accordance with ASTM Test Method C 143.

Compressive Strength Tests: Each day concrete is poured, the Engineer shall mold four concrete test cylinders in accordance with ASTM C 31. Contractor shall pay for the service of an independent testing company to cure and test the concrete cylinders in accordance with ASTM C 39 and C 172. Cylinders shall be tested at 7 days, 14 days, 21 days, and 28 days. Methods of sampling and testing concrete mixtures shall include but not be limited to the following:

Composite Samples:	ASTM C 172.
Specimen Preparation:	ASTM C 31.
Compressive Strength:	ASTM C 39.
Air content:	ASTM C 173 or C 231.
Slump:	ASTM C 143.
Unit Weight:	ASTM C 138

Evaluation and acceptance of concrete and concrete structures shall be in accordance with Chapters 17 and 18 of ACI 301.

Any retesting and inspection of concrete due to inadequacy, deficiency, failure, or removal shall be done at Contractor's expense.

20-21 MEASUREMENT OF QUANTITIES

The volume of concrete to be paid for shall be determined by computation from the dimensions of the structures as shown on the Plans and as amended by approved change order. No deduction will be made for volume of reinforcing steel.

20-22 PAYMENT FOR CONCRETE IN STRUCTURES

There will be no separate payment for concrete in structures, but the price therefore shall be considered included in whatever items Contractor deems appropriate.

Section 21

PLACING STEEL REINFORCEMENT

21-1 MATERIALS

Provide reinforcing steel as shown on the Plans. Conform to Section 10-23 of these Technical Specifications except as modified herein. All materials covered by this Section shall be manufactured in the United States.

The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of publications at the time of bid shall govern.

American Concrete Institute (ACI) Standard

ACI 318	Building Code Requirements for Reinforced Concrete.
ACI SP-66	ACI Detailing Manual.

American Welding Society (AWS)

AWS D 12.1	Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

Concrete Steel Reinforcing Institute (CRSI)

1 MSP	Manual of Standard Practice
1 SPLBK	Reinforcement Anchorages and Splices
1 PLACE	Placing Reinforcing Bars

Use galvanized steel chairs and accessories or plastic coated units for work exposed to view, weather, or moisture so that finished surfaces will not be marred or stained; use precast concrete only (no metal), suitably sized for load distribution, in slabs-on-grade. Use no supports of wood or other cellulose material.

21-2 SUBMITTALS

Before starting concrete work, submit shop drawings in accordance with Section 5. Comply with requirements of ACI 318, ACI SP-66, CRSI 1MSP, CRSI

1SPLBK, and CRSI 1DET. Show bar size, dimensions, bends, placing, and construction joint details. Submit drawing showing locations of any construction joints not shown on the plans. Maximum submittal drawing size shall be 22-inches by 34-inches. Submit type, size, and location of all slab and bar supports. Hooks, lap splices, bends and offsets shall be in accordance with the drawings. Obtain approval before shop fabrication. Such approval is intended only as an additional precaution against errors, and shall not be construed as relieving Contractor of his responsibilities for the accuracy of the information.

Submit Certificate of Compliance stating that reinforcement complies with specified requirements. Reinforcing steel shall be properly identified. Contractor shall bear costs for test of steel by an approved laboratory if the reinforcing steel is not properly identified.

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. Clean surfaces to bewelded of loose scale and all foreign material. Clean welds each time electrode is changed. Chip burned edges clean before welds are deposited.

21-4 BENDING

Bending and Forming: Fabricate indicated size bars into shapes and lengths shown on approved shop drawings by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not inschedule will be rejected

Reinforcing steel shall conform accurately to the dimensions shown on the Plans. The term “standard hook” used herein shall conform to ACI SP-66.

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 references.

21-5 PREPARATION FOR PLACING

Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material.

Prior to installation of reinforcing steel work, Contractor shall inspect surfaces to receive work, and arrange for satisfactory correction of defects in workmanship and material that could have adverse affect on reinforcing steel work.

Contractor shall receive approval in writing from the Engineer of all reinforcing work prior to ordering concrete for placement.

21-6 PLACING

Conform to CRSI 1 MSP, and CRSI 1 PLACE except as modified herein.

At each location during concrete placing, inspect reinforcement and maintain bars in correct positions. Templates to maintain the correct position of reinforcing may be required. Contractor shall install templates, if required by the inspector, at no additional cost to the City.

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 Contractor at his own expense.

The clear distance between parallel bars shall not be less than two and one-half (2½) 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 (1½”). The concrete cover of slab steel may be less than this minimum if so shown on the Plans. Reinforcing bars shall have a minimum concrete cover of three inches (3”) from edges that are placed against earth or that are to be submerged in water.

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.

21-7 WELDS AND 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 bars and smaller and sixty (60) bar diameters for Nos. 9, 10, and 11 bars. 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. 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.

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

21-8 PAYMENT FOR PLACING STEEL REINFORCEMENT

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 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 Contractor. The amount of asphalt binder material, as a percentage of the total weight of the mixture shall be determined by California Test 367.

Contractor shall be responsible for designing a job-mix formula by the material supplier or 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.

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

22-2 MATERIALS FOR ASPHALTIC CONCRETE

Aggregate material shall conform to the requirements of Section 39 of the State Specifications for three-quarter inch (¾") maximum aggregate for major streets and one half inch (½") for residential streets or as determined by the Engineer. Where two lifts are placed, the Engineer may require that the base course be ¾" maximum aggregate and the surface course be ½"maximum aggregate. Consideration shall be given to percentage of heavy vehicles and bus stop locations.

Paving asphalts shall meet the requirements of Section 10-18 of these Specifications.

Unless otherwise indicated on the Plans or in the Special Provisions, asphalt binder to be mixed with aggregate shall be steam-refined paving asphalt: PG 64-10 or PG 64-16 for residential and collector streets and PG 70-10 for on/off

ramps, Intersections, arterials, and thoroughfares. Use ARHM-GG (Asphalt Rubber hot Mix – Gap Graded) with PG 64-16 for overlays, unless otherwise indicated.

22-3 MIXING EQUIPMENT FOR ASPHALTIC CONCRETE

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

22-4 GENERAL REQUIREMENTS FOR PLACING ASPHALT CONCRETE AND ASPHALT CONCRETE OVERLAYS

Contractor shall notify the public seventy-two (72) hours prior to the start of work by placing door hangers to all business and residences that may be affected by the work as determined by the Engineer. Contractor may be required to contact business owners in person to explain the work schedule as determined by the engineer. No work shall be permitted until the public has been notified.

If Required by the Engineer, Contractor shall notify the following City departments and agencies seven (7) days prior to performing the work: Public Works Solid Waste Division (Street Cleaning Section), Public Works Parking Division, Public Works Street Maintenance Section (Traffic Signs and Markings Section and Traffic Signals and Lighting Section), Police Department Communications Center, Fire Department Communications Center, and Colusa Metro Regional Transit (bus stops and light rail). If required, Contractor shall contact the appropriate representative of each City department or agency, and provide a work schedule in writing.

Contractor shall be responsible for trimming of trees necessary to perform the work as determined by the Engineer. Contractor shall obtain a tree-trimming permit from City Tree Services Division prior to trimming trees.

Contractor shall be responsible for removing all yard waste and debris effecting the work at his expense. Yard waste shall not be relocated to planter strips, pedestrian areas, or other areas not approved by the Engineer. Garbage cans that are temporarily removed from the street shall be placed back in their original position at the end of the workday.

Contractor shall be responsible for removing all vegetation from the roadway surface and edge of pavement, and sweeping in advance of placing the pavement operation (prior to tack coat) to the satisfaction of the Engineer.

Contractor shall clean, sweep, and maintain the cleanliness of the streets to be paved to the satisfaction of the Engineer throughout the course of the work. Materials spilled or dispersed as a result of the work on adjacent streets

shall also be cleaned at the expense of Contractor. The street shall be swept with a mechanical type pickup machine and shall be left thoroughly clean and clear of any pavement grindings at the end of each working day. The machine shall spray adequate amounts of water to control dust.

Contractor shall remove and dispose of existing pavement markers prior to placing asphalt. All thermoplastic limit lines, crosswalks, and legends applied to the road surface shall be scarified prior to placing the overlay. Excess crack seal shall be removed as directed by the Engineer.

Contractor shall place temporary pavement delineation necessary for the safety of vehicular and pedestrian traffic. Temporary pavement delineation layout shall be approved by the Engineer.

All manholes and utility covers concealed with asphalt concrete shall be carefully referenced out ("cross-tied") prior to the placement of asphalt by Contractor. All exposed survey monuments shall be referenced out prior to the overlay, covered by an appropriate method approved by the Engineer, and uncovered after the overlay without disturbing or damaging the survey monument. All relevant iron (manholes, water valves, etc.) shall be lowered prior to pavement planing as directed by the Engineer. Contractor shall submit "cross ties" to the Engineer prior to the lowering of iron.

Contractor shall coordinate the removal of on-street parking with the Engineer Seventy-two (72) hours prior to the start of work in accordance with Section 6-18 of these specifications.

22-5 PAVEMENT KEYCUTTING, CONFORMS, AND GRINDING

Where specified by the Engineer, pavement grinding shall be done to profile the street to a planer surface. The general depth of grinding shall be equal to the depth of the overlay unless otherwise approved by the Engineer.

Where specified by the Engineer, pavement keycutting shall be done to provide a key wedge against existing gutter lips. Asphalt concrete removal shall be to a minimum depth of one and a half inch (1½") adjacent to the lip and shall be tapered to the existing pavement grade over a distance of eight feet (8') minimum, from the gutter lip. At cross streets, where the condition of the side street is very good, pavement keycutting shall continue in a straight line from curb line to curb line parallel to the direction of work as directed by the Engineer.

At the beginning and ending limits of pavement keycutting, a planed pavement conform shall be constructed to the drawings shown in City of Colusa Improvement and Design Standards or as directed by the Engineer. At cross streets, where the condition of the side street is poor, planed pavement

conforms shall be done between the lip of the main street to the curb return of the side streets. When the beginning or ending limit of work is a crossing street, a fifty feet (50') planed conform extending to the round corner of the crossing street shall be constructed except that an eighteen foot (18') planed pavement conform shall be constructed on residential streets. The conform shall span the full width of the street for a distance of fifty feet (50') back from the limit line or feature resulting in the discontinuity in the work. At bridge decks, the conform shall span the full width of the street for a distance of fifty feet (50'). The depth of cut shall be equal to the depth of overlay at the limit of work and shall be progressively decreased to zero (0") over the conform length.

Where specified by the Engineer, pavement planing shall be done to retain the existing street elevation. The depth of planing below the gutter lip shall be equal to the specified thickness of asphalt concrete. The depth of planing at the centerline shall be equal to the specified thickness of asphalt concrete to be placed on the street, and shall increase from the lip of gutter to the street centerline linearly should the specified depths differ.

Contractor shall exercise care to avoid damaging the gutter lips during the grinding operations. Damaged gutter lips which have spalls in excess of one inch (1") deep by five inches (5") long shall be repaired at Contractor's expense.

Grinding operations shall be completed to the satisfaction of the Engineer prior to beginning the paving operation.

Contractor shall remove existing asphalt concrete from the top of the gutter pan and from the face of gutter lip as directed by the Engineer.

The grindings shall become the property of Contractor and disposed of off-site.

At the end of the workday, there shall not be any elevation difference between planed pavement and unplaned pavement in the traveled vehicle lanes and all curb ramps. Any differences that parallel the centerline of the street in a longitudinal direction shall be sloped by either a temporary asphalt plant mix cut back or additional planing, to produce a bevel within the planed pavement. The slope of either the cutback or the bevel shall be not greater than one-inch (1") vertical in twelve inches (12") horizontal. Other than for curb ramps, elevation differences between planed pavement and lips of gutters are not required to be sloped.

Elevation differences perpendicular to the centerline of the street, in a transverse direction, or elevation differences between the planed street and cross-streets, shall be sloped as directed by the Engineer with cutback and shall not exceed one inch (1") vertical in twelve inches (12") horizontal.

If Contractor fails to slope elevation differences as required by these Special Provisions, Contractor shall pay administrative penalties of $500 per each infraction per each calendar day elevation differences are not sloped.

Not more than three (3) calendar days shall elapse between the time pavement planing and/or pavement keycutting begins on any particular section of roadway and the time that the asphalt concrete surfacing is placed unless approved by the Engineer.

22-6 PLACING

Placing of asphaltic concrete shall conform to the requirements of Section 39 of the State Specifications. The maximum paving lift shall be three inches (3") thick.

Contractor shall fill and level all surface irregularities and ruts to ensure compliance with specified tolerances.

Contractor shall use a thirty foot (30') leveling ski on the free floating edge unless otherwise approved.

Before placing asphaltic concrete surface course on an asphaltic concrete base course, a tack coat shall be applied unless otherwise approved.

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 50°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 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, and the requirement for a tack coat, shall be determined by the Engineer.

22-7 TACK COAT

Tack coats shall be in conformance with the requirements of Section 39 “Paint Binder (tack coat)” of the State Specifications. A tack coat shall be applied to all planed surfaces, paved surfaces to be resurfaced, vertical surfaces of existing pavements, curbs, gutters, and construction joints, and other surfaces as directed by the Engineer.

Tack coats shall be SS-1 asphalt emulsion unless otherwise approved. The proportion of SS-1 and water shall be 80/20, or as determined by the engineer, and shall be applied to the surface at an application rate from .02 to 0.10 gallons per square yard. Typical application rates vary from .05 gallons per square yard for smooth finished surfaces to .10 gallons per square yard for planed pavement surfaces.

Prior to applying tack coat, the street surface shall be swept clean by brooming or washed clean to the satisfaction of the Engineer. The length of the tack coat placed in advance of the paving operation shall be determined by the Engineer to minimized degradation of the tack coat by vehicular traffic. The street surface shall also be free of moisture and dry to the satisfaction of the Engineer.

Under cold weather conditions, the Engineer may approve the use and application rate of PG 64-10 or PG 64-16 paving asphalt as a tack coat.

22-8 SPREADING AND COMPACTING

Spreading and compacting requirements shall be in conformance with Section 39 of the State Specifications except as noted herein. Compaction shall be subject to density testing as defined in Section 22-9 and 22-10 of these specifications in accordance with California Test Methods 304 and 308.

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. Vibratory rollers may be substituted when approved by the Engineer.

The initial or breakdown rolling of surface course shall be followed by additional rolling consisting of three (3) complete coverage 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 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, 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, Contractor shall follow this pattern unless otherwise directed by the Engineer.

The City will perform compaction testing at no cost to Contractor. 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. Contractor shall conform to the tolerance requirements of this specification unless otherwise approved by the Engineer in writing prior to the start of work. Contractor shall request information regarding tolerances for streets having a parabolic section prior to the start of work.

Contractor shall place asphalt such that its finished surface is ¼ to ½ inches above the gutter lip.

Pavement surface shall be deemed unacceptable should the surface hold water, the pavement ravel, an uneven gradation of mix be visible, or cracking occur during rolling. Pavement shall be removed by surface planing (a minimum depth of one and one-half inches (1½") when using one-half inch (½") mix, and two inches (2") inches when using three-quarter inch mix), and repaved to the satisfaction of the Engineer. Areas to be removed and replaced will be determined by the Engineer. Should a significant amount of surface be deemed unacceptable, the entire travel lane shall be resurfaced. A series of spot patches will not be accepted. The mix design used during resurfacing shall be the same as the adjacent pavement.

Pursuant to Section 5-14 of these Specifications, the Engineer will have the right and authority, but shall not be obligated, to retain imperfect work instead of requiring the imperfect work to be removed and reconstructed. Patch paving of imperfect work will not be allowed, and the amount of the deduction shall be based on full travel lane widths from beginning to end of the work limits or two nearest intersections as determined by the Engineer.

22-9 PAVEMENT DENSITY TESTING

Pavement density will be determined by comparing the average density of cores taken from the compacted pavement to the maximum theoretical density as determined by ASTM D 2041. As required by the Engineer, the pavement will be inspected on a lot basis. A lot will consist of either five hundred (500) tons of asphalt for a surfacing project or four hundred (400) lineal feet of pavement for a trenching project. One sample shall be taken from each lot on a random basis. One laboratory-compacted specimen shall be prepared from each lot.

Cores for determining the density of compacted pavement will be taken on a lot basis with a minimum of three cores per lot. The density of each core shall be determined per ASTM D 2726-89. The cores shall be four inches (4") in diameter.

Contractor shall plug core holes taken by the material tester with asphalt compacted greater than ninety percent (90%) of relative compaction if cores are taken the same day as Contractor's paving operations. The core holes shall be plugged prior to the end of the workday. If required to facilitate the taking of cores, Contractor shall leave lane closures in place for a reasonable period of time (approximately thirty minutes after pavement has cooled enough to drive on).

22-10 PAY FACTORS

For all asphalt pavement subject to acceptance testing, the lot will be paid for using the following pay factors:

In Place relative Compaction	Payment Factor
97.1% or higher (over-asphalted mix)	90%
92% – 97%	100%
89%-91.9% (marginal air voids)	85%
88.9%or less (unacceptable air voids)	Not acceptable (60% if otherwise approved)

The amount paid shall be at the unit price bid times the pay factor. For lots with average densities of 91.9% or less, the Engineer reserves the right to deem the lot as not acceptable and require the work to be removed and reconstructed. Unless otherwise approved by the Engineer, lots with average densities of less than 89% relative compaction shall be removed and reconstructed.

22-11 PAVEMENT REINFORCING FABRIC

Pavement reinforcing fabric shall be non-woven polyester, polyproplyene, or polypropylene/nylon materials, Petromat 4598 or approved equal conforming to the requirements of the below indicated ASTMs:

Weight, Oz./sq.yd. ASTM D 5261	3.0 to 8.0
Grab Tensile Strength (1-inch grip), Pounds ASTM D 4632	90 min.
Elongation at Break, Percent, ASTM D 4632	50 min
Fabric Thickness Mils., ASTM D 5199	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 10-18 of these specifications and shall be the same grade of the mix design.

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 (½”) 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 lay down 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 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.

22-12 PAVEMENT REINFORCING FIBER

This Section includes specifications for furnishing all materials, equipment, labor, and incidentals for mixing aramid fiber reinforcement to hot mix asphalt. Aramid polymer fiber adds reinforcement to the asphalt mixture to improve high temperature rutting and low temperature cracking properties while allowing the mixture to withstand high stress applications.

-Store aramid product in a dry environment and do not allow them to be in contact with moisture.

-Standard dosage is 2.1 oz minimum of pure aramid per ton of asphalt mixture. This amount can be increased as needed such as 1.5x (3.15 oz) or 2x (4.2 oz) minimum dosage for additional mixture performance with no change to the mix design. The weight applied is for pure aramid fibers only. The weight of any delivery or packaging materials is not considered.

-The aramid fiber supplier's representative should be on site during the first day of production mixing. This requirement can be waived if fiber supplier and HMA producer can supply evidence of supplier's brand of fiber product being successfully produced by the HMA producer. The fiber supplier's representative may be on site for additional days as requested by the Engineer.

-Introduce the aramid fiber with delivery material(s) as follows:

-Batch Plant - When a batch type plant is used, add the aramid product

dosage to aggregate in the weigh hopper or pugmill. This may be done with loose fibers and a fiber metering device or may be done by using manual dosing equipment. If necessary, increase the batch dry mixing time to ensure the aramid fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.

-Drum Plant - When a continuous or drier-drum type plant is used, add the aramid product at the Recycled Asphalt Pavement (RAP) collar or to the RAP belt in a continuous manner to uniformly disperse with the aggregate. Use a separate aramid product metering device feed system to proportion by weight of total mix, the required percentage of fiber reinforcement into the mixture. Control the aramid product metering system with a proportioning device to meet the dosing requirements.

NOTE: When a continuous or drier-drum type plant is used for limited production volumes, the addition of the aramid product may be done by using manual measuring tools or equipment at the location listed above. Because this is not an automated process, a written protocol must be supplied by the producer to demonstrate how they will attain the dosage requirement, and documentation must be supplied by the material manufacturer assuring this method will produce the desired uniform aramid fiber distribution.

-As determined by the Engineer, mix the aramid fiber with the aggregate longer, if needed, to allow thorough distribution of aramid fibers at the end of the mixing process and to promote asphalt coating of individual strands of aramid fiber. At the start of any fiber mixing, visually observe the reinforced asphalt mixture at the plant and in first three trucks at the point of discharge and prior to delivery to the job site. Observation shall include using a shovel or other tool to inspect the mixture by allowing it to slightly cool and fall from the shovel's or tool's edge. Further inspection can be performed by allowing the loose mixture to cool and pulling apart to inspect for strands of aramid. Adjust mixing time and temperature if needed to ensure aramid fiber distribution.

Property	**Measure**	**Standard**
Material	Aramid	ASTM D276
Form	Monofilament fibers	Manufacturer
Length	0.75 to 1.50 inches (19 to	Manufacturer
Filament	12 ± 2 microns	
Specific Gravity	1.44 ± 0.01 g/cm^3	ASTM D2256
Tensile Strength	400,000 psi (2.758 GPa)	ASTM D2256
Elongation at	4.4 % maximum	ASTM D2256
Degradation	800°F (426° C) minimum	ASTM D2256
Acid and Alkali	Inert	Manufacturer
Treatment Type	Sasobit® Wax	

22-13 PAYMENT FOR ASPHALTIC CONCRETE

Payment for Asphalt Concrete (Fiber Reinforced)-2" shall be at a price per ton of delivered and place material for finished pavement. Payment for Asphalt Concrete (Fiber Reinforced)-2" 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 bid per ton of asphaltic concrete pavement.

Payment for pavement key cutting shall be at the unit price per lineal foot of street surface planed 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.

Payment for Roadway Grinding- 2" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved but not limited to, grinding of roadway, loading, hauling and disposing of the excavated material, as shown on the plans, as specified in these Special Provisions, the Standard Specifications and as directed by the Engineer and no additional compensation will be allowed.

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.

Payment for 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 therefore.

Section 23

BITUMINOUS SEALS

Section 24

CURBS, GUTTERS AND SIDEWALKS

24-1 CONCRETE IN CURBS, GUTTERS, AND SIDEWALKS

Concrete in curbs, gutters, and sidewalks shall be Class "B", as specified in Section 10-5 of these Specifications. The cement shall be Type II as set forth in Section 10-1 of these Specifications. Fly ash shall not be substituted for cement if subgrade is expansive clay or if the “R Value” is ten or less.

When placing new concrete next to the existing concrete, Contractor shall match the color of the existing concrete. The color additive and amount may vary, and shall be approved by the Engineer prior to placing the new concrete. Without prior approval, new concrete that does not match the color of the existing concrete shall be removed and replaced at Contractor’s expense.

24-2 CONCRETE CUTTING

Where new concrete is to join existing concrete, the exact limits of existing concrete removal shall be determined by the Engineer prior to saw cutting. Concrete saws shall be water-equipped for dust control. Contractor shall take the necessary precautions to prevent cut material and saw cutting run-off from entering the City’s storm drain system.

24-3 SUBGRADE AND AGGREGATE BASE

Subgrade shall be prepared as specified in Section 14-7, and aggregate base shall be prepared as specified in Section 17-1 of these specifications. A minimum of six inches (6”) of Class 2 aggregate base shall be placed under all curb, gutter, sidewalk and driveways, except that twelve inches (12”) of Class 2 aggregate base shall be placed if the subgrade is expansive clay or the “R Value” is ten or less. Prior to placing concrete, aggregate base shall be uniformly moist, and any excess water shall be removed.

24-4 FORMWORK - NON EXTRUDED CONSTRUCTION

Forms for curb, gutter, and sidewalk shall be of a width equal to the full depth of the curb and gutter and wood forms shall be a minimum of one and one half inches (1 1/2") thick. Warped forms and forms not having a smooth straight upper edge shall not be used. Benders, or thin plank forms, rigidly placed, maybe 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, unless otherwise approved. Clamps, spreaders, and braces shall be used when necessary to obtain tolerances specified herein.

Sidewalks 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 eight (8) hours after concrete finishing has been completed.

24-5 EXTRUDED (SLIP-FORM) CONSTRUCTION

Extrusion machines shall be properly adjusted and in satisfactory operating condition. Prior to placing concrete, contractor shall demonstrate proper adjustment of all screeds and floats by measurements from grade stakes driven to known elevations. Satisfactory operation and adjustment of all propulsion and control equipment, including pre-erected grade and alignment lines, shall be demonstrated to the satisfaction of the Engineer prior to and during the extrusion of concrete.

Concrete used with extruded construction shall be of such consistency that, after extrusion, it will maintain the shape of the curb section without support. 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. Finishing with a brush application of grout to repair defects will not be permitted.

Unless otherwise indicated in the Contract Documents, extruded concrete curb shall be anchored to existing pavement by the use of dowel reinforcing, an approved adhesive, or both, as directed by the Engineer. If an adhesive is used, the surface shall be thoroughly cleaned prior to its application. The existing pavement shall be cleaned by wire brush, by blast cleaning, or as approved by the Engineer. The cleaned surface shall be free from dust, loose material, or oil. The adhesive shall conform to Section 95, “Epoxy”, of the State Specifications.

24-6 EXPANSION JOINTS AND SCORE LINES

In curbs, gutters, and sidewalks, expansion (weakened planed) joints shall be placed at curb returns, top of driveway transitions, light poles, fire hydrants, beginning of drain inlet transition, other fixed objects, or where directed by the engineer. Expansion joints shall be placed every sixty feet (60'). The joint material shall be three-eighths inches (⅜”) thick, a minimum of two and one-half inches (2½") 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 shall be one and one-half inches (1½") deep, one-eighth inch to one-quarter inch (⅛"- ¼") in width, and placed every twelve feet (12') with a standard four-foot (4') bite score in between. Expansion joints, score lines, and

bite scores shall conform to the City of Colusa Improvement and Design Standards.

When placing new concrete next to the existing concrete, Contractor shall match the score lines of the existing concrete. The score lines spacing may vary and shall be approved by the Engineer prior to placing the new concrete. Without prior approval, new concrete that does not match the score lines of the existing concrete shall be removed and replaced at Contractor's expense.

24-7 FINISHING CONCRETE SURFACES

The top and exposed surface of the concrete shall be finished, whereby the concrete is poured to form or extruded, properly screeded, floated, troweled, edged, 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.

Non-extruded 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. Surfaces of non-extruded 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 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 flow line, lip of gutter, back of curb, and back of sidewalk shall not exceed plus or minus 0.05-foot in any twenty-five foot (25') length from the elevations shown on the plans. When a straightedge 10 feet long is placed on the top of a finished surface, the surface shall not vary more than .02 feet except at grade changes or curves. Contractor shall water test the gutter at the time of construction, and no more than .02 feet of water shall remain shortly after water supply is stopped.

Partial concrete pours shall terminate at an expansion joint or deep-score line. The end of such a partial pour shall be vertical and square ended. If the partial pour is terminated at a deep-score line dowels shall be required.

24-8 CURING OF CONCRETE

Concrete shall be cured in conformance with the provisions set forth in Section 10-6 of these specifications.

24-9 DAMAGE AND REPAIRS

Any damage done to concrete curbs, gutters, sidewalks, or driveways during the progress of the work shall be repaired by Contractor to the satisfaction of the

Engineer. Contractor shall protect the work from graffiti and vandalism. Patching of damaged areas shall not be allowed. Damaged or vandalized areas shall be removed and replaced to the nearest score line as directed by the Engineer at Contractor's expense.

24-10 SLOPE AND WIDTH OF SIDEWALKS

Sidewalks and planting strip between curb and sidewalk shall slope uniformly towards the street at a rate of not more than two percent (2%) and not less than one percent (1%). 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 centerline and extending across the width of the sidewalk.

Unless otherwise shown on the Plans or by the Special Provisions, sidewalks shall be four feet six inches (4'-6") wide and three and five eights inches (3⅝") thick.

24-11 DOWEL REINFORCEMENT

Dowel reinforcement shall be installed to join existing concrete to new concrete as directed by the Engineer. A typical dowel installation consists of a No. 4 bar snugly fit or epoxied four to six inches, and spaced between 18 and 24 inches apart, in the existing concrete. The dowels shall conform to Section 21 of these Specifications.

24-12 CURB RAMPS AND DRIVEWAYS

Curb ramps for the physically handicapped and driveways shall be constructed to the dimensions, lines, grades as shown on the plans, and to the drawings shown in City of Colusa Improvement and Design Standards.

24-13 CURBS & GUTTER RECONSTRUCTION TO ACCOMMODATE DRIVEWAYS

Where curbs are removed for the purpose of constructing a driveway, the entire curb and gutter shall be removed to the nearest score line and the gutter rebuilt as directed by the Engineer.

24-14 PAYMENT

On unit price proposals, unit prices will be required as set forth in this paragraph. The price bid on each of the following items shall include full compensation for furnishing all material, labor, and equipment necessary to construct the completed work as shown on the Plans.

1. Concrete Curb and Gutter

Payment for concrete curb and gutter will be at the price bid per lineal foot which will include full compensation for finishing the subgrade, dampening the subgrade, including furnishing the water; furnishing, placing, and later removing necessary forms and form work; furnishing and finishing concrete; curing concrete; furnishing and placing expansion joint material; furnishing and placing dowel 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 bid for each type specified.

2. Sidewalks

Payment for sidewalk will be at the price bid per square foot which will include full compensation for finishing the subgrade; dampening the subgrade, including furnishing the water; furnishing, placing, and later removing necessary forms and form work; furnishing concrete; furnishing and placing expansion joint material; finishing the sidewalk surfacing; curing the sidewalk, furnishing and placing dowel reinforcement; 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 for each thickness specified.

3. Curb Ramps and Driveways

There will be no separate payment for curb ramps and driveways and the cost thereof shall be included in the price bid for sidewalk and/or curb and gutter, unless otherwise indicated in the Special Provisions.

4. Removal of Existing Curb, Gutter, and Sidewalk

Payment for Removal of Existing Curb, Gutter and Sidewalk will be included in the payment for “Demolition” per Section 13.

Section 25

SANITARY SEWER AND STORM DRAIN MANHOLES

25-1 STANDARD MANHOLES

City standard manholes shall conform to Sections 10, 14, 25, and to the drawings shown in City of Colusa Improvement and Design Standards. Unless otherwise shown on the Plans or called for in the Special Provisions, only City standard manholes shall be used on City work.

25-2 MANHOLE CASTINGS

Castings for manhole heads and manhole covers shall conform to Section 10-25 of these Specifications. Dimensions of manhole heads and covers shall be as shown in City of Colusa Improvement and Design Standards.

25-3 CONSTRUCTION OF MANHOLES

Sanitary sewer and storm drain manholes shall be watertight structures constructed by placing precast concrete sections on a cast in place or precast concrete base. All construction of sewer and storm drain manholes shall be constructed using precast concrete bases.

1. Precast Concrete Sections

Precast concrete sections shall conform to ASTM C 76 for Class III pipe, or C478 for precast reinforced concrete manhole sections. Manhole barrels, pre-cast bases, cones, flat top lids, and grade rings shall conform to the requirements of ASTM C 478. Lifting holes shall be sealed with plastic sealing compound conforming to Section 10-37 on the side facing the soil and grouted smooth on the interior with a non-metallic, non-shrink grout in conformance with Section 10-55.

2. Cone sections

Cone sections shall be constructed of concentric cones except in the following cases:

a. Eccentric Cone, Type 3A – Manholes 8-foot deep and greater

b. Eccentric Cone, Type 4 – Manholes for sewer mains 21-inch and larger; storm mains 27-inch diameter and larger

c. Reduced Height Cone – Manholes for pipe with depths of cover measuring 30 inches to 42 inches above crown of largest

connecting pipe

d. Flat Top Lid – Manholes for pipe depths of cover of 18 inches to 30 inches above the crown of the largest connecting pipe

3. Concrete Bases, General

Concrete manhole bases may be either cast in place or pre-cast of a type and manufacture as approved by the Engineer. Unless otherwise approved by the Engineer, a minimum of twelve-inches (12") of Type A clean crushed rock conforming to Section 10-14 of these Specifications shall be placed and compacted below the base to provide a firm foundation. If subgrade cannot be compacted using standard construction methods, it will be considered unsuitable material and handled in accordance with Section 14-8 of these Specifications.

Stubs in the base shall match inlet pipe sizes and shall align true with all inlet and outlet pipes (within a tolerance of ± 4 degrees). Reducers will not be permitted. All inlet pipes that enter the manhole at the bases shall be channelized through the manhole with smooth uniform bends toward the direction of flow. In all cases, positive slope for all inlet pipes shall be maintained through the manhole. Two flexible joints shall be provided outside manhole barrel for each pipe connecting to a precast manhole base. Flexible joints shall consist of standard bell and spigot connections. Upon written approval by the Engineer, flexible connectors with stainless steel shear bands as manufactured by Fernco, or equal, may be installed. Joints shall be one pipe diameter apart and a minimum of 24-inches apart. Pipe connections to base shall be grouted in place and made watertight.

Manhole bench shall slope upwards from the spring-line of the pipe to the projected level of the crown of the pipe at the manhole wall, or 12 inches above the spring-line, whichever is less. All holes, cracks, and seams shall be grouted flush with the manhole interior using non-shrink nonmetallic grout in accordance with Section 10-55. All internal surfaces shall be constructed with a smooth and uniform finish.

4. Cast-in-place Bases

Cast in place concrete bases shall be Class "B" concrete as set forth in Section 10-5 of these Specifications. Portland Cement shall be Type II, as set forth in Section 10-1 of these Specifications. Installation of cast in place bases shall require written approval of the Engineer.

5. Manhole Flowlines

Manhole flowlines for main pipe and intersecting mains thirty-six inches (36") or less in diameter shall be constructed of vitrified clay pipe liners. If the

main is “laid through”, flowline material shall be same as the host pipe. PVC flowlines are not allowed.

Where multiple pipes are joined, the host pipe for purposes of this specification is defined as the downstream pipe. If inlet and outlet pipes are of different sizes, new flowline pipe size shall match larger pipe size. If host pipe is not utilized as the flowline, new flowline shall match inlet and outlet pipe elevations and shall extend to inside face of manhole. For host pipes up to 36-inches in diameter, all inlet pipes shall be channelized through the manhole base using clay pipe bends, grouted smooth to prevent the accumulation of debris.

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.

6. Precast Bases

Precast concrete bases and their details shall have the prior approval of the Engineer and shall conform to ASTM C 478 and the Standard Drawings.

Openings in the base that are not connected to a pipe shall be sealed with a watertight plug such as a “Gripper” mechanical wing nut plug by Cherne, or equal, and grouted smooth.

7. Joining Precast Manhole Sections

Preformed plastic sealing compound, in conformance with Section 10-37 of these Specifications, shall be used for joining all precast manhole sections. Prior to application of preformed plastic sealing compound, all joint surfaces shall be thoroughly cleaned. 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. Squeeze-out on the inside of the manhole shall be neatly trimmed flush with the inside surface.

All surface irregularities and joints in the interior of the manhole shall be grouted smooth with non-shrink metallic grout in conformance with Section 10-55. In areas of high groundwater, the external joint of each barrel section and of the barrel/cone connection shall be sealed with an external rubber sealing wrap as manufactured by Infi-Shield Inc. or equal. The seal shall be made of neoprene and EPDM rubber and have a minimum total thickness of 60 mils. Material shall conform to specifications of ASTM C 923, ASTM C 443, and ASTM F 477.

Material shall extend beyond each side of the joint a minimum of 3-inches, be continuous around the perimeter of the barrel section, and overlapped a

minimum of 6-inches. “High groundwater” will be considered a location where the groundwater reaches the level of the manhole barrel during a typical rainy season.

8. Manhole Chimneys

For manholes constructed in streets, the height of the manhole chimney shall be between six and three-quarters inches (6-¾”) and eighteen inches (18”) and in accordance with these guidelines. In general, manhole precast components shall be selected to produce the minimum practical chimney height. In newly constructed streets, chimney height shall be between six and three-quarters inches (6-¾”) and thirteen inches (13”). On streets with average cross slopes greater than 3% or streets receiving overlays, chimney height shall be between twelve and eighteen inches.

9. Chimney Collars

There shall be a minimum of eight inches (8”) 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.

10. Concrete Collars (unimproved areas)

For manholes not constructed in streets, three (3), six inch (6”) adjusting rings shall be placed between the top of the cone and the bottom of the manhole head. Top of head shall be a minimum of six inches (6”) above the ground surface. A concrete collar shall be constructed around head a minimum of six inches (6”) wide, from top of cone to top of head.

11. Manhole Location Signs

For manholes not constructed in streets a manhole location sign shall be installed in accordance with these specifications and as directed by the Engineer. The use of concrete for mount stabilization will not be allowed. Sign posts shall be driven a minimum of three feet into the undisturbed or compacted soil. If a stable mount cannot be achieved at minimum sign post mounting heights, greater driven depths must be used in conjunction with longer channel posts. All signs shall be mounted on the wide, or open, side of the channel post. Bolts shall protrude beyond the lock nut by at least a full thread after assembly, and care shall be exercised when tightening the bolts so as not to create a “Dimple” in the aluminum sign.

12. Manhole Connections

Connections to an existing manhole shall be made using a "Core-Bore" technique or other method approved by the Engineer. All connections to sanitary sewer manholes shall be made using a resilient connector conforming to ASTM C 923, as made by Kor-N-Seal, A-LOK, or approved equal, and shall be watertight. For connections not part of the base, the annular space between the resilient connector and the manhole wall shall be filled with a flexible material approved by the pipe manufacturer.

13. Inside and Outside Drop Manhole Connections

Where the elevation difference between the invert in and invert out of a manhole is over 2', an inside or outside drop connection shall be installed. The drop connection construction shall follow City standard detail 7-19.

14. Manhole Testing

In areas where ground water is expected, all manholes shall be tested and shall meet the requirements of ASTM C 1244 prior to acceptance. For installations not affected by groundwater a minimum of 25% of manholes shall be tested. At the discretion of the Engineer, a failed test may result in an increased number of manholes to be tested. Manholes shall be tested prior to backfill. If the manhole fails the test at this time, the manhole shall be repaired by Contractor and retested. This procedure shall be repeated until the manhole passes the required test. The Engineer may also require the manholes to be tested using this method after backfilling if he has reason to suspect that the manhole has been disturbed during the backfilling operation, or at other times during construction of the improvements being installed as part of the development.

In order to prepare the manhole for this test, all lift holes shall be plugged and all pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn in to the manhole.

The test procedure shall be as follows:

a. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

b. A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of mercury.

c. The manhole shall pass if the time for the vacuum to drop from 10 inches of mercury meets or exceeds the values indicated in Table 1 of ASTM C 1244.

The vacuum gauge used for this test shall be supplied by Contractor, and shall have maximum scale division of 0.1 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. In addition, the Engineer may compare Contractor's gauge with a City owned gauge at any time. During testing, the vacuum gauge shall be located such that it is readily visible.

Surface restoration shall be in accordance with the section of the General Requirements entitled “Pavement Cutting and Surface Restoration” and shall be paid for under this item of the contract. Pavement cutting shall be perpendicular and parallel to the centerline of the road.

25-4 Sewer Force Main In-Line Cleanout

The sewer force main in-line cleanout shall conform to the standard manhole 4 per City standard detail 7-17 with two (2)- parallel sanitary sewer force mains. The force mains shall have an MJ 10” x 10” DIP Tee with bolted flange pressure plates. Depths will vary depending on plan location.

25-5 PAYMENT FOR MANHOLES

Payment for 48” and 60” manholes shall be at the unit price of each per manhole. This price shall include full compensation for all necessary excavation, dewatering, form work, pre-cast and/or cast-in-place concrete, connections, furnishing all other material and doing all work necessary to construct the manholes complete in place to the dimensions shown on the Plans or in these Specifications.

Sewer Force Main In-Line Cleanout, shall be at the unit price of each per cleanout. This price shall include full compensation for all necessary excavation, dewatering, form work, pre-cast and/or cast-in-place concrete, fittings, furnishing all other material and doing all work necessary to construct the manholes complete in place to the dimensions shown on the Plans or in these Specifications.

Section 26

LAYING SEWER AND DRAIN PIPE

26-1 EXCAVATION

Trench excavation for all sewer and drain pipe shall conform to standard drawing 4-20 and the following requirements

Table 26-1.1 – Minimum and Maximum Trench Width (TW) @ Top of Drainage Pipe		
Pipe Inside Diameter (inches)	**(Min. Trench Width) Pipe Outside Diameter Plus (inches)**	**(Max. Trench Width) Pipe Outside Diameter Plus (inches)**
33 or less	12	16
36 or greater	12	24

Table 26-1.2 – Minimum and Maximum Trench Width (TW) @ Top of Sewer Pipe		
Pipe Inside Diameter (inches)	**(Min. Trench Width) Pipe Outside Diameter Plus (inches)**	**(Max. Trench Width) Pipe Outside Diameter Plus (inches)**
Flexible Pipes		
15 or less	12	24
18 or greater	12	36
Vitrified Clay Pipe		
All Pipe Sizes	24	No Limit

Contractor shall substitute stronger pipe or increased bedding and backfill requirements, subject to approval of the Engineer, **at no extra cost**, if the specified trench width is exceeded by the fault of Contractor. If field conditions do not allow for a trench within the above limitations, at no fault of Contractor, as determined by the Engineer, alternative bedding and backfill requirements shall be incorporated as directed by the Engineer and added cost will be reimbursed as extra work.

At a minimum, the depth of 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 deeper.

No tunnels shall be allowed, except when, in the opinion of the Engineer, it is impossible or impracticable to prevent tunneling.

Contractor shall comply with the requirements set forth in paragraph 6-8 "TRENCH SAFETY PLANS", Section 6.

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 26-11, "Repaving Trenches".

Contractor, at his/her option, may elect to cut existing sewer services that are encountered or tunnel under them. All sewer services cut by trench excavation shall be replaced before nightfall of the same day in accordance with Standard Drawing 7-24, City of Colusa Improvement and Design Standards. No additional compensation will be paid Contractor for any sewer services purposely or accidentally cut and repaired

26-2 DEWATERING

Contractor shall be responsible for the control, removal, and disposal of any groundwater that may be encountered in the course of excavating and backfilling trenches or placing pipe. Whenever water or over-saturated soil conditions exist which may interfere with proper installation, trenches shall be dewatered to a level twelve inches (12") below the trench bottom before placement of any pipe or material. Per details on the plans, when groundwater is encountered, a nonwoven geotextile fabric shall be placed and a twelve inch (12") layer of 3/4" crushed rock place over top the fabric. Fabric is to be wrapped around the rock to create a bench for the pipe to site on top.

Unless approved in writing by the Engineer, groundwater and/or water from trench dewatering shall be free of sediment and other construction materials before entering the City storm drain system. A dewatering plan, including a water de-sedimentation plan, shall be submitted to the Engineer for approval prior to any pumping or discharge of water to the City storm drain system.

26-3 HEALTH AND SAFETY

Contractor is warned that existing sanitary sewers and appurtenances have been exposed to sewage and industrial wastes. These facilities shall therefore be considered contaminated with disease-causing organisms. Personnel in contact with contaminated facilities, debris, wastewater, or similar items shall be advised by Contractor of the necessary precautions that must be taken to prevent infection. It is Contractor's responsibility to urge his personnel to observe a strict regime of proper hygienic precautions, including any inoculations recommended by the local public health officer.

Because of the danger of solvents, gasoline, and other hazardous material in the existing sewers or drains, these areas shall be considered hazardous to open flame, sparks, or unventilated occupancy. Contractor shall be aware of these dangers and shall take the necessary measures to assure his personnel observe proper safety precautions when working in these facilities.

Contractor shall not allow any wastewater to discharge from sanitary sewage collection systems onto adjacent lands or waters. In case of accidental discharge, Contractor at his/her expense shall be responsible for containment, immediate cleanup, and disposal to the full satisfaction of the Engineer. Where containment is not possible, Contractor at his/her expense shall provide adequate disinfection as directed by the Engineer or jurisdictional agency. If, in the opinion of the Engineer, Contractor fails to adequately follow the above guidelines, the City will make arrangements to have the work done by others, and have the cost deducted from amounts owing to Contractor.

26-4 PIPE MATERIALS/TYPES

Sewer and drain pipe shall conform to Sections 10, 26, and City of Colusa Improvement and Design Standards. The type, class and size of pipe are generally shown on the Plans and/or in the list of quantities contained within the Proposal.

1. Continuous types

Only one type of pipe shall be used between manholes with the exception of changing from Class III to Class IV RCP as long as the pipes are completely compatible with no modifications and both classes of pipe come from the same manufacturer and are of the same manufacturing process.

Prior to the start of work, Contractor shall submit a plan showing types of pipe and locations to the Engineer. Any deviation in the plan thereafter shall not be allowed unless approved in advance by the Engineer.

2. Acceptable Sewer Pipe Types

Sewer pipe types shall be as shown on the Plans or as noted in the Special Provisions and shall be of one of the following types unless otherwise noted: Vitreous Clay (VCP); Closed Profile Polyvinyl Chloride (CPPVC); Polyvinyl Chloride (PVC); Glass Fiber-Reinforced Thermosetting-Resin; calcareous aggregate reinforced concrete (RCP) Class ; or HDPE Solid Wall Fusion Jointed.

3. Acceptable Drainage Pipe Types

Drainage pipe types shall be as shown on the Plans or as noted in the Special Provisions and shall be of one of the following types unless otherwise noted : Reinforced Concrete (RCP) Class III or Class IV; Closed Profile Polyvinyl Chloride (CPPVC); Polyvinyl Chloride (PVC); Glass Fiber-Reinforced Thermosetting-Resin; or HDPE Solid Wall Fusion Jointed.

26-5 LAYING PIPE

Laying sewer and drain pipe shall conform to Sections 10, 14, 26, and City of Colusa Improvement and Design Standards. Pipe shall be placed in accordance with the Plans, Special Provisions, manufacturer's recommendations, and as directed by the Engineer.

1. Saw-cutting over existing pipelines

Prior to saw-cutting, Contractor shall mark the exact location of the existing pipeline on the pavement using a ferreting device or equivalent.

2. Manhole connections

All connections to the manholes not cast as part of the manhole base shall be made by use of a coring machine. The annular space between the outside of the pipe and the manhole shall be sealed by using a flexible annular space filler such as "Kor n' Seal Cavity O-Ring" by NPC Inc. or approved equal.

3. Bedding

Bedding shall be Type A clean crushed rock and shall be placed in accordance with these Technical Specifications and the pipe manufacturer's recommendations. 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. Initial backfill shall be brought to uniformity on each side of the pipe

to prevent distortion or displacement. Consolidation under pipe haunches shall be accomplished by shovel slicing or rodding to assure all voids are filled. Remaining initial backfill shall be placed in lifts and then consolidated with vibratory equipment to insure proper compaction. Ponding and jetting methods of achieving compaction will not be allowed.

4. Special foundation treatment

Whenever the bottom of the trench is soft or rocky, or, in the opinion of the Engineer, otherwise unsuitable as a foundation for pipe bedding, the unsuitable material shall be removed to a minimum depth of six inches (6") and replaced with Type D clean crushed rock, "pit run" or cobbles or any combination thereof. Pit run shall have a minimum sand content of 25 and shall be compacted to 90% relative compaction. Cobbles shall be a maximum of 12" and a minimum of 4".

As an alternate to, or in addition to, the bedding materials specified above, the Engineer may direct Contractor to furnish and place geotextile fabric below the bedding materials. The geotextile material shall be a high modulus woven fabric, and shall be inert to commonly encountered chemicals, rot-proof, and resistant to ultraviolet light, insects, and rodents. The geotextile fabric shall have a minimum grab tensile strength of two hundred pounds (200 lbs.) in any direction as measured in accordance with ASTM D 4632, a Mullen burst strength of at least four hundred pounds per square inch (400 psi) per square inch per ASTM D 3786, and an Equivalent Opening Size no larger than the U.S. Standard Sieve Number 50 as determined by ASTM D 4751. Geotextile fabric shall be Mirafi 600X or equal. Each roll of fabric shall be handled and placed in accordance with the manufacturer's recommendations. Furnishing and placing of geotextile fabric will be paid for as extra work as defined in 4-6, "Extra Work, Force Account".

If material more than twelve inches (12") below the typical trench bottom is ordered removed by the Engineer, the excavation below that point and the imported material required to backfill the trench to that elevation will be paid as extra work as provided in Section 4 unless otherwise specified in the Special Provisions. Before excavation of the pipe trench in fill areas of roadway embankments, the fill area or embankment shall be completed to a height above the pipe invert grade line of not less than twice the internal pipe diameter or to final fill or embankment subgrade, whichever is lower, but in no case less than twelve inches (12") above the top of the pipe. Such embankment shall be compacted to a minimum relative compaction of ninety percent (90%) for a distance on each side of the pipe equal to a least two (2) pipe diameters. The remainder of the embankment shall be compacted to the minimum relative compaction specified elsewhere in these Specifications for the type of construction being done, or as specified in the Special Provisions or on the Plans.

5. Trench backfill

a. Initial backfill

Initial Backfill shall be provided by Contractor and shall be placed in accordance with these Technical Specifications and the pipe manufacturer's recommendations. Initial backfill shall be the material between the top of the bedding material and six inches (6") above the top of the bell or barrel if the pipe does not have a bell. Unless otherwise indicated in the Special Provisions, initial backfill shall be granular material consisting of imported Type A, or Type B clean crushed rock, conforming to the requirements of 10-17, "Clean Crushed Rock" of these Technical 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. Contractor shall place initial backfill by shovel slicing,–tamping, and/or vibratory compaction in order to produce firmly compacted material under the haunches of the pipe. Compaction shall be by mechanical pneumatic or vibratory compaction equipment approved by the Engineer. Care shall be used to avoid dislodging the pipe. No wedging or blocking of the pipe will be permitted. Ponding and jetting methods of achieving compaction shall not be allowed.

When the bedding material for the pipe consists of crushed rock, sand shall not be used as initial backfill material.

b. Trench backfill

Unless otherwise approved by Engineer, trench backfill shall be provided, and placed to grade by Contractor, in accordance with these Technical Specifications and the pipe manufacturer's recommendations. 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. Minimum relative compaction of the trench backfill material shall be ninety percent (90%) when tested according to ASTM D 1557, except that the top six inches (6") below the subgrade shall be compacted to a relative compaction of ninety-five percent (95%). 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 Contractor and deducted from any payment due Contractor for work performed under the terms of the Proposal.

Ponding and jetting methods of achieving compaction shall not be allowed.

Upon written request by Contractor, and upon approval of the Engineer, the trench may completely backfilled to the bottom of the AC pavement with slurry cement or Control Density Fill backfill provided in conformance with 10-16, "Controlled Density Fill". For pipes and conduits two inches (2") and smaller, bedding, initial backfill, and trench backfill shall be slurry cement backfilled, placed to within one and one-half inches (1½") of finished grade.

c. Unsuitable material/import

If the portion of existing, native material removed in the excavation of trenches to be used for backfill is determined by the Engineer to be unsuitable for backfill not due to any action or negligence of Contractor nor because native material is inadequately protected from inclement weather, Contractor shall remove unsuitable material and import and place suitable backfill material.

The cost for this item shall be paid separately and it includes all associated costs including hauling away unsuitable material, disposal, and transportation and material cost for import material, except that the cost of placing and compacting import material is not included in this item but is included in the item for placing pipe. The quantity of "Unsuitable Material/Import" and the cost thereof shall not include that native

material which is removed from the trench in the area wherein the pipe bedding, initial backfill, aggregate base course, asphalt concrete or the pipe itself is placed. Such material, whether unsuitable or not, and its replacement material of whatever kind shall be included in the cost of the pipe.

The quantity of unsuitable material/import shown on the Proposal is for bidding purposes only. The unit price indicated will not be adjusted because the actual quantity varies from the quantity shown on the Proposal. The cost for replacing unsuitable material rendered unsuitable due to any act or omission of Contractor or due to inclement weather shall be borne by Contractor and there will be no compensation therefore.

Trench import material shall be placed in accordance with "Trench Backfill" herein.

d. Unstable trench

Contractor may assume that trench side walls may be maintained, without shoring, at a slope of three-quarter vertical to one horizontal (3/4:1). When trench side slopes are not able to be maintained at this slope due to unstable materials or excessively high ground water or both, as determined by the Engineer, and not based on improper or insufficient dewatering nor because of inadequate shoring and not due to any action or negligence of Contractor, the trench shall be considered an unstable trench. When such unstable trenches are encountered, as defined herein, additional effort and materials will be paid for as extra work, as described in Section 4, unless otherwise directed in the Special Provisions.

In areas of trench determined to be unstable, flexible pipe may be used in sizes up to nominal 24-inch diameter. Larger sizes up to and including 42-inch diameter may only be used if submitted with an engineered design for trench details for normal installation and for unstable trench conditions, stamped and signed by an engineer registered in the State of California and with prior written approval by the Engineer. Additional trench width shall also be provided in accordance with manufacturer's recommendations for installation in unstable conditions.

When placing flexible pipes in unstable trench locations, Contractor shall perform that work necessary to create a stable trench. All work shall conform to pipe manufacturer's recommendations, to ASTM D 2321, and the special provisions. At a minimum, vertical, stable trench walls shall be maintained to 12 inches above the top of the pipe and additional trench width shall be excavated, in accordance with pipe manufacturer's recommendations, to a point 12 inches above the top of

the pipe, and replaced with Type A clean crushed rock. Initial backfill shall be brought to uniformity on each side of the pipe to prevent distortion or displacement. Consolidation under pipe haunches shall be accomplished by shovel slicing or rodding to assure all voids are filled. Remaining initial backfill shall be placed in lifts and then consolidated with vibratory equipment to insure proper compaction.

e. Precast manhole bases

Where pre-cast manhole bases are used, Contractor shall install a flexible bell and spigot) joint a horizontal distance of 18-inches to 24-inches from the wall of the manhole.

f. Existing pipe

Existing pipe shall be removed at such places as shown on the Plans or as designated by the Engineer in accordance with Section 13 and the Special Provisions. All removed pipes or portions thereof shall be disposed of by Contractor.

g. Pipe laying, grade and alignment:

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—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 Contractor, grade and alignment controlled by a laser beam system which complies with OSHA requirements may be used. 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 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.

h. Moveable trench support:

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 (2½) 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.

i. Protecting existing sewers and drains:

Mortar or brick plugs shall be installed and maintained in existing manholes as directed by the Engineer in order to prevent surface water, ground water, and debris from entering existing sewer or drain systems during construction. Inflatable plugs will not be permitted. Care shall be

exercised in installing plugs to avoid interrupting service. Plugs shall be removed upon completion of testing as described in 26-10.

j. Installation procedures for HDPE solid wall pipe:

i. Handling:

Pipe, fittings, and accessories shall be carefully inspected before and after installation and those found defective shall be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings, and accessories shall be cleaned, and shall be maintained in a clean condition. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings or any other material be dropped or dumped into trenches.

ii. Joint welding:

Sections of polyethylene pipe shall be joined into continuous lengths on the job site above ground. The joining method shall be the thermal butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. Fusion equipment used in the joining procedure shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, fusion temperature, alignment, and fusion pressure.

Butt fusion shall conform to ASTM D 2657 and pipe manufacturer's criteria for the type of joining. Butt fusion joining shall be 100% efficient and shall provide a joint strength equal to or better than the tensile strength of the adjacent pipe.

Fusion equipment shall be operated only by technicians who have been certified by the pipe manufacturer, and who have a minimum of two (2) years of experience fusion welding pipelines of the diameters used in this project. The technician's experience shall be documented in the HDPE pipeline submittal.

iii. Installation of pipe:

All pipe shall be carefully placed and supported at the proper lines and grades and all pipe flanges shall be set level, plumb, and aligned. All flanged fittings shall be true and perpendicular to the axis of the pipe. All bolt holes in flanges shall straddle vertical centerline of pipes. Piping shall be installed without springing or

forcing the pipe in a manner which would set up stresses in the pipe, valves, or connected equipment.

26-6 CONNECTION TO EXISTING MAIN LINES

Connections to existing main lines via the "Sewer Main Disconnection/Reconnection" Detail in the plans shall be installed at the points shown on the Plans. All connections shall be installed perpendicular to the main unless otherwise shown on plans or approved by the Engineer. All connections to the existing sewer infrastructure shall be made carefully and connected using a coupler or approved equal fitting.

Connection shall be made via an inflatable pipe plug to stop sewage flows during time of construction. A temporary bypass will be required during the time of construction, contractor shall provide the plan for the City to review and approve.

The removal of the existing sewer manholes and pipe are accounted for in the demolition line item. The installation of the new manhole is accounted for under the 48" Sanitary Sewer Manhole line item. The installation of the new pipe from the existing is accounted for under the respective pipe size line item.

26-7 SEWER AND DRAIN SERVICES

Sewer services shall be installed at the points shown on the Plans. All sewer services shall be installed perpendicular to the main unless otherwise shown on the plans or approved by the Engineer. 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 placed 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 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.

26-8 DRAIN AND DITCH BOX LEADS

RCP or PVC ditch box leads and fittings shall be constructed to the details on the Plans, the Special Provisions and shall conform to Sections 10 and 14. Where noted on the plans, C900 class 100 PVC pipe shall be used.

All connections of drain leads to the maintenance holes not cast as part of the maintenance hole base shall be made by use of a coring machine. The annular space between the outside of the pipe and the maintenance hole shall be sealed by using a flexible annular space filler such as "Kor n' Seal Cavity O-Ring" by NPC Inc. or approved equal.

26-9 PIPE JOINTS

All pipes shall have elastomeric gasket joints providing a water tight seal. Joints in pipe shall conform to section 10-19of these Specifications.

26-10 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 sub-grade of the street, the pipe must be covered with a protective covering as shown on Drawing 7-25, of City of Colusa Improvement and Design Standards. The concrete used in making the covering shall conform to Portland Cement concrete Class “A”, as denoted in these Specifications. As an alternate, C900, C905, or ductile iron pipe with controlled density fill placed as shown in City of Colusa Improvement and Design Standards Drawing 7-25 may be used, as approved by the Engineer.

26-11 TESTING OF PIPE

After laying pipes, backfilling, trench compaction, and before placing any road base or asphalt, sewer and drainage pipelines shall be inspected and tested for obstructions and leakage, unless otherwise specified, as follows.

1. Test for obstructions

All lines or mains shall be cleaned by balling, and any obstructions or irregularities shall be removed or repaired by Contractor. All testing, cleaning and repairing shall be done to the satisfaction of the Engineer. Water used in cleaning shall not be permitted to enter existing sewer or drainage systems. Contractor shall provide all necessary labor, materials, tools and equipment for the tests and shall dispose of all waste, including water at their own expense.

2. Test for leakage

As directed by the Engineer, individual pipeline joints or any section of constructed pipeline shall be tested by the Contractor using the methods listed or described in (3) and (4) of this Section, or the pipe manufacturer's recommendations An exception to this requirement is HDPE solid wall pipe where only a hydrostatic test for leakage is required as recommended by the manufacturer. For sections of pipe between manholes, no leakage is acceptable for solid wall HDPE. Leakage testing must take place in the presence of the Engineer.

3. Air test for leakage

Air testing of joints for RCP pipelines 27 inches and larger in diameter shall follow ASTM C-1103.Pipeline sections 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.

Table 2610.1 - Minimum Time for Prescribed Pressure Drop

Pipe Diameter (inches)	Time Span (seconds)
4	122
6	184
8	245
10	306
12	367
15	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 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.

4. Hydrostatic test for leakage

Hydrostatic testing of RCP pipelines 27 inches and larger in diameter shall follow ASTM C-1103. Hydrostatic testing of pipeline sections 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 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 shall 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 shall 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 on the 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.

5. Testing for deflection

For all flexible sewer and drain pipes and fittings, the minimum pipe stiffness (F/Δy) at 5% deflection shall be 46 PSI in accordance with ASTM D 2412, "External Loading Properties of Plastic Pipe by Parallel-Plate Loading." A deflection test shall be made by 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 than 96 hours 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 Contractor's forces and performed at the expense of Contractor. One-hundred percent (100%) of all flexible sewer and drain pipe mainline installed shall be deflection tested for excessive deflection using a pre-sized, rigid mandrel or "Go-No-Go" device 5% smaller than the average inside diameter of the pipe as approved by the Engineer. Mandrel tests may be performed by the City after a 6 month period of time at which time a maximum deflection of 7½% from the base internal diameter, as specified in ASTM D 3034 and ASTM D 2680 for PVC or ABS gravity sewer pipe, respectively will be allowed. The mandrel used shall be the PHOS PVC Sewer Pipe Deflection Gauge or other deflection gauge approved by the Engineer.

The mandrel shall be drawn through the pipe using only the force that can be exerted by one individual on the end of a rope, using no mechanical advantage. Under no conditions shall the mandrel device be attached to the cleaning ball.

Pipe which does not pass all specified mandrel tests shall be replaced at Contractor's expense. Re-rounding or other attempts to reduce deflection beyond the allowable shall not be acceptable. All re-tests for deflection shall be made at the expense of Contractor.

6. Closed Circuit T.V. inspection

Unless otherwise directed by the Engineer, Contractor shall perform Closed Circuit TV (CCTV) camera inspections of all new installations of sewer, main lines. Comply with Section 26-12 requirements.

26-12 REPAVING 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. Before saw cutting the pavement, Contractor shall use a ferreting device or equivalent to determine the exact location of the existing pipes and mark them on the

pavement. 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 the edge of the trench is within two (2) feet of existing curb and gutter or pavement edge, the asphalt concrete pavement between the trench and the curb or pavement edge shall be removed and replaced.

Contractor shall restore all surfaces which have been removed or damaged by Contractor in kind, using the same material as existing, unless otherwise noted on the Plans or in the Special Provisions. The repaving is to be done in such a manner to, as closely as possible, replace the cut pavement with a similar type and an equal or greater structural section. 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.

1. Asphalt concrete replacement

The structural section shall be no less than four inches (4") of asphaltic concrete over twelve inches (12") of Class 2 aggregate base. Asphalt concrete shall be Type B, medium, and its placement shall conform to the requirements of Section 22 of these Technical Specifications. Class 2 aggregate base and its placement shall conform to the requirements of Sections 10-7 and 17.

2. Portland cement concrete replacement

Restoration of existing Portland cement concrete pavement shall consist of at least six (6) inches of Portland cement concrete and shall conform to the requirements of Sections 10 and 19. Concrete surfaces to be replaced shall be colorized, as necessary, to match existing adjacent concrete color by the addition of Lamp Black coloring agent. Contractor shall submit concrete mix design for approval including a proposed proportion of coloring agent appropriate to the shade of adjacent concrete. Where entire alley requires replacement, concrete shall not include coloring agent, unless directed by the Engineer.

3. Unpaved surfaces

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 D 1557.

26-13 PROCEDURES FOR CLOSED-CIRCUIT TELEVISON (CCTV) INSPECTIONS OF PIPING SYSTEMS

1. Standards

Unless otherwise directed or approved by the Engineer, CCTV recording performed for acceptance of new pipelines shall conform to the requirements herein. Submit, in accordance with Section 5-7 of these Technical Specifications, one (1) electronic copy of the CCTV video, database, and report on a portable electronic data storage device for approval.

2. Equipment

a. Camera

The camera shall record in color. The footage read-out shall appear on screen away from the central focus of the main. A target shall precede the camera for measuring sags and offsets (size of target shall be noted within the video and on the video label). Target sizes shall be as follows, unless otherwise specified or directed by the City:

TARGET SIZE	PIPE SIZE
¾ inch	≤ 12 inches
1 inch	>12 inches and ≤ 36 inches
2 inches	>36 inches

The focal distance shall be adjustable through a range from 6 inches to infinity. The camera shall be tractor driven with a rotating camera head suitably sized for each pipe diameter to be inspected.

b. Recorder

The recorder shall record in digital video format using MPEG-2 technology or shall be capable of being converted to an MPEG-2 (*.mpg file format) or the latest digital video format compatible with the City's applications without the loss of video quality.

c. Video Quality

The digital video recording shall be a high-resolution video of DVD quality with a minimum of 720 columns of pixels by 480 rows of lines (720x480) with a minimum refresh rate of 60 interlaced fields per second (60Hz or 30 frames per second) as established by the National Television System Committee (NTSC).

d. Lighting

There shall be sufficient lighting to produce a clear and sharp image of the entire inside periphery of the pipe for all conditions encountered during the work. Lighting is to be adjusted according to the size of pipe. In an eight-inch diameter pipe with joints at five-foot intervals, the lighting shall allow the camera to reveal not less than three consecutive joints, or up to ten feet of unobstructed pipe shall be visible in the monitor picture.

e. Locator

A locating device or other acceptable locating method shall be used to locate points of deficiencies on the ground, in green paint, or green flag.

3. Procedure

a. Timing

The Contractor shall notify the Construction Inspector two (2) working days prior to televising the mains to allow the Inspector the option of being on-site at time of televising.

The job is ready for CCTV inspection, only after compaction of street sub-grade and prior to placement of road base. The following must be completed before CCTV inspection:

i. All underground facilities, utility piping, conduits, and access structures are installed, backfilled, and trench backfill compacted.

ii. Final joint testing.

b. Schematic

The manholes shall be uniquely identified (e.g., location stationing, letter identifier, consecutive numbering, etc.) on a plan to be provided to the Inspector and the televised segments tied to the assigned manhole reference. Use existing City Mapbook manhole identifiers unless otherwise approved by City. The length of televised run shall be measured from pipe end to pipe end in one contiguous pipeline segment from manhole to manhole. Maximum allowable tolerance for the TV counter shall not exceed 1 foot in 1,000 feet for location accuracy.

c. Camera Run

The main shall be flushed cleaned prior to running the TV camera. TV runs shall not be performed during cleaning operations and shall provide a clear view of the interior of the pipe and manholes. The camera is to be placed in the main with the footage counter at zero (0) at the pipe end within the manhole. The camera is to travel at a speed not to exceed 30 feet per minute with slowdowns at joints and services. Inspect service connections with a rotating camera head. The picture shall be clear and bright enough to allow a photograph of a section to be made. The footage counter, date, and time shall appear on screen at all times, and show the upstream and downstream manhole line segments being televised. All service laterals shall be televised and recorded from point of service cleanout or manhole to City connection on City main or manhole tap.

d. Water Introduction

Prior to performing the TV on new construction, the Contractor must introduce enough water in the pipe segment(s) to fill all low sections and flow through the final downstream structure included within the pipe segment to be inspected. If any section of the pipe segment appears to be dry, additional water must be introduced as described above. The City Inspector will verify the adequacy of water and target size before the TV is performed. The TV must begin within 30 minutes of introducing water into the pipe segment.

e. Recording

The following items are to be recorded on the first 15 seconds of the recording:

i. Location, subdivision name and/or project name and number

ii. Date and time

iii. Upstream and downstream manhole identifier or stationing reference number associated with the project construction plans

iv. Company name, Operator's name and NASSCO's PACP Certification Number

v. Direction of travel (e.g.; against flow, with flow)

vi. Pipe size

vii. Pipe shape

viii. Pipe material

ix. Significant comments

A label shall be affixed to the portable electronic data storage device and jacket or envelope with the above information, start-end footage, and size of target.

Each televised segment shall be preceded by the following:

i. Location (MH to MH identifier or station reference number associated with the project construction plans)

ii. main size, type of pipe, pipe shape

iii. main slope and flow direction

iv. length of run (measured per asbuilt plans)

v. number of pipes entering MH and sizes

vi. number of service connections

The portable electronic data storage device shall be given to the City's Engineer or Construction Inspector and shall become the property of the City of Colusa upon completion of the televised inspection. The City reserves the right to reject any televised inspection not conforming to the requirements herein. Any televised inspection that is rejected shall be re-inspected at the Contractor's expense.

4. Acceptance Criteria

Maximum acceptable sag for sewer pipes is ¾ inch, unless otherwise specified in the Special Provisions and the Project Plans. All other criteria as set by the City Technical Specifications and the Contract Documents shall apply for both sewer and drain pipes. Within ten full working days from receipt of the digital video, database, and report, the Inspector shall review and either approve the main(s) or call for repairs. The Contractor is to be notified in writing of any deficiencies revealed by the television inspection that will require repair. If the Contractor is to make repairs and wishes to review the television inspection with the Inspector, the Contractor shall contact the Inspector to set a time for viewing. Upon completion of any repairs, the main is to be re-inspected.

5. Report

Perform and record all CCTV inspections in accordance with the National Association of Sewer Service Companies' (NASSCO's) Pipeline Assessment

Certification Program (PACP). CCTV inspections shall be conducted entirely in digital video format compatible with Granite XP software (version 7, Granite Net or City's most current version), recorded in accordance with section 26-12, 2.b., and stored on a portable electronic data storage device.

CCTV inspection reports shall be accurate to within +/- 2 (two) feet or less of the total measured footage along the pipe from upstream end of the pipe to the downstream end of the pipe or vice versa.

Every section of the pipe (access point to access point) shall be identified on the video display in accordance with section 26-12, 3.d. In addition to inspecting the pipe, all manholes shall be panned with the CCTV camera.

Documentation of the work shall consist of digital video recordings, the PACP CCTV Report(s), and the unmodified PACP database. The database shall contain PACP scoring for each inspection observation or defect. The documentation shall note important features and any defects encountered. One copy of the digital video recording, inspection observation database, and report (one printed copy & one digital copy) shall be submitted to the City on a portable electronic data storage device for approval. With the submission, it shall also include the CCTV Inspection video **form** (attached to the end of this Section 26) filled with required information.

26-14 PAYMENT FOR SEWER AND DRAIN PIPE

Payment for sewer and drain pipe will be at a price bid per lineal foot which will include full compensation for pavement cutting and removal, excavation, trenching, shoring, dewatering, removal and disposal of existing pipe, bedding, furnishing and laying of pipe, initial backfill, trench backfill, manhole connections, temporary paving, and all other work necessary to construct the sewer or drain pipe 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 the centerline of manhole to centerline of manhole and shall include the straight run of all tees where used.

Payment for clean crushed rock or bedding material provided for use shall be considered as included in the price paid for laying pipe, unless otherwise indicated in the Special Provisions.

Payment for concrete or control density fill used as protective covering shall be included in the price bid for installation of the pipe in place, unless otherwise set forth in the Special Provisions.

Where 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 tee 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 for testing and inspecting the pipe shall be included in the price bid for the pipe in place.

The cost of removing and replacing pavement over trenches shall be included in the price bid for installation of the pipe in place, unless otherwise set forth in the Special Provisions. Final paving quantities are included in other bid items.

Payment for Sewer main disconnection/reconnection will be paid for at the contract unit price bid of each which will include full compensation for pavement cutting and removal, excavation, trenching, shoring, dewatering, removal and disposal of existing pipe, connection fittings, bypass plan, bedding, laying of pipe, initial backfill, trench backfill, manhole connections, temporary paving, and all other work necessary to construct the sewer or drain pipe complete in place as shown on the Plans.

CCTV Inspections of Pipe Systems *(☐ Submission for Sewer or ☐ Storm Drain)* ***Insp Form 020***

********* Manhole Inspection is not Included *********

This submission is submitted by, Name:_____; Tel:_____Dept:_____; Date:_____
This submission is received by, Name:_____; Tel:_____ Dept:_____; Date: _____

Project ID:_____, ☐ CPC or ☐ RPC; Project Name:_____(Phase____)
Developer, Name: _____
TV Operator: Name:_____, Tel: _____
NASSCO Cert #:_____or ☐ Not Certified
Remarks: _____

****

The submitted items: 1) ☐ DVD video; ☐ Flash drive; ☐ Others: _____
2) ☐ NASSCO, PACP Report

****

-- Inspection Section ---

Type of Tests/Inspections ***required to be done Before*** *CCTV Inspections Submission*

Sewer Collection System
(√ those have been tested & passed)

☐ Mains, test type: _____
☐ MH, test type: _____
The above information has been verified and
Approved by, Name : _____
Signed:_____Date:_____
Tel: _____
☐ Result, attached; ☐ No attachment
Remarks: _____

Storm Drain Collection System
(√ those have been tested & passed)

☐ Mains, test type: _____
☐ MH, test type: _____
The above information has been verified and
Approved by, Name : _____
Signed:_____Date:_____
Tel:_____
☐ Result, attached; ☐ No attachment
Remarks: _____

Compaction Tested & passed, Approved by, Name:_____, Tel: _____
☐ Result, attached; Signed:_____, Date: _____
Remarks: _____

****

CCTV Examiner, Name:_____; Tel:_____; Date: _____
Approved, Sign:_____; Date: _____
Approved with Comments: _____

Reject this submission, By:_____Date: _____
Rejection because of: 1) ☐ The said inspection section has not been completed;
2) ☐ NSAACO, PACP: Main Inspection with Pipe-Run Graph Report is incomplete;
3) ☐ NSAACO, PACP: Observation Report is incomplete;
4) ☐ TV the pipe line partial, not from MH to MH;
5) ☐ The plug for stub is not wing nut or equivalent device
6) ☐ Exceed the maximum acceptable sag for: ☐ Sewer, ¾"; ☐ Storm Drain, ___

Additional Comments:_____; _____
:_____; _____

----- After the approval of this TV inspection, please call for the project final walkthrough! -----

Section 27

WATER DISTRIBUTION, RECYCLED WATER AND SEWER FORCE MAIN SYSTEMS

27-1 GENERAL

All water and pressure pipe, fittings, valves, fire hydrants, blow-offs, air release valves and other appurtenances shall be installed in accordance with the requirements of the project Plans and Special Provisions, these Technical Specifications, the American Water Works Association (AWWA), ANSI-61, the City's Cross Connection Control Policy, and the manufacturer's recommendations. Materials shall be as specified in Section 10 "Construction Materials" of these Technical Specifications.

During construction, **Contractor shall not operate any valves in the City's distribution system** and must request that City Utilities Department Personnel operate them. Contractor shall request the Engineer to notify the City Utility Department Personnel as specified in Section 27-11 of these Technical Specifications.

27-2 WATER AND PRESSURE PIPE

1. General - All pipes shall be designed to withstand the external earth load and the AASHTO H-20 vehicle live load. The pipe shall also be designed to withstand an internal working pressure of one hundred and fifty pounds per square inch (150 psi). Recycled Water pipe shall be of the color purple.

2. Water Services - Pipe used for services two inches (2") in diameter or less shall be copper or polyethylene tubing as specified in Section 10 of these Technical Specifications. Pipe used for water services four inches (4") in diameter or large shall be the same as specified for distribution mains.

Polyethylene services shall be a single piece of tubing (no joints allowed including butt welds) and shall have a locating wire attached with ten (10) mil tape at three foot (3') spacing. The minimum allowable radius shall be thirty (30) times the tubing diameter.

3. Distribution Mains (4" to 12") – Unless otherwise specified on the Plans or Special Provisions, water mains four inches (4") through twelve inches (12") diameter in water distribution systems shall be made of ductile iron pipe (DIP),

or polyvinyl chloride pipe (PVC) meeting the applicable requirements of Section 10 of these Technical Specifications.

27-3 TRENCHING FOR WATER AND PRESSURE PIPE

Trenches for pipe shall be as specified herein unless otherwise indicated on the Plans or in the Special Provisions.

Prior to cutting pavement Contractor shall notify Underground Service Alert (USA) per Section 6-19 of these Technical Specifications and shall bring to the Engineer's attention any possible conflicts.

Existing pavement to be removed shall be saw cut the full depth to provide a neat straight pavement break along both sides of the pipe trench as shown on Standard Drawing 4-20. Contractor shall perform the pavement cutting operation by saw cutting.

Trenches for pipe shall be excavated to the lines and grades indicated on the Plans and as detailed by Standard Drawing 4-20 in City of Colusa Improvement and Design Standards. Contractor shall furnish, install, and maintain a trench shoring system in compliance with Section 6-8 of these Technical Specifications.

Pressure distribution pipe shall be installed at 42" minimum from existing ground surface.

In order to avoid conflicts with other utilities, particularly at street intersections, it may be necessary to deviate from the above-specified minimum and maximum cover requirements. At locations where the crossing of water mains with other underground utilities results in grade conflicts, adjustment to the vertical alignment of the water main may be required. Adjustments over or under the conflicting utility line shall be made as detailed in Standard Drawing 8-5 in City of Colusa Improvement and Design Standards. The cost to make these adjustments shall be included in the bid price to install the pipe when the conflicts are shown on the Plans.

In designing the distribution system, it was intended that ten feet (10') be the minimum horizontal distance between parallel water and sanitary sewer lines and services, and that the water main be at least twelve inches (12") higher. No field changes shall be made that conflict with the requirement without prior approval of the Engineer. When crossing a sanitary sewer force main, the water main shall be a minimum of three feet (3') above the sewer line and no fittings within ten feet (10') of the crossing.

The bottom of the excavated trench shall be cleared of rocks and clay lumps larger than two inches (2") in size. All grade stakes, wood, cut and

abandoned pipe, or other material shall be removed from the trench. The bottom of the trench shall be smoothed and compacted to provide uniform support of the pipe between the joints. The bottom of the trench shall be compacted to a minimum of ninety percent (90%) of maximum dry density as determined by ASTM Test Designation D698.

Whenever the bottom of the trench is soft or rocky, or, in the opinion of the Engineer, otherwise unsuitable as a foundation for pipe bedding, the unsuitable material shall be removed per Section 14-8 of these Technical Specifications.

Unsuitable material encountered during excavation of the trench shall be excavated and disposed of as directed by the Engineer. Contractor shall excavate unsuitable material and the resulting space shall be filled per Section 14-8 of these Technical Specifications.

At the end of each working day, the maximum amount of trench open on any portion of the project shall not exceed the length of open trench necessary for placing pipe the next working day. This open trench shall be bridged. Open trench exceeding the length necessary for placing the pipe the next day shall be backfilled, compacted, and temporarily paved. Within the traveled way in a direction crossing traffic flow, the open trench shall either be bridged or shall be backfilled, compacted, and temporarily repaved. Temporary paving shall be installed in accordance with the requirements of Section 14-4 of these Technical Specifications.

Unless directed or indicated otherwise, plug or seal the ends of existing pipes cut to install new pipe. As a minimum, provide temporary end covers to prevent dirt from entering pipes that are to be reconnected. The cut ends of abandoned pipes made of plastic, clay, Transite, concrete, or similar materials shall be permanently sealed with a concrete plug extending at least two feet (2') into the cut pipe. Use Class "C" or Class "D" concrete per Technical Specifications Section 10-5. Cut ends of abandoned steel pipes may either be plugged with concrete as above, or sealed by welding quarter inch (¼") thick steel plates onto each end. Cut ends of abandoned pipe that will be removed do not require permanent seals.

When active pressure mains must be cut, Contractor shall anticipate that existing system valves do not seal drip tight, and thus pipes downstream of existing valves may become pressurized. Seal the cut ends of active mains with watertight 150 psi pressure rated end caps suitable for potable water use. Pressure rated end caps shall be left in-place until the cut pipe is restored, or the Engineer determines that the cut pipe is fully isolated and thus is no longer an active main. If end caps are removed from mains to be abandoned, plug the exposed ends as described above.

Contractor shall be responsible for the control, removal, and disposal of

any groundwater that may be encountered in the course of excavating and backfilling trenches or placing pipe. Whenever water or over-saturated soil conditions exist which may interfere with proper installation, trenches shall be dewatered before placement of any pipe or material. Unless approved in writing by the Engineer, groundwater and/or water from trench dewatering shall be free of sediment and other construction materials before entering the City storm drain system. A dewatering plan, including a water de-sedimentation plan, shall comply with Section 16-1 of these Technical Specifications and be approved by the Engineer prior to any discharge of water to the City's storm drain system.

27-4 LAYING WATER AND PRESSURE PIPES

1. General

Contractor shall take all appropriate measures to prevent any type of foreign material or animals from entering the pipe while the pipe is being placed. Contractor shall clean the inside of the pipe as directed by the Engineer.

Pipe for shall not be placed during inclement weather or when the conditions in the trench will interfere with proper jointing of the pipe as determined by the Engineer. Whenever the work of placing the pipe is discontinued and at the end of each workday, all open ends of pipe, fittings and valves at the pipe end shall be sealed. The seal shall be water tight and shall be easily installed and removed. The trench shall be temporarily backfilled to completely cover the seal.

All metallic pipe and fittings shall be wrapped with eight (8) mil polyethylene material in accordance with AWWA Standard C105/A21.5. Polyethylene shall be installed in accordance with the requirements of Section 27-17 "Corrosion Monitoring" in these Technical Specifications.

Pipe for the project shall not be stockpiled within public street right-of-way along the alignment of the pipe in excess of an amount representing a five (5) day supply at current rates of pipe laying, and shall never exceed a maximum length of five hundred feet (500') unless otherwise indicated in the Special Provisions. Stockpiling of pipe on the opposite side of the street from construction shall not be allowed without the approval of the Engineer.

Each section of pipe and each fitting shall be thoroughly cleaned before it is installed. All pipes, valves, fittings, and appurtenances shall be lowered into the trench in such a manner as to prevent any damage, particularly to the pipe lining and coating. Under no circumstance shall pipe or appurtenances be dropped into the trench.

The pipe shall be laid true and uniform to line and grade, with no visible change in alignment at any joint unless a curved alignment is shown on the Plans,

in which case the maximum deflection at any joint shall not exceed two-thirds (⅔) the manufacturer's recommendation for the type of pipe and joint being used.

All pipe jointing, including the deflection at joints in curved alignments, shall be in accord with accepted best practice and as detailed herein and in the manufacturer's installation manual. Both joint surfaces shall be clean before joints are made. Materials used to join the pipe shall only be that furnished with the pipe or recommended by the manufacturer.

When field cutting pipe, the cut ends shall be cut square and all burrs removed from the pipe interior. The beveling of the pipe ends shall be as specified by the manufacturer. Guide marks for jointing the pipe, after cutting, shall be made on the pipe in accordance with the manufacturer's recommendations.

Contractor shall prevent undue pipe deflection and/or unit loading during pipe handling. Damage to the pipe lining or coating shall be repaired by Contractor in accordance with the manufacture's recommendations as directed by the Engineer

2. Rubber Gasket Joints

The joining of lengths of pipe with rubber gasket joints shall be performed in the following sequence and in accordance with the pipe manufacturer's recommendations:

a. The spigot groove, inside bell sealing surface and rubber O-ring gasket shall be thoroughly cleaned.

b. The above-cleaned surfaces shall be thoroughly lubricated with a soft, vegetable soap compound.

c. The gasket shall be uniformly stretched while placing it in the spigot groove to assure a consistent volume of rubber distributed uniformly around the circumference.

d. The pipe shall be joined by a firm horizontal push without binding.

e. A feeler gauge shall be inserted between the bell and spigot to check the position of the rubber gasket around its periphery. If the gasket is in an improper position, it shall be removed, inspected, reassembled, and rechecked.

3. Cleanup-Up Behind Pipe Laying Operations

Contractor shall maintain cleanup operations in pace with pipe laying. Concurrently with or immediately after placing a temporary bituminous surface within paved areas, or the placing of backfill in unpaved locations, all areas affected by Contractor's operations shall be restored to their original conditions (except for final repaved surfacing) and left in a neat and orderly condition.

Paved areas shall be swept with a power broom and then flushed with water.

Excavations at locations of valves, blow-offs, air relief valves, and tie-in connections shall not be left open without the Engineer's written permission.

Replacement of removed improvements or repairs to damaged or disturbed real property or improvements shall be performed concurrently with the cleanup work.

Failure to perform the above work in pace with the forward trenching progress shall be sufficient cause for the Engineer to order Contractor to stop trenching until the Engineer has determined that the work has been caught up.

27-5 PLACING LOCATING WIRE WITH DISTRIBUTION MAINS

All runs of pipes (4" to 12") including metal and plastic shall have a locating wire taped to the top of the pipe to facilitate location after installation, as shown on Standard Drawing 8-1 in City of Colusa Improvement and Design Standards. The locating wire shall be a No. 10 gauge copper wire insulated with high molecular weight polyethylene (HMWPE), blue in color for water, purple in color for recycled water main and green in color for sewer force main, and suitable for direct burial.

27-6 THRUST BLOCKING AND RESTRAINED JOINTS

1. Pipes (4"-12")

All plugs, caps, tees, or bends with a deflection greater than eleven and a quarter degrees (11¼°) shall be provided with concrete thrust blocks installed as detailed on Standard Drawing 8-2. Nuts or bolt heads of bolted connections shall not be covered by concrete or form materials. The thrust block shall extend from the fitting to undisturbed soil.

Deadman thrust assemblies shall not be allowed without prior approval from the Engineer.

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 APPURTENANCES

1. General

Appurtenances shall comply with the material requirements of Section 10 of these Technical Specifications and shall be installed per the manufacture's recommendations. All new valves and hydrants to open counter-clockwise.

Appurtenances shall be installed at elevations and locations as shown on the Plans. The joints between the main pipe and side fittings shall be restrained in compliance with the Plans, Special Provisions, and these Technical Specifications. The trench bottom shall be graded uniformly to provide a level base for the fittings and minimize torsional strain when the backfill is placed.

Polyethylene material with a minimum thickness of eight (8) mil shall be placed around the exterior of the appurtenances in accordance with AWWA Standard C105/A21.5. Polyethylene shall be installed in accordance with the requirements of Section 27-17, "Corrosion Monitoring".

2. Gate Valves

All gate valves shall be restrained in both directions.

Value operating nut extensions are required in accordance with Standard Drawing 8-19 in City of Colusa Improvement and Design Standards when valve nut is in excess of thirty inches (30") below finished grade.

Contractor shall carefully place valve into position, avoiding contact or impact with other equipment, or trench walls. The pipe ends shall be prepared in accordance with the manufacturer's instructions. The water main shall be properly supported to avoid line stress on valve. The pipe/valve joint shall not be deflected nor shall the valve be used as a jack to pull the pipe into alignment.

3. Backflow Prevention Assemblies and Swing Check Valves

The City maintains a backflow prevention and cross-connection control program in accordance with the requirements of Title 17 of the California Administrative Code. Backflow prevention assemblies shall be installed in accordance with the appropriate Standard Drawings in City of Colusa Improvement and Design Standards (Drawing Numbers 8-27 thru 8-37 and 8-34 thru 8-39). The backflow prevention assembly must be installed such that the device is readily accessible for testing and maintenance, and shall be located as close as practical to the point of service delivery (meter).

The City of Colusa Department of Utilities maintains a list of approved assemblies. Only assemblies that appear on this list are acceptable for installation. Assemblies shall be shipped from the manufacturers in the fully assembled configuration. This includes bypass arrangements and shutoff valves. Assemblies received for installation not completely assembled are not approved. Field conversions of double check assemblies to a detector assembly, or vice versa, are not permitted.

The City of Colusa's requirements for designing, constructing, installing, and maintaining backflow prevention assemblies is found in the Cross Connection Control Policy of Department of Utilities. Copies of the "Cross Connection Control Policy" are available from the Department of Utilities Customer Service at 1395 35th Avenue. Following acceptance of the installation, the device must be performance tested at the owner's expense by a certified tester selected from the City approved list.

All assemblies shall be installed to provide protection from vandalism and freezing. Cages must be installed so that adequate clearance is available for maintenance and testing or it should be completely removable and allow for any discharge from the relief valve to fully drain from the protective cage or cover.

As a minimum, backflow prevention assemblies shall be sized equivalent to the diameter of the service connection. The installation of backflow prevention assemblies shall be aboveground.

4. Blow-Offs

a. Distribution Mains

Standard two inch (2") and four inch (4") blow-offs shall conform to and be installed in accordance with Standard Drawing 8-13 in City of Colusa Improvement and Design Standards.

5. Combination Air Vacuum and Release Valves

Combination air vacuum and release valves shall be two inches (2") or four inches (4") in size, as indicated on the Plans. Installation of air vacuum and release valves shall conform to and be installed in accordance with Standard Drawings 8-43 thru 8-48 in City of Colusa Improvement and Design Standards.

6. Flexible Couplings and Flanged Coupling Adaptors

a. Distribution Mains:

Flexible couplings shall be installed with provisions for thrust restraint.

7. Mechanical Joints

Contractor shall thoroughly clean socket and plain end of all rust or foreign material. The socket, gasket and plain end shall be lubricated with soapy water or an approved pipe lubricant meeting requirements of AWWA C111. The bolts shall be tightened to draw gland toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the joint using torque-measuring wrenches.

8. Valve Boxes

Valve boxes shall be furnished and installed in accordance with Standard Drawings 8-15, 8-16, and 8-17 in City of Colusa Improvement and Design Standards.

9. Access Manholes

Installation of access manholes shall conform to and be installed in accordance with Section 25 and Standard Drawing 8-40 in City of Colusa Improvement and Design Standards.

27-8 PIPE BEDDING AND BACKFILLING OF TRENCHES

Pipe bedding and initial backfill for pipe, and services shall be furnished and placed according to the requirements contained herein and as detailed on Standard Drawing 4-20 in City of Colusa Improvement and Design Standards. The pipe bedding and initial backfill material shall consist of sand meeting the requirements as given in Section 10-13 of these Technical Specifications unless otherwise specified in the Special Provisions.

Bedding material shall be placed and compacted along the bottom of the trench to provide uniform support for the pipe at every point between the joints. Support of the pipe by wedging or blocking shall not be permitted. At the location of each joint, holes of adequate size shall be provided in the bottom and sides of the trench to permit easy joint preparation, pipe assembly, and visual inspection of the entire joint.

Initial backfill shall be placed immediately after pipe joints have been completed, inspected, and passed by the Engineer. Trench backfill shall be earth material, unless otherwise specified in the Special Provisions, placed and compacted above the granular bedding and initial backfill material to the level of the subgrade in paved areas or to the top of the trench in unpaved areas. Backfill shall be provided by Contractor and shall be placed in accordance with Section 14-3 of these Technical Specifications and the pipe manufacturer's

recommendations.

Imported granular material may be used to backfill pipe trenches in place of job excavated native 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 Technical Specifications. Compaction and placement requirements for imported granular material shall be the same as required for compaction of job excavated native material.

Full depth select or imported backfill will be required under the following circumstances:

1. At locations where over excavation is required, i.e., butterfly valves, blow-offs, system tie-in connections, insulated joints, etc.

2. At locations where pipes for sewage or drainage cross above the water transmission main pipe.

3. In areas where the trench section is of unusual configuration.

4. Jacking and receiving pits for the boring and jacking of pipe casings.

Full depth select backfill shall be placed in layers not exceeding eight inches (8") in depth and shall extend to the level of subgrade road subbase and to undisturbed earth on the sides. Compaction and placement requirements for full depth select backfill shall be the same as required for compaction of job excavated native material. Unless otherwise specified on the Plans or Special Provisions, full depth select backfill material shall consist of sand, Class 2 aggregate base or controlled density fill (CDF) meeting the requirements of Section 10 of these Technical Specifications.

27-9 REPAVING TRENCHES

Repaving of trenches for mains and water services shall be as specified in this Section of these Technical Specifications unless otherwise indicated on the Plans or in the Special Provisions

Contractor shall restore all surfaces, which have been removed or damaged by Contractor in kind, using the same material as existing, unless otherwise noted on the Plans or in the Special Provisions. The repaving is to be done in such a manner to, as closely as possible, replace the cut pavement with a similar type and an equal or greater structural section.

Upon completion of trench backfill, existing pavement as well as any curbs, gutters and sidewalks that have been cut or damaged as a result of the

construction activities shall be replaced. The replacement of pavement, curb, gutter or other improvements shall match that of the original as close as practical unless otherwise indicated on the Plans. Segments of pavement that were damaged during construction shall be cut to a neat straight line. To form the required "T" trench, the existing pavement shall be ground or saw cut an additional six inches (6") outside the excavated area prior to paving. The minimum pavement section within public street right-of-way shall be four inches (4") of asphaltic concrete over twelve inches (12") of Class 2 aggregate base unless otherwise noted on the Plans or in the Special Provisions.

Aggregate base for repair and/or replacement of existing pavement shall meet the requirements for Class 2 aggregate base as contained in Section 10 of these Technical Specifications. Aggregate base shall be placed and compacted in accordance with Section 14 of these Technical Specifications, except that it shall be compacted to a relative compaction of not less than ninety-five percent (95%) as measured by tests specified in Section 14 of these Technical Specifications.

Asphaltic concrete pavement and its placement shall conform to the requirements of Section 22 of these Technical Specifications.

Restoration of existing concrete pavement shall consist of at least six inches (6") of concrete and shall conform to the requirements of Section 19. Concrete surfaces to be replaced shall be colorized, as necessary, to match existing adjacent concrete color by the addition of Lamp Black coloring agent. Contractor shall submit concrete mix design for approval including a proposed proportion of coloring agent appropriate to the shade of adjacent concrete.

Where entire alley requires replacement, concrete shall not include coloring agent, unless directed by the Engineer.

Concrete used in the repair and/or replacement of curb, gutter, or sidewalk shall conform to Section 24-1 of these Technical Specifications. Concrete used in the replacement of existing concrete "V" gutter or pavement shall be Class "A" concrete in accordance with Section 10 of these Technical Specifications. Placement of concrete shall conform to the requirements of Section 24 of these Technical Specifications.

Where less than two feet (2') of existing pavement is left between the edge of the trench and the lip of concrete gutter or pavement edge, the narrow strip of existing pavement shall be removed and the area repaved along with the area overlying the trench. All existing asphaltic concrete or concrete pavement adjacent to the pipe trench that has been loosened, cracked, or damaged as a result of Contractor's operations shall be removed and replaced.

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 of these Specifications and compacted to ninety-five percent (95%) relative compaction as determined by ASTM Designation D1557.

All pavement debris and other excavated material not destined to be used for backfill shall be removed and disposed of outside the limits of the project at Contractor's expense.

27-10 SERVICES

Materials for services shall meet the requirements specified in Section 10 and shall be installed in accordance with the Standard Drawings. All new and reconnected services shall be metered.

The location of 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.

Service saddles for one inch (1"), one and a half inch (1½") and two inch (2") services shall be installed in accordance with Standard Drawing 8-23 in City of Colusa Improvement and Design Standards. Three inch (3") services are not allowed. A three inch (3") meter shall be installed on a four inch (4") tap. Tapping sleeves for services four inch (4") and larger shall have a stainless steel sleeve and stainless steel flange.

Gate valves for water services four inches (2") and larger in diameter shall be installed at the main with a flanged connection and shall include a valve box and riser. Boxes and risers shall be as specified in and installed in accordance with Standard Drawing 8-15 in City of Colusa Improvement and Design Standards.

No hydrant branch lead, services or fitting (tee, ell, etc.) shall be tapped to accommodate any service.

27-11 TAPS TO NEW AND EXISTING MAINS

Prior to scheduling taps on new or existing water mains, Contractor shall provide the Engineer a copy of a bacteriological report showing that all piping including on-site fire services, private fire hydrants, and domestic services meet the requirements of these Technical Specifications.

Water taps on new mains prior to being accepted by the City shall be made by Contractor. Water taps on existing City mains shall only be made by City crews at Contractor’s expense.

For any given project, a maximum of two (2) main shutdowns, main tie-in connections (tap or “cut-in”), or combination thereof directly involving work by the City crews, shall be scheduled per day. Such work performed by City crews

will be between 9:00 am and 3:00 pm. Modification to this procedure may be requested by Contractor and will be considered on a case- by-case basis with the final determination to be made by the Engineer.

Contractor shall notify the Engineer that a shutdown is required and the City will schedule the shutdown within five (5) working days of notification. The Engineer will notify Contractor of the time of shutdown at least two (2) working days prior to the shutdown. Contractor shall excavate around the main, per Standard Drawing 8-24, twenty-four (24) hours prior to the City tapping the main.

Any change made to the vertical and horizontal alignment of water services shall be made behind the sidewalk and outside the City right-of-way. Within the City right-of-way the water services shall be installed perpendicular to the main.

27-12 PRESSURE TESTING INSTALLATIONS

Prior to making final tie-in connections, the entire system shall be pressure tested by Contractor independent of the existing system or systems to be connected.

Contractor shall furnish all hoses, pumps, pressure gauges, leakage measuring devices, connections, relief valves, temporary pressure heads, other necessary apparatus, and personnel required for hydrostatic pressure and leakage testing. Pressure gauges shall register pressure in pounds per square inch gauge (psig). The range of the gauge shall be from zero to two hundred and seventy-five pounds per square inch gauge (0-275 psig). The gauge readings shall have a five (5) psig incremental tick marks. The gauge shall be calibrated within forty-five (45) days of the hydrostatic test and the calibration tag affixed to the gauge.

In no case shall there be placement of permanent pavement prior to successful completion of the test. Joints and fittings must be backfilled to the springline of the pipe and the pipe between joints backfilled to a depth necessary to hold the line securely during the test, but in no case less than eighteen inches (18") above pipe. Thrust blocks shall have been in place for at least thirty-six (36) hours if high-early-strength concrete was used or at least seven (7) days if standard concrete was utilized.

A hydrostatic test pressure of one hundred fifty pounds per square inch gauge (150 psig) shall be maintained for 60 minutes. The allowable leakage criterion is "zero". No leakage, as represented by a measurable drop in pressure below the starting test pressure, is allowed.

Contractor shall determine the cause of unacceptable leakage results, take corrective measures, and conduct subsequent tests until the pipeline meets the allowable leakage criteria. Contractor shall perform any excavation required

to locate and repair leaks or other defects that may develop during the test, including removing backfill that has been already placed. The Engineer shall witness the test and Contractor shall provide the Engineer a forty-eight (48) hour notice prior to the test.

Contractor at his expense shall repair any leaks detected by visual inspection regardless whether test results are acceptable.

Contractor shall take all necessary precautions to prevent joints from drawing while the pipelines and their appurtenances are being tested. Any damage to the pipes and their appurtenances, or any other structures, resulting from or caused by these tests, shall be repaired by Contractor at Contractor's expense.

27-13 "CUT-IN" CONNECTION TO EXISTING MAINS

Connection of new mains to existing mains shall be made only after the newly constructed mains have been successfully disinfected and pressure tested including onsite fire systems and domestic services.

Contractor shall furnish and install all pipe, fittings, and valve boxes necessary to complete the "cut-in" as shown on Standard Drawing 8-4 in City of Colusa Improvement and Design Standards.

City crews shall perform all shutdowns of existing mains. See Section 27-11 for water main shut down procedure.

Contractor shall expose the existing main at the "cut-in" locations per Standard Drawing 8-24 and shall have all material necessary to complete work onsite at least one day prior to the scheduled "cut-in" to the satisfaction of the Engineer. Contractor shall have all necessary manpower and equipment ready at the time of the scheduled "cut-in" necessary to be able to complete the "cut-in" within four (4) hours of the shutdown to the satisfaction of the Engineer. Failure to comply with above-specified requirements shall result in the cancellation of the scheduled shutdown.

New pipe, fittings and valves required for connection but not included in the hydrostatic pressure testing and disinfection procedures shall be disinfected prior to connection in accordance with AWWA Standard C651 relating to "Connections Equal To or Less Than One Pipe Length".

In the connection of new mains to existing mains, any offset in horizontal or vertical alignment between the exposed ends of new and existing pipes that is six inches (6") or greater shall be taken up by the use of elbow fittings. Ninety degree (90°) elbows shall be used only with the Engineer's approval. Deflection of the pipe joints or the use of flexible couplings shall not be permitted.

A temporary bypass will be required during the time of construction; contractor shall provide the plan for the City to review and approve.

27-14 SETTING, ADJUSTING AND LOCATING VALVE BOXES

For all new valves installed, Contractor shall furnish and install valve boxes, covers, drop caps, and steel risers in accordance with Standard Drawings and 8-16 in City of Colusa Improvement and Design Standards. For Recycled Water Main valve boxes, on the cover, it shall indicate "Recycled Water" with a purple rise pipe.

Unless otherwise shown on the Plans, or specified in the Special Provisions, in construction areas involving elevation changes or where existing valve boxes or risers are disturbed, or as indicated on the Plans, Contractor shall furnish and adjust to final grade all existing valve boxes in accordance with Standard Drawings 8-15, 8-16 and 8-17 in City of Colusa Improvement and Design Standards. All non-steel risers shall be replaced with steel risers in accordance with Standard Drawings 8-15 and 8-17 in City of Colusa Improvement and Design Standards. When approved by the Engineer, Contractor may reuse existing valve boxes that meet these Standards Specifications and are in an undamaged condition.

All water valve boxes removed for subsequent reinstallation to allow reconstruction of existing streets shall be temporarily replaced with a protective metal container. The temporary container shall cover the riser over the valve and will assist in keeping the location of the valve 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 Contractor shall 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.

27-15 ADJUSTING AIR RELEASE VALVES

Contractor shall install new or adjust existing air valve box or manhole head and cover in accordance with Standard Drawing 8-43 thru 8-46 in City of Colusa Improvement and Design Standards.

All precast concrete sections used to construct the vaults or manholes for air release valves shall be set in Portland Cement mortar or preformed plastic sealing compound. The preformed plastic sealing compound and the mixing of the mortar shall meet the requirements specified in Section 10-37 of these Technical Specifications.

The interior and exterior surfaces of the joints of the precast concrete sections shall be coated with Portland Cement mortar. The precast sections shall

be cleaned and moistened immediately prior to setting the sections in the mortar. A moistened brush shall be used to apply and smooth the mortar to the interior and exterior joint surfaces of the precast concrete sections.

27-16 PAYMENT FOR FURNISHING AND INSTALLING WATER DISTRIBUTION, RECYCLED WATER AND SEWER FORCE MAIN SYSTEMS

Payment for sewer force main, recycled water force main and water line, will be at a price bid per lineal foot which will include full compensation for furnishing all labor, material, tools, and equipment and doing all work involved in cutting, trenching, laying, blocking, making connections, testing, backfilling, and paving or repaving, as required herein, on the Plans or in the Special Provisions.

Payment for concrete or control density fill used as protective covering shall be included in the price bid for installation of the pipe in place, unless otherwise set forth in the Special Provisions.

Placing of valves (gate and air release) will be paid for at the contract unit price bid per valve, which price shall include full compensation for furnishing all labor, material, tools, and equipment and doing all work involved in cutting, trenching, laying, blocking, making connections, testing, backfilling, and paving or repaving, as required herein, on the Plans or in the Special Provisions.

The cost for testing and inspecting the pipe shall be included in the price bid for the pipe in place.

The cost of removing and replacing pavement over trenches shall be included in the price bid for installation of the pipe in place, unless otherwise set forth in the Special Provisions. Final paving quantities are included in other bid items.

Payment for connection to existing force main will be paid for at the contract unit price of each, which will include full compensation for furnishing all labor, material, tools, and equipment and doing all work involved in cutting, trenching, laying, blocking, bypass plan, making connections, testing, backfilling, and paving or repaving, as required herein, on the Plans or in the Special Provisions.

Section 28

DRIVEWAY CULVERT AND SIDEWALK FRENCH DRAINS

Section 29

MOVING OR CHANGING UTILITIES AND WATER SERVICES

Section 30

DRAIN INLETS, GUTTER DRAINS AND DITCH BOXES

30-1 DRAIN INLETS

Drain inlets shall conform to Sections 10 and Standard Drawings 9-2, 9-3, 9-4, 9-5, and 9-11 of City of Colusa Improvement and Design Standards. Drain inlets shall be pre-cast or cast in place or a combination of the two. Hand forming of concrete will not be allowed. For cast in place drain inlets, maximum wall thickness shall be 8 inches. Concrete shall be Type A or B in Accordance with Section 10 of these Specification.

30-2 DRAIN INLET GRATE AND HOOD

The grate shall conform to drawings included in City of Colusa Improvement and Design Standards. Joints and connections between grate frame, hood and vertical walls of drain inlet shall be smooth and continuous, with a slight broom finish or equivalent. If steel, surfaces shall be covered with an asphaltic paint.

30-3 GUTTER DRAINS

Gutter drains shall conform to Standard Drawings 9-6, 9-7, 9-8, 9-9, and 9-10 of City of Colusa Improvement and Design Standards.

30-4 WATER QUALITY MARKING

All drain inlet and gutter drain installations shall include a permanent storm water quality marking conforming to City of Colusa Improvement and Design Standards.

30-5 PAYMENT

Payment for drain inlets, gutter drains or ditch boxes will be at the price bid per each and will be considered full compensation for excavation, material, and labor necessary to construct this item in place.

Section 31

CONSTRUCTION OF FENCING

Section 32

TRAFFIC, MARKINGS

32-1 THERMOPLASTIC PAVEMENT MARKINGS

Thermoplastic traffic stripes and markings, both white and yellow, shall be placed as shown on the Plans, and in conformance with Sections 84 of the State Technical Specifications. All striping details shall be in conformance with the State Standard Plans (latest edition).

1. Material

Thermoplastic shall be Alkyd type for extrusion application and shall produce an adherent reflectorized strip capable of resisting deformation by traffic.

The thermoplastic material shall be 100 percent solids. The binder shall consist of synthetic alkyd resins and shall be homogeneously incorporated with all the necessary prime pigments, fillers, and glass beads to produce a traffic coating to meet the requirements as specified herein. The characteristics of finished thermoplastic are shown on Table 32-2.01

Table 32-2.01

	White	Yellow
Glass Beads, AASHTO M-247, Type I, percent by weight, min. (Cal. Test Method 423)	30	30
Titanium Dioxode (TiO2), percent by weight, min. (AASHTO T250-77)	10	
Lead Chromate, Medium Heat Stability, percent by weight, min.		2.5
Specific Gravity, max. (Cal. Test Method 423)	2.15	2.15

	White	Yellow
Binder, percent by weight, min. (Cal. Test Method 423)	18	18
Ring & Ball Softening Point, ¤F (ASTM E28)	200 – 240	200 – 240
Tests on Material after 4 hours heat with stirring at 425¤ + 2¤F, which includes 1 hour for meltdown and temperature stabilization:		
Bond Strength to Concrete, 0.125-inch thick film drawdown at 425¤F test at 75¤F + 2¤F, psi, min. (Cal. Test Method 423)	180	180
Brookfield Thermosel Viscosity, Spindle SC4-27, 20 RPM at 425¤F, Poise (Cal. Test Method 423)	30 – 45	30 – 45
Impact Resistance, Falling Ball Method, 0.125-inch thick film drawdown at 425¤ F on concrete. Test at 75¤F + 2¤F inch-lbs., (ASTM D 2794)	10	10
Daylight Luminous Reflectance, min. (ASTM E97)	75	40
Yellowness Index, max., (ASTM E313)	15	
Hardness, Shore A-2 Durometer with 2 kilogram weight at 115¤F (Cal. Test 423)	60 – 80	60 – 80
Low Temperature Stress Cracking, Resistance at 25¤F (AASHTO)	No Crack	No Crack
Color Match, Federal Std. No. 595a, Color No. 33538		Passes

2. Removal

Traffic stripes and pavement markings shall be removed by any method that does not materially damage the existing pavement. Pavement marking images shall be removed in such a manner that the old message cannot be identified. Where grinding is used, the pavement marking image shall be removed by grinding a rectangular area. The minimum dimensions of the rectangle shall be the height and width of the pavement marking. Residue resulting from removal operations shall be removed from pavement surfaces by sweeping or vacuuming before the residue is blown by the action of traffic or

wind, migrates across lanes or shoulders, or enters into drainage facilities. The Contractor shall be responsible for disposal of all removed striping material.

Traffic stripes shall be removed before any change is made in the traffic pattern.

3. Application

The thermoplastic material shall be applied by extrusion methods in a single uniform layer. Stencils shall be used when applying thermoplastic material for pavement markings. Stencils may be new or used, if in good condition. If stencils are bent or damaged, they shall be replaced at the request of the Engineer.

The pavement surface to which thermoplastic material is applied shall be completely coated by the material and the voids of the pavement surface shall be filled. Surface must be dry before application. Contractor may use artificial method to dry the pavement surface.

Unless otherwise specified in the Special Provisions, the thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.075-inch. Thermoplastic Material for pavement markings shall be applied at a minimum thickness of 0.125-inch. Glass beads shall be applied immediately to the surface of the molten thermoplastic material, at a rate of not less than 8 lbs. per 100 sq. ft. The amount of glass beads applied shall be measured by stabbing the glass beads tank with a calibrated rod.

Contractor shall apply all traffic stripes and markings on new asphalt surface in accordance with the manufacturer’s recommendations.

3. Tolerances and Appearance

The completed traffic stripes and markings shall have clean and well-defined edges without deformations, and shall be free of tears or other disfigurements. Improperly placed, defective, or disfigured traffic stripes and markings shall be immediately removed from the pavement surface by methods approved by the Engineer. All such removal work shall be at Contractor's expense.

Completed traffic stripes shall be uniform, shall be straight on tangent alignment, and shall be on a true arc on curved alignment. On tangent alignment, when a 100' string line is stretched taught and placed directly on the outer edge of the completed traffic stripe, the distance between the string and the edge of the traffic stripe shall not exceed three-fourths of one inch (3/4") when measured anywhere along any 100' interval of the tangent alignment. On curved alignment, the outer edge of the traffic stripe shall not deviate more than three-

fourths of one inch (3/4") from the true arc. The lengths of the gaps and individual stripes that form broken traffic stripes shall not deviate more than 2" from the lengths required to produce a uniformly repeating, broken-stripe pattern.

4. Time Limitations

All permanent marking must be placed no earlier than three (3), and no less than seven (7), days from the placement of slurry seal. Partial removal of roadway markings shall be replaced within two (2) weeks. Contractor may contact City Signs and Markings to replace markings at cost.

32-2 PAINTED PAVEMENT MARKINGS

1. General Requirements

Painted pavement markings shall not be used unless directed by the Engineer. If directed, painted pavement markings shall be placed in conformance with the State Standard Plans (latest edition) and Sections 84 of the State Specifications except as modified herein.

32-3 RAISED REFLECTIVE PAVEMENT MARKERS

1. General Requirements

Raised reflective pavement markers shall conform to Section 81 of the State Specifications except as noted herein.

2. Materials

Raised reflective pavement markers shall be #290 manufactured by 3M Company or approved equivalent and shall be placed in conformance with Section 81 of the State Standard Specifications.

3. Placement

Blue raised reflective pavement markers shall be placed in the street, 6” - 12” off of centerline and perpendicular to the fire hydrant. Markers shall be blue with two reflective faces.

32-4 TEMPORARY PAVEMENT MARKINGS

1. General Requirements

Temporary pavement markers shall be furnished, placed, maintained, and later removed as specified in the Special Provisions, and as directed by the Engineer.

2. Materials

The following markers are approved for use on City of Colusa street resurfacing projects:

Temporary Overlay marker (Types Y and W) manufactured by Davidson Plastics Company, 18726 East Valley Highway, Kent, Washington 98032, telephone (206) 251-8140.

Safe-Hit Temporary Pavement Marker, manufactured by Safe-Hit Corporation, 1930 West Winton Avenue, Building #11, Hayward, CA 95545, telephone (415) 783-6550.

Swareflex Pavement Marker (Models 3553, 3554, Cat Eyes Nos. 3002 and 3004), manufactured by Swareco and distributed by Servtech Plastics Inc., 1711 South California Street, Monrovia, CA 91016, telephone (818) 359-9248.

Stimsonite Construction Zone Marker (Model 66), manufactured by Amerace Corporation, Signal Products Division, 7542 North Natchez Avenue, Niles, IL 60648, telephone (312) 647-7717.

Flex-O-Lite Raised Construction Marker (RCM), manufactured by Flex-O-Lite, Lukens Company, P.O. Box 4366, St. Louis, MO 63123-0166, telephone (800) 325-9525.

3M Scotch-Lane A200 Pavement Marking System (reflective raised pavement marker on reflective traffic line tape), manufactured by 3M Company, Highway Safety Products, 1010 Hurley Way, Suite 300, Colusa, CA 95825, telephone (916) 924-9605.

MV Plastics Chip Seal Marker (1280/1281 Series with Reflexite Polycarbonate, PC 1000, reflector unit), manufactured by MV Plastics, Inc., 533 W. Collines Avenue, Orange, CA 92667, telephone (714) 532-1522.

3. Placement

Temporary reflective raised pavement markers shall be placed in accordance with the manufacturer's instructions. Temporary reflective raised pavement markers shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used.

At the direction of the Engineer, Temporary pavement striping may be required.

After paving and or planing, temporary pavement markers shall be placed on all existing striped streets that are opened to public traffic prior to final striping in accordance with the striping diagrams. Temporary pavement markers that are damaged from any cause during the progress of the work shall be repaired or replaced by Contractor at his expense.

When no longer required for the work as determined by the Engineer, temporary pavement markers shall be removed in accordance with the provisions in Section 15-2, "Miscellaneous Highway Facilities," of the State Standard Specifications, except as otherwise provided herein. If the temporary pavement markers to be removed are on surfacing that is to be removed, the temporary pavement markers may be removed and disposed of in conjunction with the removal of the surfacing, providing such pavement markers do not interfere with the required traffic lane delineation, as determined by the Engineer.

The 14-day waiting period for placing pavement markers on new asphalt concrete surfacing shall not apply to temporary pavement markers.

32-5 PAYMENT

Payment for thermoplastic pavement markings will be at the unit price bid per lineal foot for striping as measured by the lineal foot of thermoplastic material placed. No payment will be made for gaps in broken traffic stripes. Double center stripes will be paid as two (2) stripes. Regular cross walks will be measured by the lineal foot.

Payment for all other thermoplastic markings (STOP, AHEAD, Ladder Crosswalks) will be at the contract lump sum price.

Payment for all thermoplastic markings will be considered full compensation for furnishing all labor, material, tools, equipment and incidentals, and for doing all work involved in removing existing striping and placing stripes and markings, placing blue reflective markers at fire hydrants as specified in the Special Provisions and as directed by the Engineer. Existing striping shall be removed by grinding.

The quantities of thermoplastic traffic stripes or thermoplastic pavement markings may be adjusted, deleted, or omitted as directed by the Engineer to meet the existing requirements. No adjustment to the unit price bid will be made because of a change in quantity from the Engineer's estimate.

Section 33

PNEUMATICALLY APPLIED MORTAR

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 and testing of all electrical systems shown on the Plans, and as specified in these Technical Specifications and 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.

For specifications not covered by these Technical Specifications, the latest State of California Transportation Plans and Specifications shall apply.

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 Colusa ordinances governing such types of construction.

34-3 EQUIPMENT LIST AND DRAWINGS

Unless otherwise permitted in writing by the Engineer, 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 units, and shall be supplemented by

other data, including detailed scale drawings and wiring diagrams. All data shall be submitted to the Engineer for review and approval.

Contractor shall submit to the Engineer a statement from each vendor supplying electrical equipment, including but not limited to, traffic signal controllers and cabinets, signal and pedestrian displays, pedestrian pushbuttons, traffic signal standards, streetlight standards, luminaires, service pedestals, conduits, conductors, pull boxes 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 Contractor shall be indicated on the statement.

Prior to acceptance of the work, 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 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

Contractor shall submit a schedule of work to the Engineer or Inspector at the pre-construction meeting and within 5 days of the Engineer's written request at any other time. The schedule shall show the order of work in which the Contractor proposes to carry out the work, and the schedule shall show the proposed dates of work.

Contractor shall not perform electrical work above ground at any location until all electrical materials have been received by Contractor. Contractor may place electrical service pedestals and underground infrastructure 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

Contractor shall have an approved traffic control plan showing proposed traffic control measures and detours for vehicles and pedestrians prior to starting any construction work. Contractor shall submit a proposed plan for review, comments, and approval approximately ten (10) working days prior to the start of any work.

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 Traffic Control Requirements of these Specifications.

34-6 EQUIPMENT TO BE SUPPLIED

All equipment, material and supplies called for in the Special Provisions shall be new, free of defects, and currently manufactured items, 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 project shall be furnished and installed as though such parts were shown on the Plans or specified herein.

For Capital Improvement Projects, all equipment, materials, or supplies to be considered as an approved equal must be submitted to the City for approval no less than ten (10) calendar days prior to the bid opening date. If the City finds said equipment, materials, or supplies to be acceptable, an addendum will be issued notifying all bidders by the close of business on Friday before the bid opening date. If there is no addendum accepting an approved equal, bidders shall submit bids based on the original specified equipment, materials, or supplies.

34-7 PROTECTION OF EXISTING IMPROVEMENTS

Existing improvements, utility and adjacent property shall be protected from damage resulting from 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 Contractor throughout the construction period.

Contractor shall notify the Traffic Signal Maintenance Section of the Department of Transportation two (2) days 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 Contractor before acceptance of the work.

Contractor shall be liable for costs or repairing damage to existing improvements.

The contractor will ensure that utility services to customers in the project area are maintained.

The Contractor is responsible for the protection of and for damage to

existing overhead and underground utility lines and services encountered during the course of construction. The Contractor shall notify the respective utility owner prior to any interruption of service.

The Contractor is expected to "pothole" existing underground utilities a minimum of ten (10) working days in advance at any location where an existing utility may be in conflict with the proposed work.

The cost of relocating existing overhead or underground utilities not specified on Plans to be relocated, but which the Contractor elects to relocate or cut and reconnect for his/her own convenience, shall be borne by the Contractor.

34-8 MAINTAINING EXISTING ELECTRICAL FACILITIES

All existing streetlights and traffic signals shall be maintained in operation until replacement standards are energized, as directed by the Engineer or Inspector.

All new 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. 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. or as directed by the Engineer. Contractor shall notify the Engineer five (5) working days prior to a traffic signal intersection shutdown.

34-9 EXCAVATING AND BACKFILING

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 be performed immediately before installation of conduit.

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.

Whenever a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged or removed, the entire square or slab shall be removed and replaced to the nearest score mark or joint.

For trenching in dirt, 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 ninety-five percent (95%). Compacting of backfill material by pounding or jetting will not be permitted.

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 Contractor. Concrete sidewalks shall have a minimum thickness of three and one-half inches (3½") and the minimum thickness of concrete driveways shall be six inches (6").

All surplus excavated material shall be removed and disposed of within the same day of work. All sidewalks and gutters shall be washed down and swept clean.

34-10 CONDUITS

Conduits to be installed shall be either rigid mild steel, hot dipped galvanized conduits or Schedule 40 polyvinyl chloride conduit. The same type of conduit shall be used for the entire system.

1. 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. Conduit shall meet the crush rating listed in UL651 Standards. Schedule 40 conduit shall be rated for use with 90 degree conductors.

All PVC conduits shall be a minimum of one and one-half inches (1½") in diameter. Where larger size conduit is used, it shall be for the entire length of the run from pull box to pull box. No reducing couplings will be permitted in any run. All conduit ends shall have the appropriate conduit bushing and shall be sealed in an approved manner until wiring is started. Unless otherwise specified, all PVC conduits shall contain a minimum of one No. 10 green ground conductor.

Duct seal shall be installed on all conduits. All new conduits starting and terminating in pull boxes shall have end bells.

High Density Polyethlene (HDPE) Conduit shall be manufactured to UL 651A specifications, compliant with NEC Article 353, and be of Schedule 40. HDPE shall have high tensile strength to weight ratio, crush resistance, low coefficient of friction for directional drilling.

2. Requirements for Conduit Installation

The installation of conduit in paved streets shall be accomplished by directional drilling method or by trenching.

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”).

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, 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 free of 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 by the use of a sealing compound approved by the Engineer.

Conduits terminating in pull boxes, standards, pedestals, and cabinets shall rise vertically and shall not slope in any direction. Conduits terminating in standards, pedestals, and cabinets shall terminate one and one-half inches (1½")

above finished grade. Conduits shown on the Plans to be adjacent and parallel to each other shall be installed in the same trench or drill hole unless otherwise specified or directed by the Engineer.

Contractor shall replace roadway striping and markings with same material if damaged by directional drilling, bore pits, potholes, or trenching. Replacement striping and markings shall be thermoplastic or paint, per the City of Colusa Standards.

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. All sod removed shall be replaced within forty-eight (48) hours.

Only nylon or polyethylene rope (1250LB rating min.) shall be used to pull wire and cable in conduit systems.

3. Trenching Installation of Conduit in Paved Streets

For trenching in roadway, the Contractor shall use the City of Colusa "T"-trench method.

Trenches shall be backfilled or covered at the end of each work day. All conduit installed by trenching shall be anchored every 10 feet to the bottom of the trench, with an approved method, to prevent the conduit from floating when the concrete is backfilled into the trench.

Trenches in reconstructed roadways shall be backfilled with Slurry Cement Backfill as defined in Section 10 of these Technical Specifications. A red oxide in the amount of 5 lbs. per cubic yard shall be mixed uniformly throughout the slurry cement.

Trenches in existing roadways shall use the "T-Trench" method. The portion over the trench shall be paved with City Standard asphalt concrete, per Section 22 of the City Technical Specifications. Trenches shall be backfilled with Slurry Cement Backfill as defined in Section 10 of these Technical Specifications. A red oxide in the amount of 5 lbs. per cubic yard shall be mixed uniformly throughout the slurry cement.

Trench shall not exceed six inches (6") in width. The top of the installed conduit shall be a minimum of twenty-four inches (24") below finish grade.

The outline of all areas of pavement to be removed shall be cut to a minimum depth of four inches (4") with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. The outline area shall extend 6" beyond both sides of the conduit trench (6" in maximum).

Cuts shall be neat and true with no shatter outside the removal area. Contractor shall not cut with saw or rock cutting excavators within 24 inches of either side of located or marked buried electrical conduit. At these locations Contractor shall daylight or pothole to continuing a saw cut.

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.

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. When pull boxes are shown on the plans or designated by the Engineer to be in the sidewalk the entire square or slab shall be replaced as specified in section 34-9 of these specifications. Contractor shall cut, remove, and replace the concrete to the nearest joint when installing new pull boxes. For pull boxes to be removed, holes or depressions resulting from the removed pull box shall be filled, compacted, brought to grade, and filled to match surrounding materials.

Pull boxes shall be precast reinforced concrete boxes, unless otherwise noted. Each box shall be set in concrete with a minimum of six inches (6”) of concrete on all four sides. The six inch (6”) thick sides shall be a minimum of twelve inches (12”) deep. The pull box shall rest on crushed rock foundation. The crushed rock foundation shall have a minimum of 12” of depth and extend a minimum of 6” beyond the outside edge of the pull box. Compact crushed rock while maintaining integrity of conduit. Conduit and pull box shall not be damaged nor cracked.

All new pull boxes shall be set in place prior to pouring any new sidewalk.

Concrete pull box covers shall be protected during construction. Damaged covers must be replaced with new covers by the Contractor.

Existing pull boxes damaged by the installation of new conduits shall be removed and replaced at the Contractor's expense as directed by the Engineer

Pull boxes shall not be set in driveways, vehicular traveled lanes or in any part of a new sidewalk curb ramp area including the sidewalk ramp area of ADA compliant driveways.

Unless otherwise specified, all pull boxes for street lighting systems shall be CALTRANS Standard No. 5 size, and all pull boxes for traffic signal systems shall be CALTRANS Standard No. 6, unless otherwise specified in the Plans. 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. No more than two (2) extensions may be used.

34-12 PAYMENT FIBER OPTIC CONDUITS AND PULL BOXES INSTALLATION

Fiber Optic Conduits and Pull Boxes Installation shall be made at the 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, making connections, backfilling, and paving or repaving, as required herein, on the Plans or in the Special Provisions.

Section 35

LANDSCAPE PLANTING

Section 36

IRRIGATION SYSTEM

Section 37

BORING AND JACKING

Section 38

CLARIFICATION/DEVIATION

38-1 REQUESTS FOR CLARIFICATION

A. Contractor requests for clarification of the plans and/or specifications shall be directed to the ENGINEER in writing. Such requests shall not be received directly from a Subcontractor or Supplier.

B. Normally, a separate form shall be used for each specific item for which a clarification is required. Requests for clarification for more than one item using a single transmittal form will be permitted only when the items are so functionally related that expediency indicates review of the group of items as a whole.

C. The ENGINEER will reply to Contractor's request for clarification within fifteen (15) working days following receipt by the ENGINEER.

38-2 DEVIATION REQUESTS

A. Contractor requests for deviation from the plans and/or specifications shall be directed to the ENGINEER in writing. Such requests shall not be received directly from a subcontractor or Supplier.

B. The ENGINEER will reply to Contractor's request for deviation from the plans within fifteen (15) working days following receipt by the ENGINEER.