



**Standard Specifications
For
Private Contracts**

July 2019

Development Services
220 Nellen Avenue
Corte Madera CA 94925
(415) 945-1530

TABLE OF CONTENTS

INFORMATION AND INSTRUCTIONS FOR APPLICANTS AND PRIVATE CONTRACTOR

<u>Articles</u>	<u>Page</u>
1. Purpose of Specifications	I
2. Understanding of Contract Documents	I
3. Subsurface Information	I
4. Experience and Financial Qualifications	II
5. Subcontractors	II
6. Nature of Estimated Quantities	II

GENERAL SPECIFICATIONS

<u>Articles</u>	<u>Page</u>
1. Definitions	2
2. Terms	3
3. Work to be Done to the Satisfaction of the District	4
4. Satisfaction of District	4
5. Engineer to Direct the Work	4
6. Compliance with Contract Documents	4
7. Precedence of Contract Documents	4
8. Interpretation of Specifications	5
9. Drawings	5
10. Drawings Required of Contractor	5
11. Shoring Plan	6
12. Bonds	6
13. Workers' Compensation Insurance	7
14. Public Liability and Property Damage Insurance	7
15. Permits, Licenses and Fees	8
16. Laws and Regulations	8
17. Licensing of Contractors	8
18. Contractor's Legal Address	8
19. Assignments and Subcontracts	8
20. Fair Employment Practices	9
21. Employment of Apprentices	9
22. Certified Payroll Submittals and Cost Data	9
23. Guarantee	9



Articles

Page

THE WORK - GENERAL

24.	Work to be Done	10
25.	Work and Material Quality	10
26.	Responsibility of Contractor and Applicant	11
27.	Contractor to Supply Sufficient Labor, Equipment and Material	11
28.	Construction Plant, Equipment and Methods	12
29.	Cooperation	12
30.	Inspection	13
31.	Lines, Grades, Measurements and Surveys	13
32.	Line and Grade Changes	14
33.	Notice of Commencement/Cessation of Work	14
34.	Changes in Scope of Work	14
35.	Extra Work	14
36.	Acceptance of Work	15
37.	Termination of Contract	15
38.	Cancellation of Contract	15
39.	Protests	15
40.	Claims	16

CONSTRUCTION

41.	Use of Improvement During Construction	16
42.	Contractor's Superintendents or Foremen	16
43.	Contractor's Employees	16
44.	Use of Drugs/ Smoking	17
45.	Night and Weekend Work	17
46.	Overtime Work	17
47.	Protection of Work, Persons and Property Against Damage	17
48.	Protection of Existing Facilities	18
49.	Illumination of Work	19
50.	Traffic Control	19
51.	Road Accessibility and Open Trench	20
52.	Public Inconvenience	20
53.	Drainage Protection	21
54.	Dust Abatement	21
55.	Hauling Over City Streets, County Roads and All Highways	21
56.	Clean Up	21
57.	Material to be Obtained from the District	22



<u>Articles</u>		<u>Page</u>
------------------------	--	--------------------

MATERIAL

58.	Responsibility for Material	22
59.	Salvage of Material	23
60.	Samples and Tests of Material and Work	23
61.	Defective Material and Workmanship	23
62.	Patents	24

PAYMENT AND TIME

63.	Contractor to Serve Notice of Delays	24
-----	--------------------------------------	----

OTHER

64.	Communication	24
65.	USA Notification and Utility Field Meeting	24
66.	Compliance with Environmental Laws	25
67.	District Harassment Policy	25

**TECHNICAL SPECIFICATIONS
(FOR PRIVATE CONTRACTS)**

<u>Section</u>		<u>Page</u>
SD 01300	Construction Submittals	SD-01310-1
SD 01610	Contract Materials	SD-01610-1
SD 02200	Earthwork	SD-02200-1
SD 02500	Asphaltic Concrete Paving and Resurfacing	SD-02500-1
SD 02655	Cathodic Protection Magnesium Anodes	SD-02655-1
SD 02713	Distribution Piping System	SD-02713-1
SD 03301	Minor Concrete	SD-03301-1
SD 03400	Control Density Fill	SD-03400-1
SD 09801	Field Applied Tape Coating Systems	SD-09801-1
SD 18000	Environmental Protection	SD-18000-1



INFORMATION AND INSTRUCTIONS (PRIVATE)
FOR APPLICANTS AND PRIVATE CONTRACTORS

1. Purpose of Specifications

These specifications are set apart from the District's Standard Specifications due to differences between District contract work and private contract work. Since the District intends to maintain certain standards and only retains indirect control over the contractor by means of the agreement with the applicant, the following specifications shall apply to and bind both the applicant and his contractor. These specifications shall govern the work under Pipeline Extension Agreement except as modified therein.

2. Understanding of Contract Documents

By entering into agreement with the District, the Applicant and Contractor acknowledge that they have read and understood each and every part of the contract documents and the nature of the work. As a result, the Applicant and Contractor agree that they will not make any claims for compensation or allowances based upon or arising from any alleged misunderstanding of the contract documents or existing physical conditions at the construction site. The applicant or his Contractor shall, upon discovery of any error or omission in the contract documents, immediately call it to the Engineer's attention.

3. Subsurface Information

Any data shown on the drawings, or communicated to the Applicant or Contractor by the District, in regard to the location, depth, dimensions, type or character of any pipes, conduits or other structures on the site of the work, is based on information provided by the applicant and owners of such structures and is offered solely for the convenience of the Applicant and Contractor. Data should be verified, including daylighting (exposing) of the structures, by the Contractor prior to installation of any facilities.

Nothing herein shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of the project can be inferred from the presence of other visible facilities (such as buildings, meter and junction boxes on or adjacent to the construction site). In general, the location of water services, gas services and sewer laterals crossing the line of work, or of other minor structures or obstructions, may not be shown on the drawings.

However, at the request of the Applicant or Contractor, the Engineer will have the approximate location of any known, existing water services marked on the street. Except as stated above, the Applicant and Contractor shall assume full responsibility and shall make no claim against the



District for any damage to existing facilities, for any inconvenience to the Contractor or for added costs in performing work which may be attributed in any degree to: (1) Failure of the District to furnish information pertaining to structure locations; or (2) inaccuracy of any furnished information.

4. Experience and Financial Qualifications

The Contractor, upon request of the Engineer, shall show the District that he has the necessary experience and license in the class of work to be performed, and the ability, equipment and financial resources to perform the work satisfactorily in accordance with these specifications. This information shall be furnished to the District and the District will determine the sufficiency of the Contractors experience and financial qualifications.

5. Subcontractors

The Contractor must comply with the "Subletting and Subcontracting Fair Practices Act" (Public Resources §4100 et seq.). In addition, he shall inform the District of the names and addresses of each subcontractor to be employed on the job. The Contractor may be required to furnish to the District information regarding technical experience, financial status, and available equipment for each subcontractor to be employed. The District reserves the right to review qualifications of subcontractors and will advise the Applicant and Contractor of its findings.

6. Nature of Estimated Quantities

The amount of work and material required for private work is estimated and costs are indicated in the contract documents. Since estimated quantities are only approximations of anticipated labor and material required for the job, the District reserves the right to increase, decrease or eliminate the amount of any work or material required under the contract.



STANDARD SPECIFICATIONS
GENERAL SPECIFICATIONS FOR PRIVATE CONTRACTS

Marin Municipal Water District
220 Nellen Avenue
Corte Madera, CA 94925

July 2019



MARIN MUNICIPAL WATER DISTRICT

GENERAL SPECIFICATIONS FOR PRIVATE CONTRACTS

1. DEFINITIONS

Whenever any of the following words or expressions, or pronouns in place of them, are used in the specifications or contract, they shall be understood to have the following meanings:

APPLICANT - Any individual or entity entering into an agreement with the District to have water facilities installed by forces completely under his (its) control.

CONTRACT OR AGREEMENT - The written agreement between the District and the Contractor and/or Applicant covering the work. All contract documents shall be deemed part of the contract.

CONTRACT BONDS - The surety bonds furnished by the Contractor's and/or Applicant's surety as a guaranty that he will: (1) complete the work in accordance with the terms of the contract; and (2) guarantee maintenance of the facilities for the time period specified in the contract documents.

CONTRACT DOCUMENTS - The contract documents shall include the Contract Bonds, the Standard Specifications for Private Contracts, reference specifications, supplemental specifications, general and detailed plans or drawings, all executed supplemental agreements, addenda, permits, the contract, all general or special provisions pertaining to the work or materials, and all modifications issued after contract execution.

CONTRACTOR - The individual who or entity that shall perform the work specified in the contract documents.

CONTRACTOR'S EMPLOYEES - Any persons engaged in the execution of work under this contract, as direct employees of the Contractor or as employees of subcontractors.

DISTRICT - The Marin Municipal Water District.

ENGINEER - The District's Manager of Engineering or his duly authorized representative.

INSPECTOR - The authorized representative of the Engineer assigned to make a detailed inspection of any or all portions of the work or materials therefore.

MATERIAL OR MATERIALS - These words shall be construed to include construction materials (fabricated or otherwise), manufactured articles, machinery, and any other classes of material or supplies, including the use of equipment and consumption of power



and supplies, to be furnished in connection with the contract, except where a more limited meaning is indicated by the contract documents.

PLANS OR DRAWINGS - All drawings made by or for the District pertaining to the work included in the contract documents.

PROVIDE – To furnish and install.

REFERENCE SPECIFICATIONS - Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the contract documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project, unless specifically referred to by edition, volume, or date.

REMOVE – To dismantle and dispose of offsite.

SPECIFICATIONS - The written direction, provisions, and requirements pertaining to the work. The specifications include the private contract standard specifications, reference specifications and any attachments necessary, including addenda, to provide direction in regard to the work under this contract.

STANDARD SPECIFICATIONS - The Standard Specifications for Private Contracts, dated June 2019 and prepared by the District.

SUBCONTRACTOR - An individual or entity under a contract with the Contractor for the execution of any part of the work or for the furnishing of any material used in the work.

SURETY - The individual or entity which the Applicant or Contractor engages (through binding agreement) to assume liability for all debts and responsibility for the acceptable performance and/or maintenance of work under this contract if the Contractor defaults.

(THE) WORK - That which is to be constructed or done under the contract in accordance with the contract documents.

2. TERMS

Unless otherwise stated, wherever words "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that the direction, requirement or permission of the Engineer is intended. The words "sufficient", "necessary", "proper", and the like, shall mean sufficient, necessary, or proper in the judgment of the Engineer. The words "approval", "acceptable", "satisfactory", or other words of like import shall mean approved by, or acceptable to, or satisfactory to the Engineer.



3. WORK TO BE DONE TO THE SATISFACTION OF THE DISTRICT

The Contractor shall furnish all labor, materials, tools, and equipment, except as otherwise expressly specified, that are necessary or proper for completion of the work according to the contract. Work shall be performed and materials provided to the satisfaction of the District.

4. SATISFACTION OF DISTRICT

Whenever in these specifications the satisfaction of the District must be met and the District makes a determination in good faith of satisfaction or dissatisfaction, such determination shall be final and binding upon all parties.

5. ENGINEER TO DIRECT THE WORK

Work shall be performed under the general direction of the Engineer. At his discretion, he may from time to time, choose the order and location of work to be done. He may also, at his discretion and at any time, exercise general control over the work, to safeguard the interests of the District.

The Contractor shall immediately comply with any and all orders and instructions given by the Engineer. Nothing herein shall be construed to relieve the Contractor of any of his obligations or liabilities under the contract.

6. COMPLIANCE WITH CONTRACT DOCUMENTS

The Applicant and Contractor must strictly comply with all requirements of the contract documents. Variance from such requirements shall be permitted only upon the advance written consent of the Engineer. The Applicant and Contractor may not rely upon any actual or alleged oral statement or representation of anyone purporting to waive, alter, or amend any such requirements.

7. PRECEDENCE OF CONTRACT DOCUMENTS

If there is a conflict among contract documents, the document highest in precedence shall control. The order of precedence shall be:

- 1) Permits from other agencies as may be required by law;
- 2) Agreement between Applicant and District;
- 3) Detailed Plans or Drawings;
- 4) Standard Plans;
- 5) "Standard Specifications for Private Contracts";
- 6) Reference Specifications.



Change orders, supplemental agreements and approved revisions to plans and/or specifications will take precedence over documents listed above.

8. INTERPRETATION OF SPECIFICATIONS

Any discrepancy in or misunderstanding of the contract documents shall be immediately referred to the Engineer. The Engineer shall clarify the true intent and meaning of the contract documents, and any decision rendered shall be binding on the Applicant and Contractor. The Applicant and Contractor will not be allowed to take advantage of any error or omission in the plans and specifications. Suitable instructions will be given or corrections made when such error or omission is discovered.

9. DRAWINGS

The location and general arrangement of the facilities to be installed under the contract are as shown diagrammatically on the contract drawings.

Additional drawings that may be necessary will be supplied by the District during the progress of the work, and such drawings shall become a part of the contract documents.

10. DRAWINGS REQUIRED OF CONTRACTOR

Within a reasonable time as determined by the District, the Contractor shall submit to the Engineer any drawings or information as required under these specifications. Such submittals shall be reviewed and approved by the Contractor in regard to conformance to contract plans and specifications prior to submittal to the District. They shall become part of the contract documents upon the District's approval. Unless otherwise specified, 5 copies of any required information shall be submitted. If the materials submitted by the Contractor are in accord with acceptable practice and meet the requirements of these specifications, the Engineer will return one set marked "no exceptions noted" within 15 working days after their receipt at the Engineer's office; otherwise said data will be returned to the Contractor within the 15 day period with a statement of the points found unsatisfactory. In such a case the Contractor, at his own expense, shall proceed at once to revise said materials until they are found satisfactory by the Engineer. No fabrication shall start prior to the time the materials are determined to be satisfactory. The Contractor shall have no claim for damages because of any delays for revisions found necessary to fulfill the requirements of these specifications. Regardless of such delays, the Contractor shall be responsible for any failure to complete the work as required by the contract documents. Revisions of said materials shall be considered as changes necessary to meet the requirements of the specifications.

Neither the inspection nor lack of inspection of any such materials shall constitute a waiver of any requirements of the contract documents or relieve the Contractor of any obligations thereunder. In addition, any deviation from the contract documents (including shop drawings, etc.) shall be brought to the attention of the Engineer by written notice. Defective work,



materials and equipment may be rejected notwithstanding conformance with drawings, catalog cuts, specifications, lists and graphs inspected by the Engineer.

11. SHORING PLAN

Prior to excavation of any trench five (5) feet or more in depth, the Contractor shall submit to the District 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. If the plan varies from the standard shoring systems indicated in the State Division of Industrial Safety, CAL/OSHA Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer. No excavation shall start until the Engineer has accepted the plan and the Contractor has furnished the Engineer with a copy of the CAL/OSHA permit pertaining to the work. In addition, no excavation shall be allowed until the Contractor furnishes the Engineer with a copy of the project notification forms or (letters) he has forwarded to the CAL/OSHA District Office.

12. BONDS

As a part of the contract execution, the Applicant must file with the District a performance bond in the sum indicated in the Agreement. The "Performance Bond" is to guarantee faithful performance of all work, within a reasonable time as determined by the District, in a manner satisfactory to the District, and that all material and workmanship will be free from original or developed defects. To insure the District of the protection that the guarantee (Article 54) is to provide, the Contractor shall, except where otherwise specified, provide a surety bond in the amount specified in the contract. The bond may be included in combination with a performance bond but in no case shall the maintenance bond be less than specified in the contract. The maintenance bond shall be in effect for two years after the date of the completion notice from the District. The bonds shall be maintained by the Applicant in full force and effect until the work is accepted by the District, and until all claims for materials and labor are paid.

Should any bond become insufficient, the Applicant shall increase or replace the bond as necessary within 10 days after receiving notice from the District.

Should any Surety at any time be unsatisfactory to the District, notice will be given the Applicant to that effect. Failure by the Applicant to employ an acceptable surety shall be basis for cancellation of the Contract.

Changes in the work, made pursuant to the contract, shall in no way release the Contractor or Surety from their obligations. Notice of such changes shall be waived by the Surety.



13. WORKERS' COMPENSATION INSURANCE

Before commencement of work, the Contractor shall furnish to the District satisfactory proof of compliance with Labor Code §3700 which requires every contractor to secure the payment of compensation to his employees, and to be insured against liability for workers' compensation.

14. PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

Before commencement of work, the Contractor shall furnish to the District satisfactory proof that he has adequate public liability insurance to protect himself against losses from liability for damages on account of bodily injuries, death, and/or property damage (including loss of use suffered or alleged to have been suffered by any person or persons), caused by or arising from the Contractor's performance under the contract. The District shall have the right to approve/disapprove any insurance carriers or forms.

Such insurance coverage shall specifically name Marin Municipal Water District, its officers, officials, agents, employees and volunteers, as additional insured and shall provide that said coverage is primary to any insurance carried by the District. Before the execution of this contract and before any work shall commence, the Contractor shall furnish to the District, a copy of such insurance policy.

The Contractor shall also supply the District with an insurance certificate stating that said insurance has been issued and is in good standing and that said policy shall not be cancelled or renewal refused without 60 days advance written notice to the District.

Said public liability insurance shall be maintained by the Contractor in full force and effect during the entire period of performing the contract and shall be in an amount not less than \$1,000,000 combined single limit.

The required minimum amount of public liability insurance may be increased if in the judgment of the District, conditions on the work warrant such increase. The Contractor shall increase the amounts of the insurance in accordance with any such determination by the District.

If the Contractor fails to maintain such insurance, the District will notify both the Applicant and the Contractor of the insufficiency and will stop work on the project until adequate insurance coverage is provided.

Nothing herein contained shall be construed as limiting in any way the extent to which the Contractor may be held responsible for payment of damages resulting from his operations.



15. PERMITS, LICENSES AND FEES

The Contractor shall procure all necessary permits and licenses, pay all charges and fees (including fees for encroachment, special, and street opening permits) and give all notices necessary to the due and lawful prosecution of work unless otherwise expressly provided. The Contractor shall furnish the District with copies of all permits, licenses and notices procured by him for prosecution of the work.

The Contractor shall pay all sales taxes and fees levied on material, supplies, or equipment purchased by him and used on or incorporated into the work, and all other taxes properly assessed against his equipment or property used in connection with the work.

16. LAWS AND REGULATIONS

The Contractor shall keep himself fully informed of and shall strictly comply with all laws, regulations and orders of properly constituted authorities affecting the contract, the material to be supplied, the work to be done, and the persons connected with the work. Authorized persons may at any time enter upon any part of the work to ascertain compliance with such laws, regulations or orders.

17. LICENSING OF CONTRACTORS

The District may prohibit the Contractor from performance of any part of the contract until he is properly licensed. Such prohibition placed on the Contractor shall not constitute grounds for claim against the District.

18. CONTRACTOR'S LEGAL ADDRESS

The address given in the contract is designated as the legal address of the Contractor, but such address may be changed at any time by written notice delivered to the District. The delivery or deposit of any drawing, notice, letter or other communication to such legal address, post office or U.S. Postal Service box shall constitute legal and sufficient service upon the Contractor.

19. ASSIGNMENTS, SUBCONTRACTS

The Contractor shall constantly give his personal attention to the faithful prosecution of the work; he shall keep the work under his personal control and shall not assign nor subcontract the whole or any part thereof, except as provided herein.

The District may request that the Contractor and/or Applicant submit a copy of each contract which he proposes for subcontract or for assignment of any portion of the work. Should the District determine that any subcontractor does not have the experience or financial qualifications to perform said portion of the work, or that he is unable to provide in due time the necessary labor, materials, tools or equipment to perform said portion of the work, or is



otherwise unacceptable, the Contractor shall be notified in writing. He shall then substitute an acceptable subcontractor or shall perform said work without subcontracting it.

No subcontract or assignment shall relieve the Contractor or his Sureties of any liability or obligation under the contract.

20. FAIR EMPLOYMENT PRACTICES

This contract is subject to the provisions of the California Fair Employment and Housing Act (Government Code §12900 et seq.) which state that the Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of sex, race, color, religion, ancestry, or national origin. The Contractor and subcontractors shall take affirmative action to ensure that employment of applicants and treatment of employees conform to the code. Such action shall include, but be not limited to the following areas of consideration: Employment standards, qualifications, reclassifications, job upgradings, demotions, transfers, recruitment, recruitment advertisements, layoffs or terminations, payment rates or other forms of compensation, and selection for training, including apprenticeship. The Contractor and subcontractors shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State setting forth the provisions of said Act.

The Contractor and any subcontractors under him shall permit access to records of employment, employment advertisements, application forms, and other pertinent data by the California Fair Employment and Housing Commission, or any other agency of the State designated to investigate compliance with this article.

21. EMPLOYMENT OF APPRENTICES

The Contractor and any subcontractors under him shall comply with the requirements of Labor Code Sub-Section 1777.5 and 1777.6 concerning the employment of apprentices.

22. CERTIFIED PAYROLL SUBMITTALS AND COST DATA

The Contractor may be required to submit on a daily basis a full detailed report of the previous day's work. This report shall show the number of persons employed, the hours worked at each rate of pay, the time and cost of rental of each piece of equipment used, the amount and cost of each class of material used, and any other costs to the Contractor, all as applied to each subdivision of the work.

23. GUARANTEE

The Contractor guarantees that all work performed by him, and all structures furnished and installed or constructed by him under this contract, will fully meet all requirements of the contract documents.



For a period of two years after final acceptance (as defined in Article 60) of the work the Contractor shall guarantee his workmanship by agreeing to maintain all of the facilities or structures furnished and installed or constructed by him under the contract. Should any installed facilities fail to fulfill any of the requirements of the contract, the Contractor shall promptly repair or replace unsatisfactory material and repair any facilities as directed by the Engineer. Such repairs and replacements shall not inconvenience the District. All costs shall be borne by the Contractor. The Contractor shall not be liable for damage caused by other parties who damage facilities installed by the Contractor.

Should the Contractor fail to act promptly in accordance with this requirement, or should the circumstances require repairs or replacements before the Contractor can be notified or can respond to notification, the District may at its option, make the necessary repairs or replacements, and the Contractor shall pay to the District all costs of such repairs, including applicable overhead.

The Contractor shall be responsible for the full cost incidental to making good any and all of the above guarantees and agreements. The above guarantees and agreements are covenants, the performance of which shall be binding upon the Contractor and his sureties.

24. WORK TO BE DONE

The Contractor shall perform all work as described in the contract documents. In the performance of the work, the Contractor shall furnish all material not specifically indicated as being furnished by the District and shall install all necessary material, whether furnished by the District or by the Contractor, as indicated in the contract documents. All work shall be so performed that upon completion of the contract, the work is ready for use.

25. WORK AND MATERIAL QUALITY

All work shall be performed in a workmanlike manner in conformity with the best accepted construction and installation practices. Unless otherwise specified, work shall be performed at a minimum in accordance with the applicable sections of the current standards of the American Water Works Association (AWWA), the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), the American Welding Society (AWS), the National Electrical Manufacturing Association (NEMA), the Instrument Society of America (ISA), the California Building Standards Code, the American Concrete Institute (ACI), and other generally accepted national quality control organizations that issue standard specifications.

Material or manufactured articles shall be new and 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 material or articles of the kind required, with due consideration of the use to which they are to be put. In the event that requirements for any material to be used in the work are not specifically set forth in these



specifications, the Contractor shall submit information regarding the material he intends to use to the Engineer for the District's written approval prior to use in the work.

26. RESPONSIBILITY OF CONTRACTOR AND APPLICANT

The Contractor and Applicant shall take all responsibility for the work. They shall bear all losses resulting to them or to the District on account of the amount or character of the work or because the nature of the ground in or on which the work is done is different from what is assumed or expected or on account of weather, flood, unforeseen difficulties, accidents, or any other causes. They shall assume the defense of and indemnify and hold harmless the District and its officers, agents, and employees, from all claims of any kind arising from the performance of the contract, including claims for personal injury or death, claims for damage to property and claims for loss of business, and including all such claims as may be presented or asserted by officers, agents or employees of the Contractor, officers, agents, or employees of the District, and officers, agents or employees of subcontractors or third parties.

The District will call to the Contractor's attention all job site conditions or activities known to the District which are likely to create a risk of physical harm to workers or the public. The District will also note any failure to comply with safety rules and regulations when observed or made known to the District, and direct the Contractor to take immediate remedial action to correct such conditions or activities.

In the event that immediate action is not taken by the Contractor to comply with applicable safety rules and regulations and to correct such dangerous conditions or activities, the District reserves the right to stop work under the contract until corrective action is taken by the Contractor.

Regardless of any suggestion, direction or other activity by the District, the Contractor and its Surety will continue to indemnify and hold the District harmless under the foregoing provisions of this article. Likewise, any failure of the District to detect or to call attention to any such condition or lack of compliance with safety rules shall in no way relieve the Contractor of his obligations under the contract.

27. CONTRACTOR TO SUPPLY SUFFICIENT LABOR, EQUIPMENT AND MATERIAL

The Contractor shall at all times keep upon the premises a sufficient amount of material, shall have proper equipment available at the job site, and shall employ a sufficient number of workers to prosecute the work at the necessary rate to complete the contract within a reasonable time as determined by the District.

Should the Contractor, at any time during the progress of the work, refuse, neglect, or otherwise fail to supply sufficient material, labor, tools and equipment to prosecute the work at such necessary rate, the District may notify the Contractor in writing to furnish whatever the Engineer determines necessary to do so. If the Contractor does not comply with such notice



from the District within 3 working days of the date of notice, the District will notify the Applicant, stop the Contractor's work on the project, and arrange for alternate labor to complete the project.

The District shall have the option to terminate the contract should the Contractor at any time during the progress of the work neglect, refuse or be unable, in the judgment of the District, to supply sufficient material or workers to prosecute the work at the rate necessary to complete it within reasonable time determined by the District.

28. CONSTRUCTION PLANT, EQUIPMENT AND METHODS

The Contractor's plant and equipment and his methods and organization for handling the work, shall be such as will secure a satisfactory quality of work, and a rate of progress which, in the judgment of the Engineer, will insure the timely completion of the work.

The Contractor shall give the Engineer complete, advance written information regarding his plans for prosecuting all parts of the work. If at any time in the judgment of the Engineer, the Contractor's plant or equipment or any of his methods of executing the work are unsafe, inefficient, or inadequate to insure the required quality or rate of progress of the work, the Contractor and Applicant will be notified of deficiencies.

The Contractor and Applicant shall promptly rectify the deficiencies. Neither correction of deficiencies nor failure of the Engineer to cite deficiencies shall relieve the Contractor from his obligation to secure the degree of safety and the quality of work required by the contract. The Contractor alone shall be responsible for the safety, adequacy and efficiency of his plant, equipment and methods.

29. COOPERATION

The Contractor shall cooperate with all other contractors and workers who may be employed by the District on any work in the vicinity of the work to be done under the contract. The Contractor shall conduct the work to avoid interference with the work of such contractors or workers. He shall also assume all liability for any damage to the work of other contractors or injury to employees of the District resulting from his work.

Any difference or conflict which may arise between the Contractor and other contractors or between the Contractor and District employees in regard to their work shall be resolved by the Engineer. The District shall have full authority to coordinate the timing and integration of associated projects or contracts and the Contractor agrees to follow and be bound by the decisions of the Engineer. The Contractor shall suspend or continue any part of the work in a manner prescribed by the Engineer, when such suspension or prosecution is necessary to facilitate the work of other contractors or workers working for the District.



The Contractor shall be liable for any damage or delay to the work of the other contractors or workers which may be caused by unnecessary delay or carelessness on his part.

30. INSPECTION

All work and material (including the manufacture and preparation of such material) from the beginning of the construction until final completion and acceptance of the proposed work, shall be subject to the inspection and approval by the Engineer.

Unless otherwise authorized, work shall be done only in the presence of the Engineer. Any work done without proper inspection will be subject to rejection. The Engineer shall at all times have access to the work during its construction or fabrication at shops and yards as well as the project site. The Contractor shall provide every reasonable facility for ascertaining that all material and workmanship conform to the contract documents.

Any work or material found to be in any way unsatisfactory or defective before the acceptance of the proposed work shall be corrected or replaced immediately by the Applicant and the Contractor at their own expense, regardless of the fact that it may have been previously overlooked or passed by the Engineer. Inspection of the work shall not relieve the Applicant and Contractor of the obligation to fulfill all conditions of the contract.

Whenever required by the Engineer, the Contractor shall furnish all labor, material, tools and equipment necessary to make an examination of any work under the contract that may be completed or in progress, even to the extent of uncovering or taking down portions of the previously inspected, finished work. Where such uncovering or taking down is necessitated by the Contractor's violation of law or breach of contract, or where such work is found unsatisfactory, all costs associated with making such examination and of reconstruction shall be borne by the Contractor.

31. LINES, GRADES, MEASUREMENTS AND SURVEYS

All work under the contract shall be done to the lines and grades indicated in the contract documents or prescribed by the Engineer. The Contractor shall lay out all work, including structures and pipelines, and shall be responsible for any errors resulting. He shall provide all necessary surveys, field staking, and positioning for the construction of all components at the proper alignment, elevations, grades, and positions, as indicated on the Drawings and as required for the proper operation and function. The Contractor shall stake his own work area limits as shown on the drawings.

It may be necessary at times that portions of the Contractor's work be discontinued for brief periods, in order that the Engineer may make measurements or surveys without interruptions or other interference that might impair the accuracy of the results. At any time, on request of the Engineer, the Contractor shall discontinue his work to such extent as may be necessary for such purposes of the Engineer.



The Contractor shall not be entitled to payment for work or delays associated with the establishment or checks of lines, grades or measurements.

32. LINE AND GRADE CHANGES

The Engineer may change the alignment, grade or dimensions of any portion of the work from those indicated in the contract documents at any time prior to startup or during work under the contract.

If such a change involves abandonment of current contract work which was complete prior to the change by the Engineer, the Applicant may file a written protest to determine responsibility. No payment will be made for segments of the abandoned work performed subsequent to the notice of abandonment.

33. NOTICE OF COMMENCEMENT/CESSATION OF WORK

Before any work under the contract is started, the Contractor shall inform the Engineer of the time and place of work commencement, and the nature of the work to be done, in order that the Engineer may make proper provision for inspection of the work, for furnishing of lines and grades and for making measurements for records. Such information shall be given to the Engineer at least 4 working days in advance of the time at which the Contractor proposes to begin the work.

The contractor shall inform the Engineer of any work cessation at the site. Such notice shall include an estimate of the time that the Contractor expects to be off the job site. The Contractor shall notify the Engineer of his commencement of further work on the site at least one day prior to resumption of work.

34. CHANGES IN THE SCOPE OF WORK

The District may order alterations in the amount or dimensions of all or any part of the work contemplated, and may direct the Contractor via the Applicant to furnish any extra material and perform any extra work that the District may consider necessary or desirable for the proper construction and completion of the work.

35. EXTRA WORK

Any work which in the judgment of the Engineer is not covered by the contract documents is extra work. The Applicant shall have the Contractor perform all such extra work when ordered by the Engineer and after acceptance of the order by the Applicant and the Contractor. Performance of extra work shall include the furnishing of all required labor, material, tools, equipment and other facilities as may be necessary to complete the extra work.



36. ACCEPTANCE OF WORK

When the Contractor is satisfied that all work is complete and ready for use, he shall notify the District in writing to that effect. Upon receipt of such notice, the Engineer will make a verification inspection. If the work is found to be satisfactory, the Contractor will be so notified.

37. TERMINATION OF CONTRACT

After giving the Applicant and Contractor 7 days written notice, the District may, without prejudice to any other right or remedy, terminate the contract if either the Contractor or Applicant:

(1) files for protection under the Bankruptcy Act; (2) experiences a general assignment made for the benefit of any of their creditors; (3) has a receiver appointed for either of them; (4) persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper material; (5) fails to make prompt payment to subcontractors or for material or labor; (6) persistently disregards laws or regulations or the orders of the District; (7) is otherwise guilty of a material breach of any provision of the contract.

The Contractor shall not be entitled to any payment nor will any facility be accepted for work done after the date of termination notice. It is the Applicant's responsibility to remedy the situation that led to termination. If the Applicant fails to remedy the situation or is unable to have another Contractor continue the work, the Contract shall be void.

38. CANCELLATION OF CONTRACT

The District in its discretion may cancel the contract when conditions encountered during the work make it impossible or impracticable to proceed, or when the District is prevented from proceeding with the contract by act of God, by law, or by official action of a public authority. Any remaining deposits will be refunded to the Applicant.

39. PROTESTS

If the Contractor considers any work demand to be beyond the requirements of the contract, or if he considers any instruction, order, notice, ruling, omission or decision of the Engineer to be unfair, he shall file a written protest with the Engineer within 15 days after knowledge of the same. The protest shall clearly state the Contractor's objections and reasoning. Unless such protests and objections are made of record in the manner and within the time stated above, the Contractor shall be deemed to have waived and does hereby waive all claims for extra work and damages on account of demands, instructions, orders, rulings, omission and decisions of the Engineer.



Upon receipt of any such protest from the Contractor, the Engineer shall promptly review it and advise the Contractor in writing of his decision. This decision shall be final and binding on all parties, unless the Contractor files a formal claim with the District.

40. CLAIMS

If the Contractor does not agree with the Engineer's decision regarding a protest, he may file a formal written claim within 15 days of the Engineer's written decision. Failure to submit and document a claim in the manner and within the time stipulated in this article shall constitute a waiver of all claims in connection with the underlying protest.

In addition to information provided in the protest, the claim shall include references to applicable provisions of the specifications and other pertinent factual data. The Contractor shall maintain complete and accurate records of his activity.

The Contractor shall have no claim for loss of anticipated profit on portions of the work not performed or for interest on any payment which is the subject of the claim.

The District's General Manager shall consider the claim and render a final decision on any such claim within 30 days of receipt.

41. USE OF IMPROVEMENT DURING CONSTRUCTION

The District reserves the right to take over and utilize all or part of any completed facility or appurtenance. The Contractor will be notified in writing in advance of such action. Such action by the District will relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use or from the action of the elements or from any other cause, except injury or damage resulting from the Contractor's operations or negligence. The Contractor will not be required to reclean such portions of the improvement before field acceptance, except for cleanup made necessary by the Contractor's operations. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials.

42. CONTRACTOR'S SUPERINTENDENTS OR FOREMEN

The Contractor shall at all times during his absence be represented on the work by one or more superintendents, foremen or other representatives authorized and competent to receive and carry out any instructions that may be given to him (them) by the Engineer. The Contractor shall be liable for the faithful observance of any instructions delivered to him or to such representative(s) on the work.



43. CONTRACTOR'S EMPLOYEES

The Contractor shall employ only competent and skillful workers on the work. Upon notice, the Contractor shall immediately discharge any worker that in the judgment of the Engineer is incompetent, unfaithful, disorderly, or refuses to carry out the provisions of the contract, uses threatening or abusive language to any person on the work representing the District or is otherwise unsatisfactory. That worker shall not be re-employed on the work without the consent of the Engineer.

44. USE OF DRUGS/SMOKING

The Contractor shall not permit alcoholic beverages, narcotics, hallucinogenic or other controlled substances nor the presence of employees or subcontractors' employees under the influence of such drugs about the work, or upon any area occupied by him in the prosecution of the work. Drugs for medicinal purposes will be allowed if they do not impair work performance or job safety.

Smoking will not be allowed inside any of the District's buildings or on the District's Watershed Lands.

45. NIGHT AND WEEKEND WORK

If at any time the Engineer deems it necessary, the Contractor may be required to prosecute the work at night or on weekends. In addition, if the Contractor requests to do work at night or on weekends, he may be allowed to do so if approved by the Engineer. The Applicant and/or Contractor shall bear all costs for inspection of night and weekend work unless otherwise indicated in writing by the Engineer. No such work shall be done unless previously approved in writing by the Engineer.

46. OVERTIME WORK

Regular District working hours are 7:00 AM to 4:30 PM, Monday through Friday, excluding holidays observed by the District. The Contractor or Applicant shall keep the Engineer fully informed of all work outside these working hours in order to assure proper scheduling of required inspection and materials testing personnel. Upon written request, the District will notify the Applicant of the costs of inspection of such work and the costs shall be charged to the Applicant. All inspection work outside the regular working hours as described above or beyond 8 hours per day on any particular job, will be charged at each inspector's current overtime rate with applicable overhead.

47. PROTECTION OF WORK, PERSONS AND PROPERTY AGAINST DAMAGE

The Contractor shall protect his work and material from damage due to the nature of the work, the action of the elements, the carelessness of other contractors, or any other cause, until the



completion and acceptance of the work. Should any damage occur, he shall repair it at his own expense to the satisfaction of the District. Neither the District nor any of its agents assumes any responsibility for collecting indemnity from any person, or persons, causing damage to the work of the Contractor.

The Contractor shall bear all responsibility for personal injuries, death or property damage caused by or arising from his performance under the contract. Whenever reasonably necessary to prevent the same, the Contractor shall furnish guards, fences, warning signs, walkways, lights, barricades, and any other necessary precautions. All efforts shall be made by the Contractor to avoid damage to trees and other plants. All landscaping, including but not limited to lawns, trees, shrubs, fences, driveways, walkways and paths shall be restored as nearly as practicable to their original state. All safety orders, rules and recommendations of the District, the City, or County in which the work is to be done, and the State of California Division of Industrial Safety and the Occupational Safety and Health Administration (OSHA) applicable to the work to be done under this contract, shall be obeyed and enforced by the Contractor. No order or direction of the Engineer or any other representative of the District shall relieve the Contractor of any such responsibility.

The Contractor shall bear all responsibility for determining any possible fire hazard in the area in which work is to be performed and shall observe all rules and regulations of the responsible fire department or jurisdiction. In the event a fire is started by the Contractor, the work force on the site shall be at the disposal of the fire fighting agencies for purposes of checking and extinguishing the fire. In such an event, there shall be no claims against the District, the City, the County or the State and all claims for damage shall be the responsibility of the Contractor.

The Contractor acknowledges that he has fully considered all risks, hazards and safety measures particular to this contract. If at any time it appears that the proposed work or installations will create or cause any risk to persons or property, the Contractor shall assume all responsibility to avoid and eliminate such hazard or risk and shall take such additional steps and provide such additional safety measures as are reasonably required to eliminate them.

The District may, at its option, retain deposits due under the contract and/or require that the Applicant withhold all payments due to the Contractor until all suits or claims for damages have been finally resolved by satisfaction of judgment or settlement and satisfactory evidence to that effect is furnished to the District. In addition, service will not be issued until resolution of all suits or claims.

48. PROTECTION OF EXISTING FACILITIES

The Applicant shall assume the financial responsibility for timely removal, relocation, or protection of existing main or trunkline utility facilities located on the construction site which are not identified with reasonable accuracy in the contract documents. It shall be the responsibility of the Applicant and Contractor to determine the costs of locating, repairing damage not due to the Contractor's negligence, removing, or relocating such facilities.



Upon learning of the existence and location of any utility omitted from or shown incorrectly on the plans, or not properly field marked, the Contractor shall immediately notify the Engineer in writing.

The Contractor shall bear all responsibility for removal, relocation, or protection of all other existing facilities, utilities, underground structures and private property in the work area. He shall at all times prosecute his work so as not to damage said facilities, utilities, structures or property nor interfere with their safe operation and use.

The Contractor shall make arrangements with the owners of all utilities and underground structures to have them located and marked before work may commence in any particular work area. In addition, the Contractor shall expose all existing utilities along the work prior to work startup.

Whenever existing utility mains, laterals, conduits, ducts, pipes, or structures are in conflict with the grade and alignment of the work, they shall be permanently supported, removed, relocated or reconstructed by the Contractor through cooperation with the owner of the obstructing facility.

When working close to existing underground facilities the Contractor shall protect the facilities encountered. Except as specified above, the cost of repairing, replacing or protecting these facilities shall be borne completely by the Contractor. If in the judgment of the Engineer the Contractor is not taking proper precautions, the District will stop the Contractor's work on the project, notify the Applicant and proceed to terminate the Contractor's contract unless proper protection is provided.

Should any such facilities, utilities, structures or property be damaged during the Contractor's operations, he shall immediately notify the property owners or authorities and arrange for immediate repair at his expense.

49. ILLUMINATION OF WORK

When any work is performed at night or in a place where there is little or no daylight, the Contractor shall provide artificial light sufficient to prosecute the work properly and safely and to permit thorough inspection.

50. TRAFFIC CONTROL

During working hours, two-way traffic shall be maintained on all traveled roadways in the construction zone. Whenever the traveled way is reduced to one lane, the following conditions shall be met:



- a. Proper traffic control shall be in effect at all times as described in the State of California Division of Highways pamphlet, Instructions for Flagmen.
- b. There shall be two full-time flagpersons, one at each end of the work area. Each flagperson shall be equipped with a red vest, "STOP/SLOW" paddle and a red flag. In addition, portable radio communication shall be used as directed by the Engineer.
- c. Signs warning motorists of the upcoming obstructions shall be placed an adequate distance ahead of the work area and shall be maintained at all times. Proper coning, as determined by the Engineer, shall be maintained at all times to direct traffic safely.
- d. Failure to comply with the above rules or to maintain traffic control in a safe manner at all times shall be cause for the immediate shutdown of the work.

The Contractor shall furnish all necessary flagpersons and traffic control equipment in the areas where work is being performed and routing and directing of traffic is required. The areas in which flagpersons are required, the number of flagpersons, and the amount of traffic control equipment, shall be determined by the Engineer.

All temporary surfacing shall conform to existing pavement elevation as precisely as practicable. Prior to final paving, the Contractor shall maintain temporary paving surfaces to insure safe, convenient travel by users of the roadway. Temporary paving shall be patched on a daily basis as directed by the Engineer.

51. ROAD ACCESSIBILITY AND OPEN TRENCH

No roads shall be blocked or made inaccessible, due to the Contractor's work, without prior written approval of the Engineer and the affected agencies. The length of trench excavation in advance of the pipe laying operation and amount of ditch remaining open without backfill will be regulated by the Engineer in accordance with field conditions. Any such requirement placed on the Contractor shall not be considered as a claim for delay of work.

52. PUBLIC INCONVENIENCE

The Contractor shall take all necessary steps to minimize inconvenience to the general public throughout all work under this contract. No driveways or private roads shall be blocked without notifying the property owner and access must be restored during all non-working hours. Safe access must be maintained for pedestrian traffic throughout the work area at all times. At least one lane of the street must be kept open at all times unless prior arrangements have been made with all involved parties.

All stockpiled material and parked equipment at the job site shall be located to avoid interference with private property and to prevent hazards to the public. Locations of stockpiles and parking areas must be approved by the Engineer.



53. DRAINAGE PROTECTION

If the proposed work may be performed during the rainy season, the Contractor shall act to maintain existing drainage facilities by working carefully around them. He shall not divert water on private land nor permit water to pond. He shall not inconvenience the public or jeopardize its safety.

54. DUST ABATEMENT

At all times during work performance, the Contractor shall exercise proper and efficient measures to prevent his operations from producing dust in amounts which may cause damage to property or a nuisance to persons in the general vicinity of the work. Water to settle the dust may be available from the District's facilities. If District water is not available, the Contractor shall arrange for alternate water sources at his expense.

55. HAULING OVER CITY STREETS, COUNTY ROADS AND ALL HIGHWAYS

The Contractor shall obtain all required permits for hauling over City streets, County roads and State or interstate highways. He shall strictly follow permit requirements, particularly load limitations. Full responsibility for hauling shall be borne by the Contractor.

56. CLEAN UP

During the progress of the work the Contractor shall keep all his work areas in a neat and clean condition. As directed by the Engineer, refuse shall be removed in a satisfactory manner as often as may be necessary to prevent any accumulation of rubbish.

The discharge of solid or liquid waste materials into stream channels from the construction area will not be permitted at any time. Any substances which are individually, cumulatively or collectively considered toxic or harmful to humans, wildlife, vegetation or aquatic biota, shall be kept under control at all times and must not be allowed to escape the construction area. All such substances shall be completely contained during transportation and storage, and used safely without spillage.

Following the completion of any portion of the work, the Contractor shall promptly remove all of his equipment, temporary structures and surplus material, except as otherwise provided, and shall satisfactorily dispose of all refuse resulting from the work, leaving the premises in a neat and clean condition.

Each job site shall be clean at the end of each working day. The Contractor shall remove all dirt, debris, material, etc., which might be an inconvenience or hazard to vehicular or pedestrian traffic. All clean-up operations shall be done to the satisfaction of the Engineer, and



final clean-up shall not lag behind the completion of the construction operation by more than 3 working days.

57. MATERIAL TO BE OBTAINED FROM THE DISTRICT

When indicated in the Contract Documents, certain material will be provided by the District to the Contractor. This material shall be obtained by the Contractor at the District's yards in Corte Madera or San Rafael, California, or other designated sites.

The Contractor shall provide all labor, tools, material (i.e. dunnage, tie downs, etc.) and equipment necessary for loading, hauling and unloading material from the storage points to the job sites. The Contractor shall be responsible for the proper and careful handling of all material from the time it is obtained until it is properly and completely installed and accepted by the District. Any damage to material during this time shall be brought to the Applicant's attention by the Contractor, but shall remain the Contractor's responsibility. The Applicant and/or Contractor shall bear all costs of repairing or replacing such material.

Prior to commencement of work under the contract, material to be furnished by the District will be issued only upon written request by the Contractor if submitted to and countersigned by the Engineer at least 4 working days prior to furnishing of such material. No material will be issued until complete execution of the contract and fulfillment of all preconstruction requirements. After work has commenced the Contractor shall give the District at least a 24-hour notice prior to drawing of material. Receipts for material which are signed by the bearer of the request shall be conclusive evidence of the delivery of the specified material to the Contractor. All excess material shall be returned undamaged to the point from which they were obtained within 5 working days after written request by the Engineer. All damaged or missing material will be charged to Applicant.

The District will furnish reasonable quantities of free water to load, flush and pressure test the new water main. Water will be provided from District facilities through the inspector's construction meter. The Contractor or Applicant is required to obtain a hydrant meter for all other uses related to subdivision work (i.e. grading, dust control, etc.) and pay for the use of that water. Use of fire hydrants is subject to permission from the applicable local fire jurisdiction and operation of hydrant valves will not be permitted. Care shall be exercised in drawing water from District facilities and the Contractor shall comply at all times with instructions from the Engineer in this regard. The Contractor shall be liable for any damage or waste resulting from improper drawing of water.

58. RESPONSIBILITY FOR MATERIAL

The Contractor shall be responsible for all material that he furnishes and shall replace at his own expense all such material found to be defective in manufacture, damaged in shipping or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of such defective material.



The Contractor's responsibility for material furnished by the District shall begin at the point of delivery to the Contractor. The Contractor shall examine all material furnished by the District at the time and place of delivery to him and shall reject all defective material. Any material furnished by the District and installed by the Contractor without discovery of such defects will, if found defective prior to final acceptance, be replaced with sound material by the District. However, the Contractor, at his own expense, shall furnish all labor and equipment necessary to remove said defective material and install the sound material in a manner satisfactory to the Engineer.

59. SALVAGE OF MATERIAL

During the work all salvageable material, equipment or appurtenances which are removed from existing facilities shall remain the property of the District and shall be returned to the District yard. The determination of which material is salvageable shall be made by the Engineer whose decision shall be final. Material which is not designated salvageable shall become the property of the Contractor and be removed from the site of the work.

60. SAMPLES AND TESTS OF MATERIAL AND WORK

Upon request of the Engineer, the Contractor, at his own expense, shall prepare and furnish samples and test specimens of any material not obtained by the District, and identify the source of such material.

All samples shall be submitted with ample lead time to enable the Engineer to make any tests, analyses or examinations the Engineer deems necessary prior to incorporation of such material into the work.

All tests of the completed work required by the specifications shall be made by the Contractor under the direction of the Engineer. In addition to bearing the costs of testing, the Contractor shall repair all damages to the work resulting from test failure at no expense to the District.

In order that the District may determine the Contractor's compliance with contract requirements that are not readily enforceable through inspection or tests of the work and material, the Contractor shall, upon request, submit to the Engineer properly authenticated documents or other satisfactory proofs of compliance with such requirements.

61. DEFECTIVE MATERIAL AND WORKMANSHIP

Material, work or workmanship which, in the judgment of the Engineer, does not conform to the specifications and drawings, are not equal to the samples submitted to and approved by the Engineer, or are in any way unsatisfactory for their intended purpose shall be rejected. The Contractor shall remove all rejected material from the work without delay. If the Contractor fails to do so within 48 hours after having been so directed by the Engineer, the District may



stop the Contractor's work on the project, notify the Applicant and make arrangements for other labor to remove the rejected material.

Unsatisfactory material and workmanship may be rejected at any time during the progress of the work, regardless of any previous testing, inspection or acceptance of such material or workmanship.

62. PATENTS

All fees or claims for use of any patented invention, article or arrangement that is in any manner connected with the performance of the proposed work shall be included in the price bid for doing the work. The Contractor and his Sureties shall protect and hold harmless all officers and employees of the District against: (1) all demands made for such fees or claims; and (2) against all suits and claims by the holder of any invention or patent, or growing out of any alleged infringement of any patent. Before final payment is made, the Contractor shall furnish acceptable proof to the District of a proper release from all such fees or claims.

Whenever any article or class of materials is specified by a trade name, or by the name of a particular patentee, manufacturer, or dealer, the requirements of the specifications will be satisfied by the use of either the specified item or any other item that the Engineer determines is equal in quality, finish, durability, and serviceability for its intended purposes.

63. CONTRACTOR TO SERVE NOTICE OF DELAYS

Whenever the Contractor experiences or foresees any delay in the prosecution of the work, he shall immediately notify the Engineer in writing of the actual occurrence or probability of such delay and its cause. From this information, the District will be able to determine how long a delay may continue and to what extent the prosecution and completion of the work will be delayed.

64. COMMUNICATION

During the performance of this Contract, the Contractor, or an on-site representative, shall be accessible during normal working hours by telephone, to receive instructions or other communication from the District. The Contractor shall maintain communication with the District through a cellular phone or shall respond to calls sent to a pager/beeper. The Contractor shall provide either a cellular phone or a pager and shall supply the District with the appropriate telephone number for communication.

65. USA NOTIFICATION AND UTILITY FIELD MEETING

The Contractor shall contact Underground Service Alert (USA) (1-800-642-2444) seven (7) calendar days prior to start of work and shall be responsible for maintaining a valid USA location tag through renewal during the construction. The Contractor shall schedule a utility



field meeting prior to any excavation. This shall be so stated in the USA Notification. The Contractor shall be responsible to coordinate the utility field meeting at which time he shall explain the limits and impacts to USA member utilities.

66. COMPLIANCE WITH ENVIRONMENTAL LAWS

During construction, the Contractor shall comply with all pertinent requirements of Federal, State, and local environmental laws and regulations, including, but not limited to the Federal Clean Air Act, State and local air pollution and noise ordinances, and constructions sire erosion control regulations.

The Contractor shall submit an erosion control plan to the Engineer prior to construction and must have erosion control in place at least 48 hours prior to construction.

67. DISTRICT HARASSMENT POLICY

The District is committed to providing a work environment that is free of discrimination and harassment. In keeping with this policy, the District prohibits discrimination or harassment of any kind, including discrimination on the basis of sex, race, color, religion, creed, age, mental or physical disability, medical condition, national origin, ancestry, marital status, veteran status, citizenship status, military service, sexual orientation or any other characteristic protected under federal law, state law or local ordinance. Harassment and/or discrimination of District employees by the Contractor, its employees, agents and/or subcontractors is prohibited.

This Contract specifically incorporates the District's Anti-Harassment and Discrimination Policy. All Contractors, their employees, agents and subcontractors are required to follow the District's Anti-Harassment and Discrimination Policy. Contractors will be provided a copy of the District's policy upon request. Failure to follow the policy shall be cause for termination of the Contract or discharge of a Contractor's employee.



SUBDIVISION SECTION 01300

CONSTRUCTION SUBMITTALS

PART 1 - GENERAL

1.1 CONSTRUCTION SCHEDULE

The Contractor shall give one week notice in writing prior to the start of field work. Prior to the start of fieldwork, the Contractor shall submit for approval a construction schedule to the Engineer indicating the time and duration of any required equipment, plant, or system shutdowns. The schedule shall also show the critical path. This schedule shall be updated as work progresses.

1.2 CERTIFIED PAYROLL SUBMITTALS

The Contractor and all subcontractors shall submit certified payrolls in accordance with the MMWD General Specifications, Article 24, "Certified Payroll Submittals and Cost Data," on a weekly basis. These forms shall be submitted to the Engineer or his designated representative.

1.3 EMERGENCY CONTACT

The Contractor shall provide the District with a list of names and phone numbers of Contractor's representatives for 24 hour contact in case of emergency at the job site.

1.4 COMPETENT PERSON

The Contractor shall provide a list of Competent Persons as required in Article 53 of the General Specifications.

1.5 RECORD DRAWING SUBMITTALS

The Contractor shall maintain a neatly marked set of record drawings, in a format acceptable to the District, showing the installed location of all piping, mechanical equipment, and routing of new conduits, boxes, outlets, and major equipment, i.e., no less than what is shown on the plans.

Electrical, instrumentation, and control systems shop drawings shall be included as part of the record drawings. These drawings shall be appended by the Contractor to include PLC I/O addressing and wire tag numbers and shall be available for the functional test.

The record drawings shall be updated weekly and incorporated into the plans by the Contractor at the conclusion of the project and given to the Owner.

END OF SECTION

Subdivision Section 01300-1



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SUBDIVISION SECTION 01610

CONTRACT MATERIALS

PART 1 - GENERAL

1.1 GENERAL

The District will furnish the materials as listed on the schedule below. The Contractor shall furnish all materials not listed below. Exceptions shall be shown on the Plans. The quality of products provided by the Contractor shall meet the below requirements.

1.2 STANDARD OF QUALITY

All equipment and material shall be new, of the most recent model, and free from defects. Previously owned, previously installed, "like new," unused, surplus, rebuilt, repossessed, or reconditioned material or equipment is not acceptable. All equipment shall be the product of reputable suppliers having adequate experience in the manufacture of these particular items.

1.3 MATERIAL AVAILABILITY

All District furnished materials are stored at either the District's warehouse, located at 220 Tamal Vista Boulevard in Corte Madera, or the District's pipe yard, located on Pelican Way in San Rafael or in the case of hydrants, at the local fire jurisdiction. The only hydrants issued from the District's warehouse are "new" hydrants on Fire Flow Master Plan projects, unless otherwise noted on the Plans. See Standard Specification Paragraph 69 for "Materials to be obtained from the District." The pipe yard is only open on Monday, Wednesday and Friday from 8 am to 11 am.

1.4 CONSTRUCTION AND WORKMANSHIP

It is the intent of these specifications to establish quality standards and to require first-class workmanship in order to facilitate trouble-free operation and minimum maintenance of the project. The final completed installation shall display high quality work, employing industrial standards and methods.

PART 2 - PRODUCTS

2.1 PRODUCT SCHEDULE

The District shall provide all products described in the following specification sections:

Section 02655 - Cathodic Protection

Section 02713 - Distribution Piping System

Section 09801 - Field Applied Tape Coating System

END OF SECTION



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SUBDIVISION SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes specifications for furnishing, placing and performing earthwork for excavations, shoring, dewatering, backfilling, compaction and grading, at the required lines and grades, as shown on the drawings. The excavation shall include, without classification, the removal and disposal of all materials of whatever nature encountered, except hazardous waste. Water and all other obstructions, that would interfere with the proper construction and completion of the required work shall be removed and disposed of in accordance with the requirements of Section 18000 - ENVIRONMENTAL PROTECTION.

1.2 RELATED SECTIONS

- A. Section 02713 - DISTRIBUTION PIPING SYSTEM
- B. Section 03400 - CONTROL DENSITY FILL

1.3 REFERENCES

- A. ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb rammer and 18 in drop.
- B. ASTM D2216 - Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
- C. ASTM D2419 - Equivalent Value of Soils and Fine Aggregates
- D. ASTM D2487 - Classification of Soils for Engineering Purposes
- E. ASTM D2844 - Resistance R Value and Expansion Pressure of Compacted Soils
- F. ASTM D2922 - Density of Soil and Soil-Aggregate in place by Nuclear Methods (Shallow Depth)
- G. ASTM D3017 - Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.4 SUBMITTALS

- A. Sheeting and Shoring Plan: Refer to General Specifications, Article 11.



- B. Samples and Test Results: Furnish, without additional cost to the District, such quantities of import materials as may be required by the Engineer for test purposes. The Contractor shall cooperate with the Engineer and furnish necessary facilities for sampling and testing of all materials and workmanship. Submit test results for import materials. All material furnished and all work performed shall be subject to rigid inspection, and no material shall be delivered to the site until it has been favorably reviewed by the Engineer, or used in the construction work until it has been inspected in the field by the Engineer.

1.5 DUST CONTROL

Refer to Section 18000, Paragraph 3.2B.

1.6 SITE ACCESS

Access to the site will be over public and private roads. The Contractor shall exercise care in the use of such roads and shall repair at his own expense any damage thereto caused by his operations. Such repair shall be to the satisfaction of the owner or agency having jurisdiction over the road. The Contractor shall take whatever means are necessary to prevent tracking of mud onto existing roads.

1.7 SOILS TESTING

Listed below are the standard test methods to be employed by the District or by the Contractor's soils testing firm. The intent of these tests are to insure the quality of backfill material and the workmanship, methods and final product of the Contractor.

- A. In determining the in-place Density of Soil and Soil-Aggregate by nuclear methods, testing shall conform to ASTM D2922 or California Test Method No. 216.
- B. In determining laboratory moisture-density relationships of soils, testing shall conform to by ASTM D1557 or California test method No. 216.
- C. In determining the in-place moisture content of soils, testing shall follow ASTM D3017, ASTM D2216, California Test Method No. 226.
- D. In determining the Sand Equivalent, ASTM D2419 or California Test method No. 217 shall be used.
- E. In determining the resistance value, testing shall conform to ASTM D2844 or California Test Method No. 301.
- F. Classification of soils for Engineering Purposes shall be in accordance with ASTM D2487.



PART 2 - MATERIALS

2.1 EARTHWORK BACKFILL

The types of backfill material indicated below may be used for backfilling trenches as indicated in the specifications, shown on the Drawings or directed by the Engineer.

A. CLASS 2 AGGREGATE BASE

This material shall conform to the requirements set forth in Section 26 of the most recent CALTRANS Standard Specifications for the ¾" maximum size aggregate. Aggregate grading and quality requirements shall conform to the moving average criteria unless otherwise specified by the Engineer, and shall apply to material both before and after compaction.

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 account for up to 100% of the total volume of the aggregate used. Reclaimed material shall conform to the grading and quality requirements set forth in Section 26 of the most recent CALTRANS Standard Specifications for the ¾" maximum size aggregate." The Contractor shall be required to demonstrate that the recycled Class 2 aggregate base material meets CALTRANS standards. See the following link to the CALTRANS web site:

<https://dot.ca.gov/programs/design/standard-plans-and-standard-specifications>

B. SELECT SAND

This material shall be a clean material free of organic or other deleterious substances and of such gradation that a minimum of 90% will pass a No. 4 sieve and not more than 5% will pass a No. 200 sieve. If low chloride sand is required, the chloride content shall not exceed 30 parts per million by weight.

C. CONTROL DENSITY FILL

If CDF is used, see Section 03400 - Control Density Fill.

D. NATIVE BACKFILL

If native soil is allowed, prepare native soil as necessary to be free from clods or rocks larger than 3 inches in greatest dimension, and free from organic material and as approved by the Engineer.



E. DRAIN ROCK OR GRAVEL

If drain rock or gravel is required, river run or crushed rock with a maximum dimension of 3/4 inch, with no more than 10 percent passing the No. 200 sieve, and with a durability index of 40 or higher shall be used.

2.2 UNACCEPTABLE MATERIAL

Unless otherwise specified, backfill material shall not contain quarry waste, quarry fines, pea gravel, recycled materials and like material. In addition, any material not conforming to the specifications of Section 2.1 or failing performance testing shall also be unacceptable.

2.3 TRENCHLESS TOOLS

The following is a list of manufacturers that supply equipment relevant to the trenchless techniques described elsewhere in this section.

1. "Ditch Witch" by Charles Machine Works, Inc. (Perry OK) 800-654-6481.
2. "Pow-R Mole" by Petersen Underground Equipment, Inc. (Murray UT) 800-325-6419.
3. "Hole-Hog" or "Red Hog Express" by Allied Construction Products (Cleveland, OH), 216-431-2600.
4. "Ferret" by Footage Tools (Weston, Ontario Canada), 416- 746-2911.
5. "GRUNDOMAT" and "GRUNDORAM" by TT Technologies, available from Plank, (Petaluma CA), 707-763-7070.
6. LTA Corporation (Columbia Heights, MN) 612-781-4292.
7. Hacker Industries (Henderson TX) 908-657-3546.
8. ACCU-PUNCH by Vibra King, Inc. (Mankato, MN), 507-387-6574.
9. "Mighty Mole" by McLaughlin Boring Systems (Greenville, SC) 800-435-9360.
10. Grice Industries, 541-341-4644

PART 3 - EXECUTION

3.1 USA NOTIFICATION AND UTILITY FIELD MEETING

The Contractor shall contact Underground Service Alert (USA) (1-800-642-2444) seven (7) calendar days prior to start of each section and shall be responsible for maintaining a valid USA location tag through renewal during the construction. The Contractor shall schedule a utility field meeting prior to any excavation. This shall be so stated in the USA Notification. The Contractor shall be responsible to coordinate the utility field meeting at which time he shall explain the limits and impacts to USA member utilities.

See CA Government Code 4215.



3.2 EXISTING UTILITIES

The Contractor shall expose all existing utilities along the trench alignment and at connections prior to commencement of the work on the project for the pipeline installation. This is to be done in order to determine the line and grade of existing utilities, possible conflicts and mismarks. At connections, the Contractor shall expose the existing pipeline to determine the depth at which the connection is to be made and verify existing pipe material and sizes.

If the contractor damages any existing utilities, the contractor shall immediately notify that utility and make repairs satisfactory to that utility.

3.3 PROTECTION OF EXISTING SURVEY MONUMENTS

The Contractor shall not disturb, remove, alter or destroy any existing land survey monument. In the event that the Contractor believes that a monument will be thus impacted, the Contractor shall notify the Engineer. The Contractor shall allow 10 working days for the Engineer to establish sufficient data to reset the monument after the completion of construction.

3.4 SITE GRADING

- A. Rough Grading: After completion of stripping, the Contractor shall rough grade cut areas to the lines, grades and contours shown on the Drawings.
- B. Proof-Rolling: After rough grading, the Contractor shall proof-roll the areas where on-grade structures are to be constructed in order to detect soft zones. Proof-roll shall consist of passing over all required areas with a loaded scraper, front-end loader with loaded bucket, or other heavy rubber tired vehicle with high tire pressure, in the presence of the Engineer. The Engineer will determine which areas tested by proof-rolling are soft zones that require the Contractor to complete following corrective work.
 - 1. Soft Zone Corrective Work: Remove all soft material as indicated by the Engineer from all soft zones exposed by proof-rolling. Properly dispose of unsuitable material off site.
 - 2. Fill the resulting voids with moisture-conditioned Native Backfill, in level 8-inch uniform layers measured before compaction. Compact with appropriate equipment to at least 95 percent relative compaction.
 - 3. Soft zone corrective work will be considered a change in the scope of project work and will be paid for in accordance with Article 47 "Changed Conditions" of the General Conditions.



- C. Scarifying: The Contractor shall scarify, to a minimum 6-inch depth, all areas where fills are required. Moisture condition the scarified surface to within two percent of optimum water content, and compact to minimum 95 percent relative compaction.
- D. Fills:
 - 1. Do not place any fill until the Engineer has inspected, tested to his satisfaction, and favorably reviewed the prepared subgrade.
 - 2. Construct fills as shown on the Drawings, true to line, grade and cross-section. Construct fills of Native Backfill unless otherwise indicated. Place material in approximately 8-inch thick horizontal layers measured before compaction, and carried across the entire width to the required slopes. Compact all fills to a relative compaction of at least 90% unless otherwise specified. Properly moisture condition before compaction.
 - 3. The Contractor may be required to overbuild slopes and trim back to the compacted core to achieve adequate compaction of slope faces.
- E. Compaction requirements shall be 90% relative compaction. Material shall be moistened as required to aid compaction.
- F. Ditches: Cut ditches accurately to the cross sections and grades shown. Take care not to overexcavate ditches, and backfill excessive excavation to grade. Trim all roots, stumps, rock and other foreign matter from the sides and bottom of the ditches. Compact the surfaces of ditch slopes and bottom.

3.5 PAVEMENT REMOVAL

A. GENERAL

Excavation for the pipe installation shall be open cut and shall include the removal of all paving, concrete, soils, abandoned utilities, water, or other objects of any nature that would interfere with the performance of the work.

B. SAWCUTTING

In locations where the pipe is to be installed by open cut method under asphaltic concrete or concrete pavement sections, the outline of all pavement areas to be removed shall be sawcut prior to removal as required by the local jurisdiction in which the work is being performed. Any cutting that requires water shall be done with a vacuum system that collects all the water and does not allow any water or cutting products to flow into the storm drain. Sawcuts shall be neat and true, shall be cut completely through the existing pavement section to subgrade and shall be done without damaging adjacent pavement that is not to be removed. No jack-hammer, "drop hammer," or similar equipment will be allowed to cut the pavement. Grinding that results in cuts wider than 0.5 inch shall not be



considered as sawcuts. The Contractor shall anticipate that variations in the thickness of paving exist.

C. DISPOSAL

Pavement removed from the pipeline trench shall be hauled from the job and disposed at a County approved disposal site.

3.6 TRENCH EXCAVATION

A. GENERAL

Trench excavation for pipelines shall be open cut, except that service piping may be installed using either open cut or trenchless methods defined later in this section.

The trench shall be excavated to the lines and grades shown on the drawings and in accordance with trench details. If the trench is excavated below the required grade, the Contractor shall refill the trench excavated below the grade with compacted Class II Aggregate Base at no additional cost to the District.

The Contractor shall perform all excavation regardless of the type, nature, or condition of the material encountered to accomplish the construction.

B. TRANSPORT OF SPOILS

Backfill stockpiles and excavation spoils which are not immediately loaded and hauled away shall have local approval from local jurisdiction. This material shall be placed on the site away from trenches, street corners, and active work areas and shall be placed in such a manner as to minimize obstruction to traffic. Gutters and ditches shall be kept clear, or other provisions shall be made for the handling of drainage.

C. EXCAVATION FOR VALVE PLACEMENT

Mains shall be lowered below required minimum depths in the vicinity of gate valves 10-inches and larger in size. To accommodate the valve stem, the main shall be lowered as necessary to achieve the following minimum covers:

- For 10" valves, minimum cover of 36 inches
- For 12" valves, minimum cover of 38 inches

D. ALIGNMENT

The Contractor shall conform, as nearly as possible, to the pipeline alignment indicated on the plans unless modified by the Engineer. Whenever vertical or



horizontal deflection of the pipe is required to avoid obstructions or where long radius curves are permitted, the degree of deflection at joints shall be approved by the Engineer.

E. EXCAVATION AT BELL HOLES

When bell holes are required they shall be excavated at each point where pipe ends are to be joined. Bell holes shall be adequately sized to permit ease in making the joint. When necessary, bell holes shall be shored and protected in conformance with CAL/OSHA requirements.

F. SHORING

The Contractor shall at all times comply with Safety Regulations set forth in the State of California, Construction Safety Orders and Trench Construction Safety Orders, issued by CAL/OSHA's Division of Industrial Safety. No excavation shall start until the Engineer has received 1) a copy of the Contractor's permit for the project from the State Division of Industrial Safety and 2) a copy of all project notification forms and/or letters that he has forwarded to the CAL/OSHA District office.

Shoring shall follow a District approved shoring plan submitted by the Contractor. In order to prevent cave-ins and protect adjacent areas, excavation in unstable material shall be adequately shored and braced. Shoring shall remain in place until the pipeline has been installed, inspected and the earth compacted around and over the top of the pipe. Upon completion of the work the Contractor shall remove all shoring unless otherwise specified by the Engineer.

G. ROCK EXCAVATION

Wherever the word "Rock" appears in these Specifications, it shall be interpreted to mean any of the following: (1) material in ledges, bedding deposits of unstratified masses which cannot be removed without the use of hydraulic or pneumatic hammers or continuous drilling and blasting, (2) boulders larger than one cubic yard which, when first exposed, cannot be broken down from their original state with a modern 3/4 cubic yard backhoe power excavator or a Caterpillar D8 with a single tooth ripper, in good condition, and cannot be safely transported in a vehicle for disposal, (3) concrete, asphalt or masonry structures which have been abandoned and cannot be broken down from their original state with a modern 3/4 cubic yard backhoe power excavator, and (4) conglomerate deposits which are so firmly cemented that they possess the characteristics of solid rock and cannot be removed without systematic drilling.



H. TRENCHLESS INSTALLATION OF PIPELINES

Trenchless installation of pipelines shall be defined as installation of pipe using a technique that does not require open cut excavation along the length of the pipe installed. Examples of typical equipment include a pneumatic "mole," directional bore, or cable-drawn splitting head equipment. Specific techniques may be required in certain areas as indicated on the Drawings.

3.7 DEWATERING AND DRAINAGE

The Contractor shall provide all equipment and labor adequate to keep all trenches and excavations free of water. The Contractor shall keep excavated areas free of standing or flowing water during pipe installation, concrete placement, and backfilling operations by draining or pumping from a point that is outside the structural limits of work and below that of the excavation. The Contractor shall also provide a positive means to assure that no water will enter previously installed pipe. The Contractor is responsible for obtaining and complying with any discharge permits required by any appropriate regulatory authority and shall not direct drainage effluent in such a manner that damage to adjacent property or natural watercourses occurs.

3.8 REFILLING TRENCHES

A. GENERAL

The Contractor shall place backfill material around structures and in other areas, including overexcavation areas, as shown on the plans and as specified by the Engineer. Backfill shall be placed immediately subsequent to installation of the pipeline and appurtenances, and shall be installed in loose lifts not exceeding eight inches in depth. Compaction requirements shall be 95% relative compaction for Class II Aggregate Base Rock and 90% for native backfill to a depth of 18 inches below the bottom of the required paving and 90% relative compaction below that level. Material shall be moistened as required to aid compaction. No foreign materials (blocking) shall be left in the trench.

B. GEOTECHNICAL TESTING

1. TESTING BY ENGINEER

- a. Soils compaction tests will be taken on a random basis, approximately one test per 100 feet (location determined by the Engineer). Where testing is done, one test shall be taken on the lower lift and one on the upper lift of the base rock.
- b. Testing shall be accomplished in accordance with ASTM D2922 or California Test Method No. 216.



2. TESTING BY CONTRACTOR

- a. The Engineer shall have the right to witness any and all testing. In any case, all samples and test locations shall be selected by the Engineer.
- b. The testing laboratory shall be certified and shall be approved by the District prior to any testing commencing.
- c. The Contractor shall provide the District with certified test results within one working day after test completion.
- d. The Contractor shall bear all costs relating to the work performed by the outside agency. Costs for any failing verification tests which are run for/by the District shall be borne by the Contractor in the same manner as retests (see above).
- e. The Contractor shall provide the Engineer with at least a one day advanced notice prior to each test.

C. STEEL PLATES

Steel traffic plates shall not be used without the expressed written approval of the Engineer and the local jurisdiction in control of street openings and encroachments. It is the Contractor's responsibility to contact and secure permission for steel plate use prior to construction within each specific jurisdiction. Steel traffic plates, where approved, shall have a non-skid surface. The determination for use shall be made by the Engineer and shall be final.

D. COMPACTION EQUIPMENT, METHODS, AND REQUIREMENTS

1. GENERAL

Care shall be exercised in any method of backfilling to avoid damage to the protective coating or mortar lining of the pipe. It is important that proper precautions be taken to prevent floating of the pipe. The Contractor shall be wholly responsible for any damage resulting from failure to take necessary precautions when placing and compacting backfill. Compaction equipment or methods that produce horizontal or vertical earth pressures, which may cause excessive displacement or which may damage nearby structures, shall not be used. Use of a hydraulic hammer for compaction will not be allowed.

Backfilling shall conform to the requirements of the applicable local jurisdiction or those included in these specifications, whichever is more stringent. In the case of conflict between the requirements, the Engineer shall determine which shall prevail.



The Contractor should note that he shall be required to install impermeable dikes in areas where existing grades are 10% or greater. The Contractor shall be responsible to determine grades. Impermeable dikes shall be made of Type II concrete, or native clay soils compacted to 95%. Each impermeable dike shall be as wide as the trench, a minimum of six inches in thickness and extend from the bottom of the trench to a point 12 inches above the pipe. Dikes shall be located every 50 feet where required.

2. PAVED AREAS

Backfill materials shall be moistened to near optimum moisture content and shall be placed in the trench on both sides of the pipe for the full width of the trench. Sand shall be brought up evenly on both sides of the pipe. Said materials shall be placed into the trench by hand or by approved mechanical methods, and be compacted to provide solid backing against the external surface of the pipe. The Contractor shall not place or compact backfill above springline until the Engineer has inspected and approved the lower portion of backfill. Flooding of this lower portion of backfill will not be permitted.

The remaining backfill shall be placed in uniform horizontal layers not to exceed eight inches in loose thickness before compaction. Each layer shall be dampened sufficiently and uniformly tamped, rolled with a vibratory compactor or otherwise compacted throughout until the relative compaction is satisfactory. Non-uniform compacted surfaces may be rejected. Inundation of this upper portion of backfill will not be permitted. The material between the bottom of pavement and a plane 18 inches below that, shall be worked until a minimum relative compaction of 95% throughout is reached. Material below that plane shall be compacted to a minimum of 90% relative compaction throughout.

Backfill within 10 feet of any mainline valve, shall be placed and compacted in 6-inch lift thicknesses. Backfill shall be compacted to within one inch of finished grade prior to placement of temporary pavement. The Contractor shall compact temporary pavement daily on all surfaces where paving has been removed.

Impact compaction machines, such as a "Hydra Hammer", and backhoe mounted compaction machines, such as a HedShaker, shall not be used. The Contractor shall compact all backfill to the specified relative compaction as it is being installed. Wheel-rolling will not be allowed.

All excavations shall be restored to the elevation of surrounding pavement prior to completion of each day's work. If any sections of restored trench settles below the surrounding pavement, the Contractor shall re-work the trench to the same elevation as the surrounding pavement each day.



Any backfill material which cannot be compacted to the specified degree will be rejected. Any backfill material which pumps or is not firm will be rejected even if compaction requirements are satisfied. The Contractor, at his expense, shall remove the rejected material and replace it with suitable material.

Particular care shall be taken in the backfilling and compaction of the area around the taps to the main. Hand tamping will be required rather than equipment tamping or rolling.

3.9 DISPOSAL OF MATERIAL

Any excess backfill material or material rejected by the Engineer shall be removed from the job site by the Contractor. He shall make all necessary arrangements for disposal of excess material, at his cost, and upon request shall provide written evidence indicating approval to use the disposal site.

END OF SECTION



SUBDIVISION SECTION 02500

ASPHALTIC CONCRETE PAVING AND RESURFACING

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes specifications for all labor, material, testing, and equipment required to furnish and place asphaltic concrete paving and resurfacing on streets, bicycle and multi-use paths, and other areas as shown on the Drawings, described in the Specifications, and as required to provide a uniform, durable surface to satisfactorily support traffic loading and maintain existing drainage patterns.

1.2 RELATED SECTIONS

Section 02200 - EARTHWORK

Section 03302 - CONCRETE PAVING

Section 03400 - CONTROL DENSITY FILL

1.3 SUBMITTALS

Material submittals for the following are required in accordance with Section 01300 - CONSTRUCTION SUBMITTALS

- A. A mix design that is suitable for the traffic, climate conditions, curing conditions and final use.
- B. A certificate of compliance for asphaltic binder.
- C. Samples, specifications and manufacturer's recommendations on placement of pavement reinforcing fabric, if applicable.
- D. Latex emulsion specifications.

1.4 QUALITY ASSURANCE

Material tags for Asphaltic Concrete materials shall be submitted by the Contractor to ensure compliance with submittals. The Contractor shall notify the Engineer two working days prior to paving, so the Engineer may observe operations and take material samples.

1.5 COORDINATION

In order that acceptance tests and mix design tests can be completed prior to paving, surfacing, or sealing, at least two weeks in advance of paving or sealing operations the Contractor shall:



- A. Notify the Engineer of the source of materials and the mixing plant from which he intends to purchase paving materials.
- B. Provide material submittals as specified earlier in this section.

PART 2 - PRODUCTS

2.1 ASPHALTIC CONCRETE PAVING MATERIALS

A. PAINT BINDER (TACK COAT)

Diluted asphaltic emulsion, Type SS-1 conforming to Caltrans Standard Specifications Section 94.

B. PAVEMENT REINFORCING FABRIC

Fabric shall conform to Sections 39 and 88 of the Caltrans Standard Specifications.

C. ASPHALTIC CONCRETE

At the time of delivery to the work site, the temperature of the mixture shall be between 260 degrees F and 320 degrees F, the lower limit to be approached in warm weather and the higher in cold weather.

1. Aggregate: Type A, ½" maximum, medium grading, Caltrans Standard Specifications, Section 39.
2. Paving asphalt: PG 64-10 or 64-16 grade, steam refined paving asphalt, Caltrans Standard Specifications Sections 39 and 92.
3. Mix design: Conform to Caltrans Standard Specification, Section 39-2.

D. SAND SEAL

Sand seal shall be a Fine Type Bituminous Seal in accordance with Section 37 of the Caltrans Standard Specifications.

E. SLURRY SEAL

Slurry seal shall consist of asphaltic emulsion, Type II aggregate, and water in accordance with Section 37 of the Caltrans Standard Specifications.

F. FOG SEAL

Fog seal shall consist of a light spray application of SS-1h emulsified asphalt diluted with water in accordance with Section 37 of the Caltrans Standard Specifications.



G. CHIP SEAL

Chip seal shall consist of a spray application of asphalt to an existing surface, followed by a cover of rock chips or screenings, to function as a seal coat.

The asphalt used for chip seals must be fluid enough to wet and adhere to the chips and yet develop sufficient strength to bind the chips to the pavement and retain them under traffic conditions. All work and materials shall be in accordance with Section 37 of the Caltrans Standard Specifications.

H. LATEX EMULSION

Latex asphalt emulsion shall be a quick traffic, quick cure (QT-QC) type, shall be homogeneous and show no separation after thorough mixing, shall break and set on the aggregate within five (5) minutes and be ready for cross-traffic within five to thirty minutes.

Poly-chloroprene-methacrylic acid latex with polyvinyl alcohol shall be added to the water/soap phase prior to the mill manufacture of the emulsified asphalt by the emulsion producer. The amount of latex shall be between 2 and 3 percent of the asphalt residual content. Samples shall be provided.

2.2 STREET MARKING MATERIAL

All street marking material shall match existing material and shall be as specified in Section 84 of Caltrans Standard Specifications.

PART 3 - EXECUTION

3.1 TEMPORARY PAVING

Temporary paving is required unless otherwise specified.

- A. Temporary asphaltic plant mix shall be placed and compacted immediately after backfilling, road base compaction or pothole repairs have been completed. Temporary paving shall be repaired on a daily basis.
- B. The compacted temporary pavement shall have a minimum thickness of one inch or match permit requirements whichever is greater, shall have a relatively smooth surface, and shall be maintained at all times at a grade level with the adjacent street pavement surface, until permanent pavement is placed.
- C. Temporary pavement shall be removed just prior to placing the final pavement surfacing material, and disposed of at the Contractor's expense.



3.2 PROTECTION OF EXISTING SURVEY MONUMENTS

The Contractor shall not disturb, remove, alter or destroy any existing land survey monument. In the event that the contractor believes that a monument will be thus impacted, the Contractor shall notify the Engineer. The Contractor shall allow 10 working days for the Engineer to establish sufficient data to reset the monument after the completion of the construction.

3.3 SUBGRADE

The subgrade shall be prepared as specified in Section 02200, "Earthwork" as applicable to roadways. The surface of the subgrade after compaction shall be hard, uniform, smooth and true to grade and cross-section. Subgrade for pavement shall not vary more than 0.02 foot from the specified grade and cross sections. Subgrade for base material shall not vary more than 0.04 foot from the specified grade and cross section.

3.4 SURFACE PREPARATION

- A. After final pavement sawcutting and prior to final paving, any CDF, temporary paving and base fill shall be removed to a depth sufficient to allow paving restoration as required by the controlling jurisdiction's encroachment permit. The Contractor shall recompact any disturbed base material to 95%.
- B. Prior to placing final plant-mixed surfacing, the subbase and edges of sawcut pavement shall be cleaned to remove all mud, foreign material, dust and dirt.

3.5 SECOND PAVEMENT CUTS

If second pavement cuts are required by the Drawings, Encroachment Permit, or Engineer, the second cuts shall occur after all main pipe and service installations at an individual work site have been completed. Second cuts shall be made during the final paving operation, no earlier than five days prior to placing final plant-mixed permanent surfacing. Any cutting that requires water shall be done with a vacuum system that collects all the water and does not allow any water or cutting products to flow into the storm drain.

3.6 ASPHALTIC PAINT BINDER

Asphaltic paint binder shall be applied to all vertical surfaces of existing pavement, gutters, and construction joints, and to the existing base to be surfaced. The binder shall be uniformly spread at an approximate rate of 0.25 gallons per square yard of surface covered or as recommended by the manufacturer and reviewed by the Engineer.

NO BINDER SHALL BE PLACED IF THE PAVEMENT IS WET, OR IF THE AMBIENT TEMPERATURE IS BELOW 50 F.



Care shall be taken to prevent the application of binder to surfaces that will not be in contact with the new asphalt concrete pavements.

3.7 PAVEMENT REINFORCING FABRIC

After applying asphalt binder, if required by the contract documents, the Contractor shall install paving reinforcing fabric in strict accordance with the manufacturer's recommendations.

- A. Asphalt binder shall be applied to a width equal to the width of the fabric mat plus three inches on each side.
- B. All fabric shall be placed in a neat and smooth manner with a minimum amount of wrinkles as approved by the Engineer. If the fabric can be gathered together in a wrinkle or lap, and if the height of the doubled portion of extra fabric is ½-inch or more, the fabric shall be cut to remove the wrinkle, and then lapped in the direction of paving. Laps in excess of two inches shall be removed. The fabric shall make complete contact with the road surface.
- C. If a joint in the fabric is required, approximately 0.20 gallons per square yard of additional asphalt binder shall be applied to the joint, made by overlapping a minimum of 4-inches of fabric.
- D. Rolling of the fabric after placing will be permitted. Damage or distortion to the fabric resulting from vehicles, equipment or construction operations shall be repaired at the Contractor's expense.
- E. Public traffic shall not be allowed on the bare reinforcing fabric. Paving operations shall immediately follow fabric placement in order to minimize fabric exposure.

3.8 PAVING

- A. Permanent paving shall follow completion of all connections to the main line and transfers of services at each individual work site. Work sites are defined as each street or area listed in Special Provisions Section 01000 "LOCATION OF WORK."
- B. The Contractor shall conform to Caltrans Standard Specifications, Sections 19 and 39, and applicable City/County specifications for asphaltic concrete installation.
- C. The final paving surface (grade and thickness) shall be as required in the encroachment permit. Replacement of existing paving shall follow the encroachment permit covering that area of work but in no case shall paving be placed prior to the Engineer's approval of the finished road base installation. The final surfaces shall be subject to the approval of the Engineer and the controlling jurisdiction.



- D. Spreading, once-commenced, must be continued without interruption. No greater amount of the mixture shall be delivered in any one day than can be properly distributed and rolled during that day.
- E. Asphaltic concrete shall be placed in lifts of no more than three inches in thickness unless otherwise directed by the Engineer. For paving thicknesses of three inches or greater, paving shall be placed in a minimum of two lifts. Where two or more lifts are required, a tack coat shall be applied between each lift.
- F. The mix shall be compacted immediately after placing. Initial rolling with a steel-wheeled tandem roller, steel three-wheeled roller, vibratory roller, or a pneumatic-tired roller shall follow the paver as closely as possible. If needed, intermediate rolling with a pneumatic-tired roller shall be done immediately behind the initial rolling. Final rolling shall eliminate marks from previous rolling.

In areas too small for the roller, such as areas where pavement is less than four feet wide, a vibrating plate compactor or a hand tamper shall be used on each lift to achieve thorough compaction.

- G. The relative density after compaction shall be between 90 and 95 percent of the theoretical maximum density. A nuclear asphalt testing device shall be used at the discretion of the Engineer for determining the field density of compacted asphalt concrete.
- H. Asphaltic concrete shall not be placed when the atmospheric temperature is below 40 degrees F.
- I. Water valve access covers shall be adjusted to grade.

3.9 SEAL COATS

- A. Proportioning, mixing, and placing of seal coats shall conform to Section 37 of the Caltrans Standard Specifications. Latex Asphaltic Emulsion shall be added at a rate from 11 to 25 percent.
- B. Seal coats on trenches shall extend a minimum of 6 inches over the original pavement on each side of the trench, or as specified in the encroachment permit, whichever is greater.

3.10 STREET MARKINGS

- A. The Contractor shall furnish all equipment, materials, labor, and supervision necessary for installing pavement striping and markings as specified in the contract documents, or as required to replace markings which have been removed or damaged by construction operations. Street markings must be approved by the governing jurisdiction.



- B. Markings shall be replaced only when the pavement surface is dry and clear, and when the air temperature is above 40 degrees F.
- C. All equipment used in the application of pavement marking shall produce stripes and markings of uniform quality with clean and well-defined edges. Drips, overspray, improper markings and paint material tracked by traffic shall be immediately removed from the pavement surface as directed by the Engineer.
- D. The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimensions, and application of pavement delineation.
- E. When part of a pavement marking has been removed or obliterated, the ENTIRE MARKING shall be restored. The Contractor shall replace complete words or lines for all letters or lines of street markings that are removed or partially destroyed during construction operations. Restored word markings, letters, numerals, and symbols shall be identical to existing. All templates and stencils shall be obtained by the Contractor.
- F. The Contractor shall remove all temporary street markings and signs upon completion of each job under this project.

3.11 OVERLAY ASPHALT

- A. Planing Asphalt Concrete Pavement
 - 1. Existing asphalt concrete shall be planed at the location and to the dimensions shown on the plans and in accordance with these special provisions.
 - 1. The existing asphalt shall be cold planed in all areas where the overlay is to conform to the grade of the existing pavement surface, including by not necessarily limited to the end limits of the overlay, paved driveways, and existing curbs and gutters.
 - 2. Planing asphalt concrete pavement shall be performed by cold planing. The cold planing machine shall have a cutter head at least 30 inches wide and shall be operated so as not to produce fumes or smoke.
 - 3. The depth, width and shape of the cut shall be indicated on the typical cross sections, or as directed by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections and as shown on the plans. The outside line of the planed area shall be neat and uniform. The road surfacing to remain in place shall not be damaged in any way.
 - 4. Where transverse joints are planed in the pavement at conform lines, no drop-off shall remain between the existing pavement and the planed area when the pavement is opened to public traffic. If asphalt concrete has not



been placed to the level of existing pavement before the pavement is to be opened to public traffic, a temporary asphalt concrete taper shall be constructed. The asphalt concrete shall be placed to the level of the existing pavement and tapered on a slope of 30:1 or flatter to the level.

5. The Contractor shall recognize the potential safety and the traffic problems that arise after a street has been planed down to its specific depth. Thus, paving overlay operations shall follow grinding no later than 48 hours after planing has been finished and accepted. Barricades shall be placed and maintained at each structure (i.e., manholes) that could impede vehicular and pedestrian safety.
6. Concrete gutter and curb chipped by the planing machine shall be epoxy patched, or sawcut, removed and replaced at the Contractor's expense. The method of correcting damaged curb and gutter shall be determined by the Engineer.
7. Asphalt concrete for tapers shall be commercial quality and may be spread and compacted by any method that will produce a smooth riding surface, before placing the permanent surfacing.
8. The material planed from the roadway surface, including material deposited in existing gutters or on the adjacent traveled way, shall be immediately removed from the site of the work and disposed of as provided in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. The removal crew shall follow within 50 feet of the planer, unless directed by the Engineer.

B. Repair of Existing Pavement

Prior to overlay, the Contractor shall remove deteriorate areas of existing pavement and repair with new pavement in accordance with the paving requirements for trench restoration. Overlay operations shall not commence until the Engineer has reviewed the existing pavement and marked deteriorate areas that shall require restoration.

C. Placement of Asphalt

Asphalt concrete shall be Type "A". Asphalt shall be placed with a self propelled paving machine in accordance with the provisions in Section 39-5.01 of the Standard Specifications.

D. Adjust Manhole to Grade

Existing sanitary sewer and storm drain manholes shall be adjusted to grade in accordance with the provisions in Section 15, "Existing Highway Facilities," of the Caltrans Standard Specifications.



E. Adjust Utility Manholes to Grade

Existing utility manholes, valves, vaults and other street features shall be adjusted to grade in accordance with the requirements of the utility owners. The contractor shall make all necessary arrangements to complete this work and shall be responsible for all costs.

F. Adjust Monument to Grade

Existing monuments shall be adjusted to grade in accordance with the Uniform Construction Standards, Cities of Marin County of Marin Standard Drawing #930, and the provisions in Section 15, "Existing Highway Facilities," of the Caltrans Standard Specifications.

The Contractor will provide the new monument housings for adjusting the monuments to grade. The existing marker shall be salvaged and reused in the new monument housing.

G. Adjust Water Valve Access Cover to Grade

Existing water valve access covers shall be adjusted to grade in accordance with these Specifications.

During the paving operation, the Contractor shall place sheet metal sleeves in the vertical access pipe over the water valve, and replace the water valve access cover. The uncompacted asphalt concrete shall be hand-raked uniformly around the water valve access cover. The Contractor shall then compact the asphalt concrete. The sheet metal sleeve and access cover shall be flush with the new roadway surface.

After final paving, the Contractor shall clean the vertical access pipe of loose grindings, rocks, asphalt concrete and all other debris. The Contractor shall use a vacuum suction device capable of removing debris not reachable by other means. The Contractor shall clean each water valve vertical access pipe so that each water valve is fully accessible to the satisfaction of the engineer.

3.12 REPAIRING DEPRESSED PAVEMENT

- A. Depressed trench pavement shall be repaired by first removing the defective pavement to a minimum depth of 1-1/2" prior to placing additional asphaltic concrete. Raising the level by placing the additional asphaltic paving over the depressed existing paving in the trench will not be accepted by the District. The cost of repairing depressed pavement shall be borne by the Contractor.



3.13 LIMITS OF PAVEMENT REPAIR

Where resurfacing is limited to pavement repair over trenches, the following shall define the minimum required limits of paving. All costs incurred in performing this work shall be incidental to paving replacement.

- A. Any areas of overbreak shall be squared and that portion of the existing pavement shall be removed and replaced as part of the new trench resurfacing.
- B. Should voids develop under existing pavements during construction, those affected pavements shall be neatly cut in straight lines and replaced after the voids have been filled and compacted to 95% or greater.
- C. All pavement damaged by the work but not specifically part of the work shall be repaired as closely as is possible to existing conditions at the time the work on that portion of the project began.
- D. Sawcuts shall be in a straight line parallel to the centerline of the trench.
- E. Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the original pavement edge, on a straight line, parallel to the centerline of the roadway.

END OF SECTION



SUBDIVISION SECTION 02655

CATHODIC PROTECTION MAGNESIUM ANODES

PART 1 - GENERAL

1.1 DESCRIPTION

This Section includes specifications for materials used for the cathodic protection of buried ferrous pipe and accessories.

PART 2 - PRODUCTS

Unless otherwise noted, the materials for work performed under this section shall be provided by the District.

PART 3 - EXECUTION

3.1 INSTALLATION

A. CORROSION TEST STATIONS AND CABLE CONNECTIONS

1. Corrosion test stations shall consist of conduit outlets, aluminum tubing and cover outlets or meter box outlets where test leads connected to the pipeline are terminated. The type of outlet and location shall be as indicated on the Drawings or located by the Engineer at the time of installation.
2. The test lead cables shall be Type TW No. 8 and no splicing will be allowed. The Contractor shall provide enough slack in the cable near the main so that backfill will not break the connection. Cables may be run in the same trench with pipe, and 30 inches of cover must be maintained in horizontal runs. Twelve (12) inches of slack shall be provided at outlets to permit withdrawing ends for test purposes.
3. Cable connections shall be made to steel pipe by gas brazing or by Cadweld Type TB-3 connections. Connections to cast iron pipe shall be made by means of Cadweld Type HB connections. In all cases, wires and the surface to which they connect shall be cleaned and prepared in accordance with the manufacturer's recommendations, and only 100% welds, free of defects, will be accepted. After connection and approval by the Engineer, bare wire and pipe shall be primed and coated with tape.



B. PROTECTION ALONG STEEL PIPE SECTIONS

Near the termination of steel pipe sections, jumper wire shall be cadwelded to the steel pipe on one end, with the other end to be pulled into a test station that is to be set as indicated on the Drawings.

Where steel pipe sections surround an insulated piece of equipment or insulated section of pipe less than 3 ft. in length, a continuity wire shall be cadweld to each steel pipe section for continuity of cathodic protection across the insulated area.

C. PROTECTION OF COUPLINGS

Where flexible couplings and transition couplings are installed, a jumper wire shall be cadweld to the body of the coupling on one end and tied into another bonding jumper wire that is already part of the cathodic protection system at the other end as indicated on the Drawings.

D. PROTECTION OF METALLIC FITTINGS ON PLASTIC PIPELINES

Near the termination of all PVC and plastic pipe sections greater than 3 ft. in length, tracer wire shall be pulled into a test station that is to be set as indicated on the Drawings. Tracer wire shall be laid parallel to all PVC and plastic pipelines. Split-bolt connections shall be installed along the tracer wire where another tracer wire shall be run from the split-bolt connection and cadweld to any metallic fittings (saddles, mech. joint fittings) installed along the PVC/plastic pipeline.

E. ANODE PLACEMENT

Anode shall be buried approximately 2 ft. away from the pipeline. Anode may be installed vertically in an augured hole with native backfill tamped carefully to afford good soil contact. Copper lead wire shall be pulled into a test station location set as indicated on the Drawings.

Provide slack in all wires used in cathodic protection so that wires are not broken during backfill.

3.2 TESTING AND INSPECTION

Contractor shall set utility box(es) and/or aluminum tubing as indicated on the Contract drawings.

Upon installation of anodes, continuity, bonding and jumper wires, Contractor shall pull leads into test station location and notify District for testing.

END OF SECTION



SUBDIVISION SECTION 02713
DISTRIBUTION PIPING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes specifications for materials, testing and installation of all piping, fittings, valves, and accessories as shown on the Drawings, described in the Specifications and as required to completely interconnect all existing and new piping for a complete and operating system. This section applies to all buried pressure water systems.

1.2 RELATED SECTIONS

Section 02200 - EARTHWORK

Section 02655 - CATHODIC PROTECTION

Section 09801 - FIELD APPLIED TAPE COATING SYSTEMS

1.3 REFERENCES

The standards of organizations listed below are cited and modified as noted within these specifications. Citations refer to the most recent publications of these organizations' standards.

- A - American Water Works Association (AWWA)
- B - American Society for Testing Materials (ASTM)
- C - National Association of Corrosion Engineers (NACE)
- D - American Welding Society (AWS)
- E - NSF International

PART 2 - PRODUCTS

2.1 CONTRACT MATERIALS

Unless otherwise noted, the materials for work performed under this section will be supplied by the District. Temporary materials for flushing, disinfecting, hydrostatic testing and for keeping the existing piping in service until the new piping is in service shall be provided by the Contractor.



2.2 MATERIAL INFORMATION

The following material information is provided for the contractor:

- A - Piping is stocked and issued in 20 foot lengths with bell & spigot joints
- B - Welded steel pipe is mortar lined and tape or extrusion coated
- C - Weld Ells (Elbows) are stocked and issued in 45 and 90 degree sections

PART 3 - EXECUTION

3.1 GENERAL

It is specifically brought to the Contractor's attention that the pipeline has not been designed as an "engineered" project. The Contractor is given latitude to modify the profile as best fits existing field conditions. As such, all fabrication shall be done in the field after the location of existing utilities has been determined. No extra payment will be made for changes in the design as a result of either shown or unshown utilities, structures or field conditions. It is incumbent upon the Contractor to expose all utilities and structures prior to commencement of the work on the project.

For pipe with diameter greater than 12 inch, transmission pipe, the intent of the layout shown on the plans is to minimize the changes in grade and the number of elbow fittings used. Grade conflicts with existing utilities are to be avoided by gradual change of grade in the pipeline.

3.2 HANDLING MATERIAL

The Contractor shall provide and use proper equipment and tools for the safe and convenient prosecution of the work. All pipe, fittings, and valves shall be carefully lowered into the trench in such manner as to prevent damage to surfaces, lining, coating, appurtenances or other parts necessary for the materials' usefulness. Any such damage shall be repaired by the Contractor at his own expense.

3.3 PIPE INSTALLATION

- A. Unless approved by the Engineer, no pipe shall be installed until street subgrades have been established and until curbs and gutters have been installed. If pipe installation is allowed without curb and gutter, the party or jurisdiction responsible for them shall supply survey staking to indicate final grades and alignment of curbs and gutters, locations of drop inlets or storm drainage structures and other information deemed necessary by the Engineer. Stakes shall be placed a maximum of 25-feet apart and shall be offset to clear the construction zone. The party supplying the staking shall maintain stakes throughout construction and shall provide cutsheets prior to any work on the project. They



shall also furnish a letter accepting responsibility for any surveying errors and liability for any necessary corrective measures.

- B. All of the pipe shall be thoroughly cleaned of all dirt, rock and other debris that may be found in the interior of the pipe. If considered necessary by the Engineer, he/she may direct the Contractor to swab the pipe to clean it. Prior to placement of the pipe, the Contractor shall repair any damage to the exterior coating.
- C. Nothing herein shall preclude the method of assembling and welding the pipe in suitable sections above ground to reduce the number of below ground joints. If this method is adopted, the Contractor shall temporarily support the line on adequately sized and spaced timbers across the trench. The timbers shall have a minimum of one foot of bearing length on each side of the trench. Each support shall be padded to prevent any damage to the exterior coating of the pipe. When lifting and lowering multiple-pipe sections, the Contractor shall utilize the number of support locations and pieces of lifting equipment required by the Engineer.
- D. Each joint of steel or steel cylinder pipe shall be lifted by means of belt-type slings approved by the Engineer. The slings are to provide support in order to prevent damage to the coating or undue, injurious deflection of the pipe while lowering it into the trench. When lifting and lowering other pipe types, the Contractor may utilize other means approved by the Engineer. In no case shall wire rope or chain be used for such purposes.
- E. When lowering single lengths of pipe into the trench, each shall be lifted and held in two properly spaced locations and lowered in such manner as to prevent undue deflection. Such procedures shall be approved by the Engineer prior to assembly and installation.
- F. The pipe shall be bedded and installed evenly so that the pipe barrel will be in full bearing for its entire length. After the trench has been excavated and prepared in accordance with these specifications, the pipe shall be carefully lowered into place and adjusted accurately to the required line and grade. Any blocking used to support the pipe during laying shall be removed after sufficient backfill has been placed to hold the pipe on the required line and grade and before laying the next section. Each pipe shall have a firm bearing for its full length in the trench.
- G. Pipe shall be installed upgrade (low elevation to high elevation) and the bell end of the pipe shall be installed on the upgrade side unless otherwise authorized by the Engineer.
- H. Change in the pipeline grade, slope or horizontal direction, which are in excess of that allowed within the pipe joint, shall be constructed from the fittings furnished. Weld ells shall be trimmed by the contractor to the angle necessary to accomplish the required change.



3.4 SEPARATION AND CLEARANCE

- A. A minimum vertical clearance of six (6) inches shall be maintained between a water facility and any obstructions.
- B. A minimum vertical clearance of twelve (12) inches shall be maintained between high pressure or transmission gas, electrical/ communication ducts and conduits.
- C. The minimum vertical clearance and horizontal separation between water and sewer, recycled or storm drain facilities shall be in accordance with standards established by the State Department of Health Services and Title 22, Section 64572 of the California Administrative Code. The design guidelines of the Engineer are the following:

The horizontal separation between water and sewer mains shall attempt to maintain a distance of not less than 10-feet.

The horizontal separation between water mains and storm drain, recycled or raw water piping shall attempt to maintain a distance of not less than four (4) feet.

Where the water main must cross a sewer, storm drain, recycled water or raw water pipe, the crossing shall be made as close to a 45 degree angle as possible and the bottom of the water facility shall be as close to 12-inches above the top of the sewer pipe as possible. When the water main installation crosses any sewer, a minimum of eight (8) feet shall be maintained between the sewer and any pipe joint on the new water pipeline.

If these conditions cannot be met, variations will be allowed as determined by the Engineer.

3.5 PIPE JOINTING

- A. General

The type of joint to be used normally will be indicated on the plans or in the specifications for this contract. If not designated, the type of joint may be any of those listed in the paragraphs below. The Contractor shall use care in making all joints, and shall strictly follow appropriate installation procedures as indicated by the manufacturer or as directed by the Engineer. In general, installation requirements for several, but not all joint types are as follows:

- B. Welded Joints

- 1. For bell and spigot joints, the spigot must stab at least one half of the bell depth. District standard piping has a 2-inch bell. This "pull" dimension limits the deflection allowable in a welded joint.



2. All welding shall be done in accordance with American Welding Society Standards and "Field Welding of Steel Water Pipe Joints", A.W.W.A. C206. Welders shall be qualified in accordance with Section 8-5 of the AWWA specification, and proof of certification may be required by the Engineer.
3. All welds shall be made with the electric arc process. All welding rods shall be furnished by the Contractor and shall be Lincoln Fleetwood 5P or equivalent as determined by the Engineer. All welding machines shall be equipped with a voltmeter and ammeter in good working condition. Continuous feed wire welding shall not be allowed for any field welding.
4. Tack welds shall have 100% penetration, and in the event that any tacks break, they shall be completely chipped out before circumferential welding is started.
5. Welds shall be made in two or more passes. The number of filler and finish beads shall be such that the completed weld shall have a substantially uniform cross section around the entire circumference of the pipe. The entire root bead shall be made with the pipe in a stationary position and successive beads shall not be started at the same location. The crown of the finished weld shall not be raised above the parent metal by more than 1/16 of an inch. A maximum undercut of 1/32 of an inch may be permitted. Weld penetration shall be 100% and the thickness of weld shall be equal to or greater than the wall thickness of the pipe. Each bead shall be completely cleaned of all slag and extraneous materials with a pointed chipping hammer and a stiff wire brush after each pass. Welding shall not be performed when surfaces are wet or during periods of high winds unless the operator and work are properly protected.
6. Slag inclusion is permissible where it occurs between layers of the weld and is equal to not more than one-half the width of the weld metal measured in a direction parallel to the face of the weld and when its greatest dimension measured in a direction perpendicular to the face of the weld does not exceed 10% of the throat.
7. Gas pockets are permissible that do not exceed 1/16 of an inch in the greatest dimension and when there are no more than six gas pockets of this maximum size per square inch of the weld metal or where the combined areas of a greater number of pockets do not exceed 0.02 square inch per square inch (2% of weld metal).
8. Joints between plain ends shall be made using butt straps as specified by the Engineer. Butt welding between plain ends of pipe shall not be allowed.



9. The District may require weld radiographs of joints where necessary. Such radiographs will be interpreted by persons who are qualified through training and experience to perform this service. Should any welds not conform in quality to the minimum requirements, they shall be replaced by the Contractor at no cost to the District, and the Applicant will be charged the costs of obtaining and evaluating the radiographs.

C. Slip-on Joints

The slip-on type joint installation applies for several different types of pipe including ductile iron, cast iron (Tyton), polyvinylchloride (PVC), and asbestos cement (AC) pipe. In all cases, the Contractor shall follow the manufacturer's installation procedures. In general, the procedure for slip-on joints will be as follows:

1. All foreign matter shall be removed from the gasket, groove, and bell (or coupling). In addition, the spigot of the entering pipe must be clean for a minimum of 8-inches from the stab end.
2. The gasket shall be installed so that it is evenly seated in the groove within the bell (or coupling) and in accordance with the manufacturer's recommendations.
3. Approved lubricant shall be applied to the installed gasket, the bell (or coupling) interior, and the pipe spigot (from the taper end to a point outside the full insertion length). Lubricant shall not be applied to the groove. Any lubricants which are used to facilitate jointing shall conform to the American Water Works Association and NSF International standards for use in potable water systems
4. With the pipe sections in alignment and the pipe ends in contact, sufficient force shall be applied to the entering pipe so that the spigot is pushed through the gasket and against the back of the bell (or coupling). If an insertion mark is provided, it should be flush with the end of the coupling (or bell) upon completion of the joint.
5. If field cuts are required, all cuts will be squared to the Engineer's satisfaction and the spigot end beveled in accordance to the manufacturer's recommendations.
6. Maximum joint deflections shall be those allowed by the Engineer or manufacturer's specifications. For example, ductile iron pipe joint deflections may vary from five degrees for 4-inch pipe to three degrees for 12-inch pipe. However, the maximum deflection joint to joint shall be 1.0 foot. PVC is known to fail at service taps at the manufacturer's maximum allowable deflection.



D. Mechanical Joints

The mechanical type joint installation applies for several different types of pipe including ductile iron, cast iron (Tyton), polyvinylchloride (PVC), and asbestos cement (AC) pipe. In all cases, the Contractor shall follow the manufacturer's installation procedures. In general, the procedure for mechanical joints will be as follows:

1. All foreign material other than the standard coating shall be removed from the outside of the spigot and the inside of the bell in the area within 8 inches of the joint end. The follower gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket or bell end. The rubber gasket shall be placed on the spigot end with the thick edge toward the gland.
2. The entire section of the pipe shall be pushed forward to seat the spigot end into the bell. The gasket shall then be pressed into place within the bell, being careful to insure that the gasket is evenly seated around the entire joint. Then the follower gland shall be moved along the pipe into position for bolting. After bolt insertion and hand tightening, all nuts shall be tightened with a suitable (preferably torque-limiting) wrench. The torque for various sizes of bolts shall be as follows:

Range of Torque	
<u>Bolt Size (Inches)</u>	<u>(Ft. - lbs)</u>
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

Care shall be taken in final tightening of nuts in order to produce an equal pressure on all parts of the gland.

3. Maximum joint deflections shall be those allowed by the Engineer or manufacturer's specifications. For example, deflections may vary from five degrees for 4-inch pipe to three degrees for 12-inch pipe.

E. Threaded Joints

The threaded type joint installation applies for several different types of pipe including galvanized threaded pipe and brass pipe. In all cases, the Contractor shall follow the manufacturer's installation procedures. In general, the procedure for threaded joints will be as follows:

1. All foreign material other than the standard coating shall be removed from the outside and the inside within 8 inches of the joint end. The pipe shall be jointed at threaded ends with a threaded coupling.



2. Where the pipe is cut and no threaded end exists, the contractor shall clean, prepare and thread the end of pipe to make the connection with the threaded coupling.

F. Installation of HDPE Fireline Spools

1. Install flat washers between the nuts and the back up ring.
2. The back up ring shall be moved along the pipe into position for bolting. After bolt insertion and hand tightening, all nuts shall be tightened with a suitable (preferably torque-limiting) wrench. The torque for various sizes of bolts shall be as follows:

Range of torque

<u>Bolt Size (Inches)</u>	<u>(Ft. – lbs)</u>
5/8	60
3/4	100

3. Bolts shall be tightened in a cross pattern, first top, then bottom, then right, etc. Care shall be taken in final tightening of nuts in order to produce an equal pressure on all parts of the back up ring.
4. One hour after originally tightened to proper torque, all bolts shall be checked for proper torque value. Tighten all bolts to proper torque value.
5. The spool shall be backfilled with well consolidated sand and Class 2 road base to provide support to the spool piece.

G. Installation of Flexible Couplings and Flanged Coupling Adapters

1. Prior to installation, thoroughly clean oil, scale, rust, and dirt from the pipe to provide a clean seat for the gasket. Take care that the gaskets are wiped clean before they are installed. If necessary, gaskets may be lubricated with soapy water before installation on the pipe ends.
2. Connections to be made by the use of flexible couplings, or flanged coupling adapters shall have the follower ring, gasket and coupling barrel (middle ring) placed over the end of the pipe section already in place (in the trench, etc.). The other follower ring and gasket shall be placed on the next pipe to be joined. The pipe shall then be lowered as close as possible to the coupling barrel and shoved into position until there is approximately one-half inch space between the pipe ends and the coupling is centered over the space.

Tighten bolts progressively, drawing up bolt on opposite sides a little at a time until all bolts have a uniform tightness. Workmen tightening bolts



shall be equipped with torque-limiting wrenches or other favorably reviewed type.

H. Joint harnesses

Provide joint harnesses (tie rod lug or attachment plate assemblies) across all flexible couplings and flanged coupling adapters, except where specifically indicated otherwise on the Drawings. Harnesses welded to pipe sections shall be done prior to applying protective coatings. For flanged coupling adapters, anchor studs may be substituted for the harnesses on pipe up to 12-inch. Design restraint for 1 ½ times the test pressure of the applicable service or 225 psi, whichever is greater. As a minimum, conform to Tie Rod Table in AWWA..

3.6 COATING AND LINING

A. General

As with all construction, the Contractor shall strictly conform to all safety regulations issued by CAL/OSHA's Division of Industrial Safety and take all precautions indicated by the material manufacturers whose products are used on the job. In particular, whenever his men or the inspector(s) are inside the pipe, the Contractor shall use caution and shall do the following:

1. Provide adequate ventilation, lighting and communication.
2. Prevent waterflow in the pipe.
3. Insure that all valves are in the open position and are not operated until the pipe is vacated.
4. Remove all extraneous material that may cause future damage or contamination to the pipe interior.

B. Coating

1. The Contractor shall follow the manufacturer's recommendations when coating the exterior joints of concrete cylinder pipe or other similar pipe.
2. All metallic surfaces on pipe, fittings, services or appurtenances (including existing pipes that are uncovered under this contract) which will be buried and which do not have a protective coating shall be cleaned and wrapped with tape in accordance with Section 09801.
3. Prior to application of any specified tape, all bare metal and adjacent sound coating shall be thoroughly dried and cleaned by wire brushing, solvent cleaning, sandblasting, or other means as will be determined by the Engineer, to insure adequate bond of the field applied coating. Primer



shall be applied by brush to all bare metal and adjacent surfaces and allowed to set according to the manufacturer's instructions.

4. All service tubing shall be cleaned to bright metal, free of contamination and moisture. The service pipe will be primed and PVC tape shall be spirally applied using two-inch wide tape with a minimum of one-half inch overlap. Sufficient tension shall be used so that there are no wrinkles. The tape will be a 10-mil PVC tape carrying UPC approval.
5. Steel pipe surfaces including pipe joints, damaged shop applied pipe coating, hydrant buries, valves and other fittings with less than 20 mils thickness shall be cleaned of all dirt, moisture, oil or other contamination and primed and tape wrapped. The pipe shall be circumferentially wrapped with enough tension to stretch the tape. The tape shall be overlapped at least 25%. No wrinkles or other voids will be permitted.
6. All exposed metal piping shall be primed and coated with the same system as adjacent pipe. Application shall be the same as for steel pipe. Surface preparation and application of prime and tape coatings shall be done by workers trained in this procedure. Demonstration of this training may be required. All field-applied coating shall be inspected and tested before backfilling.

C. Lining

1. Small Diameter Pipe: For pipe having an inside diameter of less than 22 inches, a dry mixed cement mortar with sufficient moisture for workability shall be placed as a fillet at the face of the cement lining and around the entire circumference of the bell prior to inserting the spigot into the bell. Immediately thereafter, an inflated ball of a diameter slightly larger than the inside diameter of the pipe shall be pulled past the mortared joint to remove any fins or mortar extruding into the pipe barrel. After the inflated ball has been disturbed past the joint recess, the adjoining pipe sections shall not be disturbed. Once the inflated ball has been pulled through the pipe, the joints can be welded together.
2. Large Diameter Pipe: For pipe having a nominal inside diameter of greater than 22 inches, a dry mixed cement mortar with sufficient moisture for workability shall be hand placed around the entire circumference of the joint after completion of the joint weld. The Contractor shall provide, at his expense, video inspection of the entire completed interior of the pipeline. The Contractor shall notify the District at least 48 hours in advance of the inspection. It is incumbent on the Contractor to provide clear and visible video inspection of the pipeline. The Contractor shall deliver one copy of the videotape to the District upon completion of the video inspection. Water shall not be placed in the pipeline until after the



District approves the video inspection. Areas not mortared to the satisfaction of the Engineer shall be repaired and video inspection shall be repeated.

3.7 INSTALLATION OF APPURTENANCES

A. General

Appurtenances shall be installed on the pipeline by the Contractor at the locations shown on the Drawings, or as directed by the Engineer. The details of the installations as shown on the Drawings, or described in the Specifications are typical only, and final installations may have to be varied to meet field conditions at the time of installation.

B. Fittings

Joints between pipe and fittings shall be made in a manner similar to the method followed in joining the main sections of pipe. The trench bottom shall be graded uniformly so that no torsional strain will be placed upon fittings or connecting devices when backfill is placed. Proper thrust restraint shall be installed.

C. Valves

Valves are to be installed by the Contractor in the locations shown on the drawings and as directed by the Engineer. All valves shall be set with valve stems in a vertical plane (+ 1%) parallel to the line of the pipe. Unless otherwise directed by the Engineer, all valves shall be fully supported on 2" x 12" redwood blocking which rests firmly on undisturbed ground. Butterfly valves shall be installed such that offset underground operators are northerly or easterly of the line of pipe. The Contractor will be required to install operating nut extensions for all butterfly valves and for any valve where the operating nut will be four feet or more below finished grade. The installation shall be made after final grade is established and such that the top of the extension is a maximum of 12-inches below final grade.

D. Electrical Continuity at Valves and Hydrant Buries

Electrical continuity shall be preserved across valves, hydrant buries, and any other epoxy-coated flanges where no flange insulating kits are indicated. The Contractor shall grind each epoxy-coated flange at one bolt hole to remove sufficient epoxy coating to assure that the bolt head and nut seat on bare metal.

E. Valve Tubing, CTS Tubing, and Gate Caps

In general, valve and corrosion test station (CTS) tubing shall be installed to existing grade and raised continuously until final pavement is complete or as directed by the Engineer. The tubing shall be installed perpendicular to the main such that the operating nut, extension or terminal block is centered in the tubing.



The tubing shall be primed and wrapped. A gate cap shall cover the tubing at all times after installation. The Contractor shall, at his own expense, clean or replace any valve caps which are not in the same condition as when issued. In addition, an asphalt ring shall be placed around the top of the valve tubing to the Engineer's satisfaction. Normally the asphalt ring shall extend 12 inches outside the tubing and be placed with a thickness of four inches.

F. Blowoffs

Blowoffs are to be installed by the Contractor in accordance with the typical details shown on the Standard Drawings. The Contractor shall perform all cutting, fitting and threading necessary to fabricate the blowoff and connect it to the pipe.

G. Pressure Regulating Stations

Pressure regulating stations are to be installed by the Contractor at the locations shown on the Drawings or as directed by the Engineer. The regulating stations shall be constructed such that all appurtenances are fully accessible and can be freely maintained and operated. Pits and blocking shall be set on native soil or Class II aggregate base. The Contractor shall perform any cutting, fitting and threading necessary to fabricate the pressure regulating system and connect it to the pipe.

H. Marker Posts

In unpaved areas, District-furnished marker posts indicating mainline, drain, blowoff and air valves, easements or other facilities shall be installed as shown on Drawings or as directed by the Engineer.

3.8 HYDRANT INSTALLATION

A. Hydrants of the type indicated on the plan shall be installed by the Contractor in the number and the locations indicated on the drawings or as directed by the controlling Fire Chief, or Engineer. All hydrants shall be accurately set (+ 1% vertical) and leveled at the proper elevation as indicated by the local fire jurisdiction above the finished grade. Hydrants shall be suitably blocked with concrete thrust blocks. Hydrant details and their relationship to the curb and/or sidewalk are shown on the Standard Drawings.

B. New hydrant bodies are to be received by the contractor at the offices of the appropriate Fire Department and transported to the site.

C. Each hydrant shall be covered with a burlap bag until it is activated following permanent connection of mainline piping to the existing system. The Contractor shall protect fire hydrants whenever the Engineer determines that the situation warrants such protection. Existing hydrant bodies shall be returned to the governing fire department.



3.9 SERVICE LATERALS

- A. Service laterals may be installed using either open cut or trenchless techniques, as described in Section 02200.
- B. All new mainline taps for service transfer installations shall be located within one-foot of where the existing service line crosses the new mainline or the shortest distance to intercept the existing service line.
- C. All new mainline taps for service renewal installations shall be located on the new mainline perpendicular to the meter or the shortest distance to intercept the existing meter.
- D. All services are to be copper runs completely. Typical service transfer shall be used when existing service piping is copper. If service piping is any material other than copper, replace the service piping complete to the meter box. Service piping shall be installed, as shown on Drawings, as required by the Specification or directed by the Engineer.
- E. Service piping shall be installed in a single piece of pipe from meter to main whenever possible. Joints on the service piping shall be minimized.
- F. All existing copper services shall be insulated at the meter, as shown on the plans, unless already insulated.
- G. When installing services on PVC pipe, tapping shall be done with an approved cutting tool. The tool shall be an internal tooth shell cutter or other designed cutter, which will retain the coupon and accommodate the heavy wall of PVC class water pipe.
- H. Service connections shown as “connect service by hot tap” on the Drawings shall be made by Contractor. Contractor shall provide approved tapping machine, demonstrate that the machine is disinfected with all necessary equipment to complete the “hot tap” connection. The machine shall be an internal tooth shell cutter or other designed cutter, which will retain the coupon.
- I. Particular care shall be taken in the backfilling and compaction of the area around the taps to the main. Hand tamping will be required rather than equipment tamping or rolling.
- J. Where the water service must cross the sewer line, the bottom of the water service, within 10 feet of the point of crossing, shall be at least 12 inches above the top of the sewer.
- K. Prior to installing a service lateral using a punch tool trenchless technique, the Contractor shall locate and ascertain the depth of all conflicting utilities. The Contractor shall clearly mark the depth and location of conflicting utilities. For



sanitary sewer and storm drain facilities, the Contractor may utilize existing evidence of depth, such as manholes. For all other utilities, the Contractor shall use a pipe locator with a depth indicator. The Contractor shall be responsible for installing the service without damaging any other utilities.

- L. The Contractor shall use care to not damage any concrete curb, gutter and sidewalk in the installation of service piping and meter connections. Any damage shall be repaired or replaced, to the local jurisdiction's satisfaction at the contractor's cost.

3.10 PLUGGING OF ENDS OF PIPE

At the end of each day's work or when pipe is not being installed, the end or ends of the pipe shall be securely sealed in such a manner as to prevent the entrance of any foreign material including water into the interior of the pipe.

3.11 FABRICATION OF FIELD MITERS

A. Steel Pipe

1. Unless otherwise specified, welded fittings shall be used at points of change of direction on steel pipe. Welding of fittings shall conform to the requirements of AWS B36.10.
2. When fabricated fittings are permitted for alignment changes, the Contractor will be required to cut, fit and reweld the pipe to form the required bend. Bends shall be made with one miter for each 22-1/2 degrees or fraction thereof. In general, miters are to be formed by cutting a straight length of pipe at an angle equal to one-half the total angle required and then rotating one section 180 degrees and rewelding so that the total desired miter is obtained. Trimming and fitting that may be required to prepare the two pieces of pipe for rewelding is to be done at the expense of the Contractor. Miters may be cut by hand or machine at the option of the Contractor. All wrap, welding, repair to interior coating and exterior coating, shall be done in accordance with the requirements previously set forth for pipe jointing, coating and lining.

3.12 INSTALLATION OF INSULATING JOINTS, TEST STATIONS, AND BONDING JUMPERS FOR JOINTS

- A. As indicated on the Drawings, insulating joints shall be installed to electrically isolate sections of the pipeline. Insulating joints shall consist of plastic sleeves, washers and gaskets in flanged joints or sections of non-metallic pipe.
- B. Care shall be exercised to correctly install all parts in flange insulating kits, to prevent reducing the dielectric properties by bridging across the interior of the



pipeline with cement mortar lining, and to properly coat the exterior metal after fabrication and testing.

- C. The Contractor shall give notification at least one day in advance so that the Engineer can be on hand to test insulating joints during and after fabrication and check test lead connections before protective coatings are applied.
- D. The Contractor shall be responsible for the electrical continuity of all pipe and fittings, and the discontinuity of insulating joints. In the event that insulating joints become shorted or test lead wires or bonding jumpers become disconnected during work or within the maintenance bond period, it will be the responsibility of the Contractor to make all repairs at his expense. Loss of the insulating qualities or broken wires from any cause (other than defective materials furnished by the District) shall be repaired at the Contractor's expense, regardless of any prior approval given by the Engineer. Electrical shorts or discontinuities shall be determined by voltage and current measurements in conjunction with audio frequency signals or other means, and shall be considered detrimental when of a magnitude to jeopardize the application of cathodic protection as established by the Standards.
- E. See also Section 02655 Cathodic Protection for further requirements.

3.13 INSTALLATION OF THRUST BLOCKS

All pipe fittings which are not otherwise adequately restrained shall be blocked against the undisturbed soil on the sides of the trench by means of concrete thrust blocks or by gravity anchor blocks in the case of vertical bends, in accordance with the typical details shown on the drawings. It shall be the Contractor's responsibility to adequately restrain all permanent and temporary fittings at all times.

3.14 DIG-IN PROTECTION WARNING TAPE

Dig-in protection warning tape shall be installed in accordance with Section 02645 when pipe is installed in unpaved areas.

3.15 HYDROSTATIC PRESSURE AND LEAKAGE TESTING

A. GENERAL

1. Hydrostatic tests shall be performed on all pipe installed in this project. Contractor shall furnish all equipment, material, personnel, and supplies to perform the tests and shall make all taps and other necessary temporary connections. The Contractor must use an approved, properly functioning, double-check valve backflow prevention assembly when loading the line for testing. Test pressure shall be measured at the lowest point on the line unless specifically noted otherwise. Hydrostatic tests shall be performed on all piping at a time agreed upon and in the presence of the Engineer.



2. The hydrostatic test for buried piping shall be made after all pipe is installed and backfilled. However, the Contractor may conduct preliminary tests prior to backfill. If the Contractor elects to conduct preliminary tests, he shall provide any necessary temporary thrust restraint. In no case will final testing be done prior to acceptance of backfill compaction.
3. The hydrostatic test for encased piping shall be made after all pipe is installed and encased. However, the Contractor may conduct preliminary tests prior to encasement. If the Contractor elects to conduct preliminary tests, he shall provide any necessary temporary thrust restraint.
4. Whenever curb cocks are to be installed, they shall be installed to final grade and included in the facilities tested.
5. All supports, anchors, and blocks shall be installed prior to the hydrostatic test. No temporary supports or blocking shall be installed for final test.
6. It shall be the responsibility of the Contractor to block off or remove equipment (valves, gauges, etc.) which are not designed to withstand the full test pressure.
7. The Contractor shall provide pipe taps, nozzles and connections as necessary in piping to permit testing including valves to isolate the new system, filling the lines, purging air, draining the lines and disposal of water, as is necessary. These openings shall be plugged in a manner favorably reviewed by the Engineer after use. The Contractor shall provide all required temporary bulkheads and thrust restraints.
8. If leakage exceeds the allowable for gasketed joint pipe, the installation shall be repaired or replaced and leakage tests shall be repeated as necessary until conformance to the hydrostatic test requirements specified herein have been fulfilled. All visible leaks shall be repaired even if the pipeline does not exceed the allowable leakage rate.
9. The Contractor shall submit all test reports to the Engineer and keep records of each piping test, including:
 - a. Description and identification of piping tested.
 - b. Test Pressure
 - c. Date of Test
 - d. Witnessing by Contractor and Engineer
 - e. Test Evaluation



- f. Remarks, including such items as leaks (type, location) and repairs made on leaks
10. When not shown on the Drawings, the Contractor shall install valved outlets at high points on piping to permit venting of air. Valves shall be capped after testing is completed.

B. TEST PROCEDURE

1. Schedule. As soon as is practicable after any section of pipeline has been completed, including acceptance of backfill compaction results, and when directed by the Engineer, that section of pipeline shall be subjected to a hydrostatic pressure and leakage test.
2. Initial Filling. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the mortar lining to absorb what water it will and to allow the escape of air from any air pockets.
3. Test Section. The Contractor shall not test a section of pipeline greater than 1000 feet in length nor an elevation difference of greater than 100 feet, without the Engineer's approval.
4. Test Pressure. Unless otherwise specified, the test pressure shall be 200 pounds per square inch or fifty (50) percent above static line pressure at the lowest point of the test section, whichever is greater.
5. Duration and Conditions of Test. After the initial hydrostatic pressure is applied to the section to be tested, it must remain unaided within 10 P.S.I. of the initial pressure for a duration of two hours for distribution pipelines and four hours for transmission pipelines 24-inches in diameter and larger. If the pressure drops below this limit, the section being tested will be considered defective. The Contractor shall determine the cause of failure and make necessary repairs. The test shall be repeated until the Engineer is satisfied that leakage requirements have been met and the line is actually ready for use. The Engineer may require that valves be closed to isolate sections of piping for testing as individual mains. The Contractor shall not be entitled to additional payment for any work associated with additional testing required by the Engineer as a result of failed tests, or work required to isolate failure locations.
6. Leakage Measurement. After the pressure test and if any pressure drop has occurred, the Contractor shall determine the leakage volume. This shall be achieved by injecting water from a calibrated container into the pipeline via a pressure pump until the pressure again reaches the initial applied pressure. The amount of water injected is the leakage volume.



7. Welded Steel Pipe Leakage. There shall be no leakage allowed for welded steel pipe installations.
8. Rubber-Gasket Joint Pipe Leakage. If the Contractor cannot determine the point(s) of leakage by thorough physical examination performed to the satisfaction of the Engineer, the pipeline will be considered acceptable if the amount of leakage is less than that determined by the following formula:

$$L = \frac{ND(T)^{1/2}}{14800} \quad \text{where}$$

L = leakage in gallons per hour
 N = total number of gaskets
 D = nominal pipe diameter in inches
 T = test pressure in psi

3.16 FLUSHING AND DISINFECTION

A. FLUSHING

1. After successful pressure and leakage testing, the Contractor shall thoroughly flush the pipeline and appurtenances prior to chlorine application. The flushing velocity shall be a minimum of 2.5 feet per second unless the Engineer determines that field conditions will not permit the required flow to be discharged to waste. The flow rates required to produce the minimum acceptable velocity are shown below.

REQUIRED OPENINGS TO FLUSH PIPELINES*
(40-psi Drop in System Pressure)

<u>Pipe Size (Inches)</u>	<u>Flow Required to Produce 3.0 fps Velocity (gpm)</u>	<u>Temporary Plug/Tap Size (Inches)</u>	<u>Hydrant Outlet Number</u>	<u>Nozzles Size (Inches)</u>
4	120	2	1	2-1/2
6	260	2	1	2-1/2
8	470	2	1	2-1/2
10	730	4	1	2-1/2
12	1,060	4	1	2-1/2
14	1,440	4	2	2-1/2
16	1,880	4	2	2-1/2
18	2,380	5	2	2-1/2



*With 40 psi drop in system pressure, a 2-1/2 inch hydrant outlet nozzle will discharge approximately 1,000 gpm, and a 4-1/2 inch hydrant nozzle will discharge approximately 2,500 gpm.

2. Flushing shall be accomplished through an opening furthest from the point of entry of the flushing flow. The entire system however, shall be flushed including hydrants, laterals and blowoffs. The Contractor is responsible to ensure flushing operations comply with the NPDES Permit for Drinking Water System Discharges and shall be required to provide for and document de-chlorination of flushing water as it is being discharged.
3. Flushing shall be continued as long as the discharged water appears turbid to the Engineer. Flushing shall allow at least two exchanges of the volume of the water in the pipeline unless otherwise determined by the Engineer.
4. If necessary, the Contractor shall provide temporary piping to divert flushing water to natural drainage in order to prevent erosion or nuisance.

B. DISINFECTION

1. Submittals:

The Contractor shall provide the District a list of all chemicals that will be used for the pipeline disinfection process along with Safety Data Sheets (SDS) for approval, prior to scheduling pipeline disinfection.

2. In general, the following constitutes the District's requirements for disinfection:
 - a. After flushing, the Contractor shall disinfect the newly constructed facilities in accordance with the AWWA Standard C651-14 (or most recent version) Continuous feed method. The Contractor shall provide to the Engineer a plan detailing the lengths, diameters of the proposed pipeline disinfection sections prior to scheduling disinfection.
 - b. The Contractor or the Contractors disinfection sub-contractor shall have a minimum of 5 years of experience providing pipeline disinfection services for water agencies or municipalities. **Please supply three references that can be contacted to verify performance.**
 - c. The Contractor shall furnish all labor and material to complete the disinfection operation. All equipment required to disinfect the pipeline including, hoses, flushing standpipes, backflow devices, flow metering devices, diffusers shall be in proper working condition and shall be ANSI/NSF 61 compliant.



- d. The continuous-feed method consists of filling the main to remove the air pockets and then dosing chlorine continuously to obtain a concentration of not less than 25 mg/L free chlorine throughout the main. The contractor shall take and document a chlorine residual measurement at the end of all branches and in at least 3 locations in the main section of the pipeline to verify that the entire pipeline has the desired level of chlorine. The chlorinated water in all portions of the main shall have a residual of not less than 10 mg/L of free chlorine after the 24-hr period. **All supporting documentation and calculations used by the Contractor to determine the required chlorine, water, total solution, injection and flow rate shall be provided to the District prior to starting the disinfection process to verify disinfection time and final chlorine concentration.**
- e. All hydrants, service piping or other appurtenances, are subject to controlled flow insuring introduction of chlorine solution into all sections of the new facility.
- f. A copy of the discharge permit shall be provided to the District and a copy shall be available onsite during the flushing process.
- g. Following the chlorine contact period flush the highly chlorinated water from the main fittings, valves and branches until the chlorine residual that is measured is no higher than that generally prevailing in the distribution system or that is acceptable for domestic use. The highly chlorinated water shall be de-chlorinated and meet the Regional Water Quality Control Board's requirements for planned and unplanned discharge of potable water.
- h. The Contractor shall sample the pipeline post disinfection and measure the chlorine residual 24 hours after disinfection to ensure that not less than 10mg/L and report back to the District. If chlorine residual is found to be less than 10mg/L, the disinfection shall be considered unacceptable and the pipeline section shall be re-disinfected until the 10mg/L residual it measured.
- i. Bacteriological sampling and testing shall be requested by the Contractor and shall be performed by District Water Quality Field Technicians. Samples shall only be collected **Monday-Thursday.**
- j. Two consecutive passing tests, with sampling separated by 24 hours, are required. District staff will determine if the disinfection process has been successful. In the event that it has failed, the disinfection process shall be repeated by the contractor at no cost to the District.



- k. The Contractor shall be required to maintain a minimum of 20 psi line pressure in the disinfected pipe throughout the bacteriological sampling process. The Contractor shall also provide ¾ inch non-threaded hose bibs at each sampling location a minimum of 12-inches above grade.
 - l. Typical time necessary for passing the bacterial testing process is a minimum five (5) business days; that is, 24 hour chlorination 24 hour chlorine contact time 24 hour flushing and sampling, 24 hour second sampling, 24 hour results. The Contractor shall schedule his work with this consideration.
 - m. The chlorinating and flushing shall be done through an approved, properly functioning, double check valve backflow prevention assembly to prevent backflow.
- 3. The chlorinated water shall remain in the pipe for at least 24 hours unless otherwise directed by the Engineer. At no time shall the chlorinated water be allowed to flow into an existing water system.
 - 4. While analysis of the samples is being conducted, the pipeline shall remain isolated and a positive pressure must be maintained in the new line until the time of actual connection to the existing system. In order to insure this, the Contractor shall, at his expense, provide and install a temporary pressure gauge and/or temporary piping with an approved, properly functioning, double check valve backflow prevention assembly or approved backflow prevention device as directed by the Engineer. This gauge shall be periodically checked, and if positive pressure is not maintained, additional bacteriological testing may be required.
 - 5. After it is determined that the pipeline is free from bacteriological contamination, all temporary piping shall be dismantled and the connections to the existing pipeline shall be made.

3.17 MAKING CONNECTIONS TO EXISTING SYSTEM

- A. Connections to the existing system shall be made by the Contractor at the points indicated on the Drawings or as directed by the Engineer. It shall be the Contractor's responsibility to adequately restrain all fittings at all times.
- B. The Contractor shall be responsible for maintaining service in the existing piping system until that piping is abandoned. Temporary fittings and thrust blocks shall be installed on the existing piping wherever the pipe is cut and remains in temporary service but is not connected to the new system.



- C. **The Contractor shall be responsible for dewatering the tie-in area of all waters released from the piping as a result of the cutting of the main for making the connection.**
- D. The Contractor is warned that the existing piping may be other than standard size. Prior to scheduling a connection, he shall expose the existing pipelines at the point of connection to verify the actual pipe size and required couplings and fittings for connections.
- E. When connecting to the rough barrel of an Asbestos Cement (AC) Pipe, the Contractor shall measure the outside diameter of the rough barrel on the existing AC. The Contractor shall report the dimension to the Engineer prior to pressure testing new mains or scheduling a shutdown for connection to the existing piping. The Contractor shall conform to all regulatory requirements, including applicable requirements of Federal OSHA Title 29 and California State OSHA, for the handling of AC pipe.
- F. Connections shown as “hot taps” on the Drawings shall be made with the assistance of District forces. Upon contractor completion of the tapping valve installation, the contractor shall prepare the site for the District installation of the “hot tap.” The District shall provide the tapping machine and one technician. The contractor shall provide the necessary air compressor, lift equipment and all other assistance required.
- G. Since connections will result in temporary interruption of service in the area, it will be essential for the District to give at least two working days of advance notice to the affected consumers. Therefore, the Contractor shall notify the Engineer a minimum of four working days prior to making any connection that will necessitate shutdown of any water main currently in operation. The Contractor shall coordinate his scheduling of connections with District activities. In addition, the Contractor may be required to supply by-pass connections to maintain service to consumers as directed by the Engineer. The Contractor shall receive no additional compensation for such bypasses.
- H. Connections shall only be made on **Tuesday through Thursday** and only if weather permits as determined by the Engineer. Although there may be times when a connection must be made at night, this shall not normally be the case. The Contractor is advised of this situation and no additional compensation will be allowed for any costs resulting from such required connections and resultant delays. For customer service considerations, the District elects not to notify consumers on Friday for a shutdown of water service on the following Monday. Therefore, Monday notifications mean that the first opportunity for connection or shutdown in a week is Tuesday.
- I. The contractor shall plan his work in consideration of the time constraints inherent in the testing and notification process described above.



- J. When requested by the Engineer, the Contractor shall provide such assistance as may be required in notifying consumers of water service interruption.

3.18 ABANDONING EXISTING PIPELINES

- A. All piping to be abandoned, as shown on the plans, is abandoned only when the pipe has been taken out of service, physically disconnected from the active water system, and has been sealed by the Contractor.
- B. The contractor shall seal all cut ends of the existing piping that are not connected to the new system by either installing temporary fittings on the existing piping or by plugging the cut end with concrete extending two pipe diameters into the pipe. After the concrete placement, the pipe end shall be blocked with a 2-inch thick redwood block.

END OF SECTION



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SUBDIVISION SECTION 03301

MINOR CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes plain and reinforced concrete for pipelines including anchors, encasements, supports, thrust blocks, and other pipeline appurtenances, concrete curbs, gutters, sidewalks and roadway pavement.

1.2 SUBMITTALS

The Contractor shall, unless otherwise directed by the Engineer, provide the following:

- A. A mix design in writing for review at least 15 days before placing of any concrete.
- B. A certificate that the proposed cement complies with ASTM C150, and the proposed aggregates comply with ASTM C33 and these specifications.
- C. For Ready Mix Concrete: Delivery tickets or weighmasters certificates per ASTM C94, including weights of cement and each size aggregate, amount of water added at the plant. In addition, the Contractor shall indicate in writing on the tag the amount of water added on the job.

PART 2 - PRODUCTS

2.1 MATERIALS FOR PIPELINE CONCRETE

- A. Cement. Cement shall conform to ASTM C150, Type II. The maximum percent alkalis shall not exceed 0.6%.
- B. Aggregates. Aggregates shall comply with ASTM C33 and shall be free from any substances that will react with the cement alkalis.
- C. Water. Water to be used in concrete shall be clean and free from objectionable quantities of organic matter, alkali, salts, and other impurities which might reduce the strength, durability, or otherwise adversely affect the quality of the concrete.
- D. Concrete Mix Design.
 - 1. The design shall conform to ASTM C94, except as modified by these specifications.



2. Fly ash shall not be used in the mix.
3. The maximum water-cement ratio for Class A concrete shall be 0.44 by weight or less.
4. The classes of concrete used shall be as described in the following table:

<u>Class</u>	<u>Type of Work</u>	28-Day Minimum Compressive Strength (in psi)	Cement Content (in lbs per cy)
A	Concrete for anchors roadway, sidewalk and miscellaneous	3,000	505

5. The slump shall be measured in accordance with ASTM C143. The slump shall be 4 to 6-inches.

Engineer approval shall be required prior to placing concrete of a lower slump (slump less than 4 inches). If approved by the Engineer, the concrete shall be properly placed and consolidated. Approval by the Engineer does not relieve the Contractor of the minimum 28 day compressive strength requirement.

6. Aggregate size shall be 1-inch maximum.
7. The combined aggregate grading shall be as shown in the following table:

Combined Aggregate Gradation

<u>Sieve Sizes</u>	<u>Percent Passing</u>
2"	---
1-1/2"	100
1"	90 - 100
3/4"	55 - 100
1/2"	---
3/8"	45 - 75
No. 4	35 - 60
No. 8	27 - 45
No. 16	20 - 35
No. 30	12 - 25
No. 50	5 - 15
No. 100	1 - 8
No. 200	0 - 4



- E. Expansion Joints. Unless otherwise specified in the Drawings, Specifications, or by the Engineer, expansion joints shall consist of closed cell neoprene sponge rubber conforming to ASTM Standard TT-S-00230C, Type 2, Class A as manufactured by Velkem 116 or approved equal.
- F. Dowels. Unless otherwise specified in the Drawings, Specifications, Encroachment Permit, or by the Engineer, dowels shall consist of one foot long #4 size deformed steel reinforcing bar (rebar).

PART 3 - EXECUTION

3.1 WORKABILITY

- A. Concrete shall be of such consistency and composition that it can be worked readily into the forms without excessive spading and without permitting the materials to segregate or free water to collect on the surface.
- B. The proportions shall be adjusted to secure a plastic, cohesive mixture, and one which is within the specified slump range of 3 to 6-inches.
- C. To avoid unnecessary changes in consistency, the aggregate shall be obtained from a source with uniform quality, moisture content, and grading. Materials shall be handled in such a manner that variations in moisture content will not interfere with production of concrete of the specified degree of uniformity and slump.

3.2 PLACEMENT AGAINST EXISTING CONCRETE

- A. Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughed prior to the application of an epoxy bonding agent.
- B. An epoxy adhesive bonding agent shall be applied to the old surfaces according to the manufacturer's written recommendations.
- C. Dowels shall be inserted into existing concrete in accordance with local Town, City or County specifications, as specified in the Drawings, Specifications, Encroachment Permit, or by the Engineer.

3.3 EXPANSION JOINTS

- A. Expansion joints shall be installed in locations to match the placement of existing expansion joints and in accordance with local Town, City, or County specifications, as specified in the Drawings, Specifications, Encroachment Permit or by the Engineer.



3.4 WEAKENED PLANE JOINTS

- A. Weakened plane joints shall be installed in locations to match the placement of existing weakened plane joints and in accordance with local Town, City, and County specifications.

3.5 CONCRETE TESTS

The District may perform compressive strength tests on the concrete in accordance with ASTM C31, C39 and C143. To accommodate the tests, the Contractor shall, unless otherwise directed by the Engineer, provide the following:

- A. Four concrete test cylinders shall be molded and cured from each 100 cubic yards, or fraction thereof, of each class of concrete placed in any one day. This shall be in accordance with ASTM C31.
- B. The Contractor shall prepare test cylinders in accordance with ASTM C39. Two cylinders shall be tested at 28 days for acceptance, and one at seven (7) for information. The test results shall be the average of the strengths of the two cylinders tested at 28 days. If one cylinder in a test manifests evidence of improper sampling, molding, or testing, other than low strength, it shall be discarded and the spare cylinder shall be used for the test result. Should two cylinders in a test show any of the above defects, the entire test shall be discarded.
- C. The slump of the concrete shall be determined using ASTM C143 for each strength test sample and as required to establish consistency.

3.6 SITE-MIXED CONCRETE

In regard to site mixed concrete, the Contractor shall conform to the following:

- A. The concrete shall conform to ACI 304 as modified by these specifications.
- B. A batch-type mixer shall be used which is capable of combining the aggregates, cement, and water within the specified time into a thoroughly mixed and uniform mass and discharging the mixture segregation.
- C. Supporting equipment shall be used that can accurately proportion the cement, the coarse and fine aggregates, the admixtures, and the water which enters the mixing drum. The cement and aggregate shall be proportioned by weight.
- D. Each entire batch shall be discharged before recharging. The volume of the mixed materials per batch shall not exceed the manufacturer's rated capacity of the mixer.



3.7 READY-MIXED CONCRETE

- A. Central-mixed concrete shall be provided which conforms to ASTM C94 as modified by these specifications or Five Star Concrete Mix.
- B. Concrete shall be placed within 90 minutes or before 250 revolutions of the drum or blades, whichever occurs first unless admixtures have been used to retard the set time. If admixtures have been used, the time limit is 120 minutes or 300 revolutions of the drum or blades, whichever occurs first. Concrete exceeding the maximum allowable slump of 6 inches shall not be allowed for use on the project and shall be rejected.
- C. Truck-transported, dry-batched concrete or mix shall be used on the jobsite when haul time is excessive. Concrete shall not be retempered.

3.8 PLACING CONCRETE

- A. Placement shall conform to ACI 304 as modified by these specifications.
- B. The District shall be notified of intention to place concrete in any portion of the work. This notification shall be two days in advance of the operation as the Engineer deems necessary for him to observe the preparations at the location. All anchors, inserts and other embedded items shall be in place before the Contractor's notification of readiness is given to the Engineer.
- C. Concrete shall not be placed until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes or other means, clear of the work. Concrete shall not be placed underwater, and still water shall not be allowed to rise on any concrete until the concrete has attained its initial set. Water flow shall not be permitted over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete.

Concrete shall not be placed during precipitation. Concrete placed immediately before rain shall be protected to prevent rainwater from coming in contact with it. Sufficient protective covering shall be kept on hand at all times for this purpose.

3.9 HOT WEATHER REQUIREMENTS

- A. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation in accordance with ACI 305 and the following.
- B. When the weather is such that the temperature of the concrete as placed would exceed 80 F, ice or other effective means of cooling the concrete shall be used



during mixing and transportation so that the temperature of the concrete as placed will not exceed 80 F. Any ice used to cool the concrete must be melted before the concrete is discharged from the mixer.

- C. Precautions shall be taken when placing concrete during hot, dry weather to eliminate early setting of concrete. This includes protection of reinforcing from direct sunlight to prevent heating of reinforcing, placing concrete during cooler hours of the day, and the proper and timely application of specified curing methods.
- D. There will be no additional reimbursement to the Contractor for costs incurred for placing concrete in hot weather.

3.10 BONDING TO OLD CONCRETE

The contact surfaces shall be coated with epoxy bonding compound. The method of preparation and application of the bonding compound shall conform to the manufacturer's printed instructions and recommendations for specific application for this project.

3.11 FINISH

Concrete for curbs, gutters, sidewalks, roadway pavement, and other surface improvements shall be finished to match existing adjacent concrete, and in accordance with local Town, City, or County specifications, as specified in the Drawings, Specifications, Encroachment Permit or by the Engineer.

END OF SECTION



SUBDIVISION SECTION 03400

CONTROL DENSITY FILL

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes specifications for testing, materials, and installation of control density fill (CDF), for pipeline and pipeline appurtenances, at the required lines and grades, as shown on the drawings. Excavation shall include removal and disposal of existing paving, soil, rocks and concrete.

1.2 RELATED SECTIONS

- A. Section 02200 - EARTHWORK
- B. Section 02500 – ASPHALTIC CONCRETE PAVING
- C. Section 02713 - DISTRIBUTION SYSTEM PIPING

1.3 SUBMITTALS

- A. Contractor shall provide the following Material Submittals in accordance with Section 01300 - CONSTRUCTION SUBMITTALS
 - 1. A written mix design for review at least 15 days prior to the placement of any control density fill.
 - 2. A certificate that the proposed cement complies with ASTM C-150, Type II, and the proposed aggregates comply with ASTM C-33 and these specifications.
 - 3. Delivery tickets or weighmasters certificates per ASTM C-94, including mix number, total batched yardage, truck number, delivery address, time the material was batched, batch plant location, amount of water added at the plant and the job site.



1.4 TESTS

The District shall take samples of the CDF. These samples will consist of materials for slump testing and standard compression test cylinders.

Slump testing shall be done on site prior to CDF placement. Product delivered that cannot pass the slump requirement shall not be allowed. Compression testing shall be sent to the District's chosen materials testing laboratory.

Samples shall be tested by the District and all costs for testing shall be borne by the District. The test cylinders must obtain the required strength as provided in the Specifications.

In the event that test cylinder strength is either above or below the 28-day test limits, as required by the 2.1A.1 of this section, the Contractor shall be required to remove and replace all pipe and CDF to the lateral limits of the pipe and CDF placed on the day the representative sample was taken and at the sole expense of the Contractor.

PART 2 - PRODUCTS

2.1 CONTROL DENSITY FILL (CDF)

A. GENERAL

Non-structural control density fill (CDF) shall meet the following:

1. CDF shall be hand excavatable with unconfined compressive 28-day strengths from 50 psi to a maximum of 150 psi.
2. CDF shall be flowable to surround the pipe and self-leveling within the trench. CDF shall have a maximum slump of 5 inches in order to control set time.
3. CDF shall have a cement content of 25 to 40 lbs. per cubic yard and a total cementitious content (including cement and flyash) of 200 to 250 lbs. per cubic yard.
4. CDF shall have a maximum aggregate size of 1/2" not to exceed 40% of the total aggregate content.

B. CEMENT

Cement shall conform to ASTM C-150, Type II. The maximum percent alkalis shall not exceed 0.6%.



C. **AGRREGATES**

Aggregates shall comply with ASTM C-33 and shall be free from any substances that will react with the cement alkalizes.

D. **FLY-ASH**

Flyash shall conform to ASTM C 618 for Class F Pozzolans as modified herewith, and a loss on ignition (LOI) not to exceed 4%.

E. **WATER**

Water to be used in concrete shall be clean and free from objectionable quantities of organic matter, alkali, salts, and other impurities, which might reduce the strength, durability, or otherwise adversely affect the quality of the CDF.

F. **AIR ENTRAINMENT**

Air entraining agent shall conform to ASTM C-260. Entrained air content shall be a minimum of 8.0%. The actual entrained air content shall be established for each particular job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

PART 3 - EXECUTION

3.1 CDF TESTING

Contractor shall assist the District to sample and test each truck of CDF for slump prior to placement. The CDF shall not be placed if the slump exceeds the specified limit
Compression test cylinders from each truckload during placement shall be collected.

3.2 PIPE SUPPORT AND PLACEMENT OF CDF

Contractor shall place sandbags to support the pipe prior to installing pipe. A three-inch clearance between the pipe and bottom of the trench shall be achieved, prior to installing CDF. Sand shall be placed around corporation cocks for services to allow for installation of service piping. The pipe shall not be allowed to float. A vibrator shall be at the job site to consolidate CDF as directed by Engineer.



3.3 CURING AND SURFACE RESTORATION

As allowed by the contract documents and directed by the Engineer, steel plates shall be placed over the trench to allow for traffic during the CDF curing period. The curing period shall be that time necessary for the CDF to support traffic on it without deformation of the CDF. Typically this means that plates must be in place overnight. Plates shall be tack welded each to the next. All abrupt edges shall be covered with cutback.

If the CDF is not placed to the surface, temporary pavement shall be placed after the CDF has cured. Temporary surfaces shall be placed and maintained in accordance with Section 02500. CDF shall be removed as necessary to place the finish road asphalt section.

END OF SECTION



SUBDIVISION SECTION 09801

FIELD APPLIED TAPE COATING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

This specification covers tape systems for corrosion protection for metal pipe, tubing, valves, tie rods, fittings, and other metal surfaces in buried service. This includes protection for new unprotected metal surfaces, transition from new unprotected to existing protected surfaces, and repairs to damaged protective systems. The system shall be specifically designed to provide permanent protection from corrosion for metal piping and shall be suitable for application over coal tar, asphalt, polyethylene and epoxy surfaces. It shall also be suitable for atmospheric exposure without thermal blistering or ultraviolet degradation.

1.2 RELATED SECTIONS

- A. Section 01300 – CONSTRUCTION SUBMITTALS
- B. Section 02200 - EARTHWORK
- C. Section 02713 - DISTRIBUTION SYSTEM PIPING

PART 2 - PRODUCTS

Tape products described in this section will be provided by the District.

PART 3 - EXECUTION

3.1 GENERAL

All metal pipe, tubing, fittings, appurtenances, tie rods and other metal surfaces used for buried service shall be cleaned of all dirt, moisture, oil or other contamination in preparation for tape wrapping.

3.2 SMALL DIAMETER PIPE AND FITTINGS

Small diameter pipe (less than 2" in diameter) and miscellaneous small diameter surfaces shall be wrapped with PVC TAPE. Metal surfaces shall be cleaned to bright metal, free of contamination and moisture. PVC tape shall be spirally applied using two inch wide tape with a minimum of one-half inch overlap. Sufficient tension shall be used so that there are no wrinkles.



3.3 LARGE DIAMETER PIPE AND FITTINGS

All large diameter piping (2" and above) shall be tape wrapped using a MULTIPOYLMER 30 MIL TAPE SYSTEM. The surface shall be circumferentially wrapped with enough tension to stretch the tape. The tape shall be overlapped at least 25%. No wrinkles or other voids will be permitted.

3.4 REPAIRS TO DAMAGED SHOP APPLIED COATINGS

Steel pipe surfaces including pipe joints, damaged shop applied pipe coating, hydrant buries, valves and other fittings with less than 20 mils thickness shall be cleaned of all dirt, moisture, oil or other contamination and primed and tape wrapped using a MULTIPOYLMER 30 MIL TAPE SYSTEM.

3.5 WORKMANSHIP

Surface preparation and application of primer and tape coatings shall be done in accordance with the manufacturer's recommendation.

3.6 INSPECTION

All field applied coating shall be inspected and tested before backfilling.

END OF SECTION



SUBDIVISION SECTION 18000

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 SCOPE

- A. The requirements of Division 1 form a part of this section.
- B. During the progress of the work, keep the premises occupied in a neat and clean condition and protect the environment both on site and off site, throughout and upon completion of the construction project.

1.2 SUBMITTALS

Contractor shall develop an Environmental Protection Plan in detail and submit to the Engineer within seven (7) days from the date of the Notice to Proceed. Distribute the plan to all employees and to all subcontractors and their employees.

The Environmental Protection Plan shall include, but not be limited to, the following items:

- A. Copies of required permits.
- B. Proposed sanitary landfill site.
- C. Other proposed disposal sites.
- D. Copies of any agreements with public or private landowners regarding equipment, materials storage, borrow sites, fill sites, or disposal sites. Any such agreement made by the Contractor shall be invalid if its execution causes violation of local or regional grading or land use regulations.
- E. Proposed project site winterization plan.

1.3 ENVIRONMENTAL REQUIREMENTS

All operations shall comply with all federal, state and local regulations pertaining to water, air, solid waste and noise pollution.

1.4 DEFINITIONS

Sediment - Soil and other debris that have been eroded and transported by runoff water.



Solid Waste -	Rubbish, debris, garbage and other discarded solid materials resulting from construction activities, including a variety of combustible and non-combustible wastes, such as ashes, waste materials that result from construction or maintenance and repair work, leaves and tree trimmings.
Chemical Waste -	Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals and inorganic wastes. Some of the above may be classified as "hazardous."
Sanitary Wastes -	
Sewage -	That which is considered as domestic sanitary sewage.
Garbage -	Refuse and scraps resulting from preparation, cooking, dispensing and consumption of food.
Hazardous Mat'ls -	As defined by applicable laws and regulations. Undisclosed hazardous material contamination, if encountered will constitute a changed site condition. The District may retain a separate contractor to dispose of undisclosed hazardous material encountered.

PART 2 - PRODUCTS

(None)

PART 3 - EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

A. GENERAL

It is intended that the natural resources within the project boundaries and outside the limits of permanent work performed under this Contract be preserved in their existing condition or be restored to an equivalent or improved condition upon completion of the work. Confine construction activities to areas defined by the public roads, easements, and work area limits shown on the Draw-ings. Return construction areas to their pre-construction elevations except where surface elevations are otherwise noted to be changed. Maintain natural drainage patterns. Conduct construction activities such that ponding of stagnant water conducive to mosquito breeding habitat will not occur at any time.



B. LAND RESOURCES

1. Contractor Responsibility

Do not remove, cut, deface, injure or destroy trees, grapevines or shrubs outside the work area limits. Do not remove, deface, injure or destroy trees within the work area without permission from the Engineer. Such improvements shall be removed and replaced, if required, by the Contractor at his own expense.

2. Protection

Protect trees that are located near the limits of the Contractor's work areas which may possibly be defaced, bruised or injured or otherwise damaged by the Contractor's operations. No ropes, cables or guys shall be fastened to or attached to any existing nearby trees, grapevines or shrubs for anchorages unless specifically authorized. Where such special emergency use is permitted, the Contractor shall be responsible for any damage resulting from such use.

3. Trimming

Trim tree limbs overhanging the line of the work and in danger of being damaged by the Contractor's operations in accordance with recognized standards for such work. Remove other tree limbs under the direction of the Engineer, so that the tree will present a balanced appearance.

4. Treatment of Roots

Do not cut roots unnecessarily during excavating or trenching operations. Expose major roots encountered in the course of excavation and do not sever. Wrap them in burlap as a protective measure while exposed. Neatly trim all other roots (one inch in diameter and larger) that are severed in the course of excavation at the edge of the excavation or trench and paint them with a heavy coat of an approved tree seal as directed by the Engineer.

5. Repair or Restoration

Repair or replace any trees or other landscape features scarred or damaged by equipment or construction operations as specified below. The repair and/or restoration plan shall be favorably reviewed prior to its initiation.



6. Temporary Construction

Obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Engineer. Level all temporary roads, parking areas and any other areas that have become compacted or shaped. Any unpaved areas where vehicles are operated shall receive a suitable surface treatment or shall be periodically wetted down to prevent construction operations from producing dust damage and nuisance to persons and property, at no additional cost to the Owner. Keep haul roads clear at all times of any object which creates an unsafe condition. Promptly remove any contaminants or construction material dropped from construction vehicles. Do not drop mud and debris from construction equipment on public streets. Sweep clean turning areas and pavement entrances as necessary.

C. WATER RESOURCES

Investigate and comply with all applicable federal, state and local regulations concerning the discharge (directly or indirectly) of pollutants to the underground and natural waters. Perform all work under this Contract in such a manner that any adverse environmental impacts are reduced to a level that is acceptable to the Engineer and regulatory agencies. Refer to Section 02200, EARTHWORK, paragraph on control of water for "dewatering" water disposal requirements.

1. Oily Substances

At all times, special measures shall be taken to prevent oily or other hazardous substances from entering the ground, drainage areas or local bodies of water in such quantities as to affect normal use, aesthetics or produce a measurable impact upon the area. Any soil or water which is contaminated with oily substances due to the Contractor's operations shall be disposed of in accordance with applicable regulations.

2. Chlorinated Water

Take special measures to prevent chlorinated water from entering the ground or surface waters. Dechlorinate chlorinated water prior to discharge.



D. FISH AND WILDLIFE RESOURCES

Perform all work and take such steps required to prevent any interference or disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise significantly disturb native habitat adjacent to the project area which are critical to fish and wildlife except as may be indicated or specified.

E. CULTURAL RESOURCES

The project does not pass through any known archaeological sites. However, it is conceivable that unrecorded archaeological sites could be discovered during the construction. In the event that artifacts, human remains, or other cultural resources are discovered during subsurface excavations at locations of the work, the Contractor shall protect the discovered items, notify the Engineer, and comply with applicable law.

3.2 NUISANCE ABATEMENT

A. NOISE CONTROL

1. Location

Maximum Noise Levels within 1,000 Feet of any Residence, Business, or Other Populated Area: Noise levels for trenchers, pavers, graders and trucks shall not exceed 90 dB at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dB at 50 feet.

2. Equipment

Electrically powered equipment instead of pneumatic or internal combustion powered equipment shall be used, where feasible.

Jack hammers shall be equipped with exhaust mufflers and steel muffling sleeves. Air compressors should be of a quiet type such as a "whisperized" compressor.

All noise-producing project equipment and vehicles using internal combustion engines (including haul trucks) shall be fitted with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features. These devices shall be maintained in good operating condition so as to meet or exceed original factory specifications. Mobile or fixed "package" equipment (e.g., air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.



All mobile or fixed noise-producing equipment used on the project, which is regulated for noise output by a local, state, or federal agency, shall comply with such regulations while in the course of project activities.

3. Operations

Keep noisy equipment as far as possible from noise-sensitive site boundaries. Machines should not be left idling. Use electric power in lieu of internal combustion engine power wherever possible. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have mufflers.

The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only.

4. Scheduling

Schedule noisy operations so as to minimize their duration at any given location.

5. Monitoring

To determine whether the above noise limits are being met and whether noise barriers are needed, the Contractor shall use a portable sound level meter meeting the requirements of American National Standards Institute Specification S1.4 for Type 2 sound level meters. If non-complying noise levels are found, the Contractor shall be responsible for monitoring and correction of excessive noise levels.

B. DUST CONTROL, AIR POLLUTION, AND ODOR CONTROL

1. Unpaved areas where vehicles are operated shall be periodically wetted down or given an equivalent form of treatment, to eliminate dust formation.
2. Store all volatile liquids, including fuels or solvents in closed containers.
3. No open burning of debris, lumber or other scrap will be permitted.
4. Properly maintain equipment to reduce gaseous pollutant emissions.



3.3 CONSTRUCTION STORAGE AREAS

- A. Store and service equipment at the designated Contractor's storage area where oil wastes shall be collected in containers. Oil wastes shall not be allowed to flow onto the ground or into surface waters. Containers shall be required at the construction site for the disposal of materials such as paint, paint thinner, solvents, motor oil, fuels, resins and other environmentally deleterious substances. No dumping of surplus concrete or grout on the site will be permitted.

3.4 FIRE PREVENTION

- A. Provide spark arresters on all internal combustion engines.
- B. Store and handle flammable liquids in accordance with the Flammable and Combustible Liquids Code, NFPA 30.
- C. Provide fire extinguishers at hazardous locations or operations, such as welding.

3.5 EROSION AND SEDIMENT TRANSPORT CONTROL

- A. Discharge construction runoff into small drainages at frequent intervals to avoid buildup of large potentially erosive flows.
- B. Prevent runoff from flowing over unprotected slopes.
- C. Keep disturbed areas to the minimum necessary for construction.
- D. Keep runoff away from disturbed areas during construction.
- E. Direct flows over vegetated areas prior to discharge into public storm drainage systems.
- F. Trap sediment before it leaves the site, using such techniques as check dams, sediment ponds, or siltation fences.
- G. Remove and dispose of all project construction-generated siltation that occurs in offsite retention ponds.
- H. Confine construction to the dry season, whenever possible. If construction needs to be scheduled for the wet season, ensure that erosion and sediment transport control measures are ready for implementation prior to the onset of the first major storm of the season.
- I. Stabilize disturbed areas as quickly as possible.



3.6 DISPOSAL OPERATIONS

A. SOLID WASTE MANAGEMENT

Supply solid waste transfer containers. Daily remove all debris such as spent air filters, oil cartridges, cans, bottles, combustibles and litter. Take care to prevent trash and papers from blowing onto adjacent property. Encourage personnel to use refuse containers. Convey contents to a sanitary landfill.

Washing of concrete containers where waste water may reach adjacent property or natural water courses will not be permitted. Remove any excess concrete to the sanitary landfill.

B. CHEMICAL WASTE AND HAZARDOUS MATERIALS MANAGEMENT

Furnish containers for storage of spent chemicals used during construction operations. Dispose of chemicals and hazardous materials in accordance with applicable regulations.

C. GARBAGE

Store garbage in covered containers, pick up daily and dispose of in a sanitary landfill.

D. CLEARING AND GRUBBING

Dispose of vegetation, weeds, rubble, and other materials removed by the clearing, stripping and grubbing operations off site at a suitable disposal site in accordance with applicable regulations.

E. EXCAVATED MATERIALS

1. Native soil complying with the requirements of Section 02200, EARTHWORK, may be used for backfill, fill and embankments as allowed by that section.
2. Spoil Material: Remove all material which is excavated from the site and dispose of offsite in accordance with applicable regulations disposal site indicated in the Environmental Protection Plan. No additional compensation will be paid to the Contractor for such disposal. Include all such costs in the lump sum prices bid for the project. Remove rubbish and materials immediately following excavation.



Rubbish shall consist of all materials not classified as suitable materials or rubble and shall include shrubbery, trees, timber, trash and garbage.

3. Excavated material may be stockpiled offsite for reuse in accordance with the requirements of Section 02200, EARTHWORK. Offsite stockpile locations shall be legally obtained by the Contractor and shall meet all of the applicable regulations and requirements of this Section. No additional compensation will be paid to the Contractor for such stockpiling and reuse of native soil.

END OF SECTION



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