

NOTICE TO BIDDERS

PROPOSAL FORM

SPECIFICATIONS

and

STANDARD CONTRACTUAL REQUIREMENTS

Construction of

ZONE 9 INTERTIE AND PRESSURE REDUCING STATION

Within the City of

**BEVERLY HILLS,
CALIFORNIA**

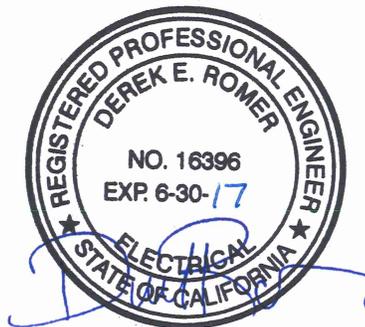
**PUBLIC WORKS DEPARTMENT
BEVERLY HILLS, CALIFORNIA**

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Approved As To Form:

**January 2016
Project No. 10106**

City Attorney

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<u>Description</u>
Southern California Edison Final Drawings 747299_0.01

NOTICE TO BIDDERS

Construction of

ZONE 9 INTERTIE AND PRESSURE REDUCING STATION

Within the City of BEVERLY HILLS, CALIFORNIA

BIDS - Sealed Proposals for the water main replacements in the locations listed below within the City of Beverly Hills, California, will be received up to the hour of 2:00 p.m., on **March 10, 2016**, at the office of the City Clerk of the City of Beverly Hills, located in Room 290 of City Hall at 455 North Rexford Drive, Beverly Hills, California. Bids will be publicly opened at 2:00 p.m. on the above-mentioned date in the office of the City Clerk of said City Hall.

PROJECT WORK LOCATION

WM No.	Main Location	Begin	End
1	Monte Cielo Ct.	Monte Cielo Dr.	La Fontaine Ct.

SCOPE OF THE WORK - The work to be done shall consist of furnishing all the required labor, materials, equipment, parts, implements and supplies necessary for, or appurtenant to, the construction and completion of the waterline replacement project in accordance with Drawing No. 10395, Sheets 1 through 18 and the Specifications prepared for this project.

ITEM NO.	ESTIMATED QUANTITIES		DESCRIPTION
1	1	Lump Sum	Mobilization/ Demobilization/ Traffic Control / Trench Safety Measures
2	5	Linear Feet	Furnish and Install 8-inch Ductile Iron Pipe-Restrained Joints, including gate valves and pressure regulating valves.
3	150	Linear Feet	Furnish and Install 8-inch Steel Piping, Flanged including gate valves and pressure regulating valves.
4	1	Lump Sum	Furnish and Install Electrical including Meter Socket, Load Center, Lighting including all Conduit, Wire and Cables
5	1	Lump Sum	Furnish and Install SCADA Panel, including programming and integration
6	1	Lump Sum	Furnish and Install Instrumentation including 8-inch Flow Meter and Piping Connections

7	1	Lump Sum	Furnish and Install Retaining Wall
8	1	Lump Sum	Miscellaneous Electrical Work including but not limited to switches, receptacles, etc.
9	1	Lump Sum	Miscellaneous Piping and Civil Work
10	1	Lump Sum	Steel Door, Windows, Paint Building & Anti-slip Floor Surface
11	1	Lump Sum	\$5,000 Allowance for Southern California Edison

Copies of the Plans, Specifications and Proposal Form may be inspected and obtained at the office of the City Engineer, located at 345 Foothill Rd. There is no charge or deposit required for this material; therefore, they are not to be returned to the City for refund. Each bidder shall furnish the City the name, address, and telephone number of the firm requesting specifications.

References in the project specifications to specific sections of the Standard Specifications refer to the book of "Standard Specifications for Public Works Construction", 2015 Edition, written by a Joint Cooperative Committee of the Southern California Chapter of the American Public Works Association and Southern California District of the Associated General Contractors of California. Contractors wishing to obtain this book may purchase copies directly from the publisher, Building News, Inc., 1612 South Clementine Street, Anaheim, California, 92802; (800) 873-6397.

AMENDMENTS - The second paragraph of Section 3-2.2.1 "Contract Unit Prices", of the Standard Specifications for Public Works Construction is deleted.

The fourth paragraph of Section 3-2.2.1 "Contract Unit Prices", of the Standard Specifications for Public Works Construction is deleted and replaced by the following: "Should any Contract item be deleted in its entirety, no payment will be made to Contractor for that Bid Item."

The following is in addition to the provisions of Section 2-9.1 of the Greenbook: The Contractor is required to locate and tie out survey monuments in the project area prior to construction involving street and highways, and to file with the County Surveyor a Corner Record of any such work. Prior to the issuance of a completion certificate, the Contractor is required to file a Corner Record for survey monumentation that is replaced. All such survey work shall be performed under the supervision of a California licensed Land Surveyor or a Civil Engineer authorized to perform such work.

The Contractor shall provide the City a copy of the office calculations and documents submitted to the County for filing in connection with the aforementioned work.

The payment for surveying, related professional services, office calculation, and furnishing all labor, materials, equipment, tools and incidentals, and for doing work involved shall be considered as included in the various items of work, and no additional compensation will be allowed therefore.

Section 3-3.2.2 shall be changed as follows:

(a) Labor. The costs of labor will be the actual cost for wages of workers performing the extra work at the time the extra work is done, plus the employer payments of payroll taxes, health and welfare, pension, vacation, apprenticeship funds, and other direct costs, resulting from Federal, State, or local laws, as well as assessments or benefits required by collective bargaining agreements.

The following will revise Section 3-3.2.3 of the Greenbook:

(a) Work by Contractor. An allowance for overhead and profit shall be added to the Contractor's cost as determined under 3-3.2.2 and shall constitute the full and complete markup for all overhead and profit on extra work performed by the Contractor. The Contractor shall be compensated for the actual increase in the Contractor's bond premium caused by the extra work. For costs determined under each subsection in 3-3.2.2, the markup shall be:

- a) Labor 20%
- b) Materials 15%
- c) Tools & Equipment Rental 15%
- d) Other Items 15%

(b) Work by Subcontractor. When any of the extra work is performed by a Subcontractor, the markup established in 3-3.2.3(a) shall be applied to the Subcontractor's costs as determined under 3-3.2.2. An allowance for the Contractor's overhead and profit shall be added to the sum of the Subcontractor's costs and markup and shall constitute the full and complete markup for all overhead and profit for the Contractor on work by the Subcontractor. For Contractor markup of Subcontractor's costs, the allowance shall be 10% on the first \$2,000 or portion thereof, and 5% on costs in excess of \$2,000.

GENERAL INSTRUCTIONS - Bids must be submitted on the Proposal Form prepared for this project and shall be delivered at the office of the City Clerk within a sealed envelope supplied by the City and marked on the outside as follows: "**BID NO. 16-02: ZONE 9 INTERTIE AND PRESSURE REDUCING STATION.**"

ENGINEER'S ESTIMATE - The preliminary opinion of probable cost of construction of this Work has been prepared and the said estimate is **\$292,300.**

PUBLIC WORKS CONTRACTOR REGISTRATION NUMBER – The Contractor is required to register with State of California Department of Industrial Relations and meet requirements to bid on public works contracts. A Public Works Contractor Registration No. shall be submitted with the bid.

LIQUIDATED DAMAGES -There will be a One Thousand Dollar (\$1,000) assessment for each calendar day that work remains incomplete beyond the time stated in the Proposal Form. Refer to the Proposal Form for specific details.

PREVAILING WAGES - In accordance with the provisions of Section 1770 et seq, of the Labor Code, the Director of Industrial Relations of the State of California has determined the general prevailing rate of wages applicable to the work to be done. The Contractor will be required to pay to all workers employed on the project sums not less than the sums set forth in the documents entitled "General Prevailing Wage Determination made by the Director of Industrial Relations pursuant to California Labor Code, Part 7, Chapter I, Article 2, Sections 1770, 1773, 1773.I."

A copy of said documents is on file and may be inspected in the office of the City Engineer, located at 345 Foothill Rd., Beverly Hills, California 90210.

Attention is directed to the provisions of Sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him. The Contractor and any subcontractor under him shall comply with the requirements of said sections in the employment of apprentices.

Information relative to apprenticeship standards and administration of the apprenticeship program may be obtained from the Director of Industrial Relations, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

PAYROLL RECORDS - The Contractor's attention is directed to Section 1776 of the Labor Code, relating to accurate payroll records, which imposes responsibility upon the Contractor for the maintenance, certification, and availability for inspection of such records for all persons employed by the Contractor or by the Subcontractors in connection with the project. The Contractor shall agree through the Contract to comply with this section and the remaining provisions of the Labor Code.

INSURANCE AND BOND REQUIREMENTS - The Contractor shall provide insurance in accordance with Section 3-13 of the City of Beverly Hills, Public Works Department, Standard Contractual Requirements, included as part of these Specifications. All subcontractors listed shall attach copies of the Certificate of Insurance naming the Contractor as the additional insured as part of their insurance policy coverage. In addition, the Contractor shall guarantee all work against defective workmanship and materials furnished by the Contractor for a period of one (1) year from the date the work was completed in accordance with Section 2-11 of the Standard Contractual Requirements. The Contractor's sureties for the "Performance Bond" shall be liable for any work that the Contractor fails to replace within a specified time.

CONTRACTORS LICENSE - At the time of the Bid Deadline and at all times during performance of the Work, including full completion of all corrective work during the Correction Period, the Contractor must possess a California contractor's license or

licenses, current and active, of the classification required for the Work, in accordance with the provisions of Chapter 9, Division 3, Section 7000 et seq. of the Business and Professions Code.

In compliance with Public Contract Code Section 3300, the City has determined that the Bidder must possess the following license(s): “A”

The successful Bidder will not receive a Contract award if the successful Bidder is unlicensed, does not have all of the required licenses, or one or more of the licenses are not current and active. If the City discovers after the Contract's award that the Contractor is unlicensed, does not have all of the required licenses, or one or more of the licenses are not current and active, the City may cancel the award, reject the Bid, declare the Bid Bond as forfeited, keep the Bid Bond's proceeds, and exercise any one or more of the remedies in the Contract Documents.

CITY CONTACT – Tristan Malabanan 310-285-2512 or tmalabanan@beverlyhills.org

THE CITY RESERVES THE RIGHT TO REJECT ANY BID OR ALL THE BIDS AND TO WAIVE ANY INFORMALITY OR IRREGULARITY IN ANY BID, BUT IF THE BIDS ARE ACCEPTED, THE CONTRACT FOR THE IMPROVEMENT WILL BE LET TO THE LOWEST RESPONSIBLE BIDDER FOR THE PROJECT AS A WHOLE.

**PROPOSAL FORM
Construction of**

ZONE 9 INTERTIE AND PRESSURE REDUCING STATION

**Within the City of
BEVERLY HILLS, CALIFORNIA**

Date: _____

To the Honorable City Council Beverly Hills, California:

In compliance with advertised notice inviting sealed proposals for the **Zone 9 Intertie and Pressure Reducing Station** within the City of Beverly Hills, California and after having carefully examined the location of the project and studied the specifications prepared for this work, the undersigned hereby agrees to enter into a contract to furnish all labor, materials, equipment, parts, implements, and supplies needed to perform the contract work to the satisfaction and under the direction of the City Engineer of the City of Beverly Hills, said contract to be drawn in accordance with the provisions in the Specifications, Notice to Bidders, and all the applicable clauses of the "Standard Contractual Requirements for Public Improvements in the City of Beverly Hills, California", as adopted by the Department of Public Works on November 1, 1976.

If awarded the contract, the undersigned agrees to furnish the necessary bonds and insurance as set forth in the above-mentioned Standard Contractual Requirements, within ten (10) days after the award of the contract.

Attached hereto is cash, or cashier's check, or a certified check in favor of the City of Beverly Hills, in an amount equal to at least ten percent (10%) of the total bid, or a bid bond for said amount on a form furnished by the City, with the understanding that said security shall be held by the City Clerk until the contract for doing the work has been entered into and that said security shall be forfeited to the City as liquidated damages should the undersigned fail to enter into a contract and furnish the above-mentioned bonds and insurance within the ten (10) days specified, if awarded the contract, as the undersigned agrees that in the event of such failure, the actual amount of the damage to the City would be impractical, and extremely difficult to determine. In the event cash, or cashier's check, or a certified check is furnished for the bid bond, then a letter is required from a bonding company stating that said company will furnish the necessary bonds, as specified in Paragraph 2-11 of the Standard Contractual Requirements if the undersigned is awarded the contract. The undersigned is aware of the fact that such a letter must be from a bonding company acceptable to the City of Beverly Hills, and that all bids accompanied by cash, or cashier's check, or a certified check in lieu of the bid bond must be accompanied by such a letter in order to be considered.

The undersigned certifies to have a minimum of three consecutive years of current experience in the type of work related to this project, and has completed 5 similar piping

and SCADA projects within the past three years. Experience by a subcontractor for may count towards the experience requirement.

The undersigned also certifies to be properly licensed by the State of California as a contractor to perform work of this specialty and further certifies to have been so licensed for the three years immediately preceding the date of receipt of bids. The undersigned agrees to furnish the City satisfactory proof of ability to perform the work, as well as records of performance of similar jobs completed recently, if and when requested to do so by the City Engineer.

The undersigned agrees that the insurance and bonding requirements set forth in Sections 2-11 and 3-13, respectively, of the City of Beverly Hills, Public Works Department, Standard Contractual Requirements can and will be fulfilled.

The undersigned hereby agrees to perform the work as described on Drawing No. 10395, Sheets 1 through 18, and in the Specifications prepared for this project, at the following prices, to wit:

<u>ITEM NO.</u>	<u>EST QTY.</u>	<u>DESCRIPTION AND UNIT PRICE WRITTEN IN WORDS</u>	<u>UNIT PRICE IN FIGURES</u>	<u>TOTAL IN FIGURES</u>
1.	1 LS	MOBILIZATION/ DEMOBILAZTION/ TRAFFIC CONTROL/ TRENCH SAFETY MEASURES _____ DOLLARS _____ AND _____ CENTS lump sum	\$ _____	\$ _____
2.	5 LF	FURNISH AND INSTALL 8-INCH DUCTILE IRON PIPE-RESTRAINED JOINTS, INCLUDING GATE VALVES AND PRESSURE REGULATING VALVES _____ DOLLARS _____ AND _____ CENTS per linear foot	\$ _____	\$ _____

3. 150 LF FURNISH AND INSTALL 8-INCH STEEL PIPING, FLANGED INCLUDING GATE VALVES AND PRESSURE REGULATING VALVES

_____ DOLLARS
 _____ AND
 _____ CENTS

per linear foot

\$ _____ \$ _____

4. 1 LS FURNISH AND INSTALL ELECTRICAL INCLUDING METER SOCKET, LOAD CENTER, LIGHTING INCLUDING ALL CONDUIT, WIRE AND CABLES

_____ DOLLARS
 _____ AND
 _____ CENTS

lump sum

\$ _____ \$ _____

5. 1 LS FURNISH AND INSTALL SCADA PANEL, INCLUDING PROGRAMMING AND INTEGRATION

_____ DOLLARS
 _____ AND
 _____ CENTS

lump sum

\$ _____ \$ _____

6. 1 LS FURNISH AND INSTALL INSTRUMENTATION INCLUDING 8-INCH FLOW METER AND PIPING CONNECTIONS

_____ DOLLARS
 _____ AND
 _____ CENTS

lump sum

\$ _____ \$ _____

7.	1 LS	FURNICH AND INSTALL RETAINING WALL	_____	DOLLARS AND CENTS	_____	_____
			_____	DOLLARS AND CENTS	_____	_____
			lump sum		\$ _____	\$ _____
8.	1 LS	MISCELLANEOUS ELECTRICAL WORK INCLUDING BUT NOT LIMITED TO SWITCHED, RECEPTACLES, ETC.	_____	DOLLARS AND CENTS	_____	_____
			_____	DOLLARS AND CENTS	_____	_____
			lump sum		\$ _____	\$ _____
9.	1 LS	MISCELLANEOUS PIPING AND CIVIL WORK	_____	DOLLAR S AND CENTS	_____	_____
			_____	DOLLAR S AND CENTS	_____	_____
			lump sum		\$ _____	\$ _____
10.	1 LS	STEEL DOOR, WINDOWS, PAINT BUILDING AND ANTI-SLIP FLOOR SURFACE	_____	DOLLAR S AND CENTS	_____	_____
			_____	DOLLAR S AND CENTS	_____	_____
			lump sum		\$ _____	\$ _____
11.	1 LS	\$5,000 ALLOWANCE FOR SOUTHERN CALIFORNIA EDISON WORK	Five thousand	DOLLAR S AND CENTS	_____	_____
			No	DOLLAR S AND CENTS	_____	_____
			lump sum		<u>\$5,000.00</u>	<u>\$5,000.00</u>

LIST OF SUBCONTRACTORS - The undersigned is required to fill in the following blanks in accordance with the provisions of Section 4104 of the Public Contract Code of the State of California and Section 2-3 of the Standard Specifications.

Name Under Which Subcontractor is <u>Licensed</u>	<u>License No.</u>	Location of the <u>Place of</u> <u>Business</u>	<u>Specific</u> <u>Subcontract</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Subcontractors listed in accordance with the provision of Section 2-3 of the Standard Specifications must be properly licensed under the laws of the State of California for the type of work which they are to perform. Do not list alternate subcontractors for the same work. All subcontractors listed shall attach copies of the Certificate of Insurance naming the Contractor as additional insured as part of their policy coverage.

The undersigned agrees to furnish proof that all contractors and subcontractors performing any work related to this improvement are complying with all the requirements of Social Security Legislation, both State and Federal, and also agrees to conform with the provisions of Sections 4100 to 4113, inclusive, of the Public Contract Code, as amended, concerning subcontractors and subcontracts.

**NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY
BIDDER AND SUBMITTED WITH BID**

State of California
County of _____

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

Contractor

(attach appropriate notary acknowledgments)

Respectfully submitted,

Dated _____

FIRM NAME _____

SIGNATURE _____
Bidder

ADDRESS _____

TELEPHONE: BUSINESS _____
RESIDENCE _____

CONTRACTOR'S LICENSE NO. _____ CLASS _____ EXPIRATION DATE _____

Bidder is * _____ If a partnership, names of partners;
If a corporation, names of President **or**
Vice President, **and** the Secretary **or**
Assistant Secretary

<u>NAME</u>	<u>ADDRESS</u>
_____	_____
_____	_____
_____	_____

I (we) hereby state and declare under the penalty of perjury under the laws of California, that the representations made herein are true and correct.

Executed on _____ 20__ at _____ California

*By: _____ *By: _____

Title: _____ Title: _____

* Please state whether the bidder is an individual, a partnership, a corporation, or an individual doing business under a fictitious name. If the bidder is a corporation, the following is required: 1) signatures of two corporate officers; or 2) a certified copy of the corporation bylaws, and a resolution of the Board of Directors which gives authority to the officers signing this agreement to execute contracts on behalf of the corporation. Also, refer to Paragraph 2-01 of the Standard Contractual Requirements.

SPECIFICATIONS
Construction of
ZONE 9 INTERTIE AND PRESSURE REDUCING STATION
Within the City of
BEVERLY HILLS, CALIFORNIA

SECTION 1

GENERAL PROVISIONS

1-01 WORK TO BE DONE - The contract work to be done under these Specifications shall consist of furnishing all the required labor, materials, equipment, parts, implements and supplies necessary for, or appurtenant to water main replacements in the following locations within the City of Beverly Hills, California in accordance with Drawing No. 10395, Sheets 1 to 18:

WM No.	Main Location	Begin	End
1	Monte Cielo Ct.	Monte Cielo Dr.	La Fontaine Ct.

The work generally consists of installation of 8” waterlines, fire hydrants, water services and associated valves and meter boxes, fittings and accessories, electrical equipment, SCADA panel including programming and integration, instrumentation, lighting, conduit and wire as shown on the plans. As required, the work shall include pavement removal and reconstruction, curb, gutter and sidewalk removal and reconstruction, driveway and alley approach removal and reconstruction, traffic striping, traffic loop installation with conduit and pull boxes, and traffic control.

1-02 STANDARD CONTRACTUAL REQUIREMENTS - The provisions of the "Standard Contractual Requirements for Public Improvements in the City of Beverly Hills", as adopted by the Department of Public Works on November 1, 1976, a copy of which is attached hereto and incorporated herein by reference, shall be applicable to the work covered by these Specifications.

1-03 REFERENCE SPECIFICATIONS

1-03.1 GENERAL - The following referenced specifications, including all amendments thereto issued prior to the date of the bid opening, shall be a part of these specifications, the same as though contained fully herein.

1-03.2 STANDARD SPECIFICATIONS - The words "Standard Specifications" when used in these Specifications or in the contract, refer to the "Standard Specifications for Public Works Construction", 2012 Edition written by a Joint Cooperative Committee of the Southern California Chapter of the American Public Works Association and Southern California District of the Associated General Contractors of California.

1-03.3 BEVERLY HILLS STANDARD DRAWINGS FOR WATERLINE INSTALLATIONS - The current City of Beverly Hills Standard Drawings are provided in Appendix A and can be downloaded from the City website. A copy of Specifications for Construction of Water Pipeline Installations is no longer available and has been superseded by Section 3 of these specifications.

1-03.4 APWA STANDARD PLANS - See Appendix B.

1-03.5 CALTRANS STANDARD SPECIFICATIONS - The July, 2001, State of California, Department of Transportation (Caltrans) Standard Specifications and Standard Plans. See Appendix C.

1-03.6 ELECTRICAL AND SCADA TECHNICAL SPECIFICATIONS - See Appendix D.

SECTION 2

SPECIAL PROVISIONS

2-01 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

2-01.1 TIME FOR COMPLETION - The work on this project shall start within 7 calendar days from the date of receipt of written notice to proceed from the City Engineer and the Contractor agrees to complete the entire work within **110 working** days from Notice to Proceed.

In case all the work called for is not completed in all parts and requirements within the time specified, the City shall have the right to grant or deny an extension of time for completion as may best serve the interest of the City. The Contractor will not be assessed with liquidated damages during the delay in the completion of the work caused by acts of God or of the Public Enemy, acts of the State, fire not due to acts of contractors or subcontractors, floods, epidemics, quarantine, restrictions, strikes, freight embargo or unusually severe weather, or delays of subcontractors due to such causes provided that the Contractor shall within ten (10) days from the beginning of such delay notify the City, in writing, of the cause of the delay. The City will ascertain the facts and the extent of the delay, and the findings thereon shall be final and conclusive.

2-01.2 LIQUIDATED DAMAGES - Time is of the essence on this contract, and should the Contractor fail to finish the work on or before the time stated above, the Contractor shall be charged by the City, as liquidated and ascertained damages, the sum of One Thousand Dollars (\$1,000) assessment for each calendar day that the work remains incomplete beyond the time specified (subject, however, to extension of time duly granted in the manner and for the causes specified in the Special Provisions) it being hereby expressly impracticable and extremely difficult to fix the actual damage which would or will be suffered in the event that the Contractor should fail fully to complete the work within the time specified, and it would be further agreed that the charges per day as aforementioned shall be reasonable and proper in premise. The amount so charged shall be deducted by the City from any monies which otherwise are or become payable to the Contractor.

2-02 PLANS AND SPECIFICATIONS - The plans and specifications showing location, character of the work, and details of construction are on file at the office of the City Engineer, located at 345 Foothill Road, Beverly Hills, California. The plans for this project are:

- A. Drawing No. 10395, Sheets 1 through 18
- B. Applicable Caltrans Standard Plans and Specifications for street stripping (if required)
- C. Beverly Hills Standard Drawings
- D. Standard Plans and Specifications for Public Works Construction, "Green

Book”

- E. Applicable American Water Works Association Standards and Design Manuals: C105, C105, C110, C115, C150, C153, C200, C205, C206, C207, C208, C213, C503, C504, C512, C600, C602, C604, C606, C621, C651, M11 and M41.

The construction of this project shall be in accordance with the notes and details shown on the Plans, the provisions of these Specifications, referenced and applicable sections of the Standard Specifications, and all other applicable references contained in the above items. References in these Specifications to Sheet No's. refer to Sheet No's. of the project drawings listed above.

Estimates of quantities appearing on the Plans, in these Specifications, Notice to Bidders and Proposal Form are merely entered for the convenience of the contractors bidding on this project. An independent check of the estimate is required by the contractor prior to submitting its bid. It must be understood that payment to the successful contractor will be made on the basis of the unit prices bid for the various items of work and on the actual quantities of work done as measured in the field by the City Engineer.

AMENDMENTS - The following is in addition to the provisions of the Greenbook:

The following is in addition to the provisions of Section 2-9.1:

The Contractor is required to locate and tie out survey monuments in the project area prior to construction involving street and highways, and to file with the County Surveyor a Corner Record of any such work. Prior to the issuance of a completion certificate, the Contractor is required to file a Corner Record for survey monumentation that is replaced. All such survey work shall be performed under the supervision of a California licensed Land Surveyor or a Civil Engineer authorized to perform such work.

The Contractor shall provide the City a copy of the office calculations and documents submitted to the County for filing in connection with the aforementioned work.

The payment for surveying, related professional services, office calculation, and furnishing all labor, materials, equipment, tools and incidentals, and for doing work involved shall be considered as included in the various items of work, and no additional compensation will be allowed therefore.

The following is in deletion and addition to the provisions of Section 3-2.2.1:
The second paragraph of Section 3-2.2.1 "Contract Unit Prices, of the Standard Specifications for Public Works Construction is deleted.

The fourth paragraph of Section 3-2.2.1 "Contract Unit Prices", of the Standard Specifications for Public Works Construction is deleted and replaced by the following:
"Should any Contract item be deleted in its entirety, no payment will be made to Contractor for that Bid item".

The following will revise Section 3-3.2.3 of the Greenbook:

- A. Work by Contractor. An allowance for overhead and profit shall be added to the Contractor's cost as determined under 3-3.2.2 and shall constitute the full and complete markup for all overhead and profit on extra work performed by the Contractor. The Contractor shall be compensated for the actual increase in the Contractor's bond premium caused by the extra work. For costs determined under each subsection in 3-3.2.2, the markup shall be:
 - 1. Labor20%
 - 2. Materials15%
 - 3. Tools & Equipment Rental15%
 - 4. Other Items15%

- B. Work by Subcontractor. When any of the extra work is performed by a Subcontractor, the markup established in 3-3.2.3(a) shall be applied to the Subcontractor's costs as determined under 3-3.2.2. An allowance for the Contractor's overhead and profit shall be added to the sum of the Subcontractor's costs and markup and shall constitute the full and complete markup for all overhead and profit for the Contractor on work by the Subcontractor. For Contractor markup of Subcontractor's costs, the allowance shall be 10% on the first \$2,000 or portion thereof, and 5% on costs in excess of \$2,000.

Copies of the plans, specifications and proposal form may be inspected and obtained at the office of the City Engineer.

Contractors wishing to obtain the book "Standard Specifications for Public Works Construction", 2012 Edition, may purchase copies directly from the publisher, Building News, Inc., 1612 South Clementine Street, Anaheim, California, 92802; (800) 873-6397.

2-03 SPECIAL WORK REQUIREMENTS AND WORK SCHEDULE

2-03.1 SEQUENCE OF WORK – The work on this project shall be completed during the hours of Monday thru Friday, 8 AM – 6 PM; and as specified in Section 2-03.2 SPECIAL WORK REQUIREMENTS.

Prior to beginning construction the Contractor shall submit a written schedule detailing the Contractor's proposed sequence of work for City approval. The Contractor shall stage the work such that only one-half of the roadway is closed at a time. The Contractor shall provide for two-way traffic in the remaining portion of the roadway where possible.

The Contractor shall make the necessary efforts to insure that at the end of each workday, the intersections are safe for traffic to travel at the posted speed limit.

All personnel, equipment and materials are to be removed from the roadway by designated quitting time each work night or work day.

The activities of the Contractor shall not interfere with access to the front or back of any business, or business or residential driveway, outside the specified construction hours.

2-03.2 SPECIAL WORK REQUIREMENTS - The following special work requirements shall be adhered to and full compensation for conforming to all of the special work requirements shall be included in the items of work for this contract and no additional compensation will be made therefore:

- A. The Contractor is prohibited from working on the following days, during which the Contractor shall secure, protect and maintain the construction area:

HOLIDAY	2016
New Year's Day	Jan 1 (Fri)
Martin Luther King Day	Jan 18 (Mon)
President's Day	Feb 15 (Mon)
Passover	April 22 (Fri), April 23 (Sat)
Good Friday	March 25 (Fri)
Memorial Day	May 30 (Mon)
Independence Day	Jul 4 (Mon)
Labor Day	Sept 5 (Mon)
Rosh Hashanah	Oct 2 (Sun), Oct 3 (Mon)
Yom Kippur	Oct 11 (Tues)
Veteran's Day	Nov 11 (Wed)
Thanksgiving Day	Nov 24 (Thurs), Nov 25 (Fri)
Christmas Day	Dec 25 (Sun)

- B. Payment for excavation, pavement removal, backfill, and pavement replacement required for water pipeline installations shall be included under the various bid items for the pipelines.

- C. The new water main and piping must be installed, chlorinated and tested before any tie-ins and connections are completed.
- D. The Contractor shall hire a reputable Bacti testing company with a minimum of 5 years relevant project experience. Bacti testing shall be compliant with AWWA C651. The testing company must be approved by the City. Bacti and pressure procedures and tests shall be approved by the City Engineer prior to any testing and placement of the permanent street resurfacing. A test pressure of 250 psi shall be used, and shall be performed per City Specifications and as directed by City Engineer.
- E. Saturday and Sunday Work shall be done concurrently with weekday work.
- F. All trenches within City streets shall have a T-section (existing pavement cut back greater than trench width) and be backfilled with 2-sack cement slurry mixture per Greenbook and City Standard Drawings.
- G. The Contractor shall place steel plates across trenches to facilitate access for all residences. AC wedges must be placed at every driveway or alley approach entrance (as necessary) to allow each resident access to their driveway or alley at the end of each workday unless approved otherwise by the City Engineer.
- H. All steel plates for trenches within alleys shall be wedged and secured with temporary AC as necessary. All steel plates for trenches within street travel lanes shall be either fully recessed or wedged with temporary AC, as instructed by the City Engineer or authorized representative. At the direction of the City Engineer, the Contractor may be required to weld steel plates to minimize rattling. Steel plates shall not restrict drainage flow along alley centerline gutters. The Contractor is responsible for sweeping up loose gravel from temporary AC pavement and maintaining the work area in a clean condition at all times. All steel plates shall be removed as soon as possible and the asphalt concrete base course placed. During non-construction hours, the Contractor shall make personnel available for securing or repairing plates.
- I. The Contractor shall limit open trench excavation. All streets and sidewalks must be plated, cleaned up and ready for vehicle and pedestrian traffic at the end of each workday.
- J. Thermoplastic striping and markings may be applied on the same day as the paving operations.
- K. The Contractor shall furnish and install all necessary striping, markings and plastic reflective pavement markers (white or yellow) to provide temporary pavement striping, markers and markings while construction

operations are completed. The temporary pavement markers shall be placed ten (10) feet on center. The temporary striping, markers and markings shall be maintained until the permanent striping and markings are applied. The work to furnish, install and maintain ALL temporary striping, markers and markings shall be included under the various items of work. The work to furnish and install ALL permanent striping, markers and markings shall also be included under the various items of work.

- L. The Contractor shall maintain the construction site during non-working hours in a clean and safe condition. The Contractor shall be available for immediate mitigation measures should the City Engineer decide that appropriate action is necessary during non-working hours.
- M. All excavated material shall be loaded into hauling vehicles as the material is excavated. Stockpiling of excavated material in the public right of way is not allowed
- N. Underground Service Alert (USA) markings shall be removed by the Contractor at the end of the construction project at the direction of the City Engineer.
- O. Dirt and/or debris not removed by conventional sweeping will require washdown at the direction of the City Engineer.
- P. All runoff from washdown shall be vacuumed using a wet/dry vacuum truck. No runoff from washdown will be allowed to drain into the storm drain system.
- Q. All dirt on construction vehicle tires shall be removed prior to leaving the construction site.
- R. Loose gravel shall be removed at the direction of the City Engineer (may require sweeping several times per day).
- S. The Contractor is responsible for relocating Grunger trash containers in the alleys as necessary for construction operations. The Contractor must place all Grungers back in the exact initial location at the end of each workday.
- T. The City requires the Contractor to furnish a cellular phone number that will be furnished to residents with questions or complaints regarding the Contractor's work. The Contractor should designate a public liaison person to handle all resident inquiries. The Contractor shall respond to residents' inquiries within one hour of the call during normal working hours. When dealing with residents, common courtesy is required.
- U. The Contractor shall repair and replace all landscaped areas damaged by

construction activity, including irrigation, within 48 hours to the satisfaction of the City Engineer. The Contractor shall re-sod lawns (with like materials) that have been damaged or removed using suitable topsoil. Plant material shall be replaced with like size and material.

- V. The Contractor shall clean and sweep all work areas by the end of each workday. All debris (including tree roots that have been cut) shall be removed by the Contractor by the end of each workday. The Contractor shall remove any barricades used to protect the construction site in a timely fashion. No open excavation will be permitted to extend into a weekend except that work which is noted in Section 2-03.1 of these specifications.
- W. Adequate delineation and barricades for traffic detour and traffic control signs shall be provided at all times.
- X. The Contractor may be required to tunnel under recently installed traffic-rated meter boxes to install water main.
- AA. For work within the City of Beverly Hills, the Contractor will be responsible for delivering construction notification letters to all residents on the affected street where work will take place, at 1 week in advance of work. The Contractor must notify the affected residents (at least verbally) prior to any work that may interfere with the resident's driveway, sidewalk or curb and gutter on the scheduled workday. The Contractor is encouraged to be flexible in scheduling the necessary work by accommodating the residents where possible. The Contractor is responsible for replacing any work damaged as a result of inadequate notification of the affected resident. The Contractor shall note that notification letters to all residents will be required for waterline construction (specify working hours/days and duration).
- BB. The Contractor shall submit for approval by the City Engineer a detour plan and work schedule three (3) working days prior to the pre-construction meeting. The job foreman must be present at this meeting.
- CC. The contractor is required to visit all project locations prior to bid.
- DD. Reflective tape shall be used at the edges of all steel plates in sidewalk or crosswalk areas. The Contractor shall control his work so as to minimize the use of steel plates within sidewalk and crosswalk areas.
- EE. The Contractor shall provide access to all fire hydrants, valves, vaults, meters and pull boxes at all times. Traffic signals, pedestrian signals and stop signs shall remain unobstructed at all times.

- FF. The Contractor will encounter existing 2-sack slurry backfill. The Contractor is not entitled to any additional compensation as a result of encountering slurry backfill.
- GG. The Contractor is responsible for replacing all striping and markings on street pavement. Thermoplastic striping and markings shall be used and may be applied on the same day as the paving operations. Raised pavement markers shall be applied one week after paving operation.
- HH. The Contractor shall furnish adjustable water valve can extension sleeves as needed to raise all affected water valve covers to finish grade.
- II. Construction vehicles are not allowed to travel along residential streets except those under construction.
- JJ. The Contractor shall schedule the work in such a manner that no construction vehicle shall traverse any newly laid street pavement.
- KK. Contractor will be responsible for maintaining the streets and sidewalks in a clean and safe manner. This will include placing temporary AC at all grade transition areas. Contractor will be responsible for street sweeping (several times a day if necessary) as required by the City Engineer. All catch basin inlets shall be protected from construction debris and runoff.
- LL. The Contractor will be required to be flexible in accommodating physically disabled residents that may be affected by the construction and are not able to park their vehicles at any adjoining street and easily access their residences.
- MM. In all areas where removal of the existing pavement structural section or waterline work will occur, the Contractor shall pothole all utilities to verify their exact location(s). The Contractor shall notify the City Engineer in the event of a conflict between the proposed improvements and the existing utilities.
- NN. The City has documented all survey markers within the project limits. Any survey monument disturbed by the Contractor shall be replaced at the Contractor's expense.
- OO. The Contractor shall install Megalug thrust restraining devices, by EBAA Iron, Inc. in locations shown on the construction drawings. Concrete thrust blocks shall only be installed where specifically approved by the City Engineer, or shown in the plans.

2-03.3 TIME SCHEDULE - The Contractor shall submit to the City Engineer a schedule indicating the sequence of work, a detour plan, estimated time for completion of each phase of the project and the method of operation required to complete the project in the

time specified. The Contractor's work schedule and detour plans shall be submitted to the City Engineer three (3) working days prior to preconstruction conference.

2-04 LIMITS OF EXISTING PAVEMENT PUNCTURED, CUT OR REMOVED

2-04.1 BREAKING PAVEMENT IN ADVANCE OF EXCAVATION - The Contractor will not be permitted to puncture, break up or remove in any manner the existing pavement in advance of the open trench, except by special permission from the City Engineer.

2-05 TRAFFIC CONTROL

2-05.1 NOTIFICATION - The Contractor shall notify the following City Departments 48 hours prior to the start of work on this project, and 72 hours prior to the closing or opening of a street, alley, driveway, or building access within the City of Beverly Hills.

BEVERLY HILLS PUBLIC WORKS DEPARTMENT

Notify Public Works Inspector (310) 285-2504

BEVERLY HILLS POLICE DEPARTMENT

Notify Traffic Division (310) 285-2193,2194 or 2196

BEVERLY HILLS FIRE DEPARTMENT

Notify Dispatcher's Office (310) 550-4900

BEVERLY HILLS SIGNAL SHOP

Notify Signal Superintendent (310) 285-2477

BEVERLY HILLS SANITATION DEPARTMENT

Notify Superintendent (310) 285-2466

The City will furnish to the Contractor "TEMPORARY NO PARKING - TOW AWAY" signs. The Contractor will be responsible for posting and removing these signs as required for this project.

2-05.2 GENERAL - All Streets where construction is in progress shall be kept open and in passable condition for emergency vehicles at all times. All major streets where construction is in progress shall maintain two-way traffic at all times. All streets outside the construction area shall be kept open at all times. The closure of any street shall apply only to that portion of the street where construction is actually in progress.

The Contractor shall provide signs for all streets where trenching and water main replacement is in progress. At a minimum, the following signs shall be provided.

C23B - "WATER MAIN REPLACEMENT -
UNEVEN PAVEMENT -
USE EXTREME CAUTION"

C27 - "OPEN TRENCH"

Prior to the end of each working day, the street block closed shall be made useable and signed (C3A -"ROAD CLOSED TO THROUGH TRAFFIC") to allow residents within the block to park within their driveway and/or garage. The Contractor shall place a "wedge" of temporary asphalt concrete to allow each resident access to his/her driveway, at the end of each working day.

When a street is closed at its intersection with the construction work, the Contractor shall provide the traffic control signs, barricades and flashing arrow signs as shown on the plans. When a sidewalk or crosswalk is closed, the Contractor shall provide signs to redirect pedestrians to available sidewalks.

When an alley is closed at its intersection with the construction work, the Contractor shall provide, as a minimum, the following signs on barricades at the intersection in advance of closure.

C18 - "ROAD CONSTRUCTION AHEAD"

C2 - "ROAD CLOSED"

When a street is closed only to through traffic, the following signs on barricades shall be provided at the intersection(s) of closure (C3A -"ROAD CLOSED TO THROUGH TRAFFIC").

When a sidewalk is under construction, the Contractor shall provide the following special construction sign on barricades in advance of closure:

"SIDEWALK UNDER CONSTRUCTION – USE EXTREME CAUTION"

2-05.3 TRAFFIC REQUIREMENTS - All lanes for moving traffic shall be at least 10 feet in width, with clearance of 2 feet from any vertical obstruction and 3 feet from any open excavation.

Adequate advance warning shall be given in advance of the detour and the direction of travel shall be properly delineated for the motorist to proceed in a safe, convenient and orderly manner through the construction area to the satisfaction of the City Engineer.

The Contractor shall be responsible for installing and maintaining the traffic cones in their proper locations as well as the traffic control signs on the approaches and throughout the project.

ALL LANE AND STREET CLOSURES REQUIRE 24 HOUR BATTERY OPERATED FLASHING ARROW SIGNS.

2-05.4 DETOUR AND TRANSITION - All detours and transitions shall be installed prior to and be approved by the City Engineer before any construction begins within the roadway. The Contractor shall be responsible for installing and maintaining traffic cones and barricades in their proper locations as well as traffic control signs on the

approaches and throughout the construction area.

- A. Street Closures and Detours.
- B. The Contractor shall provide delineation, barricades and necessary signs for street closures detours and for grinding and AC overlay operations.
- C. Thermoplastic Striping and Marking Detours, Final AC Paving, and Round Inductive Loop Installation.

The Contractor shall provide the necessary delineation, flagger(s) and flashing arrow sign control for final AC paving, striping, providing pavement markings and installing round inductive loops on any street within the project limits.

Cones or delineators shall be used to protect the work area, close left turn lanes at adjoining streets and at other locations required by the City Engineer, and shall be spaced a maximum of 10 feet apart unless noted otherwise on the plans. Provide the following signs at each approach in advance of the work area:

- 1 - C18 "ROAD CONSTRUCTION AHEAD"
- 1 - C1 "DETOUR AHEAD"

2-05.5 CONSTRUCTION SIGNS - All signs used by the Contractor shall conform to the latest standards of the "Manual on Uniform Traffic Control Devices", issued by the Department of Transportation, State of California, current edition. All warning, regulatory and construction signs shall be fully reflectorized. The traffic cones to be used shall be 28 inches in height, rubber, or plastic and be reflectorized.

2-05.6 USE OF FLAGPERSON - To properly move traffic through the construction area, flagger(s) shall be posted to slow down and reroute traffic during final AC paving, striping and marking, inductive loop installation, and if in the opinion of the City Engineer, at other phases of construction work. Flagger(s) shall be on duty the entire period the roadway is constricted.

2-05.7 CONTRACTOR'S RESPONSIBILITY - The Contractor shall take all necessary measures to obtain a normal flow of traffic to prevent accidents and to protect the work throughout the construction stages until completion of the work. The Contractor shall make the necessary arrangements to provide and maintain barriers, cones, guards, barricades and construction warning and regulatory signs. The Contractor shall take measures necessary to protect all other portions of the work during construction and until completion, providing and maintaining all necessary barriers, barricade lights, guards, temporary crossovers and watchmen.

In addition to the foregoing traffic control and safety measures, the Contractor shall undertake immediately to implement any measures requested by the City Engineer, as deemed necessary to ensure the proper flow of traffic and the protection of the public and the safety of the workers. The Contractor shall maintain at all times the ability to respond to calls from the Beverly Hills Police Department during non-working hours to

replace or provide additional traffic control or safety devices as shall be required by the Police Department.

2-05.8 PAYMENT - The entire cost for traffic control as detailed in this section and as required for this construction shall be included in the unit prices bid for the various items of work.

2-06 UTILITIES

2-06.1 CONTRACTOR'S RESPONSIBILITY - The Contractor shall verify the location of all underground utilities and services before proceeding with excavation work, requesting in advance the services of inspectors from the utility companies in order to ascertain said locations. Damage to underground utilities resulting from neglect on the part of the Contractor shall be corrected and paid for by the Contractor.

2-06.2 NOTIFICATION - The contractor shall schedule, notify and obtain City approval of the sequence of construction and all required shutdown of existing mains or services at the beginning of the project and a minimum of seven working days before the time of any shutdown. The sequence of work and scheduled shut-downs shall be submitted in written form to the City for review and approval prior to beginning any construction. The City inspector may postpone or reschedule any shutdown operation if for any reason he feels that the contractor is improperly prepared with competent personnel, equipment, or materials to proceed with the connection work.

The Contractor shall notify all owners of public utilities 48 hours in advance of excavating around any of their substructures, and shall also provide the same notice to Underground Service Alert of Southern California, Telephone No. 1800-422-4133. Upon request, the City Engineer will furnish the Contractor a list of the various offices and numbers to call.

The Contractor shall notify property owners adjacent to the site and property owners located on streets that will be closed or restricted by the Work. Notification shall be in the form of a letter, reviewed and approved by City and delivered a minimum of 15 and 1 days before construction is scheduled to commence. The Contractor shall be available to attend one community meeting to answer public questions regarding the project if required. The meeting time, date and location will be provided by City for inclusion in the notification letter.

2-06.3 INTERFERENCE (UTILITIES IN USE) - Utilities which are found by exploratory location or by excavation to interfere with the construction of this project will be relocated, altered, or reconstructed by others, or the City Engineer may order changes in location, line or grade of the project structure, to be built or being built in order to avoid said utility.

The Contractor shall also verify utility depths in intersections to be reconstructed, prior to beginning any pavement removal.

2-06.4 INTERFERENCE (ABANDONED UTILITIES) - Abandoned utilities which interfere with the construction of any portion of this project may be cut by the Contractor, the interfering portion of the utility removed, and open ends of the pipe sealed with a suitable plug or cap. The cost of this work shall be included in the unit prices bid for the particular items of work where such interference occurs unless otherwise specified.

2-07 BUSINESS LICENSES - The Contractor is required to have a current City of Beverly Hills business license issued through the City of Beverly Hills Building & Safety and/or Finance Administration Departments. This license shall be obtained by the Contractor at no fee from the City.

2-08 CONNECTIONS TO EXISTING FACILITIES - Unless otherwise indicated on the Approved Plans or specifically directed by the City Engineer, all connections to existing facilities, cut-in installations, shall be performed by contractor. All types of connections to existing water facilities shall be performed in strict accordance with the following procedures. The City Engineer must approve all work performed by Contractor prior to allowing access to the work site by City personnel.

Prior to construction, Contractor shall pothole all existing utilities and sub structures within the pipe trench of the new water main and at the locations of the proposed tie-in connections. In addition the Contractor shall locate and pothole all existing watermain services, including but not limited to fire and service connections. The City Engineer may inspect the excavations prior to Contractor's repair of trench. Contractor shall record the following information for ordering materials and as-built drawings:

- A. Pipe size, outside diameter.
- B. Pipe Roundness
- C. Pipe type such as ACP, PVC, Ductile-Iron or Steel.
- D. Pipe class and/or pressure rating.
- E. Elevation, grade, and alignment.
- F. Location of collars, pipe bells, fittings or couplings, if found.
- G. Potential conflicts with existing utilities.
- H. Locate all existing isolation valves required for the Work.
- I. Have the City test the existing isolation valves a minimum of 5 days prior to the scheduled cut-in connection construction.

- J. If the valves cannot be operated, Contractor shall meet with the City and Engineer to determine if the valves must be replaced, or if plugs can be used for the Work.

2-08 PERMITS

2-08.1 - Prior to the commencement of work, the Contractor shall obtain construction permits from the City of Beverly Hills located at 455 North Rexford Drive. Each permit shall be kept in a readily available place on the job site at all times during construction. While no fee will be charged for this permit, no permit will be issued unless the Contractor provides a code reference number from Underground Service Alert (U.S.A.) confirming that they have received appropriate advance notification and provides evidence of a current City of Beverly Hills business license.

2-08.2 -The Contractor shall obtain an after-hours permit from the Building and Safety Department, 455 North Rexford Drive, for construction operations to be performed during Saturdays and Sundays. There will be no charge for this permit.

2-09 ADDITIONAL WORK AND EXTRA WORK - The City reserves the right to order additional work over and above the quantities listed in the Proposal Form. In the event that additional work is required and is so ordered by the City Engineer, payment to the Contractor will be based on the actual quantity of additional work ordered and measured in the field by the City Engineer and will be paid for at the unit price bid by the Contractor. Likewise, the City reserves the rights to order extra work not shown on the plans and not listed in the Proposal Form. Whenever extra work is found to be necessary, the procedure described in Paragraph 5-11 of the Standard Contractual Requirements shall be followed.

2-10 SAFETY REGULATIONS AND SHORING OF EXCAVATIONS

2-10.1 SAFETY REGULATIONS - The Contractor shall comply with the requirements set forth in Section 7-10.4.1 of the Standard Specifications.

2-10.2 SHORING OF EXCAVATIONS - The requirements for shoring excavations shall conform to the Construction Safety Orders of the Division of Industrial Safety. OSHA permits must be on the job site at any time, work requiring trenching and or shoring operations exists.

Prior to the start of work, the Contractor will be required to obtain a permit from the Office of the Division of Occupational Safety and Health. The office serving the Beverly Hills area is at 6150 Van Nuys Boulevard, Van Nuys, California 91401, Tel. No. (818) 901-5403.

The Contractor shall provide the City Engineer's office with a copy of the permit prior to the start of excavation.

Where excavation of any trench 5 feet or more in depth is required, the Contractor shall submit to the City Engineer for review and acceptance, in writing, two weeks in advance

of excavation, 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 during the excavation of such trench. The plan shall be approved and signed by a registered Civil or Structural Engineer.

2-11 AVOIDANCE OF DUST NUISANCE - During the process of breaking and removal of any material from the site of the project and until completion of the contract work, the Contractor shall take all necessary measures in order to avoid the nuisance of excessive dust. Refer to Section 7-8.1 of the Standard Specifications.

Contractor shall sweep the project area free of all dust and debris at the conclusion of each working day prior to opening the construction area to traffic.

2-12 RECYCLING OF MATERIALS AND NONSTORMWATER DISCHARGES

2-12.1 RECYCLING OF MATERIALS - The Contractor is encouraged to recycle all materials. The Contractor shall provide the City all documentation as to the weight of the material in accordance with the requirements of AB 939.

2-12.2 DISCHARGES INTO STORM DRAIN SYSTEM -Storm water/urban runoff discharges to the public storm drainage system shall be prohibited for all discharges not wholly comprised of storm water, or not permitted by a valid National Pollution Discharge Elimination System (NPDES) permit issued by the California Regional Water Quality Control Board. "Storm drain system" includes all roads with drainage systems, municipal streets, catch basins, curbs, gutter, ditches, man-made channels, or storm drains. The Contractor shall prevent all non-storm water discharges from the construction site (i.e. mixing and cleaning of construction materials, concrete washout, disposal of paints, adhesives, solvents and landscape products).

2-13 SHOP DRAWING SUBMITTALS

2-13.1 The Contractor shall submit to the City Engineer within seven (7) calendar days after the notice to proceed of the contract for review five (5) copies of each shop drawing as specified in Section 3 of these Specifications. Shop drawing submittals shall include detailed design calculations, shop drawings, fabrication and installation drawings, catalog sheets, data sheets and similar items. The City Engineer shall review the shop drawings and return them to the Contractor within fourteen (14) calendar days.

2-13.2 Fabrication and/or purchase of an item may be commenced only after the City Engineer has reviewed the pertinent submittals and returned them to the Contractor marked either "NO EXCEPTIONS TAKEN" or "APPROVED WITH CORRECTIONS NOTED."

Corrections indicated on the submittals shall be considered as changes necessary to meet the requirements of the specifications and shall not be taken as the basis of claims for extra work.

2-13.3 The City Engineer's review of shop drawing submittals shall not relieve the

Contractor of the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for any misfits due to any errors in Contractor submittals. The Contractor shall assume all responsibility for the dimensions and the design of adequate connections and details.

2-14 ITEMS OF WORK

2-14.1 ITEM 1. TRENCH SAFETY MEASURES, MOBILIZATION, DEMOBILIZATION, and TRAFFIC CONTROL – Under Item 1 the lump sum bid price shall include the cost of equipment, materials, and design, for the traffic control, shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of traffic and caving ground during the excavation of trenches. Item 1 also includes obtaining of all bonds, insurance, and permits; moving onto and from the site all materials and equipment; and the furnishing and erecting of storage yards, temporary buildings, and other construction facilities; and all traffic control; all as required for the proper performance and completion of the Work. This item shall be billed at the same percentage as other work items completed.

2-14.2 ITEM 2. FURNISH AND INSTALL 8-INCH DUCTILE IRON PIPE-RESTRAINED JOINTS, INCLUDING GATE VALVES AND PRESSURE REGULATING VALVES, CLASS 53 – Under Item 2 the unit price bid per linear foot shall include the cost of but not limited to potholing, pavement cutting and removal, excavating of soil and 2-sack slurry, tunneling, wall coring for pipe penetration, hauling, disposal, furnishing and placing blocking under pipe, furnishing and installing pipe, couplings, reducers, bends, adapters, tees, crosses, polyethylene encasement around ductile iron pipe and fittings, joint restraints per plans, thrust blocks (where approved by the City Engineer or shown in plans), butterfly and gate valves per plan (including installation hardware, anchor blocks, valve box and cover, barricades, 2-sack slurry backfilling, pavement restoration, and all other labor, equipment and material incidental to the installation of the valve, complete in place), chlorinating for disinfection, temporary blow piping, pressure testing, connecting to existing pipelines, temporary bulkheads, 2-sack slurry backfilling, traffic control, dewatering, flushing and disinfecting, bacti tests, hydrostatic test, concrete cap where indicated on the plans, removal and replacement where required of existing improvements (exclusive of utilities) testing, removal and replacement where required of existing improvements which interfere with construction (includes all existing improvements located inside and outside the traveled roadway, such as pavement, curb, gutter, cross gutters, catch basin aprons, sidewalk, driveways, sprinklers, irrigation boxes, irrigation piping, parkways, landscaping, trees, roots, fencing, steel traffic posts, etc.), abandoning or removing existing valves and abandoning piping in-place, removing existing service piping, maintaining continuous water service including all costs of highlining services (if necessary), disposing of all excess excavated or removed material, and all other labor, equipment and material incidental to the installation of the pipe, complete in place.

2-14.3 ITEM 3. FURNISH AND INSTALL 8-INCH STEEL PIPING, FLANGED INCLUDING GATE VALVES AND PRESSURE REGULATING VALVES – Under Item 3 the unit price bid per linear foot shall include the cost of but not limited to potholing,

pavement cutting and removal, excavating soil and 2-sack slurry, tunneling, hauling, disposal, furnishing and placing blocking under pipe, furnishing and installing pipe, victaulic restrained couplings, reducers, bends, flanged pipe support, adapters, tees, crosses, polyethylene encasement around steel pipe and fittings, joint restraints per plans, thrust blocks (where approved by the City Engineer or shown in plans), pressure regulating valves (CLA VAL), gate valves per plan (including installation hardware, anchor blocks, valve box and cover, barricades, 2-sack slurry backfill, pavement restoration, and all other labor, equipment and material incidental to the installation of the valve, complete in place), chlorinating for disinfection, temporary blow piping, pressure testing, connecting to existing pipelines, temporary bulkheads, sack slurry backfilling, traffic control, dewatering, flushing and disinfecting, bacti tests, hydrostatic test, concrete cap where indicated on the plans, removal and replacement where required of existing improvements (exclusive of utilities) testing, removal and replacement where required of existing improvements which interfere with construction (includes all existing improvements located inside and outside the traveled roadway, such as pavement, curb, gutter, cross gutters, catch basin aprons, sidewalk, driveways, sprinklers, irrigation boxes, irrigation piping, parkways, landscaping, trees, roots fencing, steel traffic posts, etc.), abandoning or removing existing valves and abandoning piping in-place, removing existing service piping, maintaining continuous water service including all costs of highlining services (if necessary), disposing of all excess excavated or removed material, and all other labor, equipment and material incidental to the installation of the pipe, complete in place.

2-14.4 ITEM 4. FURNISH AND INSTALL ELECTRICAL INCLUDING METER SOCKET, LOAD CENTER, LIGHTING INCLUDING ALL CONDUIT, WIRE AND CABLE – Under Item 4 the lump sum price bid shall include the cost of but not limited to furnishing and installing meter socket, panelboard, furnishing and installing general purpose and emergency lighting, furnishing and installing Schedule 40 PVC conduit underground and rigid galvanized steel above ground, furnishing and installing PVC coated rigid steel elbows, bends and risers, furnishing and installing wires and cables, furnishing and installing grounding systems, testing, core drilling, patching, potholing, pavement cutting and removal, excavating, tunneling, hauling, disposal, couplings, reducers, bends, adapters, slurry backfilling, pavement restoration, and all other labor, equipment and material incidental to the installation of the underground conduits, complete in place, removal and replacement where required of existing improvements (exclusive of utilities), removal and replacement where required of existing improvements which interfere with construction (includes all existing improvements located inside and outside the traveled roadway, such as pavement, curb, gutter, cross gutters, catch basin aprons, sidewalk, driveways, sprinklers, irrigation boxes, irrigation piping, parkways, landscaping, trees, roots, fencing, steel traffic posts, etc.), abandoning or removing existing conduits, disposing of all excess excavated or removed material, and all other labor, equipment and material incidental to the installation of the electrical, complete in place. This also includes all work associated with the telecommunications (low voltage) system, coordination with SCE for hot-tie, energizing the meter, and setting up the account.

2-14.5 ITEM 5. FURNISH AND INSTALL SCADA PANEL INCLUDING PROGRAMMING AND INTEGRATION – Under Item 5 the lump sum price bid shall include the cost of but not limited to furnishing and installing the SCADA panel, programming the PLC, programming the SCADA HMI at the central station, configuring and programming the communication system, integration of the site SCADA into the City SCADA system, testing of the system including but not limited to loop checks, I/O points, alarms, set points, communication and interfacing with the HMI at the central station and all other labor, equipment and material incidental to the installation of the SCADA system, complete in place. This includes facilitating and coordinating with the City and the telecommunications company to install a phone line for DSL communication.

2-14.6 ITEM 6. FURNISH AND INSTALL INSTRUMENTATION INCLUDING 8-INCH FLOW METER AND PIPING CONNECTIONS – Under Item 6 the lump sum price bid shall include the cost of but not limited to furnishing and installing the 8-inch flow meter including ground rings and grounding, pressure transmitters, pressure gauges, piping, Thredolets, valves, block and bleed valves including any other connections necessary to attach the instruments to piping, calibrations, testing and all other labor, equipment and material incidental to the installation of all of the instrumentation, complete in place.

2-14.7 ITEM 7. RETAINING WALL- Under Item 7 the lump sum price bid shall include the cost of but not limited to furnishing and installing a retaining wall, excavation, compaction, 6” of CMB or CAB (if necessary), dowelling, rebar, expansion material, concrete, curb drain & piping, import soil, geotextile fabric, grading, removal & disposal of excess soil, landscaping, roots, etc.

2-14.8 ITEM 8. MISCELLANEOUS ELECTRICAL WORK INCLUDING BUT NOT LIMITED TO SWITCHES, RECEPTACLES, ETC. – Under Item 8 the lump sum price per bid shall include all miscellaneous electrical work associated with, but not explicitly mentioned, in the above work items including, but not limited to, switches, receptacles, intrusion alarms, and concrete pad with base layer for level working space in front of the meter.

2-14.9 ITEM 9. MISCELLANEOUS PIPING AND CIVIL WORK - Under Item 9 the unit price per lump shall include all miscellaneous piping and civil work associated with, but not explicitly mentioned, in the above work items including, but not limited to, clear and grub, grading, disposal, replacing and enhancing the landscaping with appropriate drought tolerant plants, install irrigation if there is an existing irrigation system, and removal of the tree and regrading on the west slope. Landscape improvements shall apply to the entire site surrounding the building.

2-14.10 ITEM 10. STEEL DOOR, WINDOWS, PAINT BUILDING & ANTI-SLIP FLOOR SURFACE – Under Item 10 the lump sum price bid shall include the cost of but not limited to R/R the steel door, retrofit all windows or window openings with new windows, applying interior and exterior paint, and anti-slip floor coating.

2-14.11 ITEM 11. SOUTHERN CALIFORNIA EDISON WORK ALLOWANCE Under Item 11 the lump sum price bid shall include allowance of \$5,000 for work performed by Southern California Edison. Reimbursement will be based on receipts from SCE. Any overhead or contractor staff time shall be placed in other bid items.

2-15 AS-BUILT DRAWINGS

As-built drawings shall be maintained by the Contractor during construction. As-built set of drawings shall depict the actual as-built conditions of the completed construction. As-built drawings shall include all changes in Plans, including those issued as Change Orders, Plan Clarifications, Addenda, Notice to Bidders, responses to Requests for Information, and any additional details needed for the construction of the Project.

As-built drawings shall be marked with red ink on one (1) set of full size prints to produce a record of the complete installation. The as-built drawings shall be kept by the Contractor in the Contractor's jobsite office, shall be updated during construction, and shall be available for the Engineer's inspection and copying at all times.

SECTION 3

CONSTRUCTION REQUIREMENTS AND MATERIALS

3-01 REMOVAL AND DISPOSAL OF MATERIALS

All materials removed must be hauled away from the project site on the same working day and legally disposed of and/or recycled at a site located outside the City limits of Beverly Hills. The Contractor shall recycle materials whenever possible. If the Contractor recycles materials in accordance with the requirements of AB 939, the City shall be provided documentation as to the weight of the material.

Except as otherwise specifically authorized by the City Engineer, all self-propelled equipment used by the Contractor in excavation, breaking and removal operations for street improvement work shall be equipped with rubber tires.

3-02 AVOIDANCE OF DUST NUISANCE

The Contractor shall take all necessary measures in order to avoid the nuisance of excessive dust resulting from the process of breaking, reconstructing and removing any materials on the project site. Such measures shall be employed for the duration of the contract work. Refer to Section 7-8.1 of the Standard Specifications.

3-03 STORAGE OF MATERIALS IN PUBLIC STREETS

The Contractor shall not store equipment or material within public streets or right-of-ways outside of the specified working hours.

3-04 PCC SPECIFICATIONS

The Contractor shall comply with the requirements set forth in Section 303-5 of the Standard Specifications for the construction of PCC improvements. Curb, gutter, curb ramps, sidewalk, driveway approaches shall be Class 520 C 2500 concrete. Alley gutter, cross gutter, local depression, alley approaches, appurtenances and foundations for water system appurtenances shall be Class 560 C 3250 concrete. Concrete shall have two percent (2%) calcium chloride additive by weight and shall be placed in accordance with the requirements of Section 302-6 of the Standard Specifications.

The use of calcium chloride additive shall not be used for concrete containing any reinforcing metal.

The Contractor shall use Type III cement (High Early Strength) in accordance with Section 201-1.1.1 of the Standard Specifications for driveway and alley approaches, cross gutters and alley centerline gutters.

PCC improvements shall be constructed in accordance with the requirements above, and the following requirements:

- A. The City will mark the removal area at each location.
- B. Score lines shall match adjacent markings.
- C. The Contractor shall trim or cut and remove all interfering tree roots under the supervision of the Recreation and Parks Department.
- D. The Contractor will be responsible for all markings on newly laid concrete. (The City Engineer may require removal and reconstruction of marked or damaged work).

3-05 SHOP DRAWINGS AND SUBMITTALS

The Contractor shall submit shop drawings for all project materials. Each submittal must be clean, legible and easy to follow, including, but not limited to the following items in accordance with Section 2-5.3 "Shop Drawings and Submittals" of the Standard Specifications:

- A. Pipe Material and Certificate of Compliance
- B. All Valves
- C. Fire Hydrants
- D. Asphalt Concrete Mix
- E. Portland Cement Concrete Mix
- F. Asphalt Concrete Pavement
- G. Traffic Signal Loop Detectors
- H. Thermoplastic Material
- I. Line Stops
- J. Service Lateral Piping

As a part of the above-required shop drawing submittal the Contractor shall include the following:

- A. The Contractor shall submit completed material lists for the work of this section. Such lists shall state manufacturer and brand name of each item or class of material. The Contractor shall also submit shop drawings for all grounding work not specifically shown.

- B. Shop Drawings shall provide sufficient information to evaluate the suitability of the proposed material or equipment for the intended use, and for compliance with these specifications.
- C. All Contractor submittals shall be carefully reviewed against the contract documents by an authorized representative of the Contractor, prior to submittal to the Engineer. A letter shall be included with each submittal stating the contract documents have been reviewed and the submitted product is correct for the project application and in strict conformance with the contract documents. The letter affidavit must be dated and signed by both the Contractor and the product manufacturer or service provider. In the case of shop drawings, each sheet shall be so dated and signed for approval. No consideration for review by the Engineer of any Contractor submittals will be made for any items which are not accompanied by affidavit by the Contractor. All submittals without an affidavit will be returned to the Contractor without action taken by the Engineer, and any delays caused thereby shall be the total responsibility of the Contractor.
- D. The Engineer's review of Contractor submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for any misfits due to any errors in Contractor submittals. The Contractor shall be responsible for the dimensions and the design of adequate connections and details.

3-06 QUALITY ASSURANCE

- A. Field control of Location and Arrangement: The drawings diagrammatically indicate the desired location and arrangement of piping, conduit runs, equipment and other items. Exact locations shall be determined by the Contractor in the field based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Locations shown on the Drawing, however, shall be adhered to as closely as possible.
- B. Workmanship: All materials and equipment shall be installed in accordance with printed recommendations of the manufacturer that have been reviewed by the City Engineer. The installation shall be accomplished by workmen skilled in this type of work and installation shall be coordinated in the field with other trades so that interferences are avoided.
- C. All work, including installation, connection, calibration, testing and adjustment, shall be accomplished by qualified, experienced personnel working under continuous, competent supervision. The completed installation shall display component work, reflecting adherence to prevailing industrial standards and methods.

- D. Protection of Equipment and Materials: The Contractor shall provide adequate means for and shall fully protect all finished parts of the materials and equipment against damage from any cause during the progress of the work and until acceptable by the City Engineer.
- E. All materials and equipment, both in storage and during construction, shall be covered in such a manner that no finished surfaces will be damaged, marred, or splattered with water, foam, plaster, or paint. All moving parts shall be kept clean and dry.
- F. The Contractor shall replace or have refinished by the manufacturer, all damaged materials or equipment at no expense to the Owner.
- G. Tests: The Contractor shall make all tests required by the City Engineer or other authorities having jurisdictions. All such tests shall be performed in the presence of the City Engineer. Certification of instrument calibration shall be submitted to the City for approval and acceptance. The Contractor shall furnish all necessary testing equipment and pay all costs of tests, including all replacement parts and labor necessary due to damage resulting from damaged equipment or from test and correction of faulty installation.
- H. Standard test reports for mass-produced equipment shall be submitted along with the shop drawing for such equipment. Test reports on testing specifically required for individual pieces of equipment shall be submitted to the City Engineer for review prior to final acceptance of the project.
- I. Any test failure shall be corrected in a manner satisfactory to the City Engineer at no additional cost to the City.

3-07 ASPHALTIC CONCRETE PAVEMENT

3-07.1 GENERAL -The asphaltic concrete pavement shall be placed in accordance with the typical sections shown on the plans.

3-07.2 MATERIAL -Asphalt concrete to be placed shall conform to the requirements of Section 203-6 of the Standard Specifications. AC wearing surface course shall be in accordance with the surfaces as per City of Beverly Hill Standard Drawings BH114 and BH 710. All hot tack coated surfaces must be covered at end of each day's work.

3-07.3 CONSTRUCTION DETAILS - Asphalt concrete material shall be laid in accordance with the requirements of Section 302-5 of the Standard Specifications.

3-08 PRUNING TREE ROOTS

The Contractor shall remove interfering tree roots in accordance with the following:

Tree roots shall be severed cleanly by using a speed saw and/or ax only. The use of a backhoe shall not be permitted to pull the tree roots. Tree root cuts shall be kept moist and covered with burlap to maximize protection.

The Recreation and Parks Inspector shall be notified prior to the removal of roots 4 inches in diameter or larger.

3-09 THERMOPLASTIC TRAFFIC STRIPING AND PAVEMENT MARKINGS

The Contractor shall refer to Appendix C for street striping repair and replacement.

3-09.1 MATERIALS -The thermoplastic material shall conform to State Specification 8010-21C-19. Materials shall be of the "ALKYD" type. "HYDRO CARBON" material types will not be accepted. Glass beads to be applied to the surface of the molten thermoplastic material shall conform to the requirements of State Specification 8010-11E-22 (Type II).

State Specifications for thermoplastic material and glass beads may be obtained from the Transportation Laboratory, P.O. Box 19128, Sacramento, CA 95819, Telephone No. (916) 739-2400.

3-09.2 APPLICATION - Existing surfacing which is to receive the thermoplastic material shall be mechanically wire brushed to remove all dirt and contaminants. Surfaces of new Portland cement concrete pavement to receive the thermoplastic material shall be mechanically wire brushed or abrasive blast cleaned to remove all laitance and curing compound.

Existing pavement markers which are damaged by blast cleaning or wire brushing shall be removed and replaced by the Contractor at his expense.

Thermoplastic material shall be applied only to dry pavement surfaces and only when the pavement surface temperature is above 50 degrees Fahrenheit.

A primer, of the type recommended by the manufacturer of the thermoplastic material, shall be applied to all asphaltic surfaces over 6 months old and to all Portland cement concrete surfaces. The primer shall be applied immediately in advance of, but concurrent with, the application of thermoplastic material. The primer shall be applied at the application rate recommended by the manufacturer and shall not be thinned.

Preheaters with mixers having 360-degree rotation shall be used to preheat material.

The thermoplastic material shall be applied to the pavement at a temperature between 400 degrees Fahrenheit and 425 degrees Fahrenheit unless a different temperature is recommended by the manufacturer.

The thermoplastic material shall be applied by either spray or extrusion methods in a single uniform layer.

Stencils shall be used when applying thermoplastic material for pavement markings.

The pavement surface to which thermoplastic material is applied shall be completely coated by the material and the voids of the pavement surface shall be filled.

Unless otherwise specified in the special provisions, the thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.060-inch. Thermoplastic material for pavement markings shall be applied at a thickness of 0.100-to 0.150-inch. Glass beads shall be applied immediately to the surface of the molten thermoplastic material at a rate of not less than 8 pounds per 100 square feet. The amount of glass beads applied shall be measured by stabbing the glass bead tank with a calibrated rod.

All drips, smudges and overpour shall be corrected immediately.

3-10 TRAFFIC SIGNAL LOOP DETECTORS

3-10.1 VEHICLE DETECTORS – Inductive-loop detectors shall be used.

3-10.2 CONSTRUCTION MATERIALS - Detector lead-in cable shall be four pair polyethylene insulated, individually twisted, individually shielded, filled (water-blocked), black high density polyethylene jacketed, with 300 volt dielectric rating.

The number of pairs in the detector lead-in cable shall be determined by meeting the requirements that there shall be a maximum of two detectors per pair of channel for presence or call detector loops, and one detector per pair or channel for advance loops.

Conductor: #18 AWG 7/26 stranded tinned copper per ASTM B-286.

Insulation: High-density polyethylene compound which meets the requirements of ASTM D-1248, Type III, Class A, Category 5, Grade E-8, with a .013" nominal wall thickness.

Twist Shield and Drain: The insulated conductors shall be twisted into pairs with a lay not to exceed six inches. Each pair helically applied alum/mylar with #20-7/28 TC drain under shield.

Cable Assembly: The shielded pairs shall be assembled to form a substantially cylindrical core.

Fill: All interstices shall be "Water-Blocked" with an Amorphous Jelly Compound.

Shield: A longitudinally applied aluminum mylar shield shall be applied over the filled core with an overlap.

Jacket: Black high-density polyethylene jacketing grade compound with a .030" minimum wall thickness.

Electrical Characteristics: Voltage rating - 300 volts minimum; mutual capacitance 27 picofarads per foot, 10%.

Color Code:

Two Pair -Blue/white and orange/white;
Three Pair -Blue/white, orange/white, and green/white;
Four Pair -Blue/white, orange/white, green/white, and brown/white.

Each cable shall be identified by the installation of a rigid plastic tag held in place by two nylon ties.

3-10.4 INSTALLATION DETAILS -Inductive loop detectors shall be 6-foot diameter circular loops. Slots for the loops shall be core drilled with a 6-foot diameter core bit or other method approved by the City Engineer. No holes for anchoring a router or flat saw to perform the cut will be accepted. All slots shall be vertical with a maximum width of 1/2-inch, cut to a minimum depth of 4-inches. In no case shall any cut exceed the depth of the existing pavement.

All cuts shall be washed clean. Water and slurry shall be vacuumed out or blown dry with compressed air, leaving a clean and dry loop area.

A 6-foot diameter loop consisting of 3 turns of Detecta Duct or Type 2 loop wire stacked one wire on top of another shall be installed in slot. A prewound loop wire shall be used in slots greater than 1/4-inch in width. **Loops shall be installed on the same day in which loop slots are cut.**

All slots shall be filled with hot melt rubberized asphalt sealant in accordance with the provisions in Section 86-5.01A, Installation Details of the State Specifications and the City of Beverly Hills Standard Plan BH1-5.

Sawcut homerun to the appropriate pull box within 50 feet. The homerun slot shall be 1/4 inch in width and 4 inches in depth. The homerun of the loop shall be twisted clockwise (at least 2 turns per foot) into a pair, numbered, and identified in the pull box. If the stub-out excavation area adjacent to the gutter for loop homeruns is greater than 6" in diameter, it shall be backfilled with asphalt concrete. If excavation area is less than 6" in diameter, seal area with hot melt rubberized asphalt sealant.

All lead-ins shall enter the pull box and shall be numbered and identified in accordance to the Round Inductive Loop Installation Detail BH1-5 in these specifications.

New 2-inch GRS conduits stub outs between pull box and loop detector hand hole shall be installed when noted on the plans. Compensation for all materials and work shall be included in the bid price for loops.

All installations of Traffic Signal Loop detector cable shall conform to the City of Beverly Hills Public Works Department detail and Standard Specifications for Public Works

Construction.

The Contractor shall obtain approval for exact loop location prior to final placement, and shall perform preliminary striping layout prior to loop detector layout. Loop detectors shall be 6' round with 9' spacing between adjacent loops in the same lane, except as noted on the plans. Center loops in the traveled portion of the lane, and extend limit line loops 1' from the limit line, except as shown on the plans.

3-11 PAVEMENT MARKERS

Pavement markers shall conform to the State Standard Plans and Standard Specifications, Section 84 and 85, "Pavement Markers", July 1992, except as noted on the Plans and in these Special Provisions.

Cost for removing, furnishing and installing reflective, non-reflective, and two-way blue reflective pavement markers shall be considered as included in the unit price bid for "Striping" and no additional compensation shall be allowed therefore.

3-12 DUCTILE IRON PIPE

Ductile-iron pipe shall be Class 53 manufactured per AWWA C111, C115, C150, and C151 and shall be installed per AWWA C600.

Ductile-iron pipe shall be provided in standard 5.49m (18') or 6.10m (20') lengths unless otherwise detailed or required on the Approved Plans. When deep trenches or shoring restrictions hinder the use of the standard length sections, shorter lengths shall be allowed with the concurrence of the City Engineer. Random lengths are not allowed.

The minimum length of ductile-iron pipe sections used for tie-ins and stub-outs shall be three (3) times the nominal pipe diameter or 1200mm (48"), whichever is longer, unless otherwise approved by the District Engineer.

Joints for ductile-iron pipe shall be mechanical, flanged, or push-on in accordance with AWWA C110, C111, and C153, unless otherwise indicated on the Approved Plans. Joints that are aboveground, within structures, or submerged shall be flanged unless otherwise shown on the Approved Plans.

Except as amended herein, or otherwise shown on the Approved Plans, joints for ductile-iron pipe shall have a pressure rating equal to or greater than the adjacent piping.

Horizontal Radius and Pipe Deflections: In locations where it is required to lay ductile-iron pipe along curves or install pipe deflections, ductile-iron pipe shall be deflected at joints in accordance with the requirements of AWWA C600 and no more than 80% the manufacturer's recommendations.

Plain ends of ductile-iron pipe shall conform to the requirements of AWWA C151 to accept mechanical or push-on joints, flanged coupling adaptors, flexible couplings, or grooved couplings.

All ductile-iron pipe shall be cement-mortar lined, **double thickness**, with seal coat in accordance with AWWA C104. Cement-mortar shall be in accordance with ASTM C 150, Type II or Type V.

Ductile-iron fittings shall be manufactured per AWWA C110 and C153. Gray-iron or cast-iron fittings shall not be used. Gray iron or cast-iron flanges shall not be used.

Ductile-iron fittings shall be mechanical, flanged, or push-on joints in accordance with AWWA C110, and C153.

Except as amended herein, or otherwise shown on the Approved Plans, joints for ductile-iron fittings shall have a pressure rating equal to or greater than the adjacent piping.

Unless otherwise specified, ductile-iron flanged fittings shall be integrally cast in accordance with AWWA C110, rated at a working pressure of 1,724 KPa (250 psi). Gray-iron or cast-iron flanged fittings are not permitted.

The exterior surfaces of all ductile-iron fittings shall be factory-coated with a minimum one (1) mil thick petroleum asphaltic material per AWWA C110 and C153.

All ductile-iron fittings shall be cement-mortar lined and seal-coated in accordance with AWWA C104. Cement-mortar shall be in accordance with ASTM C 150, Type II or Type V.

All materials in contact with water shall be certified to meet the requirements of ANSI/NSF Standard 61. Push-on pipe and fittings shall be TYTON as manufactured by U.S. Pipe, or approved equal.

Where the plans call for "Fully Restrained Pipe," restrained push-on gaskets or mechanical joint pipe and fittings shall be utilized. Restrained joints shall be designed for a minimum water working pressure of 250 psi. Restraint shall be accomplished by utilizing Field-Lok gaskets, EBAA Iron joint restraints with Mega-Bond coating, or a restrained joint and fitting system such as TR-Flex, or approved equal. Refer to Specification Section 3-21.

3-12.1 PIPE JOINT LUBRICANT

All pipe lubricant shall be suitable for municipal potable water systems and certified compliant with NSF/ANSI 61 and Annex G, NSF14 and Drinking Water System Components-Health effects, in addition to the requirements of the Safe Drinking Water Act.

The pipe lubricant shall be formulated to prevent turbidity, taste, and odor problems and shall not promote bacterial growth in new main installations.

The lubricant shall be safe for the use with metal or plastic rubber gasketed pipe.

The consistency shall be smooth and must remain a paste at temperatures above 150°F (66° C). The temperature range for use shall be 7°F (-14° C) to 150°F (66° C).

The lubricant shall be non-corrosive and nonflammable and shall not swell rubber gaskets.

Provide Affidavit of Compliance per submittal requirements.

3-12.2 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be used for all ferrous metal materials that are not coated with epoxy or cement mortar.

- A. Polyethylene wrap or sleeves shall be used for the protection of buried ductile-iron pipe, appurtenances, and valves.
- B. Polyethylene sleeves shall be used for the protection of buried ductile iron pipe and fittings. Where the use of a sleeve is not practical, the fittings may be wrapped. Additionally, all bolted connections shall be coated with wax tape.
- C. Polyethylene wrap or sleeves may also be installed around buried PVC pipe for recycled water identification.
- D. Polyethylene encasement shall be as indicated below and shall be selected from the Approved Materials List. Polyethylene materials shall be kept out of direct sunlight exposure.
 - 1. Polyethylene wrap and sleeves shall be a minimum 0.008" thick linear low density polyethylene film in accordance with AWWA C105.
 - 2. Polyethylene wrap and sleeves shall be clear for use with potable water and purple for use with recycled water.
 - 3. Polyethylene or vinyl adhesive tape a minimum of 2" wide or plastic tie straps shall be used to secure polyethylene encasement.
 - 4. Polyethylene wrap and sleeves shall be clear for use with potable water and purple for use with recycled water.
 - 5. Installation Methods and shall comply with AWWA C105. Method A is preferred.

6. Polyethylene encasement shall be secured with 50mm (2") wide polyethylene or vinyl adhesive tape or with plastic tie straps.

E. Provide Affidavit of Compliance per submittal requirements.

3-12.3 WARNING/IDENTIFICATION TAPE

Warning/identification tape shall be used to identify location of underground utilities and to act as a warning against accidental excavations of buried utilities. Warning identification tape shall be used on all underground water and recycled water mains, potable and recycled water irrigation systems, sewer mains, and all related appurtenances. Warning/identification tape shall also be used on cathodic protection wiring systems and tracer wire brought into and out of access ports.

Warning/identification tape shall be as indicated below and in accordance with the Approved Materials List.

1. Tape shall be an inert, non-metallic plastic film formulated for prolonged underground use that will not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil.
2. Tape shall be puncture-resistant and shall have an elongation of two times its original length before parting.
3. Tape shall be colored to identify the type of utility intended for identification. Printed message and tape color shall be as follows:

Printed Message	Tape Color
Caution: Potable Waterline Buried Below	Blue
Caution: Recycled Waterline Buried Below	Purple
Caution: Sewerline Buried Line	Green
Caution: Cathodic Protection Cable Buried Below	Red
Caution: Electric Line Buried Below	Red

Ink used to print messages shall be permanently fixed to tape and shall be black in color with message printed continuously throughout.

4. Tape shall be minimum 0.102mm (0.004" or 4 mil) thick x 150mm (6") wide with a printed message on one side. Tape used with the installation of onsite potable and recycled water irrigation systems shall be a minimum of 75mm (3") wide.

Provide Affidavit of Compliance per submittal requirement.

3-13.1 STEEL PIPE, SPECIALS, AND FITTINGS

Pipe shall be black carbon steel, conforming to ASTM A 53, Type E or S, Grade A or ASTM A 135, Grade A. Pipe 12-inches in diameter and smaller shall be Schedule 40 or 80, or as shown on plans, per ANSI B36.10. Pipe larger than 12-inches in diameter shall be standard weight per ANSI B36.10. Design thickness of the pipe shall be schedule 40 at a minimum. Pipe shall conform to AWWA C200, AWWA M11, with a minimum wall thickness of 0.2500 inches and as specified herein.

3-13.02 THREADED NIPPLES

Threaded nipples shall be of the same material as the pipe. Threads shall conform to ANSI B2.1.

3-13.03 FITTINGS AND JOINTS

- A. Three-inches in Diameter and Smaller: Fittings 3-inches in diameter and smaller shall be threaded forged steel fittings (ASTM A 105) conforming to ANSI B16.11, 3,000-pound CWP may be used.
- B. Buried Fittings: Fittings for buried pipe larger than 3-inches in diameter shall be flanged or butt-welded, conforming to ANSI B16.9. Material shall conform to ASTM A 234, Grade WPB. Wall thickness shall be the same as the pipe.
- C. Above Ground Fittings Larger than 3-Inches in Diameter: Fittings for above ground or exposed pipe larger than 3-inches in diameter shall be grooved end or flanged, conforming to ANSI B16.9. Material shall conform to ASTM A 234, Grade WPB. Wall thickness (except for grooved ends) shall be the same as the pipe. Grooved-end joints shall comply with AWWA C606. Smooth radius forged steel fittings are preferred in-lieu of fabricated steel fittings.

3-13.04 UNIONS

Unions shall be Class 300, malleable iron (ASTM A 47, Grade 35018) brass to iron seat, conforming to ANSI B16.39. Ends shall be threaded per ANSI B1.2.01.

3-13.05 GROOVED-END COUPLINGS

Grooved-end couplings shall be malleable iron, ASTM A 47, Grade 35018, or ductile iron, ASTM A 536, Grade 60-40-18. Bolts shall conform to ASTM A 183, 110,000-psi tensile strength. Gaskets shall be EPDM and shall conform to ASTM D 2000.

Couplings shall be flexible type, square cut groove, per AWWA C606. Couplings shall be Victaulic Style 77, Gustin-Bacon Figure 100, or approved equal.

3-13.06 THREAD LUBRICANT

Teflon thread lubricating compound or Teflon tape shall be used for threaded joints.

3-13.07 PIPE LINING AND COATING

- A. Cement Mortar Lining and Coating: Where indicated on the plans, buried and exposed pipe shall be cement-mortar lined and coated in the shop per AWWA C205, and as specified in Section 15076, Cement Mortar Lined and Coated Steel Pipe.
- B. Buried Piping: Where indicated on the plans, buried pipe shall be factory lined and coated per Section 09910, Painting and Coating.
- C. Exposed Piping: Piping located above ground or in vaults and structures shall be coated per Section 09910, Painting and Coating.

3-13.08 OUTLETS

- A. Outlets 2-Inches in Diameter and Smaller: Outlets which are 2-inches in diameter and smaller shall be made by welding on an extra-heavy steel weld-o-let. threaded coupling. Refer to the City of Santa Monica Standard Drawing details for water service connections to steel pipe.
- B. Outlets Larger than 2-Inches in Diameter: For outlets larger than 2-inches in diameter, flanged tees with flanged nozzle outlets shall be used. Tee fittings shall be fabricated in accord with the applicable portions of the latest revision of the AWWA Manual M11, "Steel Pipe. A Guide for Design and Installation".

Smooth radius forged steel fittings are preferred in-lieu of fabricated steel fittings.

By special permission from the City when the duration of shutdown is critical, outlets for connection to existing steel water pipelines may be made using fabricated steel nozzles. In such cases nozzle outlets shall be fabricated in accord with the applicable portions of the latest revision of the AWWA Manual M11, "Steel Pipe – A Guide for Design and Installation". In all cases, a full-wrap reinforcing plate shall be welded around the outside of the pipe section; and (on the nozzle-size) a circular annular reinforcing collar plate (with minimum ¼-inch thickness) shall be welded over the top of the steel wrapper pad, around the base of the nozzle opening. Refer to the IRWD Standard Drawings for welding and plate details.

3-14 FIRE HYDRANTS

Fire hydrants within the City of Beverly Hills shall be installed in accordance with the current Beverly Hills Standard Drawings and Specifications for Construction of Water Pipeline Installations.

3-15 COPPER PIPE AND TUBING

Copper pipe and tubing shall meet the requirements of ASTM B 88, be cylindrical, of uniform wall thickness, and free from any cracks, seams, or other defects. Piping located above floors or suspended from ceilings shall be Type "L" hard. Piping buried or located beneath floor slab shall be Type "K" soft. Copper tubing shall be joined using Mueller 110 Compression Connection Series fittings, or approved equal. No soldered or flared joints are permitted.

3-16 GATE VALVES

Valve shall be Kennedy, American R/D or approved equal. Gate valves shall be in full compliance with AWWA C500. Materials:

- A. Valve Body, Bonnet, Discs, Wedges: Ductile Iron ASTM-A536 (65/45/12)
- B. Provide valve body and bonnet of ductile iron full body thickness.
- C. Scraper, Stem Nut, Disc and Body Seat Rings: B62 Low Zinc Bronze.
- D. Ductile Iron Wedge Bearing Surfaces: Type 316 stainless steel ASTM-A276.
- E. Stem: Type 316 or 304 Stainless Steel ASTM A 276.
- F. Flanges shall comply with ASME B16.1 Class 250.
- G. Rings and body seat rings meet the requirements of ASTM B62, Copper Alloy No. 83600, or ASTM B148 C95400, or ASTM B584 C89520.
- H. O-rings and gaskets shall be made of new ethylene propylene diene Monomer (M-class) EDPM rubber. Reclaimed rubber shall not be used. Bonnet gaskets may be made of Garlock 3200.
- I. Valve Bolts and Nuts: Type ASTM Grade 304 or 316 Stainless Steel Bolts and Nuts as specified by engineer.

Valve rated working pressure: Valves 3" through 54": 300 psi.

Exposed valves: Flanged OS&Y valves. Face-to-face dimensions to comply with ANSI B16.10, flanges to comply with ANSI B16.1. Provide conventional packing in OS&Y valves. Provide Type 316 or Type 304 stainless steel bolts and bronze nuts for stuffing box follower.

Buried Valves: NRS with gear operator. Mechanical joints. Provide conventional packing or double O rings in non-rising stem.

Where specified and indicated provide a bypass valve bolted to bottom or side of main valve body. Provide valve type and material as specified and indicated.

Provide valve body with two integrally cast flushing ports for gate valve sized 24" and larger.

Provide two 360 degree ductile iron rotating discs, interchangeable and field replaceable without removal of valve body from pipeline.

Provide self-adjusting bronze scrapers to allow valve to be mounted in the horizontal position or angle as indicated from vertical or horizontal centerlines.

Provide Type 304 or Type 316 Stainless Steel stem with integrally cast thrust collar.

When required, provide each valve body with integrally cast electric motor mounting pads.

Provide a full port body design with full port completely through the entire valve body and seat rings to allow for pigging of pipelines.

Valve in full open position shall provide a clear and unobstructed water way.

Provide valve body guides and tracks with a bronze bearing surface throughout the entire travel of bottom side of a horizontally installed valve. Guide contact area: ASTM B21 Bronze.

Provide valve design to allow complete re-packing of valve stem under pressure when the valve is in full open position.

End connections, provide type as indicated and specified: Flanged ANSI B.16.1 Class 250, Grooved, Mechanical Joint.

Provide all discs and wedges free of any type pockets, linkages and pins.

Provide geared operators for all valves 16 inch and larger. Gearing: Steel with enclosed cases. Provide spur or bevel with totally enclosed gear cases.

Chainwheels: Provide where required as specified herein.

Testing: Factory test each valve per AWWA C-500 (latest Revision).
Provide a two part NSF-61 approved liquid epoxy on the exterior and interior of valve.

3-17 SLEEVED TYPE COUPLINGS

- A. Sleeve type couplings include straight couplings, transition couplings, reducing couplings and flange coupling adapters and will be used to connect all combinations of ductile iron, cast iron, steel and ACP pipe.
- B. All sleeve couplings shall meet the latest revision of AWWA C219 standards.
- C. Center ring shall be:
 - 1. Ductile Iron per ASTM A536, 65-45-12
 - 2. Steel per ASTM A283 Grade C or equivalent with a minimum yield of 30,000 psi.
- D. End rings shall be:
 - 1. Ductile Iron per ASTM A536, 65-45-12.
 - 2. Steel per ASTM A576-Grade 1020 or equivalent have a minimum yield of 54,000 psi.
- E. Coupling flanges shall have the same bolt pattern and equal or exceed pressure rating of the connecting flange. Refer to Section 2.10 for flange coupling adapter flange requirements.
- F. The location and number of each type of sleeve coupling shall be determined from the construction drawings
- G. The product shall be certified compliant with NSF/ANSI 61, Drinking Water System Components-Health effects, in addition to the requirements of the Safe Drinking Water Act.
- H. The pipe material and nominal pipe sizes are shown on the plans and it shall be field verified prior to ordering any type of couplings.
- I. All couplings shall be pressure rated for a minimum of 200 psi or the rating of the flange (whichever is greater) and shall with operate with manufacturer guarantee at the water system design pressures.
- J. The water system operating temperature range is between 32 – 150°F.

- K. The minimum wall thickness of the sleeve coupling shall be ¼ inch and the minimum center sleeves length shall comply with Table 2 of AWWA C219. Manufacturer shall confirm the minimum length is sufficient for each application. Minimum lengths for reducing couplings shall be 12-inches.
- L. Allowable angular pipe deflections shall not exceed 80 % of the manufacturer's recommendation and conform to Section 4.5 and Table 3 of AWWA C219.
- M. Coatings thickness shall be a minimum of 16 mils of either shop applied liquid or fusion bonded epoxy in accordance with AWWA C210 or AWWA C213.
- N. Gasket materials shall Buna N Grade 60 and/or exceed or meet the requirements AWWA C219 Section 4.23 and ASTM D2000.
- O. Flange bolts and nuts shall conform to the requirements of Section 2.03. End ring bolts and nuts shall conform to AWWA C219 Section 4.2.4 and AWWA C111.
- P. All couplings shall clearly be marked with a pressure rating per AWWA C219 Section 6.1.4.
- Q. Affidavits of Compliance (Certifications) per the submittal requirements.

3-18 JOINT RESTRAINT SYSTEMS

Joint restraint systems shall be used for rubber ring joint pipe. Joint restraint systems shall be used in conjunction with, concrete thrust blocks unless otherwise directed. Restrained joint systems shall be wax tape coated and polyethylene encased. Contractor shall submit manufacturer produced shop drawings, calculations, and catalog data for each joint restraint systems. All products shall be installed per manufacturer's recommendations including all referenced AWWA standards.

3-19.1 MECHANICAL JOINT RESTRAINT FOR DUCTILE IRON PIPE

- A. Restraint devices for joining plain end pipe to mechanical joint fittings and appurtenances shall conform to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53. Restraint devices shall be Listed by Underwriters Laboratories (3-inch through 24-inch size) and approved by Factory Mutual (3- inch through 12-inch size).
- B. Restraint devices for nominal pipe sizes 3-inch through 48-inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

- C. The devices shall have a working pressure rating of 350 psi for 3-inch through 16-inch and 250 psi for 18-inch through 48-inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.
- D. Gland body, wedges, and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
- E. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
- F. All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of 12 mils of coats of liquid or fusion bonded thermoset epoxy coating per AWWA 210 or AWWA 213.
- G. All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.
- H. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.
- I. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly. Manufacturer installation recommendations shall be followed.
- J. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.
- K. Approved Materials are EBAA Iron Inc. Megalug Series 1100 (Ductile Iron), or approved equal (prior to Bid).

3-19.2 STRAIGHT AND TRANSITION COUPLINGS

- A. Joint restraint to prevent axial separation shall be incorporated into the design of the sleeve or coupling used to connect two plain pipe ends. The working water pressure shall be rated for 300 psi minimum and all higher design pressures per Section 15000.1.06. For ductile iron pipe, the flange adapter shall have a safety factor of 2:1 minimum.
- B. The restraint mechanism shall consist of a plurality of individually actuated gripping surfaces to maximize restraint capability.

- C. Torque limiting twist off nuts shall be used to insure proper actuating of the restraint devices.
- D. The restraint devices shall be coated with 12 mils of Fusion-Bonded Epoxy Coating (AWWA C213-07).
- E. Ductile iron components shall be of a minimum of 65-45-12 ductile iron meeting the requirements of ASTM A536 of the latest revision and shall be tested in accordance with the stated standard.
- F. The restrained joining system shall meet the applicable requirements of AWWA C219, ANSI/AWWA C111/A21.11, and ASTM D2000.
- G. Approved Materials are EBAA Iron Inc. Megalug Series 3800 or approved equal (prior to Bid).

3-19.3 RESTRAINED FLANGED COUPLING ADAPTERS

- A. Restrained flange adapters shall be used in lieu of threaded, or welded, flanged spool pieces. Flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10.
- B. Restraint for the flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges.
- C. The flange adapter shall be capable of deflection during assembly, or permit lengths of pipe to be field cut, to allow a minimum of 0.6" gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
- D. For PVC pipe, the flange adapter will have a pressure rating equal to the pipe.
- E. The restraint shall be manufactured of ductile iron conforming to ASTM A536 and rated for a minimum of 250 psi and all higher design pressures per Section 15000.1.06. For ductile iron pipe, the flange adapter shall have a safety factor of 2:1 minimum.
- F. The restraint devices shall be coated with liquid or fusion bonded epoxy per AWWA C210 or AWWA C213.

- G. Groove end or shouldered couplings shall be in accordance with the Approved Materials List and as described below:
- H. Use square-cut shouldered or grooved ends per AWWA C606. Grooved-end couplings shall be malleable iron per ASTM A 47, or ductile iron per ASTM A 536. Gaskets shall be per ASTM D 2000.
- I. Bolts in exposed service shall conform to ASTM A 183, 69 MPa (10,000 psi) tensile strength.
- J. The minimum design working pressure shall be 250 psig.
- K. The finish shall be fusion bonded epoxy per AWWA C213.
- L. Provide affidavit of compliance for all restraining devices per submittal requirements.

3-20 FLANGES

- A. All pipe flanges shall meet the latest revision of AWWA C111, AWWA C207, and ANSI/ASME B16.5 standards.
- B. All flange materials and gaskets shall be certified compliant with NSF/ANSI 61, Drinking Water System Components-Health effects, in addition to the requirements of the Safe Drinking Water Act.
- C. Steel flanges shall conform to applicable requirements of AWWA C207.
- D. Steel flange selection shall be based on the test pressure. AWWA flanges shall not be exposed to test pressures greater than 125 percent of rated capacity. For higher test pressures, the next higher rated AWWA flange or an ANSI-rated flange shall be selected.
 - 1. For test pressures 150 psi or less, flanges shall conform to ASME B16.5 - Pipe Flanges and Flanged Fittings, 150 lb class.
 - 2. For test pressures 150 psi to 275 psi, flanges shall conform to either ASME B16.5 150 lb class or AWWA C207 Class E or Class F.

3. For test pressures 275 psi to 700 psi, flanges shall conform to ASME B16.5, 300 lb class.
- E. Steel flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise indicated. Attachment of the flanges to the pipe shall conform to the applicable requirements of AWWA C207. Flange faces shall be perpendicular to the axis of the adjoining pipe. Flanges for miscellaneous small diameter pipes shall be in accordance with the standards indicated for these pipes.
- F. Steel Blind Flanges: Blind flanges shall be in accordance with AWWA C207, or as indicated for miscellaneous small pipes. Blind flanges for pipe sizes 12-inches and greater shall be provided with lifting eyes in the form of welded or screwed eye bolts.
- G. Flange Coating: Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

3-20.1 FLANGE GASKETS

- A. All pipe gaskets shall conform where applicable to the latest revision of AWWA C111, AWWA C115, and AWWA C207 standards.
- B. All gasket materials shall be suitable for municipal potable water systems and shall be certified compliant with NSF/ANSI 61, Drinking Water System Components-Health effects, in addition to the requirements of the Safe Drinking Water Act.
- C. All gaskets shall be full-faced gasket type and with 1/8-inch minimum thickness.
- D. All gaskets shall be of non-asbestos materials and suitable to be connected to the adjacent flange materials. The minimum gasket thicknesses shall conform to AWWA C207 Table 1 and the size details per AWWA C111 Table C.1
- E. The operating temperature range shall be 0-250°F.
- F. The flange gaskets shall be a minimum pressure rating equal to the adjacent flanges including the system the test pressure. Refer to Section 15000, Article 1.08 Design.
- G. Provide Affidavit of Compliance per requirements in Specification Section 01330

3-20.2 BOLTS AND NUTS

- A. All pipe bolts and nuts shall conform where applicable to the latest revision of AWWA C111, AWWA C115, and AWWA C207 standards.
- B. All bolts and nuts for ductile iron flanges shall be hot dipped galvanized or fluoropolymer coated carbon steel bolts conforming to ATSM A307 grade A with ASTM A563 heavy hex nuts.
- C. All bolts and nuts for steel flanges shall be hot dipped galvanized or fluoropolymer coated carbon steel bolts conforming to ATSM A193 grade B7 with ASTM A194 grade 2H heavy hex nuts.
- D. All bolts and nuts shall be provided with a washer under each nut and under each bolt head made of the same material as the nuts. Washers shall be sized such that no part of the washer shall project beyond the flange outside diameter. Washers shall be flush with the flange surface and shall not impinge on any welded surface between the flange and the pipe, valve, or fitting to which the flange is attached.
- E. Bolts shall be of such length that not less than 1/4 inch nor more than 1/2 inch shall project above nut in tightened position. All bolt heads and nuts shall be hexagonal, except where special shapes are required.
- F. All bolted connections shall be wrapped and protected with Petrolatum Wax Tape Coating. Refer to Section 09902, Article 2.01.
- G. Provide Affidavit of Compliance per requirements in Specification Section 01330
- H. Fire hydrants shall be provided with break off type bolts conforming to ASTM A307 Grade A. Hex nuts shall conform to ASTM A563 with washers. All fire hydrant bolts, nuts and washers shall hot dipped galvanized.
- I. Refer to Approved Material List.

3-21 WARNING/IDENTIFICATION TAPE

Warning/identification tape shall be used to identify location of underground utilities and to act as a warning against accidental excavations of buried utilities. Warning/identification tape shall be used on all underground water and recycled water mains, potable and recycled water irrigation systems, sewer mains, and all related

appurtenances. Warning/identification tape shall also be used on cathodic protection wiring systems and tracer wire brought into and out of access ports.

Warning/identification tape shall be as indicated below and in accordance with the Approved Materials List.

1. Tape shall be an inert, metallic plastic film formulated for prolonged underground use that will not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil.
2. Tape shall be puncture-resistant and shall have an elongation of two times its original length before parting.
3. Tape shall be colored to identify the type of utility intended for identification. Printed message and tape color shall be as follows:

<u>Printed Message</u>	<u>Tape Color</u>
Caution: Potable Waterline Buried Below	Blue
Caution: Urban-Treated Run-Off Pipe Buried Below	Yellow w/Black Stripes
Caution: Sewerline Buried Line	Green
Caution: Cathodic Protection Cable Buried Below	Red
Caution: Electric Line Buried Below	Red

Ink used to print messages shall be permanently fixed to tape and shall be black in color with message printed continuously throughout.

4. Tape shall be minimum 0.004" or 4 mil thick x 6" wide with a printed message on one side. Tape used with the installation of onsite potable and recycled water irrigation systems shall be a minimum of 3" wide.
5. Provide Affidavit of Compliance per requirements in Specification Section 01330.
6. Refer to Approved Material List.

3-22

VALVE CANS

- A. Valve cans shall be used for buried valves 2" and larger, unless otherwise indicated on the Standard Drawings. Gate well lids shall be used on all valve cans.
- B. Valve cans for valves 2" and smaller shall be 4" diameter SDR-35 PVC sewer pipe selected from the Approved Materials List.
- C. Valve cans for valves larger than 2" shall be 8" diameter Class 305 C900 PVC pipe selected from the Approved Materials List.
- D. Valve cans for use in potable water system applications shall be blue. Valve cans for use in urban-treated runoff system applications shall be yellow with black stripe or shall otherwise be identified in accordance with Section 15151.
- E. Gate well lids shall be circular ductile-iron, **rated for H-20 Traffic Loading** and selected from the Approved Materials List and shall include a skirt for a close fit inside the upper portion of the gate well. Lids shall be cast with the City's name and the word "WATER" for use on potable water systems or the word "URBAN-TREATED RUNOFF" for use on urban-treated runoff water systems.
 - 1. Gate well lids for valves 2" and smaller shall be 4" diameter with 1/2" long skirt.
 - 2. Unless otherwise indicated on the Approved Plans or directed by the City Engineer, gate well lids for valves larger than 2" shall be Type Christy-G05T Traffic Valve Box 10-3/8" I.P.x 12" with an 8: PVC PIP per the Approved Materials List.

3-23

VALVE STEM EXTENSION

Valves 4" and larger require valve stem extensions to be installed when the valve operating nut is more than 5' below grade or as required by the City Engineer. All valves 2" and smaller requiring the installation of a gate well shall include a valve stem extension in accordance with the Standard Drawings.

Stem extensions shall be complete with operating nut, location ring, and lower socket to fit valve operating nuts. The configuration of the extension stem socket shall match that of the valve it operates.

- A. Valve stem extensions for valves 2" or smaller shall be in accordance with Water Agencies' Standards WV5.

- B. Valve stem extensions for valves 4" or larger extensions may be round or square hot-dipped galvanized steel tubing of solid design (no pinned couplings permitted) with guides in accordance with Water Agencies' Standards WV4.

3-24.1 PRESSURE REDUCING VALVES

Valve shall be a Cla-Val Co. 131G-DV-BPSVKCX D/S 250 LB Pressure Reducing Valve. As manufactured by Cla-Val Co. Newport Beach, CA 92659-0325.

The Pressure Reducing Valve shall maintain a constant downstream pressure regardless of changing flow rate and/or inlet pressure. "Tying" of equipment into packages for the purpose of thwarting competition shall be considered to be in non-compliance with these specifications. Manufacturers shall price items under different subsections or sections separately.

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. The valve shall consist of three major components: the body, with seat installed; the cover, with bearings installed; and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls.

No separate chambers shall be allowed between the main valve cover and body. Valve body and cover shall be of cast material. Ductile Iron is standard and other materials shall be available. No fabrication or welding shall be used in the manufacturing process. Total shipping weight shall be equal or greater in all respects to the Hytrol 100-01/100-20 body.

The valve shall contain a resilient, synthetic rubber disc, with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs (circular, square, or quad type) shall be permitted as the seating surface. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the disc firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It must have straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface. No hourglass-shaped disc retainers shall be permitted and no V-type or slotted type disc guides shall be used.

The diaphragm assembly containing a non-magnetic 303 stainless steel stem with sufficient diameter to withstand high hydraulic pressures shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.

The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The center hole for the main valve stem must be sealed by the vulcanized process or a rubber grommet sealing the center stem hole from the operating pressure. The diaphragm must withstand a Mullins Burst Test of a minimum of 600 psi per layer of nylon fabric and shall be cycle tested 100,000 times to insure longevity. The diaphragm shall not be used as the seating surface. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully opened or fully closed position.

The main valve seat and the stem bearing in the valve cover shall be removable. The cover bearing and seat in 6" and smaller size valves shall be threaded into the cover and body. The valve seat in 8" and larger size valves shall be retained by flat head machine screws for ease of maintenance. The lower bearing of the valve stem shall be contained concentrically within the seat and shall be exposed to the flow on all sides to avoid deposits. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Cover bearing, disc retainer, and seat shall be made of the same material. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. Packing glands and/or stuffing boxes shall not be permitted and components including cast material shall be of North American manufacture.

The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions. Electrical components shall have a one year warranty.

The valve manufacturer shall be able to supply a complete line of equipment from 1 1/4" through 24" sizes and a complete selection of complementary equipment. The valve manufacturer shall also provide a computerized cavitation chart which show flow rate, differential pressure, percentage of valve opening, Cv factor, system velocity, and if there will be cavitation damage.

Material Specification:

Valve Size: 8"

Main Valve Body and Cover: Ductile Iron

Main Valve Trim: Stainless Steel

End Detail: Flange (Flat-Faced), 250 LB (300 LB Steel)

Pressure Rating: 300 psi

Temperature Range: 40 -140 Degrees Fahrenheit

Rubber Material: EPDM Rubber

Coating: Fusion Bonded Epoxy

Desired Options: Valve Model Number 131G-DV-BPSVKCX D/S 250LB

Install "valve closed" indication position switch and a solenoid to "open" the valve. To accommodate the "valve closed" indication gear shall be the standard rod/donut/position switch type configuration (strictly digital closed indication – not position) and the "open" solenoid shall be plumbed in addition to a manual "open" valve. SCADA shall be capable of automatically opening the valve if the need is sensed, but an operator shall be allowed to additionally open the valve manually if the power is out.

3 – 24.2 PILOT CONTROL SYSTEM

The pressure reducing pilot control shall be a direct-acting, adjustable, spring-loaded, normally closed, diaphragm valve designed to permit flow when controlled pressure is less than the spring setting. The pilot control is held open by the force of the compression on the spring above the diaphragm, and it closes when the delivery pressure acting on the underside of the diaphragm exceeds the spring setting.

The pilot control system shall include a fixed orifice. No variable orifices shall be permitted. The pilot system shall include an opening speed control on all valves 3" and smaller for the model 131G-DV.

The pilot control shall have a second downstream sensing port which can be utilized to install a pressure gauge. A full range of spring settings shall be available in ranges of 0 to 450 psi.

A direct factory representative shall be made available for start-up service, inspection and necessary adjustments.

Material Specification for Pilot Control:

Pressure Rating: 300 psi

Trim: Stainless Steel

Rubber Material: EPDM Rubber

Tubing and Fittings: Stainless Steel

Adjustment Range: 143 psi Normal Operating Pressure with 0 to 450 psi range.

Operating Fluids: Potable Water

3-25 DOORS, WINDOWS, PAINT, AND ANTI-SLIP FLOOR SURFACE

The Contractor shall furnish all labor, materials, equipment, safety equipment and protective clothing required for completion of painting and retrofitting, and be responsible for proper instruction and supervision of their use. Application & installation shall be per manufacturers' recommendations.

All paint materials shall be those of current manufacture and shall meet all applicable regulations for the application and intended service. All coats of any particular coating system shall be of the same manufacturer and shall be approved by the manufacturer for the intended service. Clean, prepare and apply all paints per manufacturer specifications. Match all paints to existing color.

Interior and exterior paint shall be Loxon XP Masonry Coating. Ceiling paint shall be Duration Exterior Acrylic Coating.

Anti-slip floor coating shall be a mixture of Amerlock 2 and PSX 700. Consult with the local PPG Architectural Coatings representative at (213) 747-7871.

Remove existing door and furnish and install new steel door and door jam. Paint to match existing brick color. Assume wet conditions. Door shall be hot-dipped zinc-iron alloy-coated (galvannealed), factory primed for field finishing, type L-16 series, not less than 16-gauge flush or inverted, and Kynar finished. The jam shall be 14-gauge. Manufacturer shall be Steelcraft, Assa Abloy Ceco, Windsor Republic Doors, or equivalent.

Retrofit all windows and window openings with new glass, hinges and latches in kind or better. Dimensions of new windows shall match existing window openings. Seal window inserts in masonry opening from dust and water. Manufacturer shall be Milgard, Arcadia, Fleetwood, or equivalent.

**STANDARD CONTRACTUAL REQUIREMENTS
FOR PUBLIC IMPROVEMENTS
IN THE CITY OF BEVERLY HILLS CALIFORNIA**

**AS ADOPTED BY
THE DEPARTMENT OF PUBLIC WORKS
ON NOVEMBER 1, 1976**

PART I

GENERAL PROVISIONS

1-01 APPLICABILITY - Whenever these Standard Contractual Requirements are referred to in any proposal form, specifications, or contract for any work of public improvement proposed to be made by the City of Beverly Hills, they are made an integral part of all such documents pertaining to such work and are incorporated in each of such documents by reference as though set forth at length therein.

1-02 DEFINITION OF TERMS - The following terms, unless the context requires a different meaning, when used herein or in the proposal form, specifications, or the contract, shall have the following meanings:

BIDDER - Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for work contemplated.

BIDDER'S SECURITY - The cash, cashier's or certified check, or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the City for the performance of the work if the contract is awarded to the bidder.

CITY - The City of Beverly Hills, California.

CITY ATTORNEY - The City Attorney of the City.

CITY CLERK - The City Clerk of the City.

CITY ENGINEER - The City Engineer of the City

CITY COUNCIL - The Council of the City of Beverly Hills.

CODE - The terms Business and Professions Code, Civil Code, Government Code, Labor Code, and Streets and Highways Code refer to codes of the State of California.

CONTRACT DOCUMENTS - The written agreement covering the performance of the work and the furnishing of labor, materials, tools, and equipment in the construction of the work. The contract shall include the notice to bidders, proposal, plans, specifications, these Standard Contractual Requirements, and contract bonds; also any and all supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner.

CONTRACTOR - The person or persons, firm, partnership, corporation, or combinations thereof, which have entered into a contract with the City, as party or parties of the second part.

INSPECTOR - The Inspector of the Department of Public Works of the City, authorized by the City Engineer to represent him in the field during the performance of the work.

NOTICE TO BIDDERS - The public advertisement through which the City invites bids for the performance of specific work.

PLANS - The official project drawings and Standard Drawings, profiles, cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the City Engineer, which show the location, character, dimensions, and details of the work to be performed.

PROJECT DRAWINGS - The project drawings are specific details and dimensions to the work and are supplemented by the Standard Drawings insofar as the same may apply.

PROPOSAL OR BID - The offer of the bidder for the work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

PROPOSAL FORM - The form furnished to prospective bidders by the City, for use by the bidder in preparing and submitting a bid.

PUBLIC UTILITIES - Railroad tracks, overhead or underground wires, pipe lines, conduit, ducts or structures owned, operated or maintained along or across a public right of way, including such installations owned by the Water Department, the Fire Department or the Police Department of the City, but excluding sewers, storm drains, street lighting systems and traffic signal systems owned by the City and operated or maintained by the Department of Public Works.

PUBLIC WORKS DIRECTOR - The Public Works Director of the City.

REFERENCE SPECIFICATIONS - Bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to on the plans or in the specifications, copies of which are on file in the office of the City Engineer.

ROADWAY - That portion of a street or alley reserved for vehicular use.

SPECIFICATIONS - The project specifications prepared for the proposed work, and specifications included therein by reference, including standard specifications of other agencies, and any other specifications contained or referred to in supplemental agreements between the Contractor and the City.

STANDARD DRAWINGS - Plans of structures or devices adopted for work in the City and referred to on the plans or in the specifications by title or index number, or standard drawings or plans of other agencies which are referred to on the plans or in the specifications.

STATE - The State of California.

STREET SUPERINTENDENT - The City Engineer who has been authorized by the City Council to act in the capacity of Street Superintendent in the course of improvements carried under the proceedings of the Improvement Act of 1911, as amended, now a part of the Streets and Highways Code, as amended.

SUBCONTRACTOR - The person or persons, firm, partnership, corporation or combinations thereof, which have entered into a contract with the Contractor to perform part of the work.

SUBGRADE - The surface to be used as a base for the pavement, gutter sidewalk, conduit, pipe, or structure proposed to be installed.

SURETY - Any individual, firm or corporation, bound with and for the Contractor for the acceptable performance, execution, and completion of the work, and for the satisfaction of all obligations incurred.

WORK, PROJECT OR IMPROVEMENT - All the work specified, indicated, shown or contemplated in the contract to construct the improvement including all alterations, amendments, or extensions thereto made by change order or other written orders of the City Engineer.

The meaning of any other word not mentioned herein shall be clarified by the City Engineer at the request of the Contractor, who shall accept the furnished interpretation as representing the true meaning of such word.

1-03 ABBREVIATIONS - Following is a list of the most common abbreviations and symbols used on the plans and in the specifications.

ABBREVIATIONS

WORD or WORDS

AC	Asphalt concrete
ASTM	American Society for Testing Materials
BC	Beginning of curve
BCR	Beginning of curb return
BHW	Beverly Hills Water Department
BM	Bench mark
BVC	Beginning of vertical curve
CB	Catch basin
CC or C/C	Center to center
CF	Curb face
cfs	Cubic feet per second
CIP	Cast iron pipe
CL or C	Center line
CMP	Corrugated metal pipe
Conc.	Concrete
Cu.	Cubic
D	Diameter of pipe
Dia.	Diameter
Dr	Drive
DW&P	Los Angeles Department of Water & Power
Dwy.	Driveway
EC	End of curve
ECR	End of curb return
EG	Edge of gutter
Elev.	Elevation
EVC	End of vertical curve
Ex or Exist.	Existing
FB	Field Book
FH	Fire hydrant
FL	Flow line
fps	Feet per second
FS	Finished surface
Ft.	Foot or feet
Galv.	Galvanized
GL	Ground line
Gr	Grade
H	High or height

HC	House connection (sewer)
Hor.	Horizontal
ID	Inside diameter
JC	Junction chamber
JS	Junction structure
L	Length
LACFCD	Los Angeles County Flood Control District
L&T	Lead and tack
LD	Local depression
Lin	Linear
Long	Longitudinal
MH	Manhole
MTD	Multiple tile duct
MWD	Metropolitan Water District
No.	Number
OD	Outside diameter
OLC	Ornamental lighting conduit
PCC	Portland cement concrete or point of compound curvature
PI	Point of intersection
PL	Property line
PP	Power pole
PRC	Point of reverse curvature
Prop.	Proposed
psi	Pounds per square inch
PT	Point of tangency
PT&T	Pacific Telephone & Telegraph Co.
Pvmt.	Pavement
Q	Rate of flow
R	Radius
RC	Reinforced concrete
RCP	Reinforced concrete pipe
Rdwy	Roadway
R&O	Rock and oil
R/W	Right of way
S	Slope
San.	Sanitary
SCE	Southern California Edison Company
SCG	Southern California Gas Company
SD	Storm drain
Spec.	Specifications
SPCo	Southern Pacific Company
Sq.	Square
SS	Sanitary sewer
St.	Street
Sta.	Station

Std.	Standard
Str.Gr.	Straight Grade
T	Tangent distance
TC	Top of curb
TS	Traffic signal or transition structure
TSC	Traffic signal conduit
USC&GS	United States Coast and Geodetic Survey
USGS	United States Geological Survey
V	Depth of catch basin
v	Velocity
VC	Vertical curve
Vert.	Vertical
W	Width
WS	Water surface or wearing surface
Yd	Yard or yards

The meaning of any other symbol or abbreviation not shown on the preceding list and not clarified in the plans, specifications, or contract, shall be interpreted by the City Engineer at the request of the Contractor, who shall accept such interpretation as representing the true meaning thereof.

REV 10-30-80
REV 10-12-88
REV 07-17-90
REV 03-13-91

PART 2

PROPOSAL REQUIREMENTS

2-01 PROPOSAL FORMS - All bids must be submitted on the proposal form attached to the specifications for a given project, and shall be delivered at the office of the City Clerk of Beverly Hills, located at 455 North Rexford Drive, Beverly Hills, California 90210.

All proposals must give the prices bid, both in written words and in figures, and must be signed by the bidder, who must state his/her address. If the proposal is made by an individual, his/her name, post office address, and telephone number must be given. If made by a firm or partnership, the proposal must show the name, post office address, and telephone number of each member of the firm or partnership must be shown. If made by a corporation, the proposal must show the name of the state under the laws of which the corporation was chartered, and the names, title and business addresses of the president, secretary and treasurer.

2-02 REJECTION OF PROPOSALS CONTAINING ALTERATIONS, ERASURES OR IRREGULARITIES - Proposals may be rejected by the City Council if they show any alterations of form, additions not called for, conditional or alternative bids, incomplete bids, erasures or irregularities of any kind. The City reserves the right to reject any or all bids, and to waive any informality or irregularity in any bid.

2-03 BIDDER'S SECURITY - Each bid submitted must be accompanied by cash, cashier's check, or certified check made payable to the City, or a bidder's bond in favor of the City, in the form set forth in Exhibit "A" attached hereto. Any of the foregoing types of bidder's security must be in an amount equal to at least ten percent (10%) of the total bid submitted by the bidder for the project. A bidder's bond shall be executed by a corporate surety acceptable to, and approved by, the City Attorney. A bid will not be considered unless one of the above-mentioned forms of bidder's security is enclosed with it.

2-04 FORFEITURE OF THE BIDDER'S SECURITY - If the successful bidder fails to execute the contract and furnish the necessary bonds and insurance within ten (10) days from the date of award of the contract, the bidder's security shall be forfeited to the City as liquidated damages.

2-05 BONDING LETTER - If cash, or cashier's check, or a certified check is furnished for the bid bond, a letter is required from a bonding company stating that in the event the contract is awarded to the bidder the bonding company will furnish, at the bidder's expense, the bonds required by Paragraph 2-11 hereof.

2-06 WITHDRAWAL OF BIDS - A bid may be withdrawn by a bidder prior to, but not after, the date and hour fixed for the opening of the bids, as said date and hour are

specified in the Notice to Bidders.

2-07 JURISDICTION OF THE CITY COUNCIL REGARDING BIDS - All bids shall be under the jurisdiction of the City Council and subject to final acceptance or rejection until after the City Council has awarded the contract and said contract has been duly entered into with the successful bidder.

2-08 DECISION AS TO WHICH CONTRACTOR IS THE LOWEST AND BEST BIDDER - All bidders must submit with their proposal satisfactory evidence that they are capable of performing the work in accordance with the plans and specifications. The City Engineer may require any bidder bidding on any public improvement to submit experience records covering a three-year period. The City Council may reject the bid of any bidder who has been delinquent or unfaithful in the performance of any previous contract work. The decision of the City Council as to which bidder is considered the "lowest responsible bidder" will be based not only on the actual amount of the bid but also on the relative competence and experience of the bidders, with particular regard to the quality of performance of any work done by them for the City in the past, and such decision shall be final and binding upon all persons.

2-09 AWARDS - A decision with reference to the acceptance of bid and the award of a contract will be made by the City Council within sixty (60) days after the opening of bids.

2-10 EXECUTION OF THE CONTRACT - The contract, in the form set forth in Exhibit "C" attached hereto, shall be executed by the successful bidder, in accordance with the instructions set forth in Exhibit "B" attached hereto, and returned to the City for execution by the City, and shall be accompanied by the bonds required in Paragraph 2-11 hereof and the evidence of insurance required by Paragraph 3-12 hereof, all within ten (10) days after the bidder has received notice of the award of the contract. No bid or proposal shall be considered binding upon the City until such time as it has been executed by the City. The failure of the successful bidder to execute the contract and to submit acceptable bonds and evidence of insurance as, and within the time, required shall be cause for the annulment of the award and the forfeiture of the bidder's security.

2-11 CONTRACT BONDS - The successful bidder shall furnish to the City, at his own expense, two surety bonds. One bond shall be in the amount of One Hundred percent (100%) of the contract price, in the form set forth in Exhibit "D" attached hereto, to guarantee faithful performance of the contract work. The "Performance Bond" shall guarantee that all materials and workmanship will be free from original or developed defects. The "Performance Bond" must remain in effect until the end of all warranty periods set forth in the contract.

All work shall be guaranteed by the Contractor against defective workmanship and materials furnished by the Contractor for a period of one (1) year from the date the work was completed. The Contractor shall replace or repair any such defective work in a manner satisfactory to the City Engineer, after notice to do so from the City Engineer, and within the time specified in the notice. If the Contractor fails to make such replacement or repairs within the time specified in the notice, the City may perform this work and the Contractor's sureties shall be liable for the cost thereof.

The other bond, in an amount not less than One Hundred percent (100%) of the contract price in the form set forth in Exhibit "E" attached hereto, shall be furnished as required by Section 2-4 of the latest edition of the "Standard Specifications for Public Works Construction", adopted by a Joint Cooperative Committee of the Southern California Chapter of the American Public Works Association and Southern California District of the Associated General Contractors of California.

Each bond shall be executed in accordance with the instructions set forth in Exhibit "E" attached hereto, and each bond shall be executed by a corporate surety acceptable to, and approved by, the City Attorney.

2-12 RETURN OF BIDDER'S SECURITY - If cash, or cashier's check, or certified check is furnished as bidder's security, the City Clerk will return the bidder's security (excepting anyone subject to forfeiture) upon the occurrence of either of the following: the decision of the Council not to award a contract, or the compliance by a successful bidder with Paragraph 2-10 hereof.

2-13 EXAMINATION OF THE SITE OF THE WORK, PLANS AND SPECIFICATIONS - Before submitting their bids, all bidders are required to examine carefully the site of the project and the proposal, plans, specifications, and contract forms for the work contemplated, and it will be assumed that all bidders have investigated and are satisfied with the conditions to be encountered as to the character, quality, and quantities of work to be performed and materials to be furnished, as well as to the requirements of the plans, specifications, and the contract. Quantities and dimensions, as shown on the plans, specifications, and proposal form, shall be considered as being only approximate and merely intended to assist the bidders in checking their own figures as ascertained at the site of the proposed work. The submission of a proposal shall constitute a representation and warranty by the bidder that the bidder has made such an examination.

2-14 COMPLIANCE WITH THE PROVISIONS OF THE GOVERNMENT CODE All contractors shall conform with the provisions of Sections 4100 to 4113, inclusive, of the Public Contract Code, as amended, concerning subcontractors and subcontracts.

2-15 REJECTION OF BIDS - Proposals may be rejected by the City Council, whereupon evidence of prior performance of the bidder, the City Council has made a finding that within a three-year period prior to the bid opening the bidder is not a responsible contractor because of past unsatisfactory performance with the City or with other public entities.

2-16 COMPLIANCE WITH PROVISIONS OF THE FEDERAL EQUAL EMPLOYMENT OPPORTUNITY BID CONDITIONS - All bidders to be eligible for the federally-assisted or non-exempt federal construction contracts in the area of jurisdiction of the Los Angeles Building and Construction Trades Council must comply with the provisions of the greater Los Angeles Plan or the affirmative action program, both of which are set forth in the Federal Equal Employment Opportunity Bid Conditions incorporated by reference herein and attached hereto as Exhibit "H" pursuant to the

U.S. Department of Labor Orders dated September 23, 1971.

NOTE: Exhibit "H" will not be attached hereto for projects which are not financed with federal funds.

2-17 INTERPRETATION OF CONTRACT DOCUMENTS - No oral interpretations will be made to any bidder as to the meaning of the contract documents. Should a prospective bidder discover discrepancies or omissions in the contract documents or should a bidder be in doubt as to the meaning of the contract documents, the bidder shall request clarification or modification from the City. Request for an interpretation shall be made in writing and delivered to the City at least 10 days (240 hours) before the time announced for opening the proposals. Interpretations by the City will be in the form of an addendum to the contract documents and, when issued, will be sent as promptly as is practical to all parties to whom the contract documents have been issued. All such addenda shall become part of the contract. The submission of a proposal by the bidder shall constitute the acknowledgment that if awarded the contract, the bidder has carefully reviewed the contract documents, based a bid solely on these documents, found them free of any ambiguity and sufficient for bid purposes, and has not relied on any explanations or interpretations from any other source except as provided for herein.

REV 10-30-80

REV 10-12-88

REV 08-19-91

REV 11-22-95

PART 3

LEGAL RELATIONS AND RESPONSIBILITY TO THE CITY

3-01 LAWS TO BE OBSERVED - The Contractor shall be knowledgeable of all existing and pending State and national laws and all municipal ordinances and regulations of the City, which in any manner affect those employed in the work, or the material used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having jurisdiction or authority over the same. The Contractor shall particularly observe all ordinances of the City in relation to the obstruction of streets or conduct of the work, keeping open passageways and protecting the same where they are exposed or dangerous to traffic.

3-02 SOCIAL SECURITY REQUIREMENTS - The Contractor shall furnish to the City satisfactory evidence that he/she and all subcontractors are complying with all requirements of the Federal and State Social Security legislation. The Contractor, at any time on request, shall satisfy the City that the Social Security and Withholding Tax are being properly reported and paid.

3-03 PREVAILING WAGES - In accordance with the provisions of Section 1770 et seq., of the Labor Code, the Director of the Department of Industrial Relations of the State of California has ascertained the general prevailing rate of wages applicable to the work to be done under contract for public improvement. The Contractor will be required to pay to all employees on the project sums not less than the sums set forth in the documents entitled "General Prevailing Wage Determination made by the Director of Industrial Relations pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1."

A copy of said documents is on file and may be inspected in the office of the City Engineer in Room G10 of the Beverly Hills City Hall located at 455 North Rexford Drive, Beverly Hills, California 90210.

3-04 PENALTIES - The Contractor shall comply with Labor Code Section 1775 and shall forfeit, as a penalty to the City, the sum of twenty-five (\$25.00) dollars for each calendar day or portion thereof during which the Contractor or any subcontractor has paid to any worker employed in the project an amount less than that required by the provisions of the preceding Paragraph 3-03.

3-05 PAYROLL RECORDS - The Contractor's attention is directed to Section 1776 of the Labor Code, relating to accurate payroll records, which imposes responsibility upon the Contractor for the maintenance, certification, and availability for inspection of such records for all persons employed by the Contractor or by the subcontractors in connection with the project. The Contractor shall agree through the Contract to comply with this section and the remaining provisions of the Labor Code.

3-06 WORKING HOURS - The Contractor shall forfeit, as penalty to the City, the sum of twenty-five (\$25.00) dollars for each worker employed in the execution of the contract

by the Contractor or subcontractors for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week, in violation of the provisions of Article 3, Chapter 1, Part 7, Division 2 of the Labor Code (Section 1810 et seq.).

3-07 APPRENTICES - Attention is directed to the provisions of Sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor. The Contractor and all subcontractors shall comply with the requirements of said sections in the employment of apprentices.

Information relative to apprenticeship standards and administration of the apprenticeship program may be obtained from the Department of Industrial Relations, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

3-08 COLLUSION IN BIDDING - Any collusion between bidders bidding on the work and limiting free competition in bidding, shall be considered unlawful and may prevent a Contractor who has been a party thereto from receiving payment under the contract.

3-09 REGISTRATION OF CONTRACTORS - Only a Contractor licensed in accordance with the provisions of Chapter 9, Division 3 of the Business and Professions Code shall be permitted to enter into a contract with the City for any public improvement.

3-10 PERMITS AND LICENSES - The Contractor shall procure all permits and licenses, pay all charges and fees and give all notices necessary and incidental to the due and lawful prosecution of the work.

3-11 PATENTS - The Contractor shall assume all responsibility arising from the use of any patented, or allegedly patented, materials, equipment, devices, or processes used on or incorporated in the work, and shall defend, indemnify, and hold harmless the City, and each of its officers, agents, and employees from and against any and all liabilities, demands, claims, damages, losses, costs, and expenses, of whatsoever kind or nature, arising from such use.

3-12 INDEMNITY - The Contractor agrees to defend, indemnify, and save harmless the City and each of its officers, agents, and employees, from and against any and all liabilities, demands, claims, damages, losses, costs and expenses of whatsoever kind or nature, including, but not limited to, any and all direct and indirect cost of defense (including attorney fees and court costs), made against, or incurred or suffered by, any such indemnity as a direct or indirect consequence of entering into this contract or of injury, sickness, or disease, including death, to persons or injury to, or destruction of, property, including, but not limited to, the loss of use of property, resulting directly or indirectly from, or in any manner connected with or pertaining to any and all operations, and any and all activities, omissions and conditions in any manner connected therewith or pertaining thereto, of the Contractor under the contract.

3-13 INSURANCE AND WORKER'S COMPENSATION - Contractor shall procure and maintain for the duration of the contract, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work by the Contractor, his agents, representatives, employees or subcontractors, pursuant to contractor's bid or any subsequent contract. Insurance, together with an endorsement in substantially the form set forth in Exhibit "F", attached hereto, shall be of the type, in the amounts and subject to the provisions described below.

- A. Commercial general liability coverage at least as broad as Insurance Services Office Commercial General Liability occurrence coverage ("occurrence" form CG0001, Ed. 11/88) with a limit of not less than \$2,000,000 per occurrence. If the insurance includes a general aggregate limit, that limit shall apply separately to this contract or it shall be at least twice the required per occurrence limit.
- B. Business automobile liability insurance at least as broad as Insurance Services office form CA 0001 (Ed. 12/90) covering Automobile Liability, code 1 "any auto" and endorsement CA 0029 (Ed. 12/88) with a limit not less than \$1,000,000 per accident.
- C. Workers Compensation Insurance as required by the State of California and employers liability insurance with a limit not less than \$1,000,000 per accident in substantially the form set forth in Exhibit "G", attached hereto.
- D. Evidence of Coverage:
 - 1. Prior to commencement of work under this contract, or within 10 days of notification of award of contract, whichever is shorter, Contractor shall file certificates of insurance with original endorsements evidencing coverage in compliance with this contract and in a form acceptable to City. The certificate shall be on the City's standard proof of insurance form.
 - 2. Contractor shall provide to City, on request, a complete copy, including all endorsements and riders, of any insurance policy.
 - 3. During the term of this agreement, Contractor shall maintain current valid proof of insurance coverage, with City at all times. Proof of renewals shall be filed prior to expiration of any required coverage and shall be provided on the City's standard proof of insurance form.
 - 4. Failure to submit any required evidences of insurance within the required time period shall be cause for termination for default, and shall be cause for forfeiture of this bidder's bid security, if applicable.
 - 5. In the event Contractor does not maintain current, valid evidence of insurance on file with City, City may, at its option, withhold payment of any moneys owed to Contractor, or which it subsequently owes to Contractor, until proper proof is filed.
- E. All insurance coverage shall be provided by insurers with a rating of B+; VII, or better in the most recent edition of Best's Key Rating Guide, Property-Casualty Edition.
- F. Each insurance policy shall be endorsed to state that coverage shall not be suspended, voided or canceled and shall not be reduced in coverage

or limits except after 45 days prior written notice provided to the City. Upon prior request of the carrier, the notice period may be reduced to 10 days in the event of non-payment of premium.

- G. All liability coverage shall name the City, its City Council and every officer, agent and employees of the City as additional insured with respect to work under this bid or any subsequent contract.
- H. Contractor's insurance and any insurance provided in compliance with these specifications, shall be primary with respect to any insurance or self-insurance programs covering the City, its City Council and any officer, agent or employee of City.
- I. Where available, the insurer shall agree to waive all rights of subrogation against the City, its City Council and every officer, agent and employee of City.
- J. Any deductibles or self-insured retentions shall be declared to and must be approved by City. At the option of the City, either the insurer shall reduce or eliminate the deductibles or self-insured retentions as respects the City, or the Contractor shall procure a bond guaranteeing payment of losses and expenses.
- K. In the event that Contractor does not provide continuous insurance coverage, the City shall have the right, but not the obligation, to obtain the required insurance coverage at Contractor's cost, and the City may deduct all such costs from moneys the City owes to the Contractor or from moneys which it subsequently owes the Contractor.

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PART 4

PROSECUTION AND PROGRESS OF THE WORK

4-01 WORK SCHEDULE -As soon as notified of the award of the contract, the Contractor shall prepare and submit to the City Engineer a work schedule for accomplishing the work. Said schedule must show the dates of the expected start and completion of the various items of the contract work. During a scheduling conference between the Contractor and the City Engineer, the work schedule will be discussed and modified, if necessary, by mutual agreement. The work schedule must be carefully conceived and adhered to, because it will be the basis for the contents of letters addressed to owners of property adjoining the work area, giving them an understanding of the dates on which their street will be under construction and that they may be prevented from using their driveways during the Contractor's operations. Should it become necessary for the City to delay temporarily the work schedule agreed upon during the scheduling conference, every effort will be made to permit a new work schedule at the time most convenient to the Contractor, thus permitting the project to proceed with the shortest intramural movement of equipment. The Contractor shall notify the City Engineer in all such cases, in order to arrive at a mutually satisfactory schedule.

4-02 SUBLETTING AND ASSIGNMENT - The Contractor shall give personal attention to the fulfillment of the contract and shall be in control of the work. The Contractor shall not assign, transfer nor sublet any part of the work without the written consent of the City by the City Engineer and of the Surety of the Contractor's bond, and such consent of Surety, together with a copy of the subcontract, shall be filed with the City Engineer. No assignment, transfer or subletting, even though consented to, shall relieve the Contractor of liability under the contract. Subcontractors shall not be recognized as such, and all persons engaged in the project will be considered as employees of the Contractor, their work being subject to the provisions of the contract and the specifications. Should any subcontractor fail to perform work to the satisfaction of the City Engineer, said subcontractor shall be removed immediately from the project upon request by the City Engineer and shall not again be employed on the work, and the Contractor shall be held liable for the deficient work.

The Contractor shall submit to the City a list with the names, addresses, and telephone numbers of all subcontractors, as a part of, and in addition to the requirements set forth in Paragraph 2-14 hereof.

4-03 CHARACTER OF WORKMAN -The Contractor shall employ none but competent foremen, laborers, and mechanics. Any overseer, superintendent, laborer or other person employed on the work by the Contractor who is intemperate, incompetent, troublesome, or otherwise undesirable, or who fails or refuses to perform the work in the manner specified herein, shall be discharged immediately and such person shall not again be employed on the work.

4-04 AGENTS OR FOREMAN - In the absence of the Contractor from the site of the project, even if such is only of a temporary duration, the Contractor must provide and leave at the site a competent and reliable agent or foreperson in charge. All notices, communications, orders, or instructions given, sent to, or served upon, such agent or foreperson by the City Engineer shall be considered as having been served upon the Contractor.

4-05 TEMPORARY STOPPAGE OF CONSTRUCTION ACTIVITIES - The City Engineer shall have the authority to suspend the contract work wholly or in part, for such a period of time as he may deem necessary, due to unsuitable weather, or to such other conditions as he considers unfavorable for the proper prosecution of the work, or for such time as he may deem necessary due to failure on the part of the Contractor to carry out orders or to perform any of the requirements of the contract. The Contractor shall immediately comply with such an order from the City Engineer and shall not resume operations until so ordered in writing.

4-06 TIME OF COMPLETION AND LIQUIDATED DAMAGES - If all the contract work is not completed in all parts and requirements within the time specified in the proposal form, the City shall have the right to grant or deny an extension of time for completion, as may seem best to serve the interest of the City. The Contractor shall not be assessed with liquidated damages during any delay in the completion of the work caused by acts of God or of the Public Enemy, acts of the State, fire not due to acts of contractors or subcontractors, floods, epidemics, quarantine, restrictions, strikes, freight embargo or unusually or severe weather, or delays of subcontractors due to such causes, provided that the Contractor shall, within ten (10) days from the beginning of such delay, notify the City, in writing, of the cause of the delay. The City will ascertain the facts and the extent of the delay, and the findings thereon shall be final and conclusive.

4-07 SUSPENSION OF CONTRACT - If at any time, in the opinion of the City Council, the Contractor fails to supply an adequate working force, manufactured articles, or material of proper quality, or has failed in any other respect to prosecute the work with the diligence and force specified and intended in and by the terms of the contract, notice thereof in writing will be served upon the Contractor, and should the Contractor neglect or refuse to provide means for a satisfactory compliance with the contract within the time specified in said notice and as directed by the City Engineer, City Council shall have the power to suspend the operation of the contract and discontinue all work or any part thereof. Thereupon, the Contractor shall discontinue such work, or such part thereof as the City may designate, and the City may thereupon, by contract or otherwise, as it may determine, complete the work or such part thereof, and charge the entire expense of so completing the work or any part thereof to the Contractor, and for such completion the City itself or its contractors may take possession of and use, or cause to be used in the completion of the work, or any part thereof, any such materials, implements and tools of every description as may be found at the place of such work. All expense charged under this paragraph shall be deducted and paid for by the City out of any monies then due or to become due the Contractor under the contract, or any part thereof, and in such accounting the City shall not be held to obtain the lowest figure for

the work for completing the contract, or any part thereof, or for insuring its proper completion, but all sums paid therefor shall be charged to the Contractor. In case the expenses so charged are less than a sum which would have been payable under the contract, if the same had been completed by the Contractor, the Contractor shall be entitled to receive the difference, and in case such expense shall exceed the amount payable under the contract, then the Contractor shall pay the amount of the excess to the City, upon completion of the work, without further demand being made therefor. In the determination of the question as to whether or not there has been any such noncompliance with the contract as to warrant the suspension or annulment thereof, the decision of the City Council shall be binding on all parties to the contract.

PART 5

CONTROL OF THE WORK

5-01 AUTHORITY OF THE CITY ENGINEER - The City Engineer shall decide any and all questions that may arise as to the quality and acceptability of materials furnished and work performed, as to the manner of performance and rate of progress of the work, and any and all questions which may arise as to the interpretation of the plans and specifications. The City Engineer shall likewise decide any and all questions as to the acceptable fulfillment of the contract on the part of the Contractor, and all questions as to claims and compensations. The decision of the City Engineer shall be final and he shall have relative authority to enforce and make effective such decisions and actions if the Contractor fails to carry out promptly.

5-02 CONFORMITY WITH PLANS AND ALLOWABLE VARIATION - Finished surfaces shall in all cases conform with the lines, grades, cross-sections and dimensions shown on the plans. Minor deviations from approved plans, whenever required by the exigencies of construction, shall be determined in all cases by the City Engineer and authorized in writing.

5-03 PROGRESS OF THE WORK - The Contractor shall begin work on the date agreed upon following the scheduling conference mentioned in Paragraph 4-01 hereof, and shall diligently prosecute the same to completion before the expiration of the time limit appearing in the specifications and in the proposal form.

5-04 SAMPLES - The Contractor shall furnish all products and materials required to complete the work. All materials and products must be of the specified quality and fully equal to samples, when samples are required. Whenever required, the Contractor shall submit to the City Engineer for test, and free of charge, samples of any one of the materials or products proposed to be used in the work. Said samples shall be delivered by the Contractor to the place within the City designated by the City Engineer. Rejected material must be immediately removed from the work by the Contractor and shall not again be brought back to the site.

5-05 TRADE NAMES AND ALTERNATIVES - For convenience in designation on the plans or in the specifications, certain equipment or articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalog information. The use of an alternative equipment or an article or equipment which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the approval of the City Engineer, in accordance with the following requirements.

The burden of proof as to the comparative quality and suitability of alternative equipment or articles or materials shall be upon the Contractor and he shall furnish, at his own expense, all information necessary or related thereto as required by the City

Engineer. The City Engineer shall be the sole judge as to the comparative quality and suitability of alternative equipment or articles or materials and his decision shall be final. All requests for substitution shall be submitted seven (7) days in advance of bid opening to permit, if the request is approved, an addendum to be issued to all bidders.

5-06 PROTECTION OF THE WORK - The Contractor shall continuously maintain adequate protection of all work from damage, and the City will not be held responsible for the care or protection of any material, equipment, or parts of work, except as expressly provided for in the specifications.

5-07 ACCESS TO RESIDENTS DRIVEWAYS - The Contractor shall notify residents of property adjoining the location of the work, sufficiently in advance of construction, as of the date when such construction work will start. In case of work requiring excavation of the roadway which may interfere with the use by residents of their driveways, suitable provisions shall be made by the Contractor to make it possible for residents to gain access to their driveways until such time as the exigencies of construction may demand a temporary blocking of said driveways. Efforts shall be made by the Contractor to minimize the duration of said blocking and to notify the residents of this need well in advance, thus allowing them to make suitable arrangements to keep their automobiles elsewhere.

5-08 CONFLICT OF TERMS - The notice to bidders, proposal, plans, specifications, and Standard Contractual Requirements are essential parts of the contract for a given project. These documents, together with the necessary bonds and bidder's guarantee, constitute the contract as defined herein and a requirement included in one document shall be as binding as though included in all, as they are intended to be cooperative and to provide a description of the work to be done. Should there be any conflict or discrepancy between terms used, then the specifications shall govern over the plans, and change orders and supplemental agreements shall govern over any other contract document.

Special specifications of other agencies, engineering societies or industrial associations and Standard Drawings of the City or of other agencies referred to in the specifications or on the plans shall also be considered as essential parts of the contract. Where a given specification is incorporated by reference, said reference shall apply to the latest modification, unless otherwise shown on the plans or in the specifications. Whenever an object, thing, or work of any kind is indicated only on either the plans or in the specifications, it shall be deemed that the intent was to show said item in both places, and the work shall be done in the place where it is shown. In case of doubt about the meaning of any contracting clause the interpretation shall be made by the City Engineer and shall be so accepted by the Contractor.

5-09 INTERPRETATION OF PLANS AND SPECIFICATIONS - Should it appear that the work to be done, or any matter relative thereto, is not sufficiently detailed or explained on the plans or in the specifications, the Contractor shall request the City Engineer for such further explanation as may be necessary, and shall conform to such explanation or interpretation as part of the contract, so far as may be consistent with the

intent of the original specifications. In the event of doubt or question relative to the true meaning of the specifications, reference shall be made to the City Council, whose decision thereon shall be final.

5-10 ALTERATIONS, INCREASES AND DECREASES OF WORK TO BE DONE

The City reserves the right to increase or decrease the quantity of any item or portion of the work described on the plans, the specifications, or the proposal form or to omit portions of the work so described as may be deemed necessary or expedient by the City Engineer and the Contractor shall agree not to claim or bring suit for damages, whether for loss of profits or otherwise, on account of any decrease or omission of any kind of work to be done. By mutual consent of the parties signatory to the contract, alterations, modifications or deviations from the type of work described on the plans, specifications, or on the proposal form, may be made without in any way making the contract void. The price to be paid by the City to the Contractor for such altered or modified work shall be agreed upon in writing, endorsed upon the original contract and signed by the proper parties to said contract.

Whenever, during the progress of the work, such changes or modifications are deemed necessary by the City Engineer and agreed upon, as aforesaid, said deviations shall be considered and treated as though originally contracted for, and shall be subject to all the terms, conditions and provisions of the original contract.

5-11 CHANGE ORDERS - If for any reason it may become desirable during the course of the Work to change the alignment, dimensions or design of the Work, the City reserves the right to issue change orders in writing to give effect to such changes as may be necessary or desirable. The changes may or may not result in a change in the amount of Work. When the Contractor considers that any change order in writing by the City involves extra work, the Contractor shall immediately notify the City in writing as to when and where extra work is to be performed and shall make claim for compensation therefor each month not later than the first day of the month following that in which the work claimed as extra work was performed. If the changes do, in the opinion of the City, change the amount of Work, the Contract Price shall be adjusted as "extra work", pursuant to Section 6-01.

New and unforeseen work will be classed as extra work only when said work is not covered and cannot be paid for under any of the various items or combination of items for which a bid price appears on the proposal form. The Contractor shall not do any extra work except upon written order from the City Engineer. Compensation for such extra work shall be previously agreed upon in writing between the Contractor and the City Engineer.

5-12 LINES AND GRADES - Except when, as per orders from the City Engineer, minor changes in the work are to be made by the Contractor, all work shall, during its progress and upon completion, conform to the lines, grades and elevations shown on the plans. All distances and measurements are given thereon and will be made in a horizontal plane. Three consecutive points shown on the same rate of slope must be used in common in order to detect any variation from a straight line, and in case any such

discrepancy exists, it must be reported to the City Engineer. Failure to make this report shall make the Contractor responsible for any error in the finished work.

5-13 GRADE STAKES - The Contractor shall give at least twenty-four (24) hours' notice in writing prior to requiring the services of the City Engineer for laying out any portion of the work, and shall dig all holes necessary for line and grade stakes. The Contractor shall preserve all stakes set for the lines, grades or measurements of the work in their proper place until authorized to remove them by the City Engineer. Any expense incurred in replacing said stakes as the Contractor may have failed to preserve shall be borne by the Contractor.

5-14 PROTECTION OF SURVEY MONUMENT - All survey monuments existing along the portions of any street where work is to be done shall be carefully protected and preserved by the Contractor. Any displacement or damage to said monuments resulting from carelessness in spotting their location during the progress of the work or from negligent use of equipment in their vicinity shall be corrected by the Contractor at the Contractor's expense.

5-15 PUBLIC UTILITIES - In case it should be necessary to remove the property of a public utility or franchise, such owner will, upon proper application by the Contractor, be notified by the City Engineer to move such property within a reasonable time and the Contractor shall not interfere with said property until after the expiration of the time specified. The right is reserved to the owners of public utilities or franchises to enter upon the streets for the purpose of making repairs or changes in their property which may be necessary as a result of the work. Employees of the City shall likewise have the privilege of entering upon the streets for the purpose of making any necessary repairs or replacements.

5-16 UNIDENTIFIED EXISTING UTILITIES - The City shall be responsible for the timely removal, relocation or protection of existing main or trunk line utility facilities located on the site, if such utilities are not identified by the City in the plans and specifications made a part of the invitation for bids. The Contractor will be compensated by the City for the costs of locating repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications, with reasonable accuracy, and for equipment on the project necessarily idled during such work.

The Contractor shall not be assessed for liquidated damages for delay in completion of the project, when such delay was caused by failure of the City or owner of the utility to provide for removal or location of such utility facilities. This shall not be deemed to require the City 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 side of the construction; provided, however, nothing herein shall relieve the City from identifying main or trunk lines in the plans and specifications. If the Contractor performing services required under the contract discovers utility facilities not identified by the City in the contract plan and specifications, the Contractor shall

immediately notify the City and the utility in writing. The City, if it is the owner of the public utility shall have the sole discretion to perform repairs or relocation work or permit the contractor to do such repairs or relocation at a reasonable price.

5-17 REMOVAL OF INTERFERING OBSTRUCTIONS -The Contractor shall remove and dispose of all debris, abandoned structures, tree roots, and obstructions of any character met during the process of excavation, it being understood that the cost of said removals are made a part of the unit price bid by the Contractor under the item for excavation or removal of existing work.

5-18 PROCEDURE IN CASE OF DAMAGE TO ADJOINING WORK - Any portions of adjoining curb, gutter, sidewalk or any other City improvements damaged by the Contractor during the course of construction shall be replaced by the Contractor at the Contractor's expense, free of all charges to the City. The cost of additional replacement of curb, gutter or sidewalk in excess of the estimated quantities shown in the proposal form and specifications, and found necessary during the process of construction, (but not due to damage resulting from carelessness on the part of the Contractor during operations), shall be paid to the Contractor at the unit prices submitted in the bid.

5-19 AVOIDANCE OF PATCHWORK APPEARANCE - New PCC work shall conform in grade, finish and color to the adjoining portions. Any sections of said work having a patchwork appearance will be rejected by the City Engineer and the Contractor shall replace them at the Contractor's expense. To insure a neat break line between existing and new portions of PCC work, the Contractor will be required to use a concrete cutting saw of a type approved by the City Engineer. The cost of saw cutting shall be included by the Contractor in the unit prices bid for removal of existing work. Likewise, whenever adjoining PCC work is damaged during the process of new construction, the damaged portions shall be removed in such a way that a neat, straight joint is provided between the new portions and existing work.

5-20 CARE OF GUTTERS ADJACENT TO AREAS TO BE PAVED - During the process of resurfacing the roadways or construction of new pavement, the Contractor shall exercise particular care to remove all excess resurfacing material which may be deposited upon the PCC gutters. Whenever specifications call for the resurfacing material to overlap the existing gutters the overlapping portions shall not exceed the dimensions shown on the plans and a wavy overlapping line shall be avoided. Any undulation of the overlapping line accidentally resulting from the application of the paving or resurfacing material shall be corrected by the Contractor before the work is accepted by the City Engineer.

5-21 DEPTH OF THE REQUIRED EXCAVATION - When the contract work requires excavation and removal of existing pavement and excess of underlying soil, these materials shall be removed to the depth shown on the plans. Whenever the subgrade exposed after the removal of the excess underlying soil is found to be of the desirable kind, excavation need not proceed below the depth specified on the plans. However, if the excavation discloses the fact that there is mud or any other soft material in the subgrade, said material shall be removed to a minimum depth of six inches (6"), at the

discretion of the City Engineer. Backfill of the additional excavated portions shall be made with select material removed from other portions of the work, provided said material is found suitable by the City Engineer. The volume in place of the additional soil excavation will be determined by the field representatives of the City Engineer, and the Contractor will be entitled in this case to extra payment based on the additional number of cubic yards excavated, at the unit price bid under the item for excavation in the proposal form. Should imported material be required for the backfill, the unit cost per cubic yard of said imported material shall be agreed in advance, in writing, between the Contractor and the City Engineer, and extra payment for said material will be made to the Contractor for the actual volume used, as verified in the field by representatives of the City Engineer.

5-22 SEQUENCE OF THE WORK OF EXCAVATION - Whenever the contract work calls for excavation of existing pavement and excess soil and for construction of base material, the process of excavation shall be conducted by the Contractor so that, at the end of any working day, the area where excavation is proceeding shall not be more than 300 feet in advance of the area where the untreated rock base over sections already excavated is being laid, unless otherwise indicated in the specifications.

5-23 AVOIDANCE OF DUST NUISANCE - During the process of breaking, excavating and removing any material from the site of the project and until completion of the work, the Contractor shall take every precaution to avoid the nuisance of unnecessary dust by using any measures advocated by the City Engineer.

5-24 MAINTENANCE OF TRAFFIC AND SAFETY REQUIREMENT - Any Contractor performing work in a street right-of-way shall conduct operations so as to cause the least possible obstruction and inconvenience to public traffic and safety, and shall take all necessary measures to maintain an adequate traffic flow, to prevent accidents and to protect the site of the work. During construction the Contractor shall, as far as practicable, keep the project free of rubbish and debris and in as clean a condition as possible.

A suitable width of any intersecting street shall be kept in reasonably good condition for traffic, including the necessary provisions for proper drainage. Should the requirements of construction demand closing the full width of an intersection, such closing shall be allowed only after the Contractor has secured permission from the City Engineer and the duration of the closing must be for the minimum length of time possible. After said permission is granted, the Contractor shall make the necessary arrangements to provide temporary crossings, or to reroute traffic away from said intersection and provide and maintain barriers, guards, directional signs, watchpersons, and lights at all detour points, in order to give adequate warning to the public at all times that the streets are under construction and of the dangerous conditions as a result thereof. The Contractor shall also erect and maintain such additional warning and directional signs as may be furnished by the City.

5-25 BARRIERS, LIGHTS, ETC. - The above-mentioned barriers, safety lights, warning and regulatory signs, guards, temporary crossovers, and watchpersons shall also be

provided and maintained by the Contractor at the Contractor's expense over all portions of the work during construction and until completion. Provisions shall be made by the Contractor to insure operation of the safety lights throughout the evenings without interruption. No safety lights using the inflammable liquids shall be permitted during the progress of the work, and only electric battery operated safety lamps will be approved for this purpose.

5-26 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK - It is the intent of the specifications that only first class work, materials, and workmanship will be acceptable. All work which is defective in its construction or deficient in any of the requirements of the specifications shall be remedied, or removed and replaced by the Contractor in an acceptable manner, and no compensation will be allowed for such correction. Any work done beyond the lines shown on the plans or established by the City Engineer, or any extra work done without written authority will be considered as unauthorized and will not be paid for. Upon failure on the part of the Contractor to comply forthwith with any order of the City Engineer made under the provisions of this paragraph, the City Engineer shall have authority to cause defective work to be remedied or removed and replaced, and unauthorized work to be removed, and to deduct the costs thereof from any monies due or to become due the Contractor. If the work is found to be in compliance with these specifications, the City Engineer will furnish the Contractor with a certificate to that effect.

5-27 SUPERVISION - All manufactured products, materials, and appliances used and installed and all details of the work done shall at all times be subject to the supervision, test, and approval of the City Engineer or his authorized representatives. The City Engineer or his authorized representatives shall have access to the work at all times during construction, and shall be furnished with every reasonable facility for securing full knowledge with regard to the progress, workmanship and character of the materials used or employed in the work.

5-28 INSPECTORS - The Contractor shall prosecute work only in the presence of Inspectors appointed by the City Engineer and any work done in the absence of said Inspectors will be subject to rejection. All instructions given to the Contractor by such assistants shall be regarded as having been given directly by the City Engineer. The Contractor shall make a written application for an Inspector at least twenty-four (24) hours before his services are required on the work. Whenever the cost of an improvement or the cost of any portion thereof is defrayed from the Gas Tax Funds allocated to the City by the County of Los Angeles, or by the State of California, Inspectors appointed by the State or County shall likewise be given full access to the site of the work in order that they may perform their inspection duties efficiently and without interference. The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the contract as prescribed. Defective work shall be made good and unsuitable materials rejected, notwithstanding the fact that such defective work and unsuitable materials may have been previously overlooked by the Inspectors and accepted or estimated for payment.

5-29 FINAL CLEANING UP - Upon completion of the project and before making

application to the City Engineer for acceptance of the work, the Contractor shall clean all the streets and grounds occupied by him in connection with the project, of all rubbish, debris, excess material, temporary structures and equipment, leaving the entire site of the work in a neat presentable condition.

5-30 LOSS OR DAMAGE - Any loss or damage arising from any omission or act of the Contractor or any agent or person employed by him or by any action which had not been authorized in the provisions of the specifications, shall be sustained by the Contractor.

PART 6

MEASUREMENT AND PAYMENT

6-01 EXTRA WORK - Extra work as hereinbefore defined, when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made at the unit price or lump sum previously agreed upon between the Contractor and prepared by the City Engineer. All extra work shall be adjusted daily upon report sheets prepared by the City Engineer, furnished to the Contractor, and signed by both parties, and said daily reports shall be considered thereafter the true record of extra work done.

6-02 PAYMENTS - Monthly payments will be made to the Contractor in amounts equal to ninety percent (90%) of the value of all work done during the preceding calendar month, calculated at the unit price bid by the Contractor for the work and on the basis of the percentage of work performed, as estimated by the representative of the City Engineer, it being understood that the sums thus figured to be due the Contractor will become payable thirty (30) days after the approval and acceptance of said estimate by the City Engineer. The Contractor shall submit an invoice for all payments requested. No such estimate of work done or payment to be made shall be required when, in the judgment of the City Engineer, the work is not proceeding in accordance with the provisions of the contract, or when the total value of the work done since the beginning of the project or since the preceding monthly payment is estimated to amount to less than three hundred (\$300.00) dollars.

After completion of the project, the City Engineer will make a final inspection of its site and, if the work is found satisfactory, he will recommend the official approval of the contract work. The City Engineer will also make a final estimate of the actual amount of work done on each item appearing on the proposal form, including extra work, if any, and of the value of such work, and the City will pay the entire sum so found to be due after deducting therefrom all previous payments and ten percent (10%) to be retained. All previous partial estimates shall be subject to correction in the final estimate and payment. The ten percent (10%) retained shall not be due and payable until the Notice of Completion of the project has been filed by the City Clerk with the Los Angeles County Recorder and until after the expiration of thirty-five (35) days after the date of the official approval of the work by the City Council.

In accordance with Government Code Section 4590, the Contractor will be paid the amount of any funds retained by the City, if the Contractor so requests in writing, and the Contractor provides to the Director of Finance Administration a bank or savings and loan certificate of deposit or a security as described in Government Code Section 16430 in the amount equivalent to the amount withheld as determined by the Director of Finance Administration. In lieu of providing such securities to the Director of Finance Administration, the Contractor may deposit such security with a state or federally

chartered bank as an escrow agent, said escrow agreement to be satisfactory to the City Attorney. The escrow shall provide that payment of the funds shall not be made to the Contractor until satisfactory completion of the contract as provided in this Section above and shall include the satisfaction of any Stop Notices filed as provided by law and the satisfaction by the Contractor assessed against the Contractor as provided for herein. Any such security shall be provided by the Contractor at the sole expense of the Contractor and the Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest therein. To cover the expenses of the City in processing any request by Contractor for payment of funds retained pursuant to this subsection, Contractor shall pay City the amount of One Hundred (\$100.00) Dollars for processing the first application for withdrawal of funds retained and the amount of Fifty (\$50.00) Dollars for each additional withdrawal of funds retained.

It shall be mutually agreed between the parties to the contract that no certificate given, with the exception of the certificate of final payment, shall be conclusive evidence of the faithful performance of the contract, either in whole or in part, and that no payment shall be construed to be in acceptance of any defective work or improper materials.

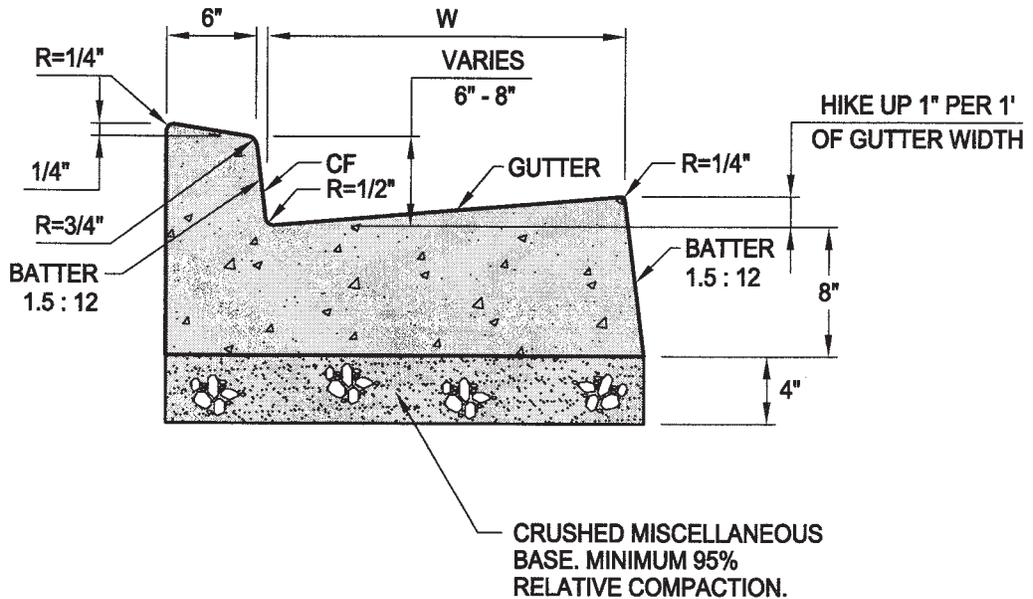
PUBLIC WORKS DEPARTMENT
CITY OF BEVERLY HILLS

REV 01-22-82
REV 12-10-86
REV 08-19-91
STDCREQ

APPENDIX A

Section I

Street Improvements



**NON-RESIDENTIAL
INTEGRAL CURB AND GUTTER SECTION**

NOT TO SCALE

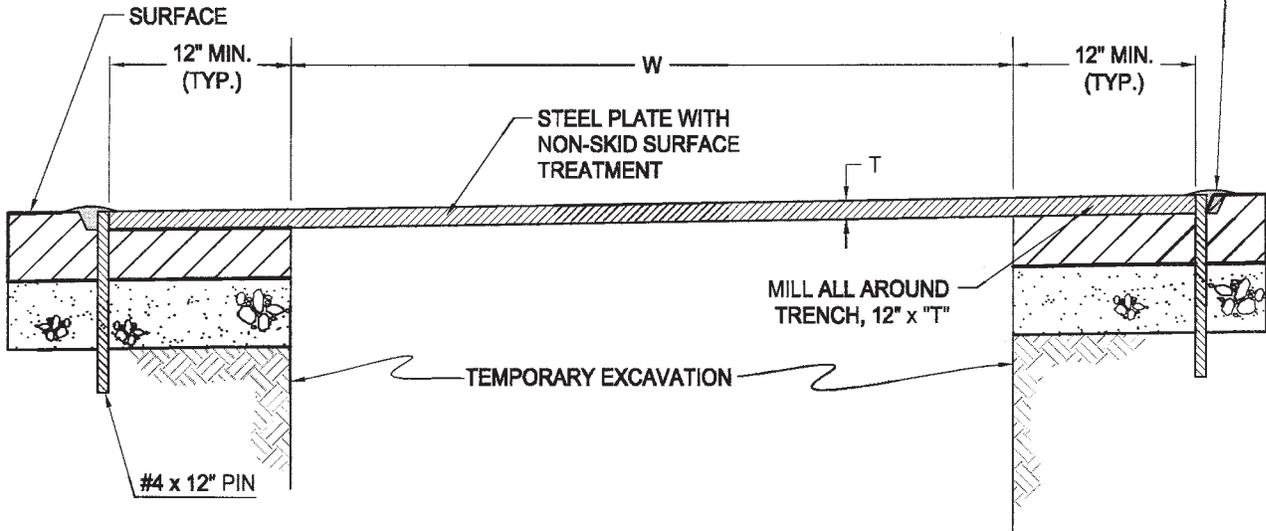
NOTES:

1. CURB AND GUTTER SHALL BE CONSTRUCTED OF CLASS 520-C-2500 PCC.
2. GUTTER WIDTH, W, SHALL MATCH EXISTING OR 24" MINIMUM, UNLESS OTHERWISE SPECIFIED.
3. AFTER THE CONCRETE HAS BEEN THOROUGHLY TAMPED TO FORCE THE LARGER AGGREGATE INTO THE CONCRETE AND BRING TO THE TOP SUFFICIENT FREE MORTAR FOR FINISHING, THE SURFACE SHALL BE WORKED TO A TRUE AND EVEN GRADE BY MEANS OF A FLOAT, TROWELED WITH A LONG HANDLED TROWEL OR "FRESNO", AND WOOD-FLOAT FINISHED. THE FLOWLINE OF THE GUTTER SHALL BE TROWELED SMOOTH FOR A WIDTH OF 4 INCHES FOR INTEGRAL CURB AND GUTTER. SIDE FORMS SHALL REMAIN IN PLACE FOR AT LEAST 24 HOURS AFTER COMPLETION OF THE GUTTER, BUT MUST BE REMOVED BEFORE THE WORK WILL BE ACCEPTED.
4. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION ("GREENBOOK").
5. CONTRACTOR SHALL HAVE A VALID CLASS "A" OR "C8" CALIFORNIA CONTRACTOR'S LICENSE.

NON-RESIDENTIAL INTEGRAL CURB AND GUTTER DETAIL

REVISIONS				CITY OF BEVERLY HILLS, CALIFORNIA		STANDARD DRAWING
MARK	DATE	DESCRIPTION		DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION		
				RECOMMENDED <i>[Signature]</i>	DATE 7-30-09	BH 107 SHEET 1 OF 1
				APPROVED <i>[Signature]</i>	DATE 7-31-09	

TEMPORARY PAVING OR COLD-MIX ASPHALT CONCRETE (CUTBACK) PLACED AROUND ALL EDGES OF PLATE AND ROAD SURFACE. USE WEDGES TO PREVENT RATTLING.



"W" TRENCH WIDTH	"T" MINIMUM STEEL PLATE THICKNESS
≤ 3' - 0"	1 INCH
> 3' - 0", UP TO 4' - 0"	1-1/4 INCH

NOTES:

1. ALL STEEL TRENCH PLATES SHALL BE FULLY SUPPORTED AROUND THE PERIMETER TO PREVENT TIPPING.
2. TRENCHES AND EXCAVATIONS SHALL BE ADEQUATELY SHORED OR BRACED TO WITHSTAND HIGHWAY TRAFFIC LOADS.
3. WHEN TWO OR MORE PLATES ARE USED, THE PLATES SHALL BE TACK WELDED AT EACH CORNER OR AS REQUIRED BY THE CITY ENGINEER.
4. ALL TRENCH PLATES SHALL BE PINNED IN EACH CORNER WITH PINS MADE OF #4 REBAR, OR EQUIVALENT DIAMETER STEEL ROD, WITH A MINIMUM LENGTH OF 12"
5. ALL TRENCH PLATING SHALL BE DESIGNED FOR HS20-44 TRUCK LOADING.
6. FOR TRENCHES AND EXCAVATIONS WITH SPANS GREATER THAN FOUR FEET (4'), A STRUCTURAL DESIGN SHALL BE PREPARED BY A REGISTERED CIVIL OR STRUCTURAL ENGINEER AND REVIEWED BY THE CITY.
7. TRENCH PLATES SHALL BE USED WHEN TRENCH WORK CAN NOT BE COMPLETED WITHIN THE SAME WORKING DAY TO MAINTAIN ALL VEHICULAR, BICYCLE AND PEDESTRIAN TRAFFIC FLOW.
8. CONTRACTOR SHALL HAVE A VALID CLASS "A" OR "C8" CALIFORNIA CONTRACTOR'S LICENSE.

STEEL PLATE FOR OPEN TRENCH DETAIL

REVISIONS		
MARK	DATE	DESCRIPTION

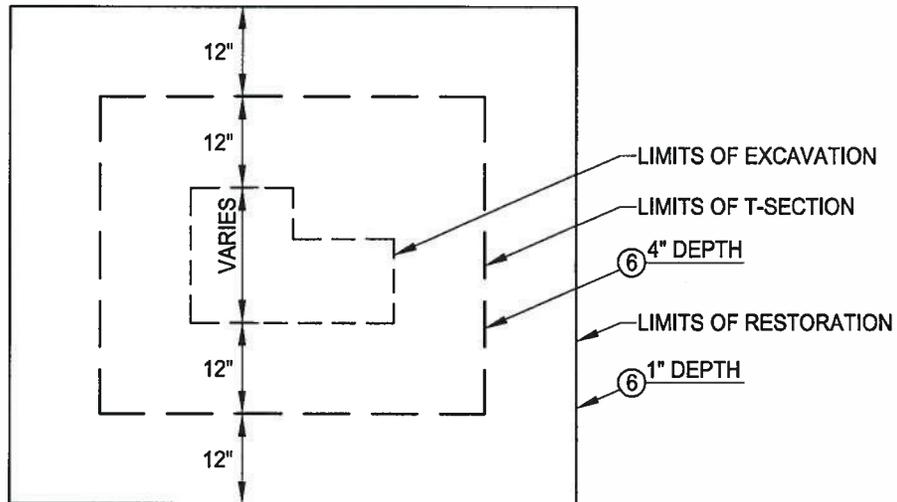


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 DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
 CIVIL ENGINEERING DIVISION

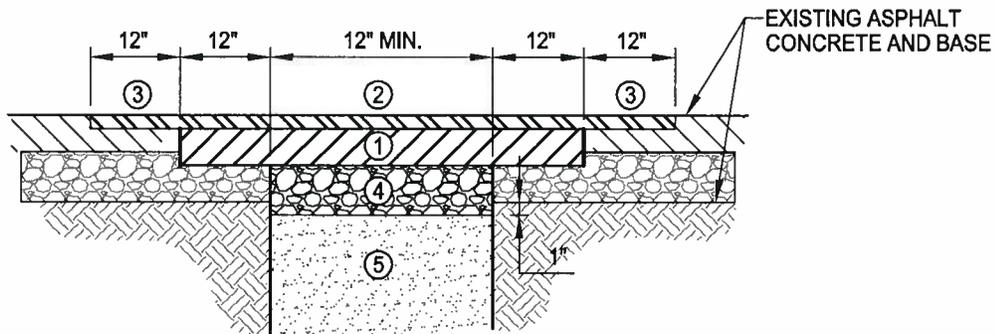
RECOMMENDED *[Signature]* DATE 7-30-09
CITY ENGINEER

APPROVED *[Signature]* DATE 7-31-09
PUBLIC WORKS DIRECTOR

STANDARD DRAWING
BH 113
 SHEET 1 OF 1



CASE I - PLAN



CASE I - EXISTING SECTION: ASPHALT CONCRETE

- ① CONSTRUCT NEW ASPHALT CONCRETE BASE COURSE, TYPE B, PG 64-10, 1" THICKER THAN THE EXISTING SECTION.
- ② CONSTRUCT NEW ASPHALT CONCRETE WEARING COURSE:

TYPES OF STREETS	DEPTH	ASPHALT CONCRETE
LOCAL RESIDENTIAL STREETS	1"	TYPE D2, PG-64-10
STREETS WITH RUBBERIZED ASPHALT	2" MIN	ARHM-GG PG-64-16
COLLECTOR/MAJOR STREETS	1-1/2"	TYPE C2, PG-64-10

① AND ②: THE TOTAL THICKNESS OF ① + ② SHALL BE 4" MINIMUM FOR LOCAL OR COLLECTOR STREETS AND 6" MINIMUM FOR MAJOR STREETS. ASPHALT CONCRETE LAYERS SHALL BE COMPACTED TO 95% OF MAXIMUM THEORETICAL SPECIFIC GRAVITY.

PAVEMENT REPLACEMENT SECTION - CASE I

REVISIONS		
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CITY OF BEVERLY HILLS, CALIFORNIA

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CIVIL ENGINEERING DIVISION

RECOMMENDED

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CITY ENGINEER

DATE 11/18/2011

APPROVED

[Signature]
PUBLIC WORKS DIRECTOR

DATE 11-18-11

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BH 114

SHEET 1 OF 4

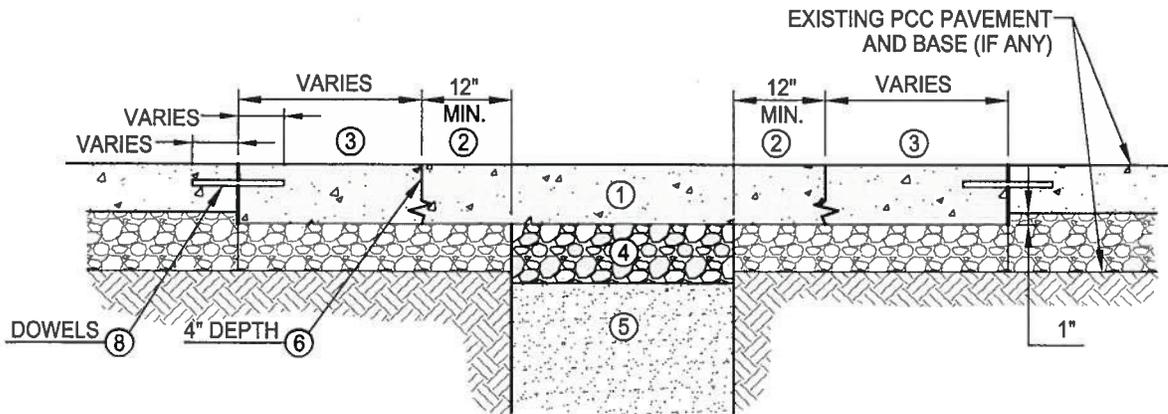
- ③ A. THE LIMITS OF THE RESTORATION SHALL BE A RECTANGULAR AREA EXTENDING A MINIMUM OF 12" BEYOND THE OUTER EDGE OF THE WIDEST PORTION OF THE T-SECTION. THE LIMITS SHALL BE SAWCUT AFTER BACKFILL OF TRENCH IS COMPLETED. THE EXISTING A.C. SHALL BE REMOVED TO A DEPTH EQUAL TO THE THICKNESS OF THE WEARING COURSE. REMOVAL BY COLD MILLING OR PNEUMATIC HAMMER IS ACCEPTABLE. IF THE REMOVALS ARE LESS THAN 5' APART OR LESS THAN 2' FROM A CONCRETE CURB, GUTTER OR CROSS GUTTER, THE RESTORATION SHALL BE CONTINUOUS BETWEEN EXCAVATIONS AND/OR THE EDGE OF THE CONCRETE.
- ④ CONSTRUCT NEW CRUSHED AGGREGATE BASE TO MATCH EXISTING THICKNESS OR 4" THICKNESS, WHICHEVER IS GREATER. COMPACT TO 95% OF RELATIVE DENSITY.
- ⑤ TRENCH BACKFILL SHALL BE EITHER:
 - A. NATIVE MATERIAL OR IMPORTED SOIL (IF NATIVE IS UNSUITABLE)
 - B. CRUSHED AGGREGATE BASE
 - C. TWO SACK CEMENT SAND SLURRY

COMPACTION TEST (USING CITY APPROVED METHOD) ARE REQUIRED UNLESS SLURRY IS USED.
- ⑥ SAWCUTTING WILL BE REQUIRED AROUND THE PERIMETER OF THE FINAL EDGE OF ALL EXCAVATIONS TO PROVIDE CLEAN, STRAIGHT, VERTICAL SIDES.
- 7. T-SECTIONS ARE 12" WIDE AS MEASURED FROM THE FINAL EDGE OF TRENCH (AFTER SLUFFING).
- 8. ALL TRAFFIC STRIPING AND/OR MARKINGS REMOVED BY RESTORATION WORK SHALL BE REPLACED.
- 9. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS ("GREENBOOK").
- 10. CONTRACTOR SHALL HAVE A VALID CLASS "A" OR "C8" CALIFORNIA CONTRACTOR'S LICENSE.

PAVEMENT REPLACEMENT SECTION - CASE I

REVISIONS				CITY OF BEVERLY HILLS, CALIFORNIA	
MARK	DATE	DESCRIPTION		DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION	

RECOMMENDED	 <small>CITY ENGINEER</small>	DATE <u>11/18/2011</u>	STANDARD DRAWING
APPROVED	 <small>PUBLIC WORKS DIRECTOR</small>	DATE <u>11-18-11</u>	BH 114
			SHEET 2 OF 4



CASE II - EXISTING SECTION: PORTLAND CONCRETE CEMENT

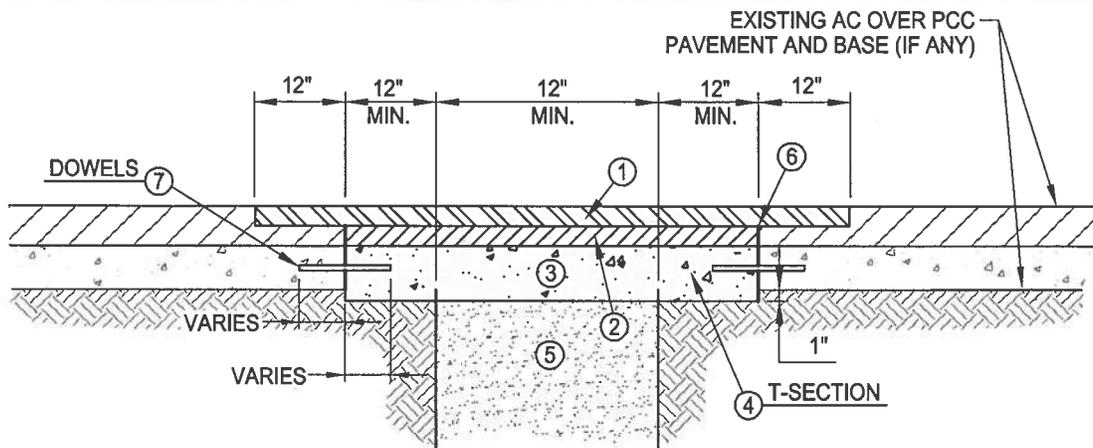
- ① CONSTRUCT NEW PCC PAVEMENT 1" THICKER THAN THE EXISTING CONCRETE, 6" MINIMUM.
- ② THE EXACT LIMITS FOR REMOVAL SHALL BE DETERMINED BY THE CITY ENGINEER SUCH THAT JOIN LINES ARE NOT WITHIN 2'-6" OF EXISTING PAVEMENT JOINTS OR SIGNIFICANT CRACKS. IF THE EXCAVATIONS ARE LESS THAN 5' APART OR LESS THAN 2'-6" FROM A CONCRETE CURB, GUTTER OR EXPANSION JOINT, THE RESTORATION SHALL BE CONTINUOUS BETWEEN EXCAVATIONS AND/OR THE EDGE OF CONCRETE.
- ③ FOR PCC STREETS OR INTERSECTIONS THE LIMITS OF THE RESTORATION SHALL BE A RECTANGULAR AREA EXTENDING TO THE NEAREST CONSTRUCTION JOINT. THE STRUCTURAL SECTION OUTSIDE THE UTILITY TRENCH AREA SHALL BE EQUAL TO ① + ④.
- ④ CONSTRUCT NEW CRUSHED AGGREGATE BASE TO MATCH EXISTING THICKNESS OR 4" THICKNESS, WHICHEVER IS GREATER. COMPACT TO 95% OF RELATIVE DENSITY.
- ⑤ TRENCH BACKFILL SHALL BE EITHER:
 - A. NATIVE MATERIAL OR IMPORTED SOIL (IF NATIVE IS UNSUITABLE)
 - B. CRUSHED AGGREGATE BASE
 - C. TWO SACK CEMENT SAND SLURRY
 COMPACTION TEST (USING CITY APPROVED METHOD) ARE REQUIRED UNLESS SLURRY IS USED.
- ⑥ SAWCUTTING WILL BE REQUIRED AROUND THE PERIMETER OF THE FINAL EDGE OF ALL EXCAVATIONS TO PROVIDE CLEAN, STRAIGHT, VERTICAL SIDES.
- ⑦ DOWEL SIZE, SPACING, AND EMBEDMENT SHOULD BE AS FOLLOWS:

CONCRETE THICKNESS	SIZE AND SPACING	EMBEDMENT
6"	#4 @ 16" O.C.	4"
8"	#5 @ 16" O.C.	6"
10"	#6 @ 16" O.C.	8"

- 8. ALL TRAFFIC STRIPING AND/OR MARKINGS REMOVED BY RESTORATION WORK SHALL BE REPLACED.
- 9. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS ("GREENBOOK").
- 10. CONTRACTOR SHALL HAVE A VALID CLASS "A" OR "C8" CALIFORNIA CONTRACTOR'S LICENSE.

PAVEMENT REPLACEMENT SECTION - CASE II

REVISIONS				CITY OF BEVERLY HILLS, CALIFORNIA	
MARK	DATE	DESCRIPTION		DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION	
			RECOMMENDED	 CITY ENGINEER	DATE 11/18/2011
			APPROVED	 PUBLIC WORKS DIRECTOR	DATE 11-18-11
STANDARD DRAWING					BH 114
SHEET 3 OF 4					



CASE III - EXISTING SECTION: ASPHALT OVER CONCRETE

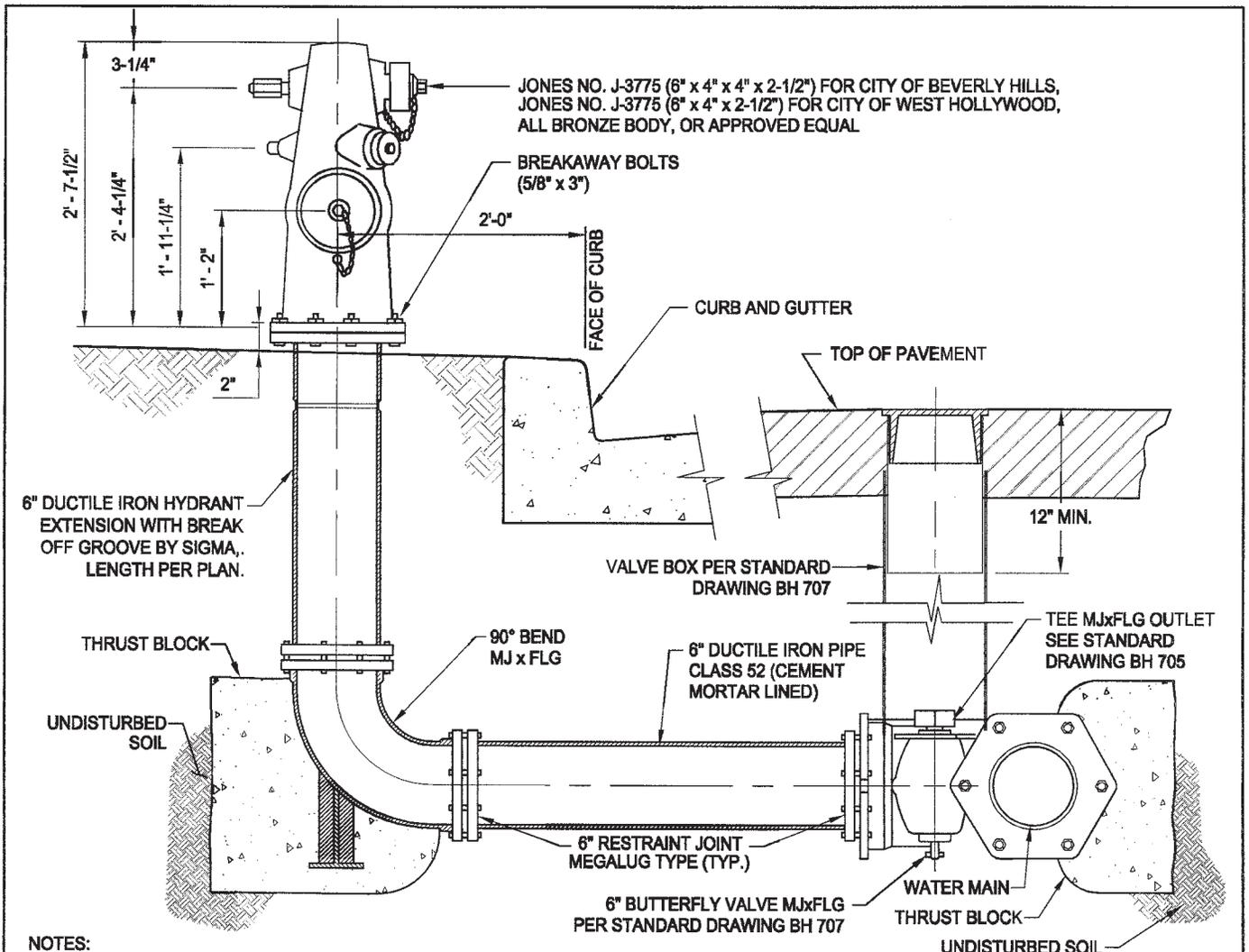
- ① CONSTRUCT 1" NEW ASPHALT CONCRETE WEARING COURSE TYPE D2, PG 64-10. FOR STREETS WITH RUBBERIZED ASPHALT USE ARHM-GG PG-64-16, 2" MIN.
- ② CONSTRUCT NEW ASPHALT CONCRETE BASE COURSE, TYPE B, PG 64-10.
- ③ CONSTRUCT NEW PCC PAVEMENT BASE, 560-C-3250, 1" THICKER THAN THE EXISTING CONCRETE, 6" MINIMUM. ASPHALT CONCRETE LAYERS SHALL BE COMPACTED TO 95% OF MAXIMUM THEORETICAL SPECIFIC GRAVITY.
- ④ THE EXACT LIMITS FOR REMOVAL SHALL BE DETERMINED BY THE CITY ENGINEER SUCH THAT JOIN LINES ARE NOT WITHIN 2'-6" OF EXISTING PAVEMENT JOINTS OR SIGNIFICANT CRACKS. IF THE EXCAVATIONS ARE LESS THAN 5' APART OR LESS THAN 2'-6" FROM A CONCRETE CURB, GUTTER OR EXPANSION JOINT, THE RESTORATION SHALL BE CONTINUOUS BETWEEN EXCAVATIONS AND/OR THE EDGE OF CONCRETE.
- ⑤ TRENCH BACKFILL SHALL BE EITHER:
 - A. NATIVE MATERIAL OR IMPORTED SOIL (IF NATIVE IS UNSUITABLE)
 - B. CRUSHED AGGREGATE BASE
 - C. TWO SACK CEMENT SAND SLURRY
 COMPACTION TEST (USING CITY APPROVED METHOD) ARE REQUIRED UNLESS SLURRY IS USED.
- ⑥ SAWCUTTING WILL BE REQUIRED AROUND THE PERIMETER OF THE FINAL EDGE OF ALL EXCAVATIONS TO PROVIDE CLEAN, STRAIGHT, VERTICAL SIDES.
- ⑦ DOWEL SIZE, SPACING, AND EMBEDMENT SHOULD BE AS FOLLOWS:

CONCRETE THICKNESS	SIZE AND SPACING	EMBEDMENT
6"	#4 @ 16" O.C.	4"
8"	#5 @ 16" O.C.	6"
10"	#6 @ 16" O.C.	8"

8. ALL TRAFFIC STRIPING AND/OR MARKINGS REMOVED BY RESTORATION WORK SHALL BE REPLACED.
9. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS ("GREENBOOK").
10. CONTRACTOR SHALL HAVE A VALID CLASS "A" OR "C8" CALIFORNIA CONTRACTOR'S LICENSE.

PAVEMENT REPLACEMENT SECTION - CASE III

REVISIONS			 CITY OF BEVERLY HILLS, CALIFORNIA DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION	STANDARD DRAWING BH 114 SHEET 4 OF 4
MARK	DATE	DESCRIPTION		
			RECOMMENDED  DATE <u>11/18/11</u> <small>CITY ENGINEER</small>	
			APPROVED  DATE <u>11-18-11</u> <small>PUBLIC WORKS DIRECTOR</small>	



NOTES:

1. HYDRANT OUTLETS SHALL FACE THE STREET AT 45° OR AS DIRECTED BY THE CITY ENGINEER.
2. FINAL HYDRANT LOCATION TO BE DETERMINED BY THE CITY ENGINEER.
3. CONNECTION OF THE FIRE HYDRANT TO THE WATER MAIN MAY REQUIRE FITTING AND COUPLINGS NOT SHOWN HEREON. THE CONTRACTOR SHALL PROVIDE AND INSTALL AT NO EXTRA COST.
4. BREAKAWAY BOLTS SHALL BE USED TO INSTALL THE HYDRANT HEAD ON THE BURY.
5. THRUST BLOCKS SHALL BE PLACED PER STANDARD DRAWING BH 709 OR AS DIRECTED BY THE CITY ENGINEER.
6. FIRE HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.
7. ALL HYDRANTS WATER OUTLET CAP MATERIAL SHALL BE BRONZE.
8. ALL FITTINGS USED TO CONNECT THE FIRE HYDRANT TO THE WATER MAIN SHALL BE PROPERLY RESTRAINED WITH APPROVED STANDARD METHODS OR AS DIRECTED BY THE CITY ENGINEER.
9. TRENCHES WITHIN THE ROADWAY FOR LATERAL INSTALLATIONS OR REMOVALS SHALL BE BACKFILLED WITH A SAND SLURRY MIX AS DIRECTED BY THE CITY ENGINEER.
10. EXPOSED BOLT AND NUT ASSEMBLIES ON FLEXIBLE COUPLINGS AND/OR MECHANICAL JOINT FITTINGS SHALL BE COATED WITH TAR BITUMASTIC ENAMEL PRIOR TO BACKFILL.
11. SURFACE CONDITIONS SHALL BE RESTORED TO THE SATISFACTION OF THE CITY ENGINEER.

FIRE HYDRANT ASSEMBLY (TYPICAL)

REVISIONS		
MARK	DATE	DESCRIPTION

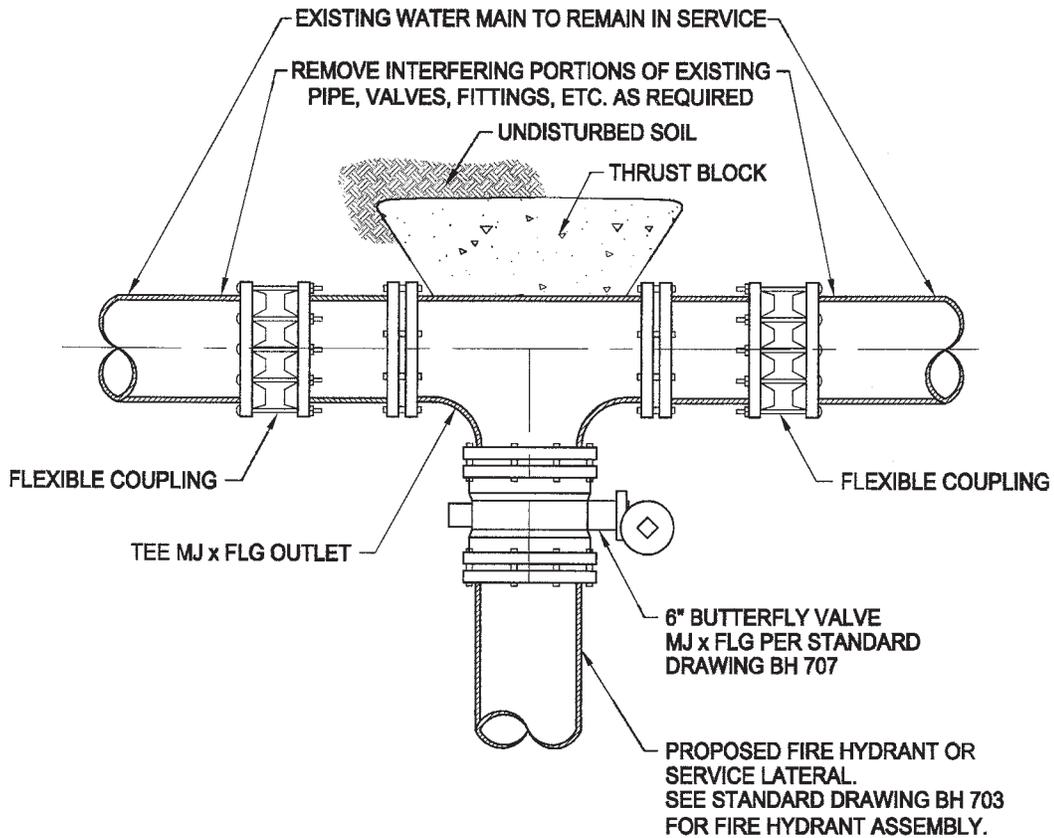


CITY OF BEVERLY HILLS, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
CIVIL ENGINEERING DIVISION

RECOMMENDED *Christina* DATE 7-30-09
CITY ENGINEER

APPROVED *[Signature]* DATE 7-31-09
PUBLIC WORKS DIRECTOR

STANDARD DRAWING
BH 703
SHEET 1 OF 1



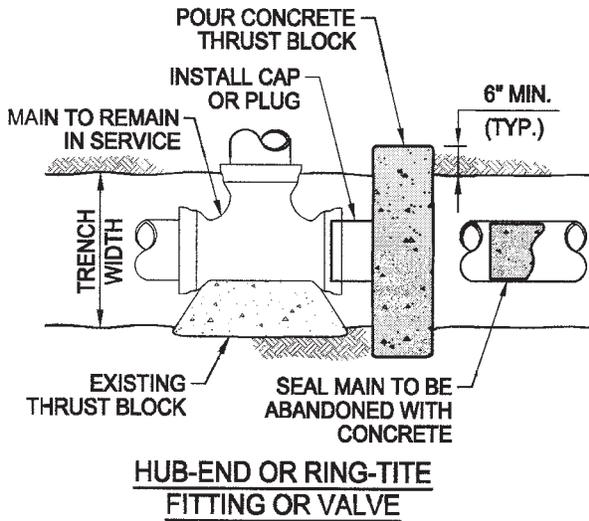
NOTES:

1. THRUST BLOCKS SHALL BE PLACED PER STANDARD DRAWING BH 709 OR AS DIRECTED BY THE CITY ENGINEER.
2. EXPOSED BOLT AND NUT ASSEMBLIES ON FLEXIBLE COUPLINGS AND/OR MECHANICAL JOINT FITTINGS SHALL BE COATED WITH TAR BITUMASTIC ENAMEL PRIOR TO BACKFILL.
3. TRENCHES WITHIN THE ROADWAY FOR LATERAL INSTALLATIONS OR REMOVALS SHALL BE BACKFILLED WITH A SAND SLURRY MIX AS DIRECTED BY THE CITY ENGINEER.
4. SURFACE CONDITIONS SHALL BE RESTORED TO THE SATISFACTION OF THE CITY ENGINEER.

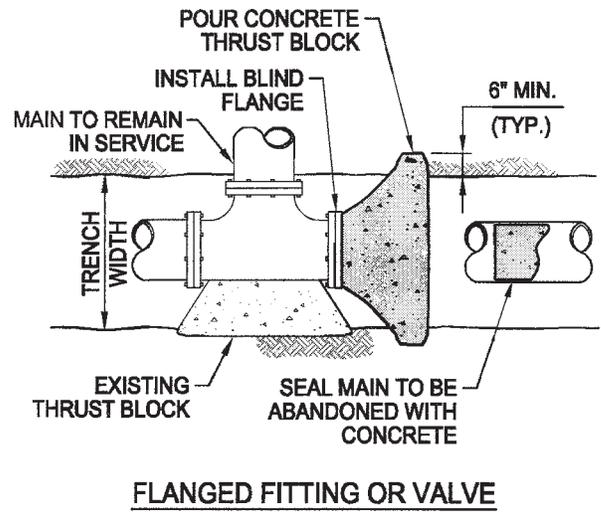
LATERAL INSTALLATION (FIRE HYDRANT)

REVISIONS				CITY OF BEVERLY HILLS, CALIFORNIA	
MARK	DATE	DESCRIPTION		DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION	

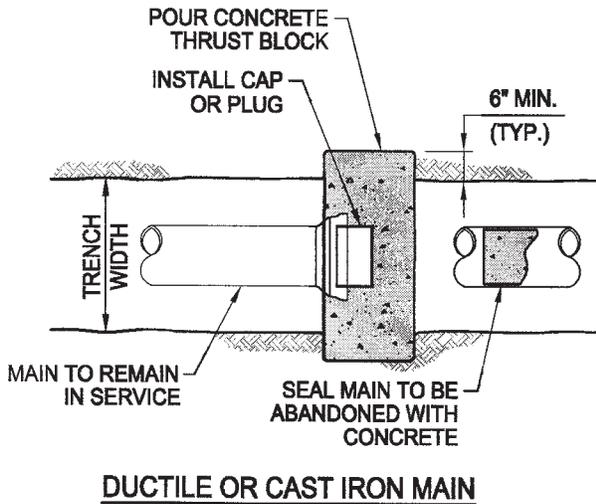
RECOMMENDED <i>C. J. ...</i> <small>CITY ENGINEER</small>	DATE <i>7-30-09</i>	STANDARD DRAWING <h1 style="margin: 0;">BH 705</h1>
APPROVED <i>R. ...</i> <small>PUBLIC WORKS DIRECTOR</small>	DATE <i>7-31-09</i>	SHEET 1 OF 1



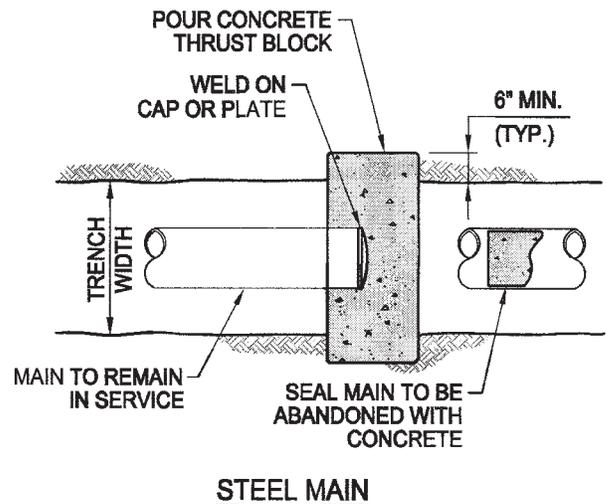
**HUB-END OR RING-TITE
FITTING OR VALVE**



FLANGED FITTING OR VALVE



DUCTILE OR CAST IRON MAIN



STEEL MAIN

NOTES:

1. CONCRETE SHALL BE 2000 P.S.I.
2. POUR CONCRETE THRUST BLOCKS AGAINST UNDISTURBED SOIL.
3. REMOVE INTERFERING PORTIONS OF MAIN TO BE ABANDONED.
4. USE STEEL ANCHOR RODS OR STRAPS ONLY WHERE PERMITTED BY THE ENGINEER.

TYPICAL CAPS AND PLUGS

REVISIONS		
MARK	DATE	DESCRIPTION



CITY OF BEVERLY HILLS, CALIFORNIA

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
CIVIL ENGINEERING DIVISION

RECOMMENDED

Clinton
CITY ENGINEER

DATE 7-30-09

APPROVED

Richard
PUBLIC WORKS DIRECTOR

DATE 7-31-09

STANDARD DRAWING

BH 708

SHEET 1 OF 1

HORIZONTAL BENDS

NOMINAL PIPE SIZE (INCHES)	TEST PRESSURE (P.S.I.)	DEAD ENDS AND TEES			BENDS LESS THAN OR EQUAL TO ANGLE:								ALL BENDS
					11 - 1/4°		22 - 1/2°		45°		90°		
		A	B	C	A	B	A	B	A	B	A	B		C
6	200	2'-6"	1'-6"	6"	1'-0"	1'-0"	2'-0"	1'-0"	3'-0"	1'-0"	3'-6"	1'-6"	8"
8	200	4'-6"	1'-6"	8"	1'-6"	1'-0"	3'-0"	1'-0"	3'-6"	1'-6"	5'-0"	2'-0"	10"
10	200	5'-6"	2'-0"	10"	2'-0"	1'-0"	3'-0"	1'-6"	4'-0"	2'-0"	6'-0"	2'-6"	1'-0"
12	200	7'-6"	2'-0"	1'-0"	2'-0"	1'-6"	3'-0"	2'-0"	4'-6"	2'-6"	7'-0"	3'-0"	1'-0"

VERTICAL BENDS

NOMINAL PIPE SIZE (INCHES)	TEST PRESSURE (P.S.I.)	BENDS LESS THAN OR EQUAL TO ANGLE:												ALL BENDS
		11 - 1/4°			22 - 1/2°			45°			90°			
		D	E	F	D	E	F	D	E	F	D	E	F		C
6	200	1'-6"	3'-0"	1'-0"	2'-0"	4'-0"	1'-0"	3'-0"	5'-6"	1'-0"	4'-0"	7'-0"	2'-0"	8"
8	200	2'-0"	4'-0"	1'-0"	2'-6"	5'-0"	1'-0"	3'-6"	7'-0"	2'-0"	5'-0"	10'-0"	3'-6"	10"
10	200	2'-0"	4'-6"	1'-0"	3'-0"	6'-0"	1'-6"	4'-0"	9'-0"	3'-0"	6'-0"	12'-0"	5'-0"	1'-0"
12	200	2'-6"	5'-0"	1'-0"	3'-6"	7'-0"	2'-0"	5'-0"	10'-0"	4'-0"	7'-0"	14'-0"	7'-0"	1'-0"

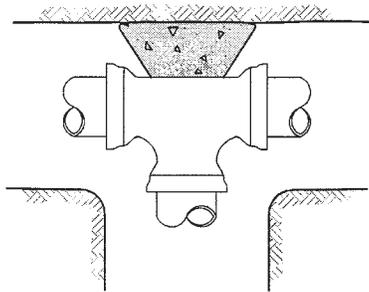
CONCRETE THRUST BLOCK SCHEDULE

NOTE:

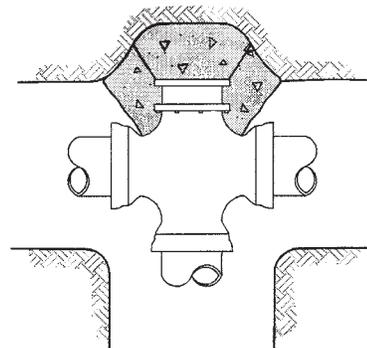
1. THRUST BLOCK SIZES ARE BASED ON A BEARING CAPACITY OF 1500 P.S.F., WITH A MINIMUM SOIL COVER OF 3'-0". IF SOIL COVER IS LESS THAN 3'-0", MULTIPLY BEARING AREA BY A FACTOR OF 1.5 FOR SOIL COVER OF 2'-0" TO 3'-0", OR BY A FACTOR OF THREE (3) FOR SOIL COVER OF 1'-0" TO 2'-0".
2. DIMENSIONS SHOWN REFER TO THRUST BLOCK TYPES SHOWN IN DETAIL, AND ARE MINIMUM VALUES ONLY.
3. CONCRETE MIX SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR 3000 LBS. STRENGTH AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM 039.
4. ALL THRUST BLOCKS SHALL BE POURED SOLIDLY AGAINST FIRM, UNDISTURBED SOIL.
5. IF SOILS HAVE BEEN PREVIOUSLY EXCAVATED AND BACKFILLED, CONTRACTOR SHALL NOTIFY CITY ENGINEER, WHO MAY DIRECT THAT THE DIMENSIONS SHOWN SHALL BE INCREASED BY A FACTOR OF 1.5.
6. CONCRETE POURED AGAINST PIPE FITTINGS SHALL NOT EXTEND BEYOND THE FITTING JOINTS WITHOUT THE APPROVAL OF THE CITY ENGINEER.
7. THRUST REACTION BACKING TYPE (SEE DRAWING) SHALL BE AS DIRECTED BY THE CITY ENGINEER.
8. THE ANGLE (θ) SHOWN IN THE DETAILS SHALL BE GREATER THAN 45° IN ALL CASES.

CONCRETE THRUST BLOCKS

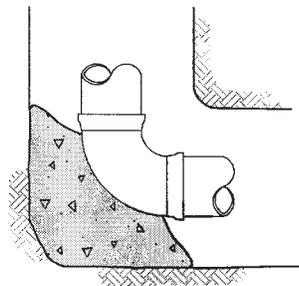
REVISIONS				CITY OF BEVERLY HILLS, CALIFORNIA		DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION CIVIL ENGINEERING DIVISION
MARK	DATE	DESCRIPTION				
			RECOMMENDED  CITY ENGINEER	DATE 7-30-09	STANDARD DRAWING BH 709 SHEET 1 OF 4	
			APPROVED  PUBLIC WORKS DIRECTOR	DATE 7-31-09		



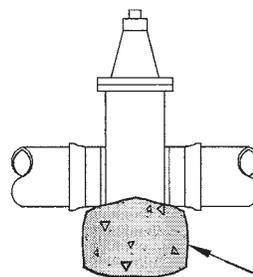
TEE



CROSS



90 DEGREE ELBOW



GATE VALVE

FOR AREA ON SIDE
FACES USE VALVES
REQUIRED FOR TEES

NOTE:

1. CONCRETE FOR THRUST BLOCK TO BE 2000 P.S.I.

CONCRETE THRUST BLOCKS

REVISIONS

MARK	DATE	DESCRIPTION



CITY OF BEVERLY HILLS, CALIFORNIA

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
CIVIL ENGINEERING DIVISION

RECOMMENDED

Christina
CITY ENGINEER

DATE 7-30-09

APPROVED

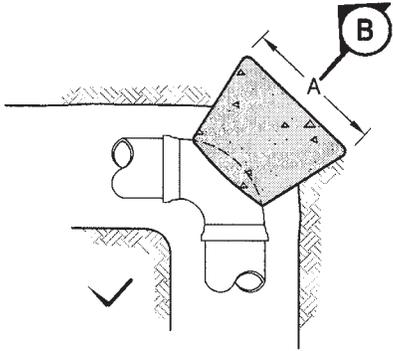
[Signature]
PUBLIC WORKS DIRECTOR

DATE 7-31-09

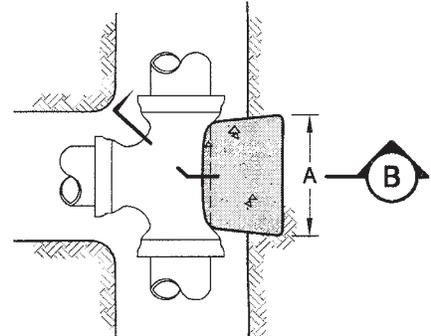
STANDARD DRAWING

BH 709

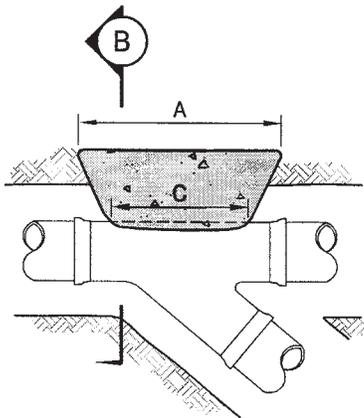
SHEET 2 OF 4



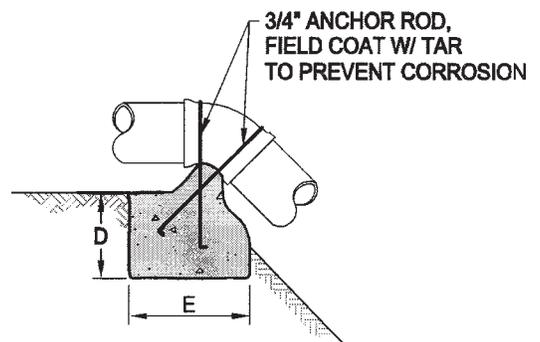
TYPE I



TYPE II

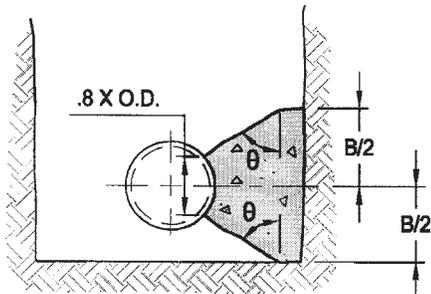


TYPE III



MAKE BLOCK WIDTH OF TRENCH

TYPE IV



SECTION B

NOTE:

1. SEE STANDARD DRAWING NO. BH 711, SHT. 1 FOR THRUST BLOCK SCHEDULE AND NOTES.

CONCRETE THRUST BLOCKS

REVISIONS

MARK	DATE	DESCRIPTION



CITY OF BEVERLY HILLS, CALIFORNIA

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
CIVIL ENGINEERING DIVISION

RECOMMENDED

Clint...
CITY ENGINEER

DATE 7-20-09

APPROVED

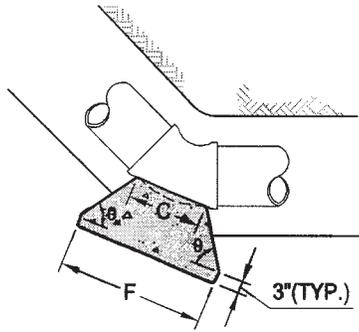
...
PUBLIC WORKS DIRECTOR

DATE 7-31-09

STANDARD DRAWING

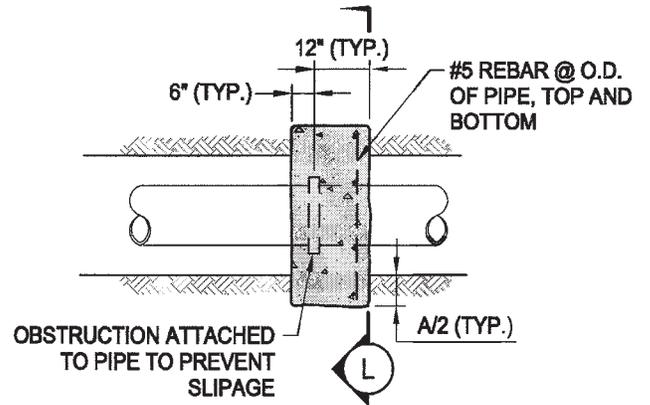
BH 709

SHEET 3 OF 4

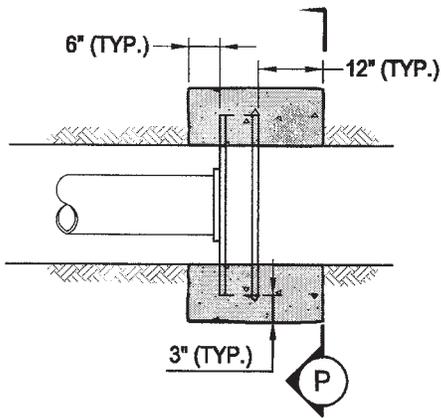


MAKE BLOCK FULL WIDTH OF TRENCH

TYPE V



OBSTRUCTION ATTACHED TO PIPE TO PREVENT SLIPPAGE

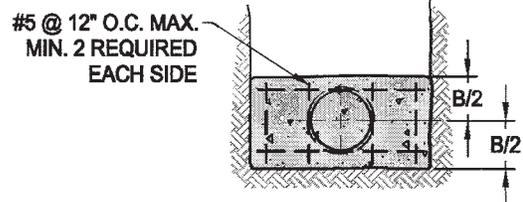


#5 @ 12" O.C. MAX. MIN. 2 REQUIRED, TOP AND BOTTOM EACH SIDE

WRAP WITH PLASTIC LINER TO PREVENT CORROSION

SECTION P

TYPE VII



SECTION L

TYPE VI

NOTE:

1. SEE STANDARD DRAWING NO. BH 711, SHT. 1 FOR THRUST BLOCK SCHEDULE AND NOTES.

CONCRETE THRUST BLOCKS

REVISIONS

MARK	DATE	DESCRIPTION



CITY OF BEVERLY HILLS, CALIFORNIA

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
CIVIL ENGINEERING DIVISION

RECOMMENDED

Alvin T. ...
CITY ENGINEER

DATE 7-30-09

APPROVED

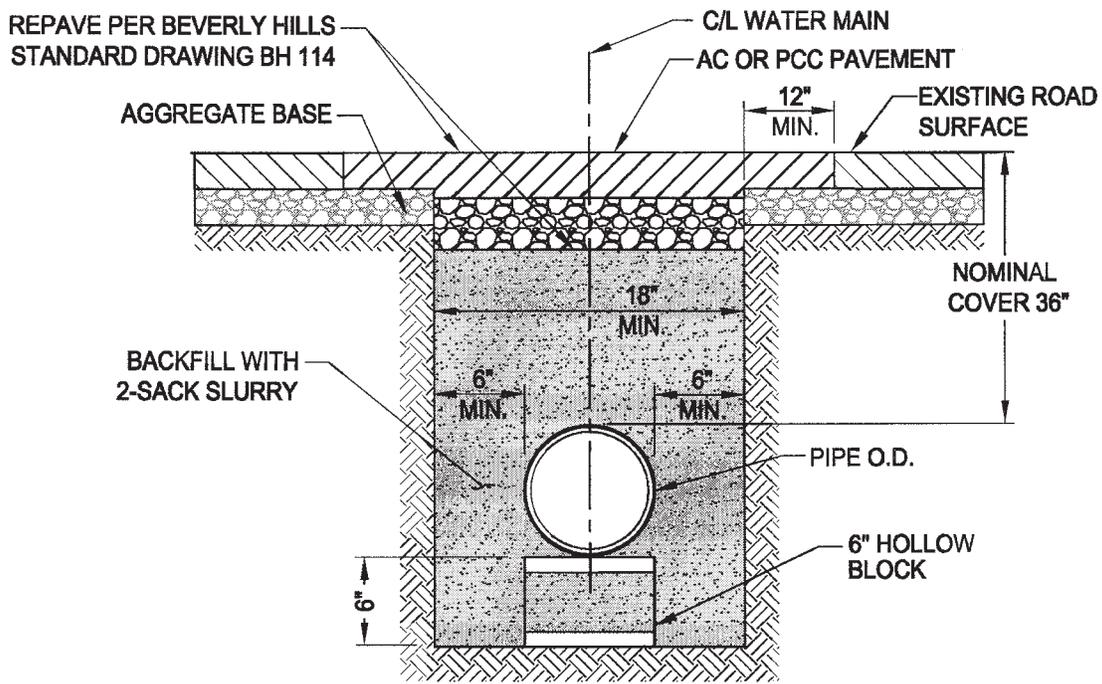
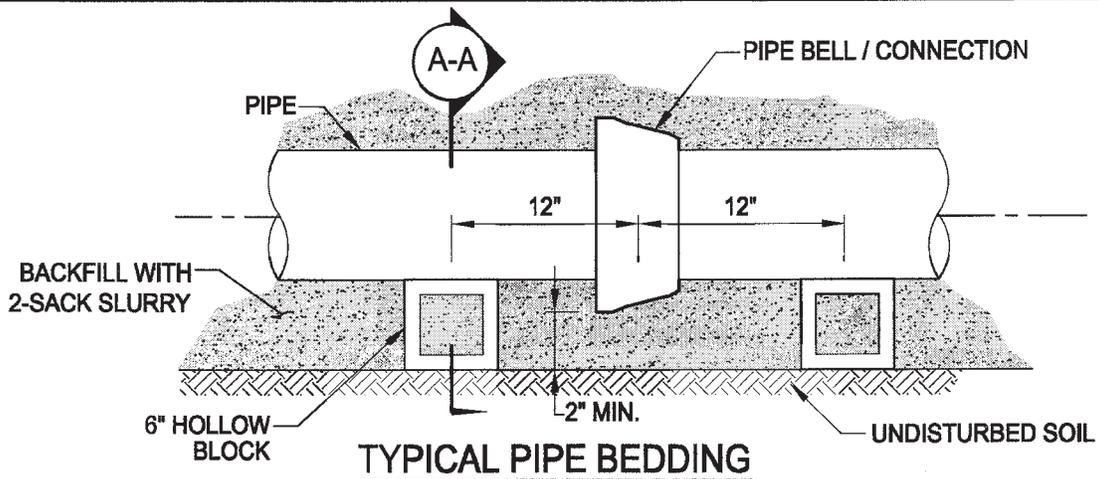
Richard ...
PUBLIC WORKS DIRECTOR

DATE 7-31-09

STANDARD DRAWING

BH 709

SHEET 4 OF 4



NOTES:

1. WHEN TRENCH WORK CAN NOT BE COMPLETED WITHIN THE SAME WORKING DAY SEE BEVERLY HILLS STANDARD DRAWING BH 113 FOR STEEL PLATE PLACEMENT.
2. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION ("GREENBOOK").

TRENCH FOR WATER LINE

REVISIONS		
MARK	DATE	DESCRIPTION



CITY OF BEVERLY HILLS, CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
 CIVIL ENGINEERING DIVISION

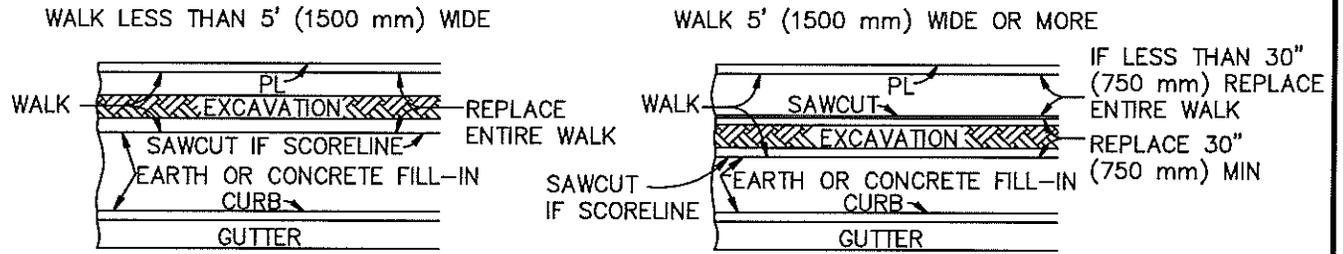
RECOMMENDED *[Signature]* DATE 7-30-09
CITY ENGINEER
 APPROVED *[Signature]* DATE 7-31-09
PUBLIC WORKS DIRECTOR

STANDARD DRAWING
BH 710
 SHEET 1 OF 1

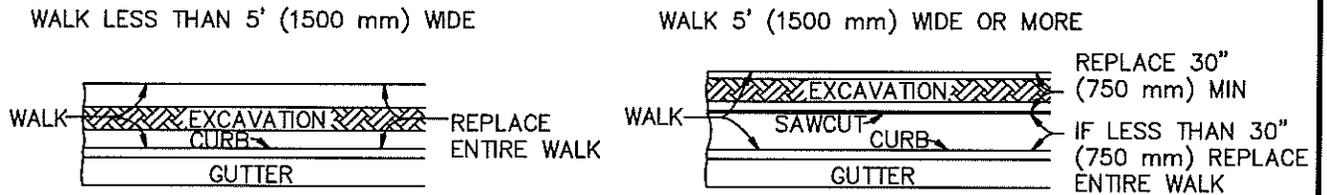
APPENDIX B

WALK OR FILL-IN REPLACEMENT FOR EXCAVATIONS MADE PARALLEL TO CURB OR PROPERTY LINE

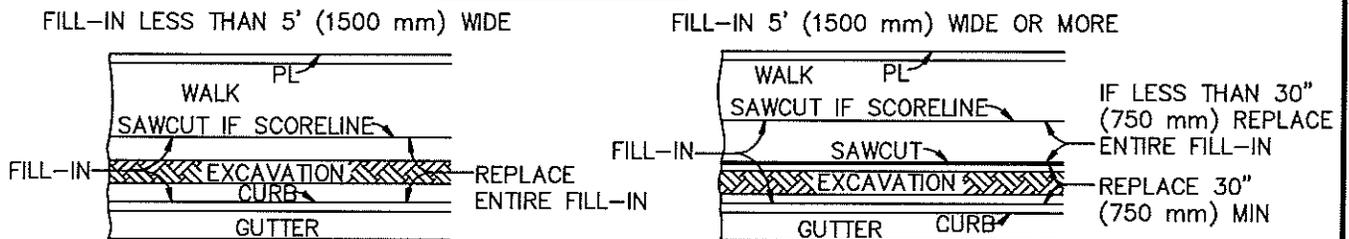
WALK ADJACENT TO PROPERTY LINE



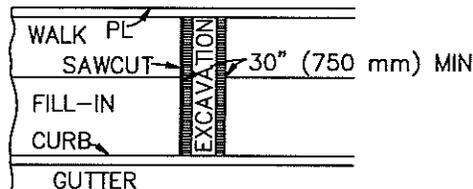
WALK ADJACENT TO CURB



FILL-IN REPLACEMENT



WALK OR FILL-IN REPLACEMENT FOR EXCAVATIONS MADE NORMAL TO CURB OR PROPERTY LINE



THESE REQUIREMENTS ALSO APPLY TO ENDS OF PARALLEL EXCAVATIONS.

IF AN EXCAVATION FALLS WITHIN 30" (750 mm) OF AN EXPANSION JOINT, CONSTRUCTION JOINT, WEAKENED PLANE JOINT, OR EDGE, THE CONCRETE SHALL BE REMOVED AND REPLACED TO THE JOINT OR EDGE.

IF AN EXCAVATION FALLS WITHIN 12" (300 mm) OF A SCORELINE, THE CONCRETE SHALL BE REMOVED AND REPLACED TO THE SCORELINE. THE SCORELINE SHALL BE SAWCUT BEFORE CONCRETE REMOVAL.

THE MINIMUM LENGTH OF REPLACEMENT IN BOTH CASES SHALL BE 30" (750 mm).

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE
 PUBLIC WORKS STANDARDS INC.
 GREENBOOK COMMITTEE
 1993
 REV. 1996, 2009

SIDEWALK & DRIVEWAY REPLACEMENT

STANDARD PLAN

113-2

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

SHEET 1 OF 2

NOTES

1. CONCRETE WALK, FILL-IN AND DRIVEWAYS REMOVED IN CONNECTION WITH CONSTRUCTION SHALL BE REPLACED TO NEATLY SAWED EDGES. ALL CUTS SHALL BE PARALLEL TO OR PERPENDICULAR TO THE CURB; ON CURVES, THE CUT SHALL BE RADIAL TO THE CURB.
2. DRIVEWAY APRONS IN WHICH THE "W" DISTANCE IS LESS THAN 11' (3300 mm) SHALL BE REPLACED IN THEIR ENTIRETY IF CUT IN ANY AREA.
3. DRIVEWAY APRONS IN WHICH THE "W" DISTANCE IS 11' (3300 mm) OR MORE MAY BE CUT WITHIN THE "W" SECTION. THE MINIMUM REPLACEMENT SHALL BE 30" (750 mm) IN LENGTH. THE MINIMUM DISTANCE ALLOWED BETWEEN SUCH CUTS SHALL BE 14' (4200 mm).
4. DRIVEWAY APRONS IN WHICH THE "W" DISTANCE IS 11' (3300 mm) OR MORE MAY BE CUT IN THE "X" OR "R" SECTION. REPLACEMENT SHALL BE THE ENTIRE "X" OR "R" SECTION.
5. DRIVEWAY APRONS SHALL BE REPLACED FROM THE BACK OF THE CURB TO THE FRONT EDGE OF THE WALK, EXCEPT, WHERE WALK IS ADJACENT TO CURB, REPLACEMENT SHALL BE FROM BACK OF CURB TO BACK OF WALK.
6. WALK PORTIONS OF DRIVEWAYS SHALL BE REPLACED AS SHOWN ABOVE FOR EXCAVATIONS MADE PARALLEL OR NORMAL TO CURB.
7. REPLACEMENT OF THE "X" OR "R" SECTION SHALL MATCH EXISTING CONSTRUCTION.

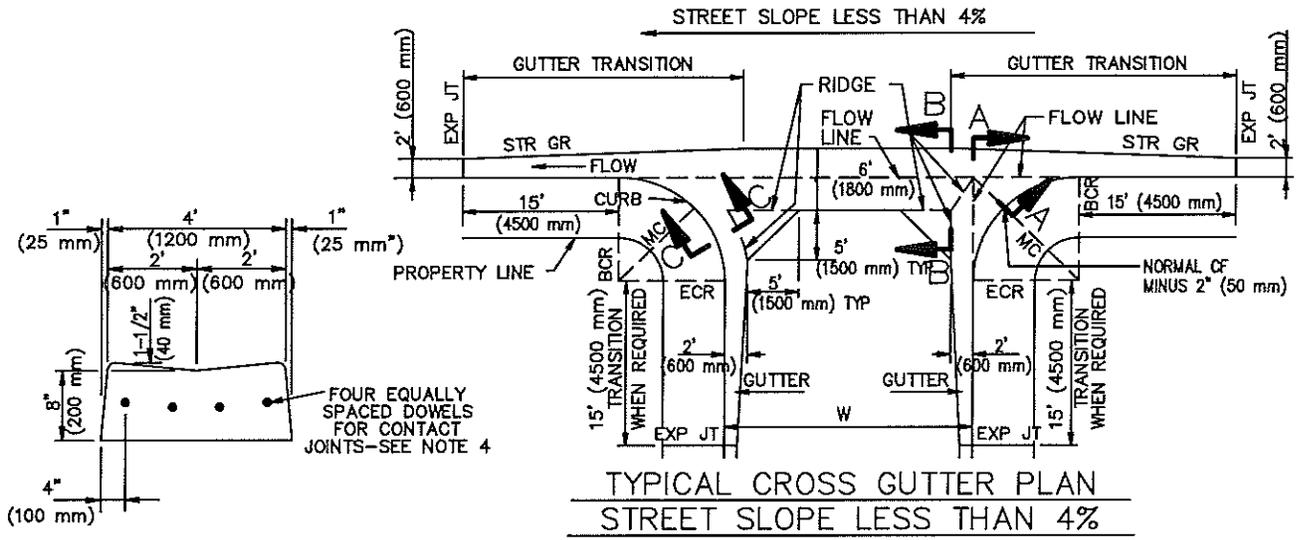
STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

SIDEWALK & DRIVEWAY REPLACEMENT

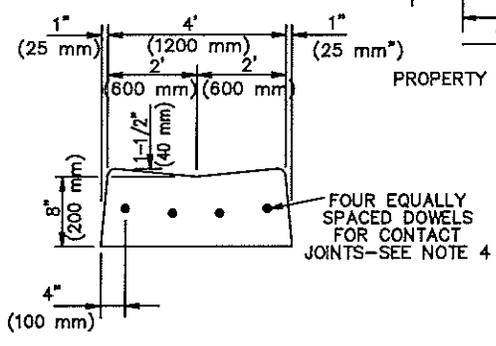
STANDARD PLAN

113-2

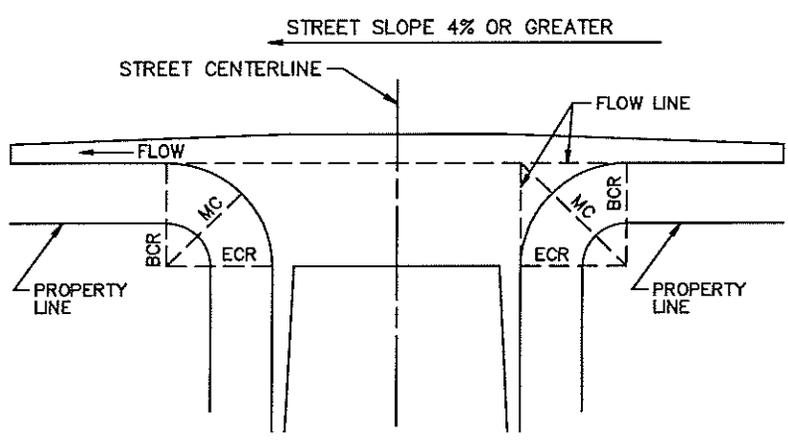
SHEET 2 OF 2



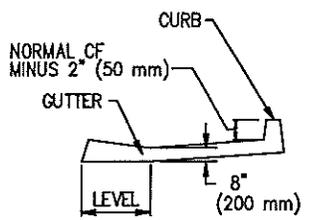
TYPICAL CROSS GUTTER PLAN
STREET SLOPE LESS THAN 4%



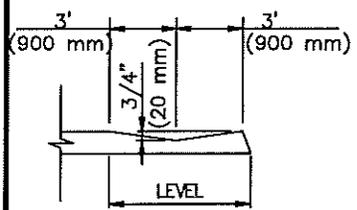
LONGITUDINAL
GUTTER



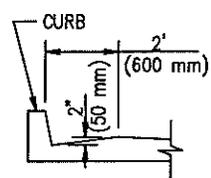
TYPICAL CROSS GUTTER PLAN
STREET SLOPE MORE THAN 4%



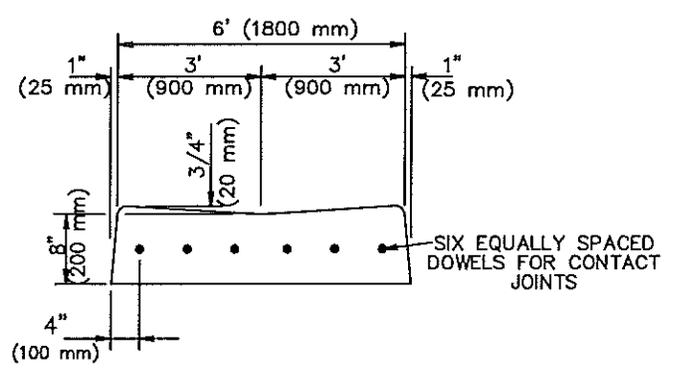
SECTION A-A



SECTION B-B

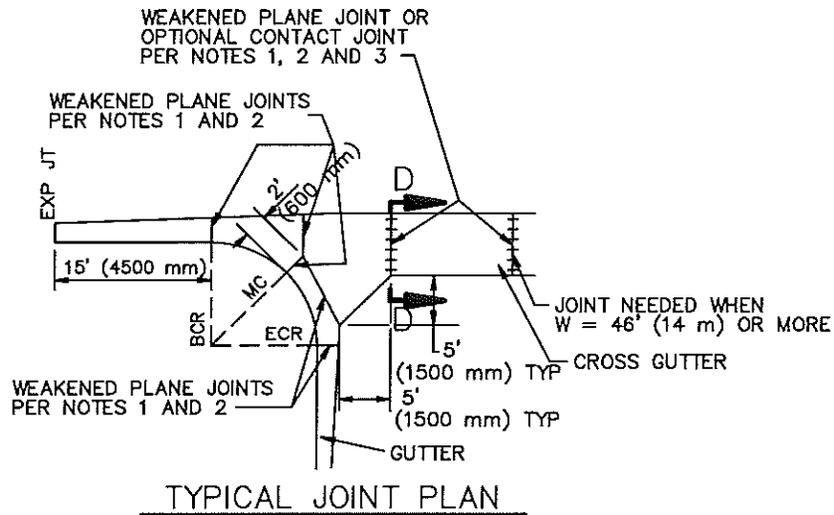


SECTION C-C



SECTION D-D

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1984 REV. 1996, 2009	<h2 style="margin: 0;">CROSS AND LONGITUDINAL GUTTERS</h2>	STANDARD PLAN <h1 style="margin: 0;">122-2</h1>
USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION		
		SHEET 1 OF 2



NOTES:

1. WEAKENED PLANE AND/OR CONTACT JOINTS SHALL BE PLACED IN CURB AND GUTTER AT LOCATIONS SHOWN ON THE TYPICAL JOINT PLAN HEREON.
2. WEAKENED PLANE JOINTS SHALL BE PLASTIC CONTROL JOINTS OR 1-1/2" (40 mm) DEEP SAW CUTS. CONCRETE SAWING SHALL TAKE PLACE WITHIN 24 HOURS AFTER CONCRETE IS PLACED.
3. DOWELS FOR CONTACT JOINTS SHALL BE #4 BARS 18" LONG (#13M BARS 450 mm LONG).
4. PLACE A WEAKENED PLANE OR CONTACT JOINT WHERE LONGITUDINAL ALLEY GUTTER JOINS CONCRETE ALLEY INTERSECTION.
5. ALL EXPOSED CORNERS ON PCC GUTTERS SHALL BE ROUNDED WITH 1/2" (15 mm) RADIUS.
6. CONCRETE SHALL BE INTEGRAL WITH CURB UNLESS OTHERWISE SPECIFIED.

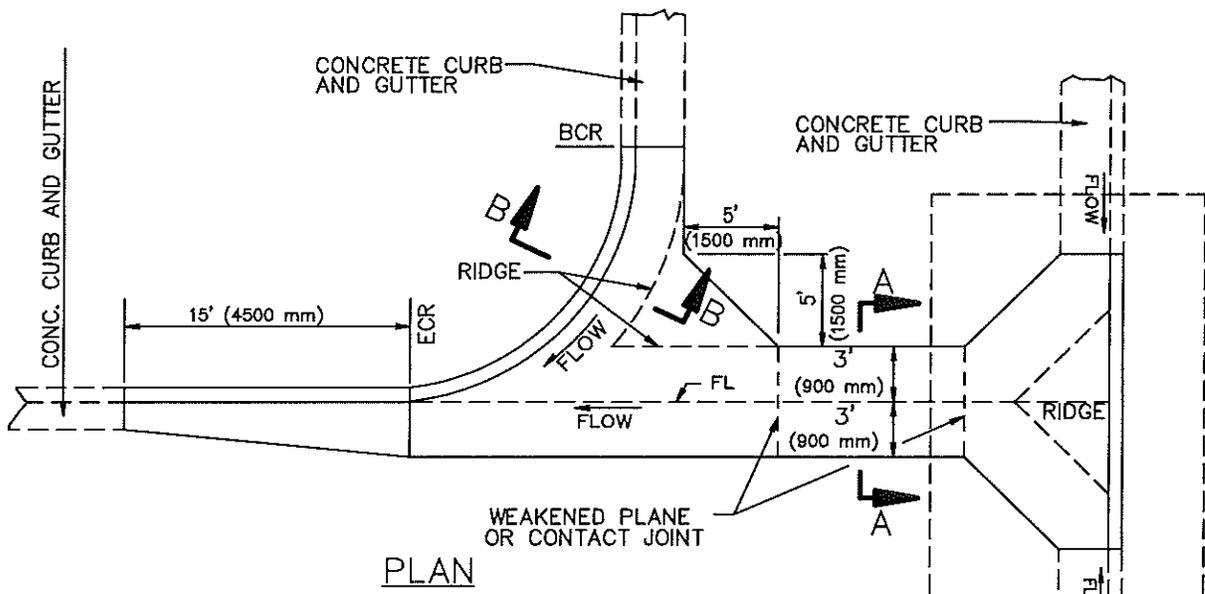
STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

CROSS AND LONGITUDINAL GUTTERS

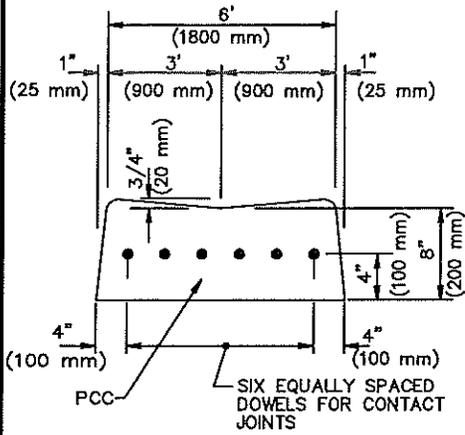
STANDARD PLAN

122-2

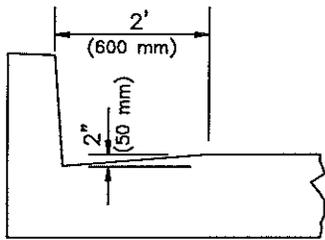
SHEET 2 OF 2



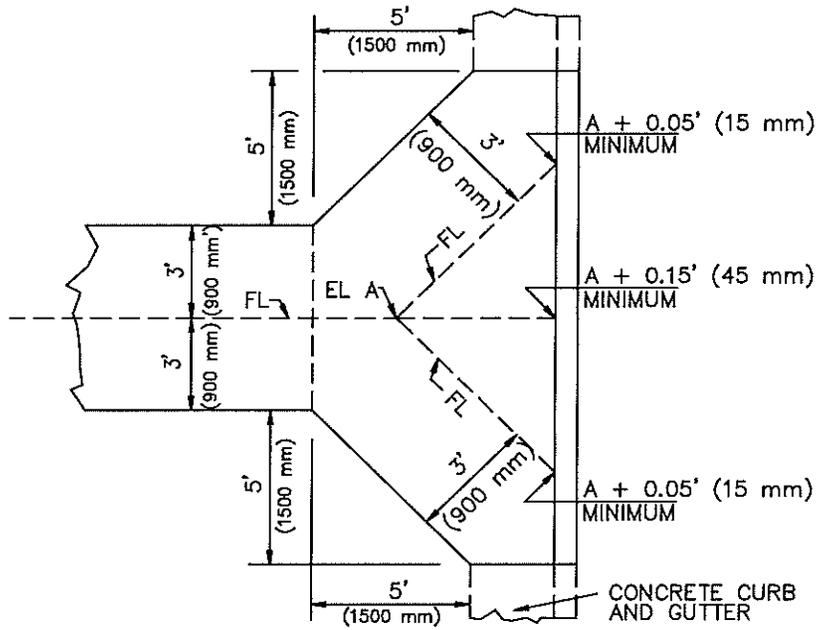
PLAN



SECTION A-A



SECTION B-B



DETAIL A

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE
PUBLIC WORKS STANDARDS INC.
GREENBOOK COMMITTEE
1993
REV. 1998, 2009

**CROSS GUTTER AT
T INTERSECTIONS**

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN

123-2

SHEET 1 OF 2

NOTES:

1. WEAKENED PLANE JOINTS SHALL BE PLASTIC CONTROL JOINTS OR 1-1/2" (35 mm) DEEP SAW CUTS. CONCRETE SAWING SHALL TAKE PLACE WITHIN 24 HOURS AFTER CONCRETE IS PLACED.
2. DOWELS FOR CONTACT JOINTS SHALL BE #4 BARS 18" LONG (#13M BARS 450 mm LONG).
3. ALL EXPOSED CORNERS SHALL BE ROUNDED WITH 1/2" (15 mm) RADIUS.
4. CONCRETE SHALL BE INTEGRAL WITH CURB UNLESS OTHERWISE SPECIFIED.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

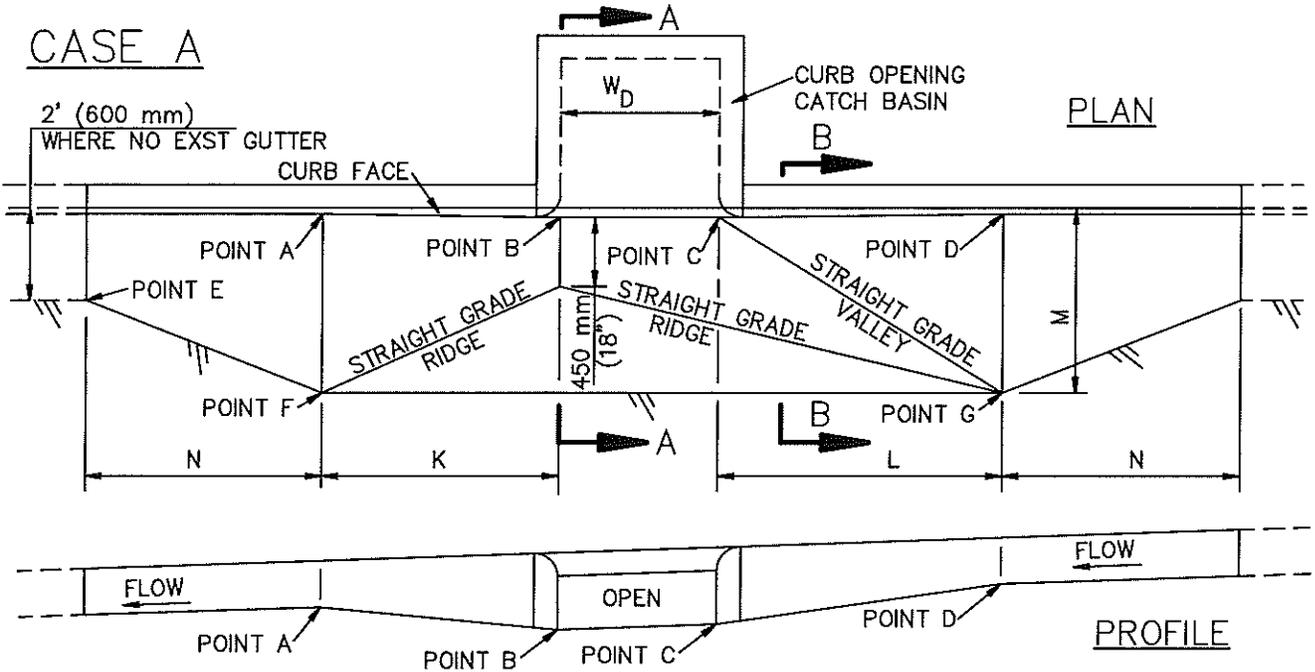
CROSS GUTTER AT
T INTERSECTIONS

STANDARD PLAN

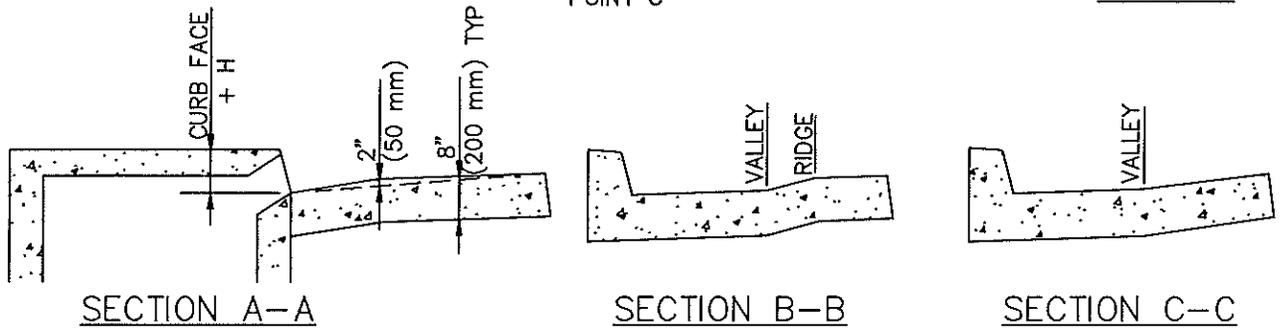
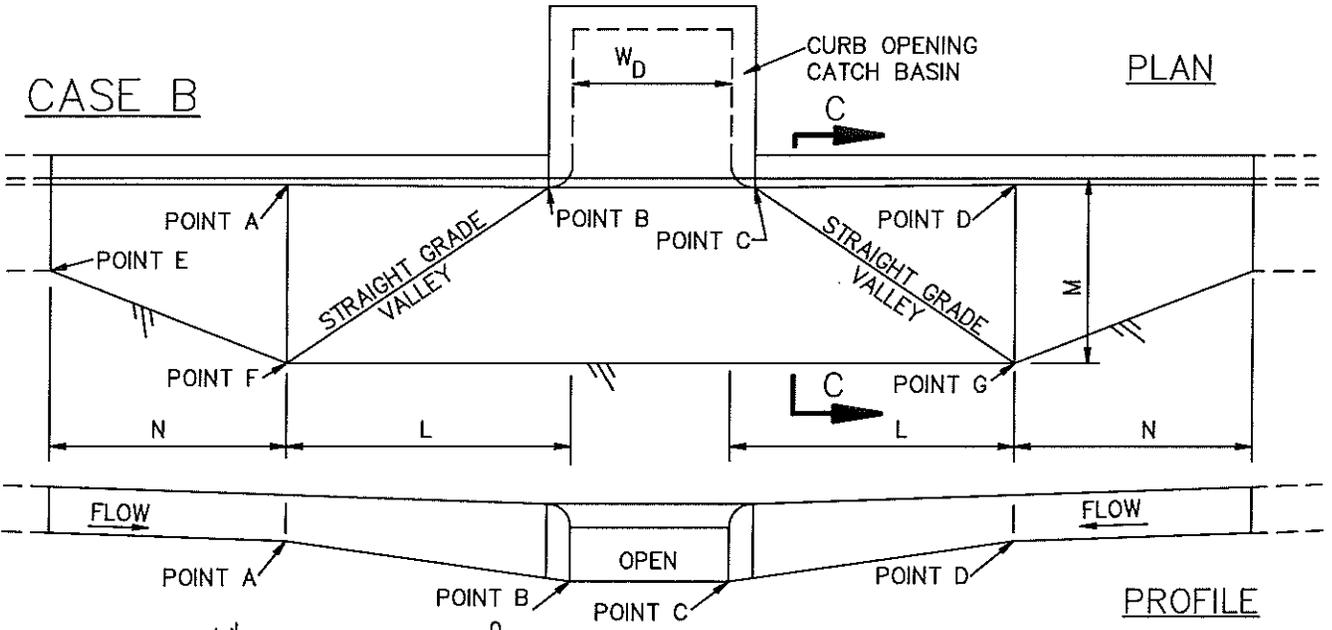
123-2

SHEET 2 OF 2

CASE A



CASE B



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE
PUBLIC WORKS STANDARDS INC.
GREENBOOK COMMITTEE
1984
REV. 1996, 2005, 2009

LOCAL DEPRESSIONS AT CATCH BASINS

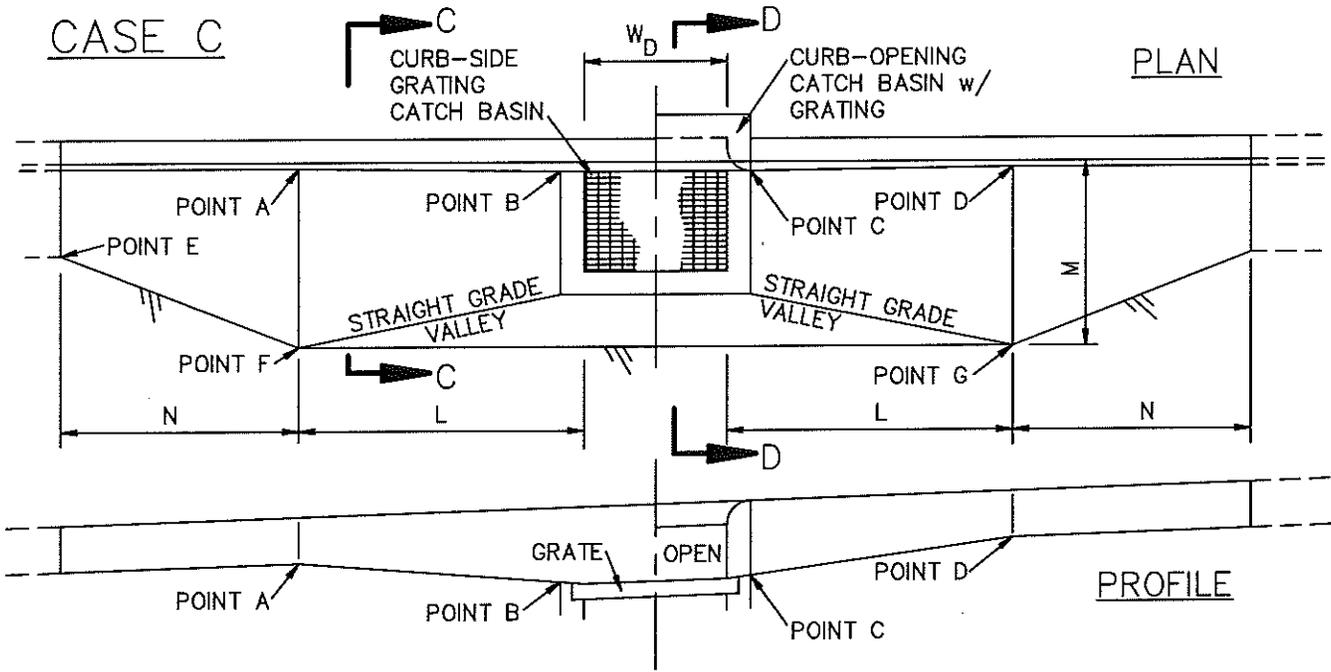
USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN

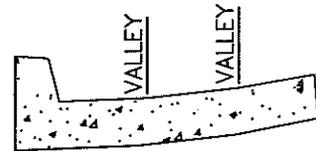
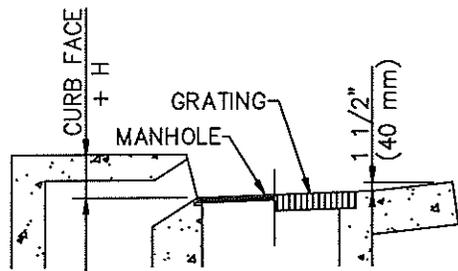
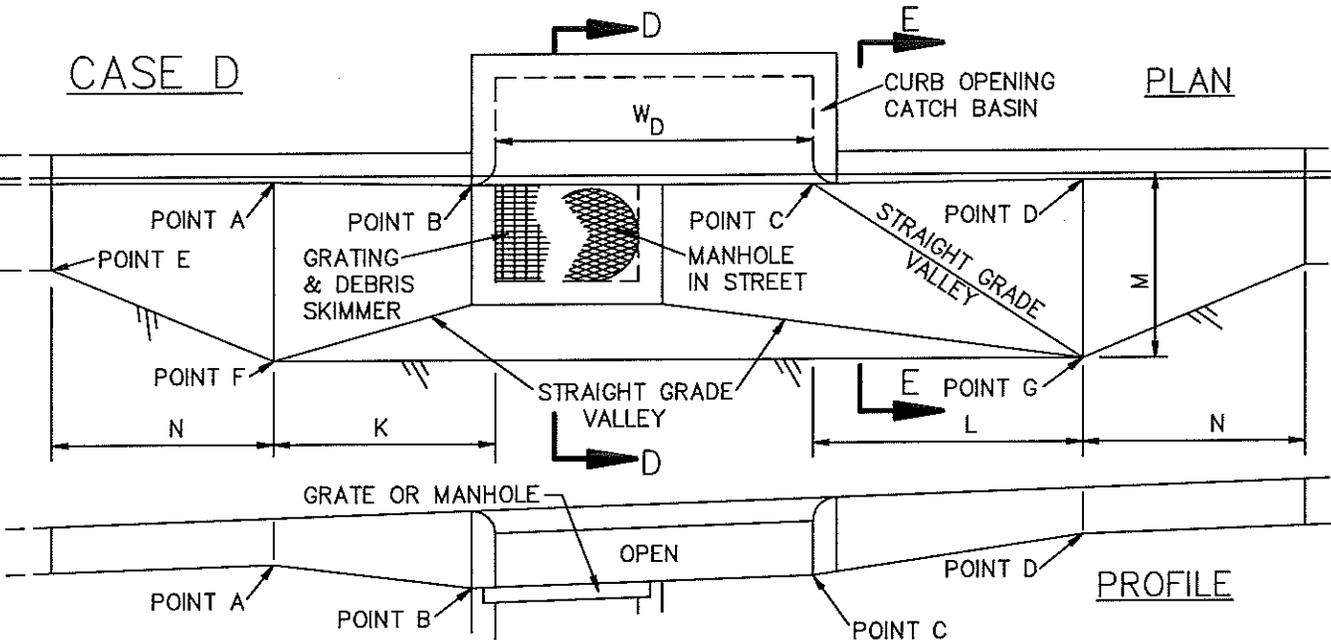
313-3

SHEET 1 OF 4

CASE C



CASE D



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

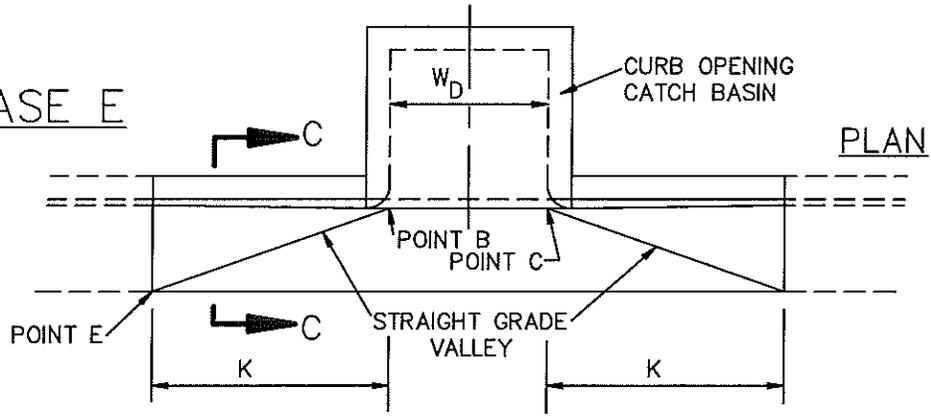
LOCAL DEPRESSIONS AT CATCH BASINS

STANDARD PLAN

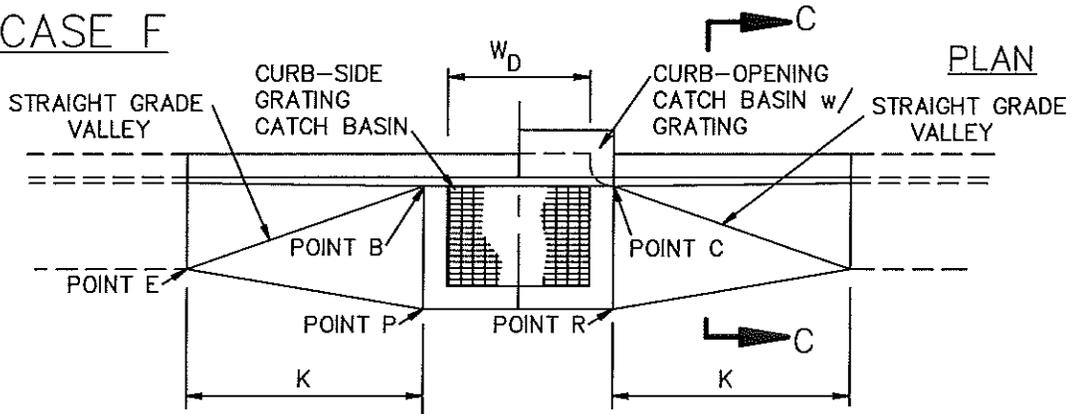
313-3

SHEET 2 OF 4

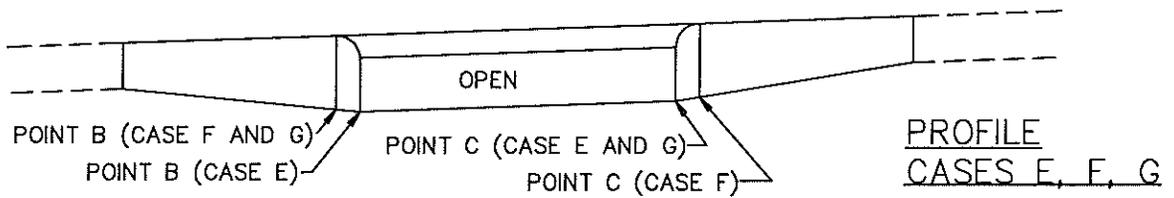
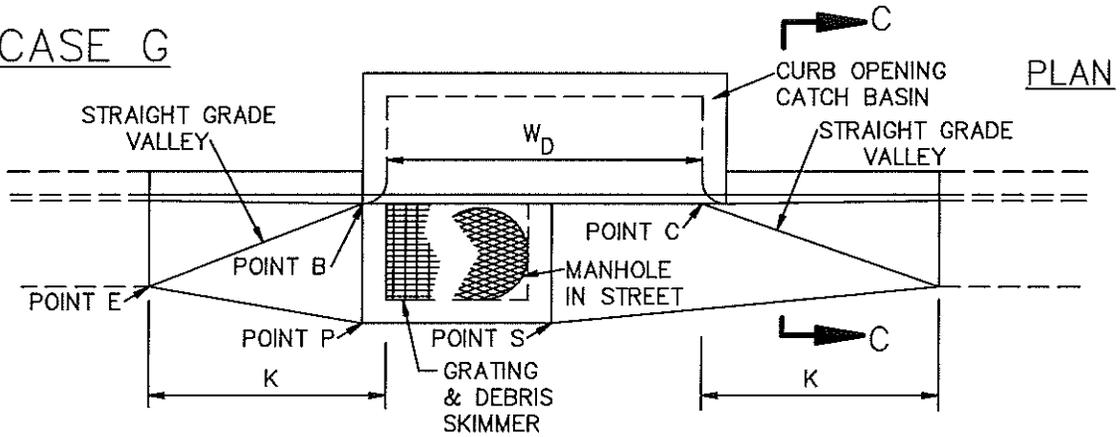
CASE E



CASE F



CASE G



NOTES:

1. ALL EXPOSED EDGES SHALL BE ROUNDED TO A 1/2" (15 mm) RADIUS.
2. THE CURB FACE AT POINTS A AND D SHALL BE THE NORMAL CURB FACE OF THE ADJACENT CURB. AT POINTS B AND C, THE CURB FACE SHALL BE THE NORMAL CURB FACE OF THE ADJACENT CURB PLUS H. (SEE APPLICABLE CATCH BASIN STANDARD PLAN.)
3. IN EXISTING STREETS WHERE NO PAVEMENT RECONSTRUCTION IS SPECIFIED ON THE PLANS, THE ELEVATION OF THE OUTER EDGE OF THE LOCAL DEPRESSION SHALL MEET THE FINISHED STREET SURFACE.
4. IN NEW STREETS OR IN EXISTING STREETS WHERE PAVEMENT RECONSTRUCTION IS SPECIFIED ON THE PLANS:

THE ELEVATIONS OF POINTS F AND G SHALL BE SET H1 HIGHER THAN THE GUTTER FLOW LINE ELEVATIONS AT POINTS A AND D, RESPECTIVELY.

THE ELEVATIONS OF POINTS P AND R SHALL BE SET H2 HIGHER THAN THE GUTTER FLOW LINE ELEVATIONS AT POINTS B AND C, RESPECTIVELY.

THE ELEVATION OF POINT S SHALL BE SET H2 HIGHER THAN THE ELEVATION AT THE NEAREST GUTTER FLOW LINE.

WHERE THERE IS NO GUTTER ADJACENT TO THE LOCAL DEPRESSION, THE ELEVATION OF POINT E SHALL BE SET H3 HIGHER THAN THE ELEVATION AT THE NEAREST TOE OF CURB.

5. DIMENSIONS:

H, H1, H2 AND H3 SHALL BE AS NOTED ON THE PLANS.

G = 24" (600 mm)

K = 5'-0" (1500 mm)

L = 6'-0" (1800 mm)

M = 4'-0" (1200 mm)

N = 5'-0" (1500 mm)

W_D = CATCH BASIN W FOR SINGLE CATCH BASIN OR DISTANCE BETWEEN EXTREME END WALLS FOR MULTIPLE CATCH BASINS.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

LOCAL DEPRESSIONS AT CATCH BASINS

STANDARD PLAN

313-3

SHEET 4 OF 4

APPENDIX C

DIST	COUNTY	ROUTE	ALTERNATE NO.	DATE	NO.	LEAF

Metrie

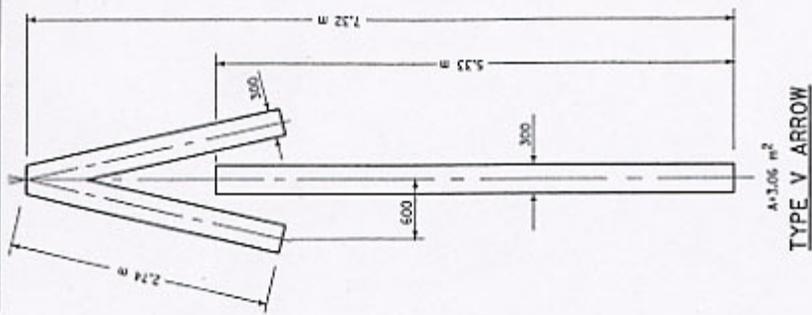
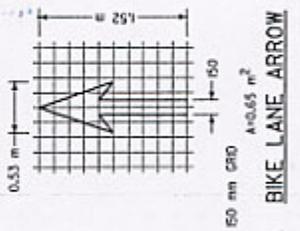
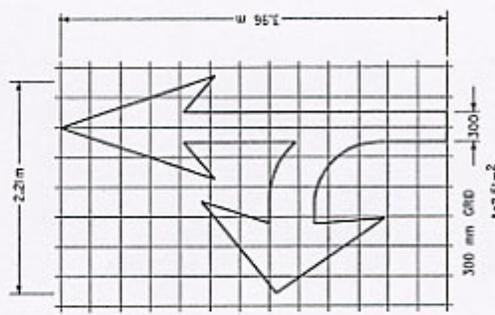
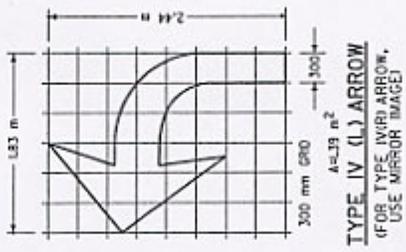
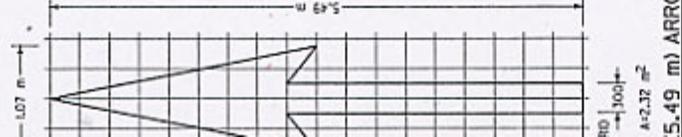
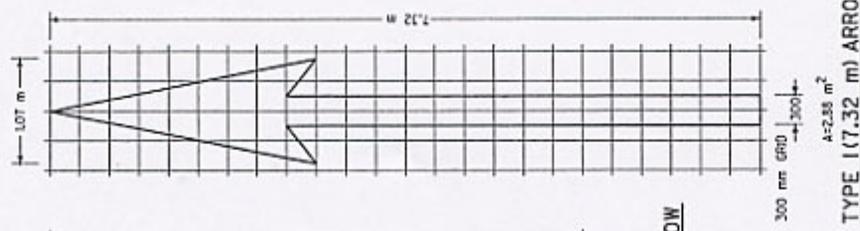
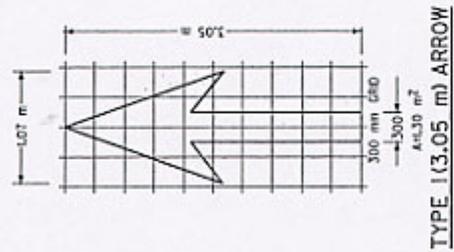
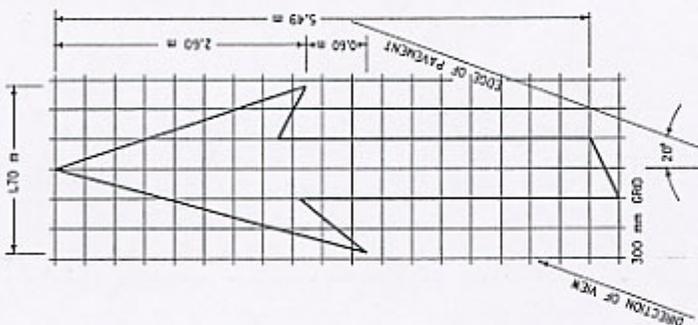
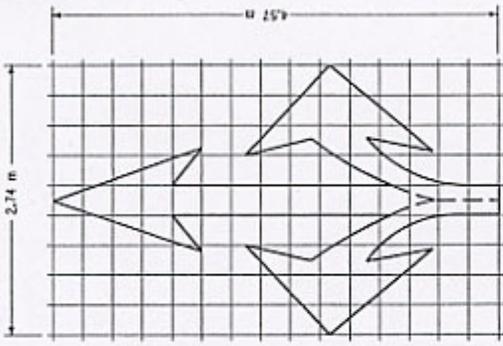
Donald E. Stone
REGISTERED CIVIL ENGINEER

Sealing L.
ENGINEER
Exp. 12-31-07

JULY 11, 2004
PLAST AFFIXING DATE

THE STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DIVISION OF HIGHWAYS
DIVISION OF HIGHWAYS

To get to the Caltrans web site go to <http://www.caltrans.gov>



NOTE
MINOR VARIATIONS IN DIMENSIONS
MAY BE ACCEPTED BY THE ENGINEER.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS
ARROWS**

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

2004 Std PLAN A24B

PROJECT COUNTY ROUTE	ALOWAY RD 4007	PROJECT NO. 121
	STATE HIGHWAY 168	DATE 07/15/04

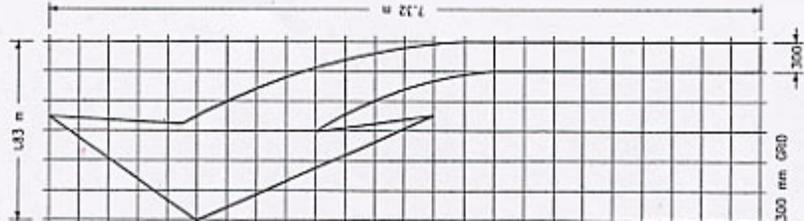
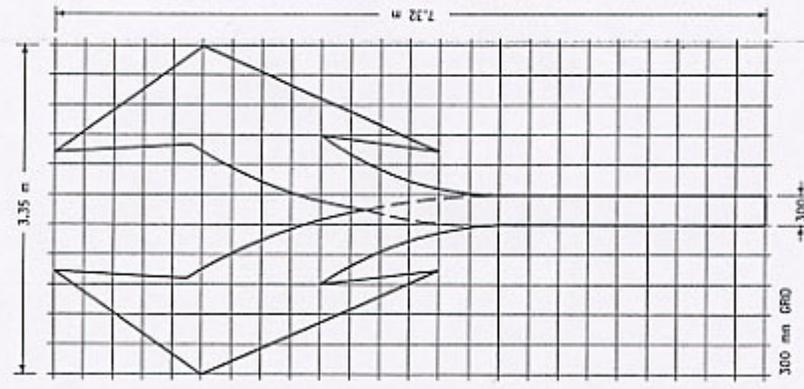
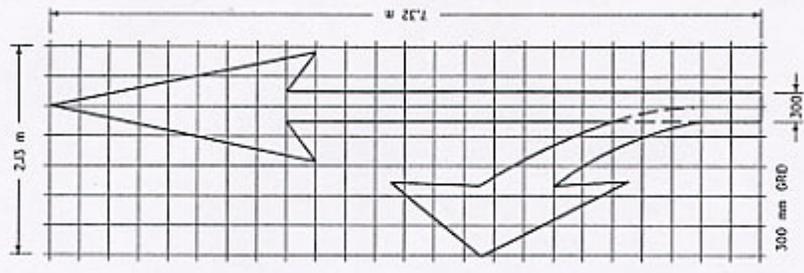
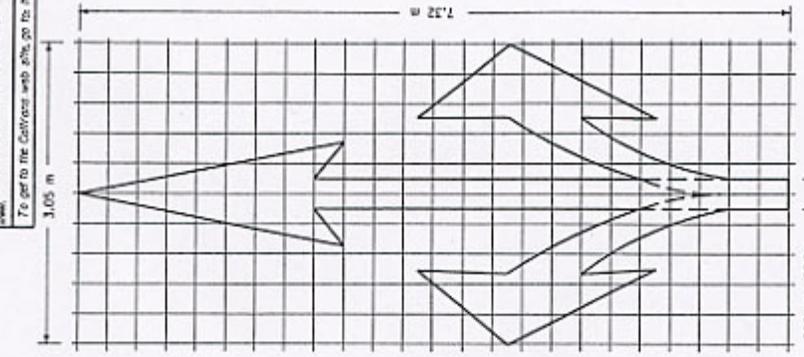
Calltrans
Metric

Donald J. Fine
REGISTERED CIVIL ENGINEER

July 1, 2004
The State of California, State Board of Civil Engineers
I hereby certify that the above is a true and correct copy of the original as submitted to the State Board of Civil Engineers for its approval.

Professional Seal: DONALD J. FINE, CIVIL ENGINEER, No. 48492, State of California, Exp. 12-31-07

To go to the Contract with 20% go to: <http://www.dir.ca.gov>



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**PAVEMENT MARKINGS
ARROWS**

NOTE
MINOR VARIATIONS IN DIMENSIONS
MAY BE ACCEPTED BY THE ENGINEER.

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

Calltrans
Metric

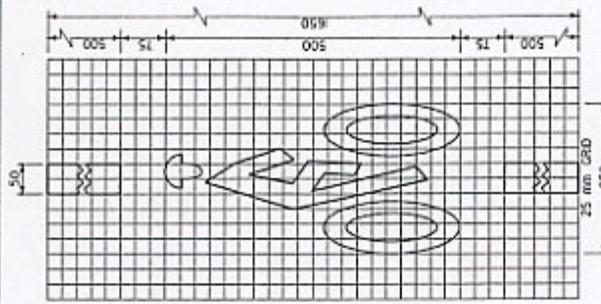
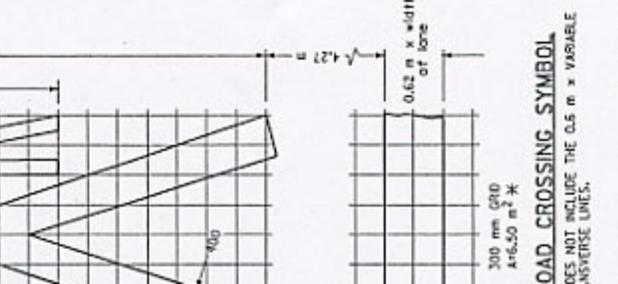
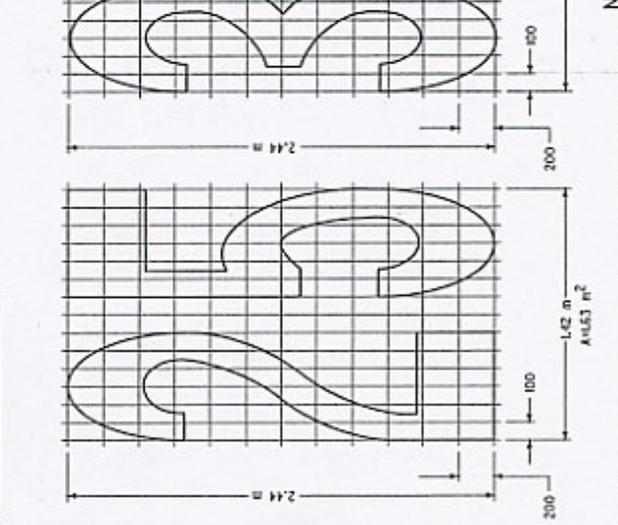
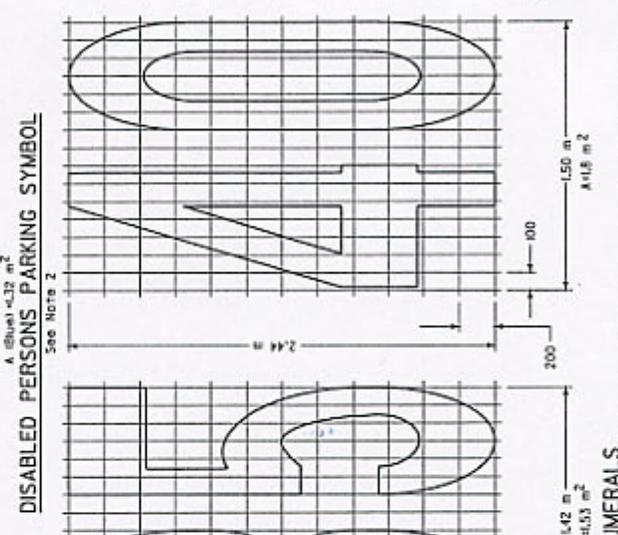
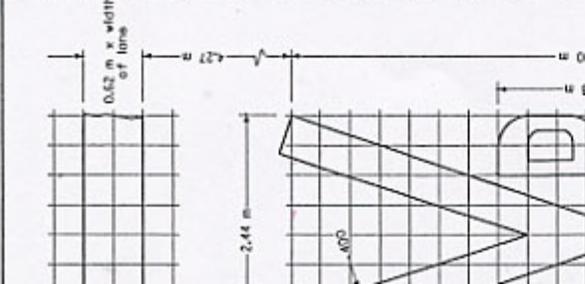
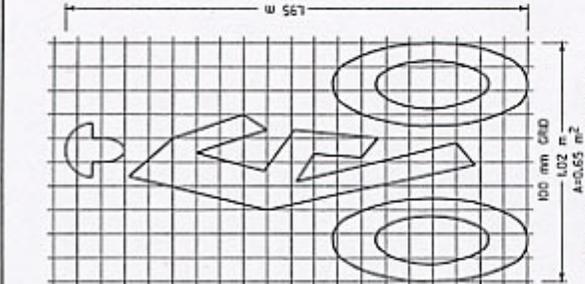
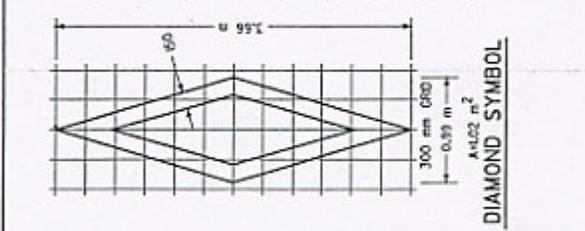
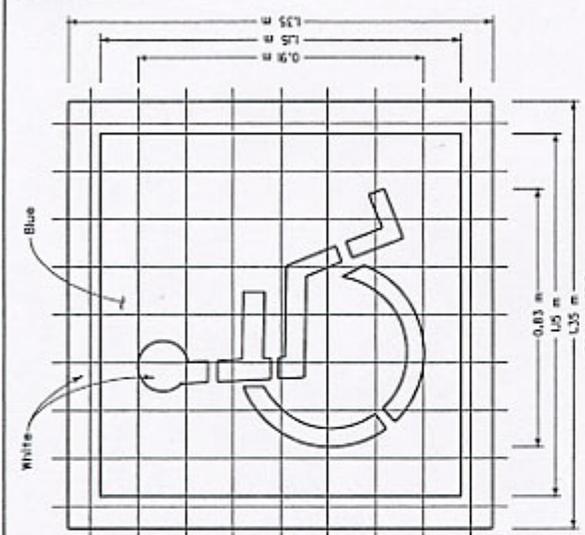
DIST COUNTY ROUTE MILEAGE
SHEET NO. 1001

Professional Engineer
DONALD E. THUE
REGISTERED CIVIL ENGINEER
No. 23153
EXPIRES 12/31/05

July 1, 2004
REGISTERED CIVIL ENGINEER
FLORIDA
No. 23153

The State of California on the effective date of this plan certifies that the Engineer is duly licensed and qualified to practice the profession of engineering in the State of California and that the Engineer is duly licensed and qualified to practice the profession of engineering in the State of California.

In part to the California web site, go to: <http://www.ced.org>



- NOTES**
1. Minor variations in dimensions may be accepted by the Engineer.
 2. This parking symbol is also known as the International Symbol of Accessibility (ISA)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS
SYMBOLS AND NUMERALS**

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

A24C

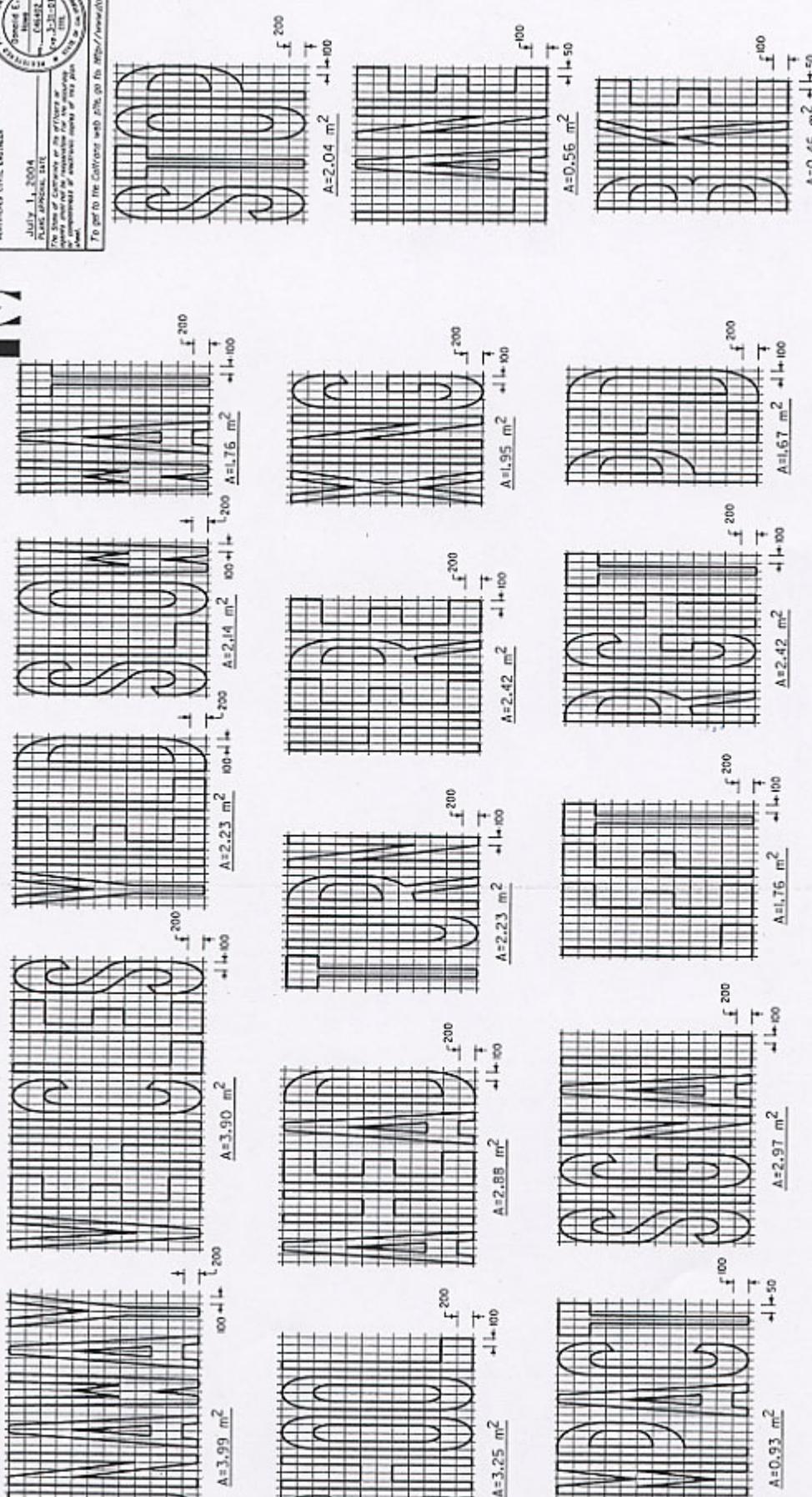


 COUNTY: MONTE SERRA, DISTRICT: 22, SHEET: 1 OF 15

REGISTERED CIVIL ENGINEER
 Donald E. Shaw
 No. 31507
 State of California
 July 1, 2004
 PLANS APPROVAL DATE

THE STATE OF CALIFORNIA AND THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE PROPER USE OF THESE PLANS. THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE PROPER USE OF THESE PLANS.

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
**PAVEMENT MARKINGS
 WORDS**
 NO SCALE
 ALL DIMENSIONS ARE IN
 MILLIMETERS UNLESS OTHERWISE SHOWN

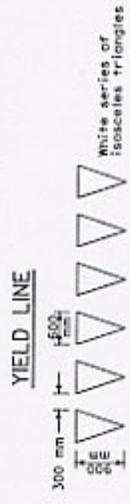
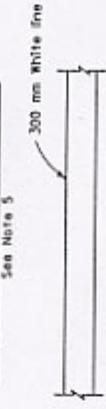
WORD MARKINGS			
ITEM	m ²	ITEM	m ²
YIELD	2.23	BRE	0.46
SCHOOL	3.25	SLOW	2.24
SIGNAL	2.31	STOP	2.04
TURN	2.23	LEFT	1.76
HERE	2.42	VEHICLES	3.90

- (3) Minor variations in dimensions may be accepted by the Engineer.
- (4) Portions of a letter, number or symbol may be separated by connecting segments not to exceed 50 mm in width.

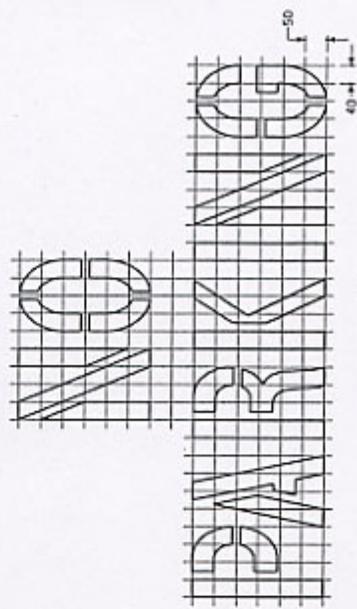
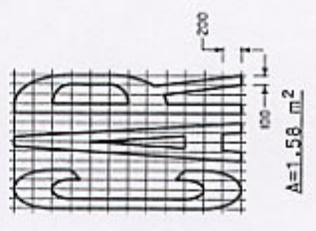
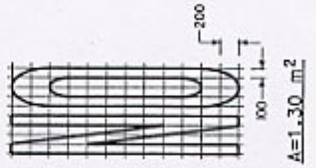
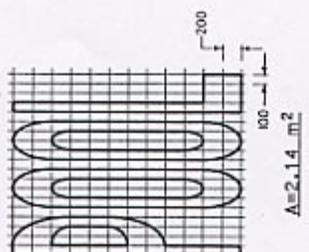
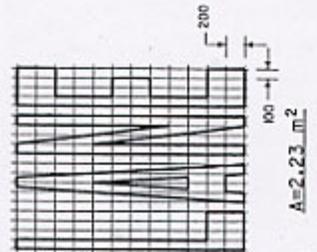
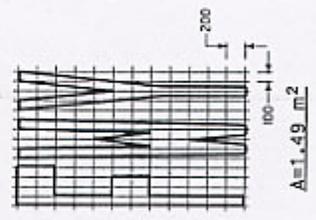
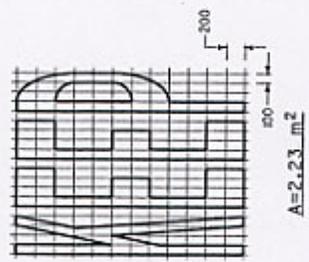
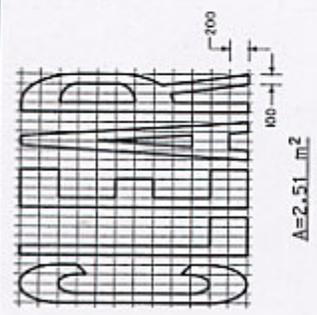
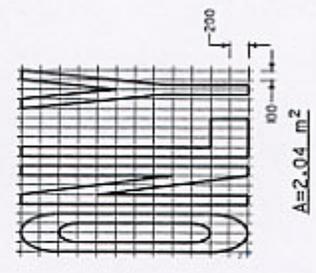
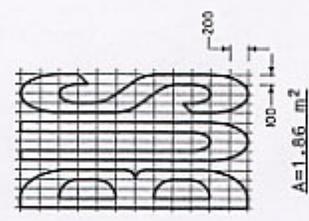
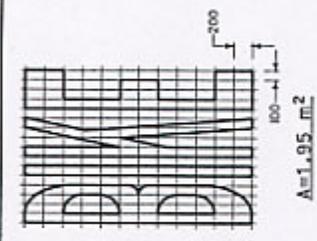


 COUNTY ROUTE PROJECT NO. 0300100101
 DATE: JULY 1, 2004
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]
 PROFESSIONAL ENGINEER
 No. 15-102-31
 State of California
 To get the Contract with AEC, go to: <http://www.AEC.org>

CROSSWALK AND LIMIT LINE



Direction of travel



A=0.21 m²
See Notes 6 and 7

ITEM	m ²	ITEM	m ²
LANE	2.23	NO	1.30
FOOT	2.14	BIKE	1.95
CAR	1.58	BUS	1.86
CLEAR	2.51	ONLY	2.04
KEEP	2.23	FWD	1.49

- Crosswalks contiguous to schoolgrounds are to be 300 mm yellow lines in place of 300 mm white shown.
- The words "NO PARKING" pavement marking is to be used for parking facilities. For typical locations of markings, see Standard Plans A20A and A20B.
- The words "NO PARKING" should be painted in white letters no less than 300 mm high on a contrasting background and located so that it is visible to traffic enforcement officials.

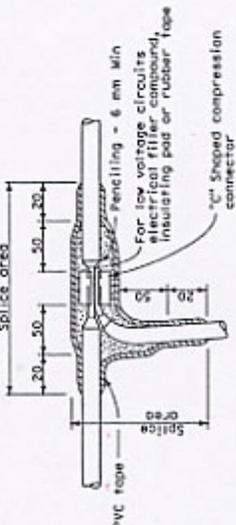
scope consists of more than one word, it should read "UP".
 first word should be nearest the driver.
 re between words should be at least four times the height
 characters for low speed roads, but not more than ten times
 ht of the character. The space may be reduced
 enery where there is limited space because of local conditions.
 riations in dimensions may be accepted by the Engineer.
 of a letter, number or symbol may be separated by connecting
 is not to exceed 50 mm in width.

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
PAVEMENT MARKINGS
WORDS AND CROSSWALKS

NO SCALE

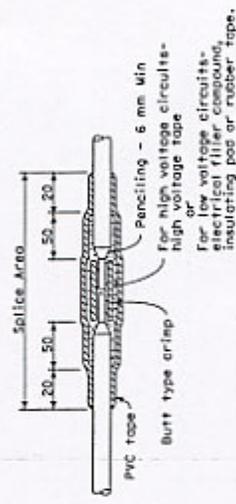
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	COUNTY	ROUTE	SECTION	POST MILE	MARKING
					
<i>Spade Type Splice</i> ELECTRICAL SYSTEMS					
JULY 1, 2004 PLAN SYMBOL DATE					
THIS PLAN IS THE PROPERTY OF CALTRANS AND IS TO BE USED ONLY FOR THE PROJECT AND LOCATION SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.					
To go to the Caltrans web site, go to: http://www.dot.ca.gov					



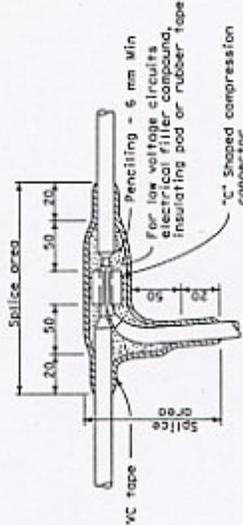
TYPE "C" SPLICE

Between 1 Free-end and 1 Through conductor



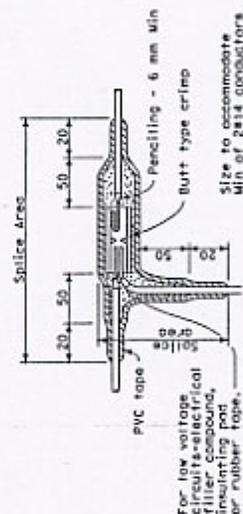
TYPE "S" SPLICE

Between 2 Free-ends



TYPE "T" SPLICE

For 3 free-ends



TYPE "ST" SPLICE

NOTES

1. Dimensions are minimum.
2. Rubber tapes shall be rolled after application.

INSULATION METHODS

Low Voltage Circuits (0-600 V)

METHOD "B"

1. Completely cover the splice area with electrical insulating coating and allow to dry.
2. Apply 2 layers of electrical insulating pad with minimum thickness of 4 mm each layer or 2 layers, half lapped, symmetric oil resistant, self fusing rubber tape.
3. Apply 3 layers half lapped polyvinyl chloride tape.
4. Cover entire splice with electrical insulating coating and allow to dry.

High Voltage Circuits (Over 600 V)

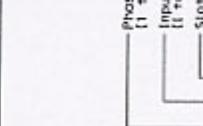
1. Completely cover the splice area with electrical insulating coating and allow to dry.
2. Apply high voltage tape to a minimum thickness equal to original insulation.
3. Apply 3 layers half lapped polyvinyl chloride tape.
4. Cover entire splice with electrical insulating coating and allow to dry.

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
**ELECTRICAL SYSTEMS
 (SPLICING DETAILS)**

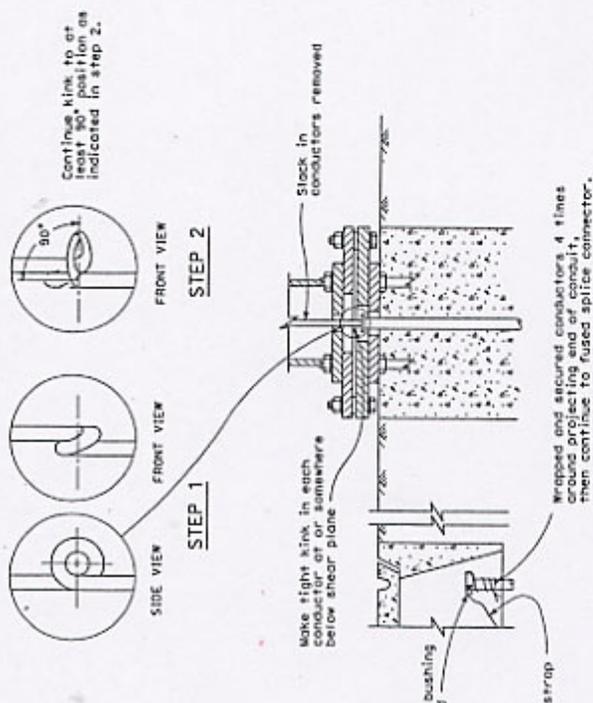
Caltrans
Metrie

REGISTERED ELECTRICAL ENGINEER
MELVIN L. JAMES
JULY 3, 2004
PLANS APPROVAL DATE
The State of California is the authority on the registration of electrical engineers and the authority of all electrical work done in the State.
To get to the Caltrans web site, go to: <http://www.dir.ca.gov>

DIST COUNTY ROUTE PROJECT NO. SHEET NO. TOTAL SHEETS



TYPICAL BANDING OF CONDUCTOR ENDS



KINKING DETAIL FOR SLIP BASE STANDARDS

Primary lines of multiple ballasts shall be provided with fused connectors. Fuse ratings shall be as noted below.

CIRCUIT VOLTAGE RATING	FUSE CURRENT RATING														
	HPS LAMP BALLAST				LOW PRESSURE SODIUM BALLAST				INDUCTION SIGN LIGHTING TRANSFORMERS (PRIMARY SIDE)						
	70 W	100 W	150 W	200 W	250 W	310 W	400 W	55 W	90 W	135 W	180 W	65 W	1 kVA	2 kVA	3 kVA
120 V	5	5	5	5	6	10	10	5	8	10	10	5	10	25	35
240 V	5	5	5	5	5	5	5	3	4	5	5	5	5	10	20
480 V 500-600 V	5	5	5	5	5	5	5	2	2	3	3	1*	3	6	10

* See Standard Plan ES-150, Type SC3 Control.

FUSE RATINGS FOR FUSED CONNECTORS
LUMINAIRE BALLAST FUSING

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
ELECTRICAL SYSTEMS AND WIRING DETAILS AND FUSE RATINGS

NO SCALE
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Calltrans

PROJECT NO. 001
SHEET NO. 10/11

DIST. COUNTY ROUTE
SANTA CLAYTON 100

DATE: July 1, 2004
DRAWN BY: [Signature]
CHECKED BY: [Signature]

Professional Engineer
C.S. 3138
Exp. 5-20-05
1155 S. G Street
San Bernardino, CA 92415

To get to the Contract web site, go to: <http://www.pwt.com>



TABLE 2

Approach Speed km/h	Minimum D m	Downgrade Minimum D*	
		-3%	+3%
30	38	45	45
40	45	50	50
50	50	55	55
60	55	60	60
70	60	65	65
80	65	70	70
Over 80	70	75	75

* Use an sustained downgrade steeper than or equal to grades shown and longer than 1.6 km.

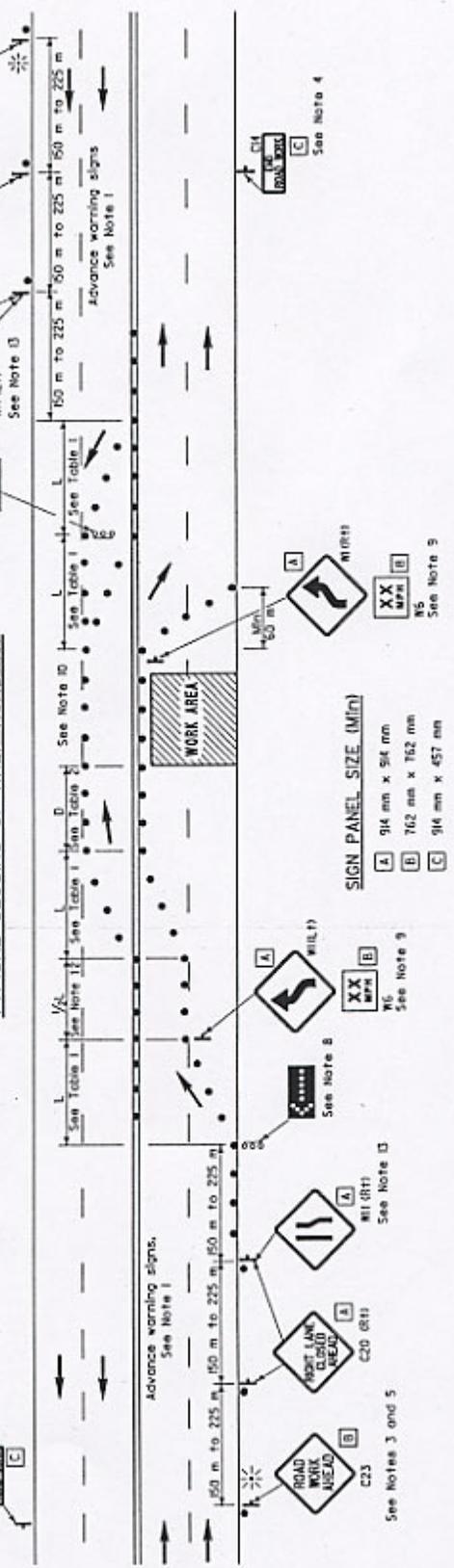
TABLE 1

Approach Speed km/h	Minimum L m	Max spacing of cones along taper
30	38	6
40	45	8
50	50	10
60	55	12
70	60	14
80	65	15

* Use L for lane widths less than or equal to 3.5 m.
** See Note 10

- LEGEND**
- Traffic Cone
 - Portable Sign
 - Direction of Travel
 - Flashing Arrow Sign (FAS)
 - FAS Support or Trailer
 - Portable Flashing Beacon

TYPICAL CLOSING OF HALF ROADWAY



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS

NO SCALE
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

- Approach speeds are low, advance flashing signs may be placed at 90 m spacing placed closer in urban areas.
- At least one person shall be assigned to provide time maintenance of traffic control devices lane closure unless, otherwise directed by Engineer.
- Advance warning sign in each direction shall be placed at the end of the lane closure. Each sign shall be at least 400 mm x 400 mm in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of work.
- "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane closure. The sign shall be placed in the posted or advisory speed limit, or ends in a taper project's limits.
- If the C23 sign would follow within 600 m of a stationary C23 or C11 "ROAD WORK NEXT MILES", use a C20 sign for the first advance warning sign.
- All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves) as specified in the specifications.
- Portable delineators, placed at one-half the spacing indicated for daytime closures, may be used instead of cones for daytime closures only.
- Flashing arrow signs shall be either Type I or Type II.
- Advisory speed will be determined by the Engineer. The WS Sign will not be required when maximum speed limit.
- The maximum spacing between cones along a taper shall be 15 m and along a taper shall be approximately as shown in Table 1.
- For approach speeds over 80 km/h, use the Traffic Control System for Lane Closure on Freeways and Expressways plan for lane closure details and requirements.
- Unless otherwise specified in the special provisions, the (L) shown between the two (L) lane closure tapers shall be used.
- When specified in the special provisions, a W1 Lane Ends Symbol sign is to be used in place of the C20 "RIGHT (LEFT) LANE CLOSED AHEAD" sign.

APPENDIX D – Electrical and SCADA Technical Specifications

SECTION 02050 DEMOLITION

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. General. This section covers the removal of existing facilities at the existing sites, in accordance with the Summary of Work, and Contract Construction Drawings.
- B. Site visit. It is the responsibility of the Bidders to visit the site and make their own determinations and conclusions as to the extent and difficulty of performing the removal work required in accordance with these specifications.
- C. Scope. All piping, slabs, and other appurtenant equipment and facilities not used for construction shall be removed from the site as directed by the City.

1.02 RELATED SECTIONS

1.03 PRESERVATION OF PROPERTY

- A. Existing facilities, which are to remain in place, shall be protected by the Contractor. Existing facilities which are to be razed, demolished, abandoned or removed shall also be protected in-place by the Contractor until the specified operation is scheduled for in the Sequence of Construction, called for in the General Requirements Division of these specifications.
- B. Any damage by construction operations to site improvements or existing facilities shall be repaired or replaced in kind by the Contractor at his expense and be acceptable to the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall notify and coordinate with the Owner 24 hours in advance of any delivery of salvaged equipment. The Owner will be responsible for unloading the equipment. Materials not needed or desired by the City shall become the property of the Contractor. The Contractor shall recycle as much of the material as possible. All material that is not recycled shall be disposed of in accordance with all applicable codes and regulations.
- B. Salvaged materials shall not be stored at the site of work unless approved by the City, and the Contractor shall remove in a timely manner all salvaged materials.
- C. Debris. Debris and refuse generated from removal operations shall be disposed of by the Contractor at his expense. The Contractor shall not allow the accumulation of debris or refuse in any quantity that represents a health or safety hazard, or that impairs any operations on site. All debris and refuse shall be disposed of off -site in a timely manner.

No debris or refuse shall be used as fill material or to fill voids caused by the removal of structures. Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

- D. Cleanup and Dust Control. Throughout all phases of removal the Contractor shall abate dust nuisance by cleaning, sweeping, and sprinkling with water or other means necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.
- E. Upon completion of the work, the site shall be cleared of equipment, unused materials and rubbish so as to present a satisfactory clean and neat appearance.

END OF SECTION

SECTION 13350
SCADA PROGRAMMABLE LOGIC CONTROLLER

PART 1 -- GENERAL

1.01 DESCRIPTION

A. General

This specification covers the following equipment.

1. Programmable Logic Controller (PLC) hardware.
2. Programming of PLC and the graphics for the operator interface.

B. Related Sections

1. Special Provisions – Submittals
2. Section 16010 – General Electrical Requirements
3. Section 13351 – PLC Panel

1.02 STANDARDS FOR SCADA PLC CONFIGURATION AND PROGRAMMING

The City has standardized on the PLC configuration to match existing units. The Contractor shall follow the SCADA Panel layout and configuration shown on the drawings and as specified to maintain a common template for operations and maintenance staff.

The City has standardized on programming logic and program structure to maintain a common template and to enable the SCADA PLC to interface with the SCADA Master Station. The City will furnish an electronic copy of a PLC program from a similar facility as a template and for informational purposes when requested by the Contractor.

The programming information furnished by the City is for informational purposes only, and shall not be interpreted as an agreement by the City to program this SCADA PLC. The Contractor shall be responsible for all programming modifications that may be required to customize the program furnished by the City for this specific SCADA installation.

In the event that the Contractor requires additional programming information the Contractor shall make the request documenting the information required on a

cover letter with the controls submittal, or by submitting a "Request for Information" (RFI) to the Engineer. The City will either respond in writing or will schedule a programming coordination meeting with the Contractor within 20 days.

1.03 SUBMITTALS

- A. Provide submittals per Special Provisions, Submittal Procedures and 01600, Product Requirements.
- B. Provide Catalog Cuts:
 - 1. Catalog information.
 - 2. Descriptive literature.
 - 3. External power and signal connections.
 - 4. Scaled drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.
- C. Provide detailed breakdown including:
 - 1. Description.
 - 2. Manufacturer, complete model number and all options not defined by model number.
 - 3. Quantity supplied.
 - 4. Component identification code where applicable.

1.04 CONTRACT CLOSEOUT

- A. Provide manufacturer's warranty certificates for items supplied under this section.
 - 1. Submit as-built drawings for PLC installations. Include a bill of materials, and show the physical layout of equipment in cabinet and physical routing of field wiring.
 - 2. Provide two copies of the final as-built operating program on CD ROM media after final approval by the City and issue updated printouts of the entire program for each copy of the O & M manual.

1.05 PROJECT/SITE CONDITIONS

- A. Design for the following Project/Site conditions:
 - 1. Elevation: Between 0 and 500 feet above mean sea level.
 - 2. Temperature: 0° F to 120° F.

PART 2 -- PRODUCTS

2.01 PROGRAMMABLE LOGIC CONTROLLER PRODUCTS

- A. Provide SCADAPack 350 PLC products as manufactured by Schneider Electric to match the City's Standard.

2.02 CENTRAL PROCESSING UNITS

- A. Provide SCADAPack 350 controller with 4MB memory, 24 VDC, (8) digital I/O, (5) analog inputs, Schneider Electric SCADAPack 350-1A00-AA00. Provide programming cables. No approved equal.

2.03 SOFTWARE

- A. Provide Telepace Ladder Logic with Programming Tools software with programming cables, Schneider Electric. No approved equal.

PART 3 -- EXECUTION

3.01 CONFIGURATION

- A. Provide PLCs configured as shown on the drawings.
- B. Provide the modules and I/O point configuration as shown on the Drawings and as specified herein.

3.02 WARRANTY

- A. Warrant equipment and installation for one year from the date of final acceptance by the City.
- B. Perform the following services during the warranty period:
 1. Repair or replace damaged modules returned for service. Spare parts shall not be used to replace damaged modules.
 2. Determine and report the cause of failure of modules returned for service.
 3. Resolve design problems discovered.

END OF SECTION

SECTION 13351

SCADA PANEL AND CONFIGURATION

PART 1 GENERAL

1.01 DESCRIPTION

- A. This specification section includes furnishing the materials and specialized equipment, and the shop fabrication, installation and testing of a fully integrated PLC based SCADA Panel.

This SCADA Panel shall include the standardized hardware and required components specified herein and as indicated on the drawings.

1.02 CITY STANDARDS FOR SCADA PANEL CONFIGURATION

The Contractor shall follow the SCADA Panel layout and configuration shown on the drawings to maintain a common template for operations and maintenance staff. The Integrator/Contractor shall be responsible to label the wires based on registers used in the PLC program for corresponding input or output.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the requirements of Special Provisions and Section 16010.
- B. Submit record of discrepancies noted between remote facility conditions and information in Contract Documents.
- C. Submit a complete list of equipment, materials, including:
 - 1. Panel configuration with internal panel layouts showing the configuration and the equipment installed. Indicate spacing and dimensions.
 - 2. Provide schematic diagrams showing all equipment in the SCADA Panel including internal wiring of subassemblies. Diagrams of subassemblies may be furnished on separate sheets.
 - 3. Submit shop drawings showing physical layout of equipment in PLC equipment cabinet. Include:
 - a. Scale Drawings: Location of equipment and physical routing of wiring. Show dimensions and locations of panel mounted devices, doors, louvers, subpanels, internal and external.
 - b. Panel Legend: List front of panel devices by tag numbers,

nameplate inscriptions, service legends, and annunciator inscriptions.

- c. Bill of Materials: List devices mounted within panel that are not listed in panel legend. Include tag number, description, manufacturer, and model number.
 - d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.
 - e. Construction Notes: Finishes, wire color schemes, wire ratings, wire, terminal block numbering, and labeling scheme.
4. Identify each device by a unique number or number-letter combination referenced to the Bill of Materials.
 5. Conductor Identification: Identify each conductor by a consecutive unique number, letter, or number-letter combination per drawings. Each conductor shall have the same identification at all terminals and tie points. Conductors connected to the same terminal or tie point shall have the same identification.
 6. Provide interconnection drawings for field wiring.
 - a. Diagrams, device designations, and symbols in accordance with NEMA ICS 1.
 - b. Diagrams shall bear contractors mark showing that they have been coordinated.
 - c. Show:
 - i. Electrical connections between equipment, consoles, panels, terminal junction boxes, and field mounted components.
 - ii. Component and panel terminal board identification numbers, and external wire and cable numbers.
 - iii. Circuit names matching Circuit and Raceway Schedule.
 - iv. Intermediate terminations between field elements and panels for, but not limited to terminal junction boxes.
 - v. Pull boxes.
 7. Catalog cuts of all devices used.
 - a. Catalog information.
 - b. Descriptive literature.
 - c. External power and signal connections.
 - d. Scaled drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.
 8. Nameplates, designations, sizes, and mounting methods.

1.04 OPERATIONS AND MAINTENANCE MANUALS

- A. Submit operation and maintenance manuals in accordance with Section 16010.
- B. Submit as-built drawings for SCADA installations. Include a bill of materials, and show the physical layout of equipment in cabinet and physical routing of field wiring incorporating any manufacturing or field changes.

1.05 AUTOCAD RECORD DRAWINGS

- A. Provide three identical copies of the record drawings of the SCADA installation on CD-ROM using AutoCAD drafting software, Release 2010 or newer version as approved by City.
- B. These drawings shall be prepared in accordance with the requirements of the Special Provisions and Section 16010. The drawings shall reference all wire numbers, wire colors, terminal block numbers and also tag names coded for all cables, conduits, wireways and all components and equipment. Methodology for assigning tag names for components and equipment shall be based on ANSI/ISA Standard 5.1-1984.

1.06 CONTRACT CLOSEOUT

- A. Provide manufacturer's warranty certificates for items supplied under this section

PART 2 MATERIALS

2.01 GENERAL

- A. Control panels and devices shall comply with the requirements of Section 16010.
- B. Control panel construction shall comply with UL508A requirements and have UL508A label, unless otherwise noted.

2.02 SCADA CONTROL PANEL ENCLOSURE

- A. Control Panel Enclosure for the SCADA Panel shall be a steel enclosure sized as indicated on drawings. Enclosure shall be Hoffman, or City approved equal. The enclosure shall be rated for outdoor use and shall have a minimum NEMA 4 rating.

2.03 SCADA CONTROL PANEL WIRING

- A. All wiring within the SCADA Panel shall be No. 14 AWG conductor size unless otherwise shown on the SCADA Power Supply drawing. Colors shall be shown on the submittal for approval by the City.
- B. Analog terminal blocks shall be “fused” type on the positive side of the loop (white wire) with “knife” blade type terminal blocks for the negative side of the loop (black wire).
- C. Control cables shall be as specified in Section 16123.
- D. Instrumentation signal cables shall as specified in Section 16123.

2.04 MARKING

- A. Identify wire terminations with a number to correspond with the schematic diagrams, or PLC register assignment. Identification tags shall be preprinted white heat shrinkable tubing, Raychem Thermofit TMS or equivalent.
- B. Plainly and permanently identify control devices using the same identification as shown on the schematic diagrams. Show identification for devices inside the enclosure on the plate adjacent to, not on, the device.
 - 1. Exception No. 1: Where the size or location of the devices makes individual identification impractical, such as on electronic assemblies, use group identification.
 - 2. Exception No. 2: Where panel layouts do not permit mounting identification plates adjacent to components, such as relays, place the permanent relay identification on the relay where it is plainly visible, and provide a second identification on the top of the panel wireway cover directly below the relay. Identify the wireway covers to show their proper location.
- C. Identification plates for devices mounted inside and outside the control enclosure shall be one of the following:
 - 1. Laminated phenolic for engraving stock; a minimum of 0.062 inch thick. Hold plates in place with metallic drive screws or the equivalent. Use permanent adhesives for attaching nameplates to wireway covers.
 - 2. Non-corrodible metal; a minimum of 0.031 inch thick for engraving stock of 0.012 inch thick for embossing stock. Hold plates in place with metallic drive screws.

2.05 TERMINAL BLOCKS AT SCADA PANEL

- A. Provide terminal blocks for incoming and outgoing control wires. Wire and mount terminal blocks so that internal and external wiring do not cross over the terminals. Terminate no more than two conductors at each terminal. All terminal blocks are to be labeled.
- B. Terminate field wiring on the "field side" of the terminal blocks. Do not connect internal panel wiring to the "field side" of the terminal blocks. Do not connect field wiring to the "panel side" of the terminal block.
- C. Terminal blocks shall be modular, raised rail mounted, rated at 10 A, 300 V, capable of terminating wire sizes 12 through 18 AWG, constructed of thermoplastic and UL listed in accordance with UL 486A and 1059. Provide copper or brass current carrying parts electroplated with tin/lead. Terminal connection shall be a screw clamp pressure plate connection, designed such that the clamping screw does not clamp the screw directly to the wire.
- D. Analog terminal blocks shall be fused type on the positive side of the loop with knife blade type terminal blocks for the negative side of the loop. Provide fused terminal blocks where indicated.
- E. Provide symmetric steel assembly raised rails (so top face of terminal blocks are even with panduit face), end brackets, jumper devices, and other accessories as required for a complete terminal block assembly.
- F. Provide Allen-Bradley terminal blocks, or approved equal.

2.06 POWER DISTRIBUTION TERMINAL BLOCKS

- A. Terminal blocks shall be modular, raised rail mounted, rated at 30 A, 600 V, capable of terminating wire sizes 12 through 18 AWG, constructed of thermoplastic and UL listed in accordance with UL 486A and 1059. Provide copper or brass current carrying parts electroplated with tin/lead. Terminal connection shall be a screw clamp pressure plate connection, designed such that the clamping screw does not clamp the screw directly to the wire. Provide Allen-Bradley terminal blocks, or approved equal.
- B. Provide symmetric steel assembly raised rails (so top face of terminal blocks are even with panduit face), end brackets, jumper bars, and other accessories as required for a complete terminal block assembly.
- C. Consecutively number terminal blocks on both sides from top to bottom with preprinted white polyamide marking tags hot printed with permanent black symbols. Provide Allen-Bradley markers, or approved equal.

2.07 SCADA FUSE BLOCKS FOR POWER DISTRIBUTION

Provide fuse blocks within the SCADA Panel at locations shown. Fuse block identification and terminal assignment shall be as shown on the SCADA drawings.

- A. Terminal blocks shall be modular, rail mounted, rated at 12 amp, 300 volt, capable of terminating wire sizes 12 through 18 AWG, and UL listed. Terminal connection shall be a screw clamp pressure plate connection, designed such that the clamping screw does not clamp the screw directly to the wire. Provide Allen-Bradley fuse blocks, or approved equal.

2.08 SCADA POWER SUPPLY

- A. Power supply shall be 24 VDC, 5 amps, Automation Direct PSB24-120.

2.09 BATTERY CHARGER

- A. Battery charger (control module) shall be 24VDC, 360W, Automation Direct PSM24-BCM360S, with temperature sensor, Automation Direct PSM-TS..

2.10 BATTERY PACK

- A. Battery pack shall be rechargeable sealed lead-acid batteries in a compact sealed battery unit and provide backup power for the PLC control panel. Battery pack shall be 24VDC, 4.5Ah, 6A fuse, din rail mount, RLH Industries 8806-1205-01BB.

2.11 ETHERNET SWITCH

- A. Provide 5-port industrial Ethernet switch, 9.6-60 VDC, Hirschmann Spider 5TX, or approved equal.

2.12 CELL MODEM

- A. Provide Verizon Pantech UML290(LTE) USB Dongle for uplink to City SCADA system. Provide Aruba RAP-3WN-US with wall mount kit.
- B. Wireless configuration:
 - a. Comply with 802.11b/g/n Mobility Controller-managed RAP
 - b. Hybrid WLAN and air monitor
 - c. Configurable to support 802.11n HT 20/40 channels or mixed-mode deployment IEEE 802.11b/g/n
- C. Wired configuration:
 - a. 10/100BASE-T Ethernet, PoE capable
- D. User authentication: 802.1X, captive portal, MAC authentication or open access
- E. Policy-based forwarding for local resource access
- F. Antennas

- a. Integrated, omni-directional antenna elements for 2x2 MIMO
- G. Antenna gain: 2.0 dBi
- H. Power: 120V AC with AC-to-DC power adapter included

2.13 MISCELLANEOUS CONTROL DEVICES

- A. Provide control relays, time delay relays, etc. as shown on schematic diagrams or as required for correct operation. Relays shall be Allen-Bradley, or approved equal.
- B. Provide indicator lights, selector switches, push buttons, meters, etc., as shown in the schematic diagrams, single line diagrams, and as required for correct operation. Mount on the front panel of the control enclosure.
- C. Pilot Lights: Provide standard full size (30.5 min mounting hole) round, transformer type, NEMA Type 4/13 for indoor and exterior areas, complete with color of lens indicated on drawings. Lamps shall be high-density light emitting diodes. Indicating lights shall be push-to-test type.

2.14 SCADA WIRING METHODS

- A. Contain wiring in panel wireways, including incoming and outgoing field control wiring. Provide white or light gray colored PVC or noryl panelways with restricted slot design, matching snap on covers, holes and nylon "push" rivets for mounting. Provide Panduit products or equal.
- B. Provide minimum 2 inches of clearance between panel wireway and wire terminations to allow for clear viewing of wire identification marking.
- C. Wiring to miscellaneous control devices on the back panel, or where a screw fastened cable tie mount may be installed, shall be tied together at short intervals and secured to mechanically fastened screw mount cable tie mount. Cable tie mounts shall be UL recognized, and of either metallic, or black, outdoor rated, weather resistant nylon or polypropylene construction. The minimum size of tie mounts shall be restricted to selection of mounts with manufacturer's recommended screw size of # 8 or # 10. The use of self adhesive cable tie mounts shall not be acceptable.
- D. Wiring to control devices where a screw mount is not possible including the front door, hinged door panel, or enclosure sides, shall be tied together at short intervals and secured to panel with epoxy applied metallic swivel cable tie mount kits Panduit part No. ASMS-A-X, or low profile epoxy adhered metallic mounts Panduit part No. MBMS-S10-C adhered to door with epoxy, Panduit part No. EMA-X, or, or equal. The use of self-adhesive cable tie mounts shall not be acceptable.

E. Enclose wiring between panel and front door in gapped polyethylene spiral wrapping.

F. Physically separate analog signal wiring from control output and power wiring

PART 3 EXECUTION

3.01 FACTORY TESTS

A. Inspect and test control panel for correct operation. Test each circuit for continuity, short circuits, and ground faults. Factory Test shall be witnessed by the Engineer and the City.

B. Prior to Factory Test provide the following to Engineer and City:

1. Preliminary Test Procedures: Outline of proposed tests, forms, and checklists.

2. Proposed test procedures, forms, and checklists.

3. Capacity, Timing, and Simulation: Describe in test procedures simulation and monitoring methods used to demonstrate compliance with capacity and timing requirements. Cover capacity and timing requirements to support equipment provided under Contract Documents and designated future components. Include calculations to support these proposed test procedures.

C. After completion of Factory Test provide Test Documentation: Copy of signed off test results when tests are completed.

3.02 SITE ACCEPTANCE TESTS

A. Test control panel with all field wiring connected. Set all adjustable set points and time delays as required. Check operation of control panel and field devices and perform required adjustments for correct operation.

B. For Site Acceptance Test provide the following to Engineer and City:

1. Preliminary Test Procedures: Outline of proposed tests, forms, and checklists.

2. Final Test Procedures: Proposed test procedures, forms, and checklists.

3. Test Documentation:

4. Copy of signed off test results when tests are completed.

5. Completed component calibration sheets.

3.03 FIELD WIRING

A. Terminate power and control wiring on terminal blocks, with terminal connections numbered per approved submittal.

- B. All wires must be marked with printed heat shrink tubing such as Brady WMS Series, or approved equal.
- C. Clearly label terminations with 50 Volts or more present with Brady Series 44000, Style B or approved equal. Identify voltage as appropriate.
- D. Bundle and tie down wires in Panel in a neat and orderly manner.
- E. For shielded cables, terminate shield at Panel terminal block only.

3.04 SERVICES OF MANUFACTURER

Provide the services of an authorized service representative of the Controls System Integrator to perform the following Inspection, Startup, Calibration and Training Services:

A. Inspection, Startup and Field Adjustment.

An authorized service representative of the Controls System Integrator shall be present at the site for a minimum of one (1) man day to witness the following and to certify in writing that the equipment and controls have been properly installed, adjusted, and readied for operation.

1. Inspection, checking and adjusting the equipment.
2. Startup and field testing for proper operation.
3. Performing field adjustments to ensure that the equipment installation and operation comply with the specified requirements.
4. Coordinate testing of I/O points with City.

B. Instruction of the City's staff

1. An authorized training representative of the Manufacturer or Controls System Integrator shall be present at the site for a specified period to instruct the City's staff in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment or laptop computer. Instruction shall be specific to the models of equipment provided including the PLC.
2. Training shall be scheduled a minimum of seven (7) working days in advance.

C. Control Systems Integrator

1. The Contractor shall contract with the City's approved Control System Integrator to perform items included in Section 3.4. The City's approved Integrator is Macro Automatics, Jay Kirsch (213) 392-3922.

3.05 WARRANTY

- A. Warrant equipment and installation for one year from the date of final acceptance by the City.
- B. Perform the following services during the warranty period:
 1. Repair or replace damaged modules returned for service.
 2. Determine and report the cause of failure of modules returned for service.
 3. Resolve design problems discovered.

END OF SECTION

**SECTION 13356
SCADA PLC PROGRAMMING**

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. This specification defines the Programmable Logic Controller software configuration programming work.

1.02 RELATED SECTIONS

- A. Section 13350 – SCADA Programmable Logic Controller
- B. Appendix D - Control Narrative

1.03 STANDARDS FOR SCADA PLC CONFIGURATION AND PROGRAMMING

- A. The Contractor shall follow the SCADA Panel layout and configuration shown on the drawings.
- B. The City will furnish an electronic copy of a PLC program from a similar facility as a template and for informational purposes when requested by the Contractor.
- C. The programming information furnished by the City is for informational purposes only, and shall not be interpreted as an agreement by the City to program this SCADA PLC. The Contractor shall be responsible for all programming for this specific SCADA PLC installation.
- D. In the event that the Contractor requires additional programming information the Contractor shall make the request documenting the information required on a cover letter with the controls submittal, or by submitting a "Request for Information" (RFI) to the Engineer. The City will either respond in writing or will schedule a programming coordination meeting with the Contractor within 20 days.
- E. The Contractor shall contract with the City's approved Control System Integrator to perform PLC configuration and programming. The City's approved Integrator is Macro Automatics, Jay Kirsch (213) 392-3922.

1.04 PROJECT SUBMITALLS

- A. Submit configuration of PLC and software documentation.

1.05 CONTRACT CLOSEOUT

Provide two copies of the final as-built operating program including PDF copies on CD ROM media after final approval by the City and issue updated printouts of the entire program for each copy of the O & M manual. Include legal PLC and HMI software and programming cables.

1.06 DEFINITIONS

"Ultimate Point Count" is defined as 200% of the initial point count.

PART 2 -- PRODUCTS

2.01 PROGRAMMING

- A. Programming of the PLCs shall adhere to the City's standards.
- B. The control descriptions comprise the functional design criteria of the SCADA system interface.
 - 1. Provide manual start/stop capabilities for all valves interfaced with the PLC.
 - 2. Provide a feedback fail alarm for all equipment interfaced with the PLC. The PLC-based fail alarm shall be initiated if a valve is commanded to start/stop by the PLC and the appropriate status feedback signal is not received within an adjustable time delay.
 - 3. All PLC and central alarm set points, control set points, and timer settings shall be selectable from a process graphic display with the appropriate password. Provide individual power and communication fail alarms for the each PLC.
- C. Control Strategy
 - 1. See Control Narrative in Appendix D.

2.02 CENTRAL COMPUTER PROGRAMMING

- A. Through the Contractor, the City's Integrator shall program and configure the existing central SCADA system for the functionality of this site.
- B. The Contractor shall be responsible for providing a detailed I/O listing to the City upon approved submittal of SCADA panel.

2.03 MANUFACTURER'S SERVICE

- A. The Contractor shall contract with the manufacturer of the PLC equipment to provide a qualified manufacturer's service person to do the following:

1. Supervision: Oversee the project regarding the installation of equipment.
2. Check the installation of all equipment prior to field testing and start-up.
3. Review the PLC logic at start-up.
4. Assist the Contractor in Factory and Field Testing.

2.04 FIELD TESTING

- A. The Contractor/Integrator shall perform thorough Field Testing, witnessed by the City and Engineer. Field testing shall include:
1. Point-to-point wire checking of all PLC I/O circuits.
 2. Verification of all analog loops.
 3. With all outputs disabled, manually activate each input device and check for status change at the appropriate input point.
 4. With all outputs which would cause mechanical motion disconnected, use forcing to verify that each output is properly addressed.
 5. Check program for proper logic, I/O and internal register address assignments, timer, counter and set point values.
 6. Functional testing of processes and alarms per Control Narrative.
 7. Functional testing of all communication networks.
 8. Monitoring of systems when first placed in "Auto" mode under PLC control.
 9. All hardware set-up modifications and program modifications shall be documented immediately.

PART 3 -- EXECUTION

NOT USED

END OF SECTION

SECTION 13423

FLOW INSTRUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Flow instruments installed permanently in field.
- B. Related Sections:
 - 1. Special Provisions – Submittal Procedures.
 - 2. Special Provisions – Product Requirements.
 - 3. Section 13485 - Instrument Index.
 - 4. Section 16010 – Basic Electrical Materials and Methods.

1.02 SUBMITTALS

- A. Product Data.
 - 1. Bill of Materials: List of required flow components/instruments.
 - a. Data Included:
 - 1) Equipment tag number.
 - 2) Description.
 - 3) Manufacturer, complete model number and all options not defined by model number.
 - 4) Quantity supplied.
 - 5) Component identification code where applicable.
 - 2. Catalog Cuts: IPS components, electrical devices, and mechanical devices:
 - a. Catalog information.
 - b. Descriptive literature.
 - c. External power and signal connections.
 - d. Scaled drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.
 - 3. Component Data Sheets: Data sheets for all components.
 - a. Format and Level of Detail: In accordance with ISA S20. Data sheets shall be developed using Microsoft Excel.
 - b. Include component type identification code on data sheet.
 - c. Specific features and configuration data for each component:
 - 1) Location or service.
 - 2) Manufacturer and complete model number.
 - 3) Size and scale range.
 - 4) Set points.
 - 5) Materials of construction.
 - 6) Options included.
 - d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
 - e. Submit hard copy printout of data sheets.
 - f. Submit electronic file copy of each data sheet.
 - g. One instrument per data sheet.

- B. Shop Drawings: Include the following:
 - 1. Connection diagram.
 - 2. Loop diagram.
- C. Manufacturer's Installation Instructions: Include mounting details.
- D. Certified factory and field calibration data sheets for instruments and devices that require set-up and calibration.

1.03 QUALITY ASSURANCE

- A. Provide sensing probe mounting hardware and manufacturer-supplied cable of sufficient length between sensing probe and transmitter.
- B. Manufacturer Qualifications: Manufacturer of proposed flow sensors of minimum five successful operating installation.

1.04 WARRANTY

- A. Submit manufacturer's standard warranty modified to comply with Contract Documents.

PART 2 PRODUCTS

2.01 Electromagnetic Flow Element and Transmitter:

- A. General:
 - 1. Function: Measure, indicate, and transmit the flow of a conductive process liquid in a full pipe.
 - 2. Type:
 - a. Electromagnetic flowmeter, with operation based on Faraday's Law, utilizing the pulsed dc type coil excitation principle with high impedance electrodes.
 - b. Full bore meter with magnetic field traversing entire flow tube cross section.
 - c. Shall not be insertion style magmeters or multiple single point probes inserted into a spool piece.
 - 3. Parts: Flow element, transmitter, grounding rings, interconnecting cables, and mounting hardware.
 - 4. Service:
 - a. Stream Fluid: Water
 - b. Suitable for liquids with a minimum conductivity of 5 microS/cm and for demineralized water with a minimum conductivity of 20 microS/cm.
 - 5. Operating Temperature:
 - a. Ambient: Minus 5 to 140 degrees F, or as noted.
 - b. Process: Minus 5 to 140 degrees F, or as noted.
 - 6. Performance:
 - a. Flow Range: As noted.
 - b. Accuracy: Plus or minus 0.5 percent of rate for all flows resulting from pipe velocities of 1 to 30 ft per sec.

- c. Turndown Ratio: Minimum of 10 to 1 when flow velocity at minimum flow is at least 1 ft per sec.
- 7. Features:
 - a. Zero stability feature to eliminate the need to stop flow to check zero alignment.
 - b. No obstructions to flow.
 - c. Very low pressure loss.
 - d. Measures bi directional flow.
- 8. Process Connection:
 - a. Meter Size (Diameter Inches): As noted.
 - b. Connection Type: 300-pound ANSI raised-face flanges; AWWA C207, Table 2 Class D.
- 9. Flange Material: Carbon steel, unless otherwise noted.
- 10. Power (Transmitter): 24VDC
- 11. Element:
 - a. Meter Tube Material: Type 316 stainless steel, unless otherwise noted.
 - b. Liner Material:
 - 1) Teflon, unless otherwise noted.
 - 2) For potable water service, must have appropriate approvals.
 - c. Liner Protectors: Covers (or grounding rings) on each end to protect liner during shipment.
 - d. Electrode Type: Flush or bullet nose as recommended by the manufacturer for the noted stream fluid.
 - e. Electrode Material: 316 stainless steel, unless otherwise noted.
 - f. Grounding Ring:
 - 1) 2 required, unless otherwise noted.
 - 2) Material: Type 316 stainless steel.
 - g. Enclosure: NEMA 4X, minimum, unless otherwise noted.
 - h. Hazardous Area Certification:
 - 1) Class 1, Division 2, Groups A, B, C, D: If noted.
 - 2) Class 1, Division 1, Groups A, B, C, D, and FM approved: If noted.
 - 3) Class 1, Division 1, Groups C, D, and FM approved: If noted.
 - i. Transmitter:
 - 1) Mounting: Remote (wall), unless otherwise noted.
 - 2) Display: Required, unless otherwise noted.
 - a) Digital LCD display, indicating flow rate and total.
 - b) Bi directional Flow Display: Required, unless otherwise noted.
 - (1) Forward and reverse flow rate.
 - (2) Forward, reverse and net totalization.
 - c) Parameter Adjustments: By keypad or non-intrusive means.
 - 3) Enclosure: NEMA 4X, minimum, unless otherwise noted
 - 4) Empty Pipe Detection: As noted.
 - a) Drives display and outputs to zero when empty pipe deleted.
- 12. Signal Interface (at Transmitter):
 - a. Analog Output: Isolated 4 to 20 mA dc for load impedance from 0 to at least 500 ohms minimum for 24V dc supply.
 - b. Discrete Outputs: If noted.
- 13. Cables:
 - a. Types: As recommended by manufacturer.
 - b. Lengths: As required to accommodate device locations.
- 14. Built in Diagnostic System:

- a. Features:
 - 1) Field programmable electronics.
 - 2) Self-diagnostics with troubleshooting codes.
 - 3) Ability to program electronics with full scale flow, engineering units, meter size, zero flow cutoff, desired signal damping, totalizer unit digit value, etc.
 - 4) Initial flow tube calibration and subsequent calibration checks.
- 15. Factory Calibration:
 - a. Calibrated in an ISO 9001 and NIST certified factory.
 - b. Factory flow calibration system must be certified by volume or weight certified calibration devices.
 - c. Factory flow calibration system shall be able to maintain calibration flow rate for at least 5 minutes for repeatability point checks.
- 16. Manufacturers:
 - a. McCrometer; UltraMag UM08 (300-pound service)
 - b. No equal accepted. Sole sourced to match equipment in use at the Owner sites.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install all instruments in accordance with the Manufacturer's recommendations.
- B. Wiring: Control System Strategies; and DIVISION16.
- C. Probe Type Conductivity Level Switches: Install in Control relay enclosure in non-hazardous location.

END OF SECTION

SECTION 13424

PRESSURE INSTRUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Permanently installed field pressure indicators with integral instrumentation devices.
- B. Related Sections:
 - 1. Special Provisions – Submittal Procedures.
 - 2. Special Provisions – Product Requirements.
 - 3. Section 13485 - Instrument Index.
 - 4. Section 16010 – Basic Electrical Materials and Methods.

1.02 SUBMITTALS

- A. Product Data.
 - 1. Bill of Materials: List of required flow components/instruments.
 - a. Data Included:
 - 1) Equipment tag number.
 - 2) Description.
 - 3) Manufacturer, complete model number and all options not defined by model number.
 - 4) Quantity supplied.
 - 5) Component identification code where applicable.
 - 2. Catalog Cuts: IPS components, electrical devices, and mechanical devices:
 - a. Catalog information.
 - b. Descriptive literature.
 - c. External power and signal connections.
 - d. Scaled drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.
 - 3. Component Data Sheets: Data sheets for all components.
 - a. Format and Level of Detail: In accordance with ISA S20. Data sheets shall be developed using Microsoft Excel.
 - b. Include component type identification code on data sheet.
 - c. Specific features and configuration data for each component:
 - 1) Location or service.
 - 2) Manufacturer and complete model number.
 - 3) Size and scale range.
 - 4) Set points.
 - 5) Materials of construction.
 - 6) Options included.
 - d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
 - e. Submit hard copy printout of data sheets.
 - f. Submit electronic file copy of each data sheet.
 - g. One instrument per data sheet.

- B. Shop Drawings:
 - 1. Connection diagram.
 - 2. Factory calibration data sheets for instruments and devices requiring set-up and calibration.
 - 3. Loop diagram.
- C. Manufacturer's Installation Instructions: Include mounting details.
- D. Field Calibration Data Sheets: Include for instruments and devices requiring set-up and calibration.

1.03 MAINTENANCE

- A. Spare Parts: Deliver one each of the following to OWNER:
 - 1. Pressure indicating transmitter.

PART 2 PRODUCTS

2.01 PRESSURE TRANSMITTER

- A. General:
 - 1. Function: Measure pressure and transmit signal proportional to pressure or level.
 - 2. Type: Electronic variable capacitance; two-wire transmitter; "smart electronics."
- B. Performance:
 - 1. Range: 0 to 800 psig, or as noted.
 - 2. Maximum Adjustable Range: Noted range shall lie between 40 percent and 80 percent of maximum adjustable range.
 - 3. Accuracy: Plus or minus 0.05 percent of span, unless otherwise noted. Provide minimum of 5-year "no-drift" warranty for device.
 - 4. Temperature: Operating range minus 20 degrees F to plus 250 degrees F, minimum.
 - 5. Humidity: 0 to 100 percent relative humidity.
- C. Features:
 - 1. Type: Gauge pressure, unless otherwise noted.
 - 2. Damping: Fluid or electronic type with adjustment.
 - 3. Indicator: Four-digit LCD indicating noted range.
 - 4. Suppressed or Elevated Zero: If required.
 - 5. Materials: Wetted parts including process flanges and drain/vent valves, Type 316 stainless steel, unless otherwise noted.
 - 6. Wetted O Rings: Glass filled TFE, graphite filled PTFE, or Viton, unless otherwise noted.
 - 7. Fill Fluid: Silicone, unless otherwise noted.
- D. Process Connections:
 - 1. Line Size: 1/2 inch or 1/4 inch, selectable.
 - 2. Connection Type: FNPT.
 - 3. Provide 3-valve manifold for isolation and calibration of instrument.
- E. Signal Interface:

1. 4 to 20 mA dc output for load impedance of 0 to 500 ohms minimum, without load adjustment with 24V dc supply.
2. Digital process variable signal superimposed on 4 to 20 mA signal; support HART□ protocol type device.

F. Enclosure:

1. Type: NEMA 4X, unless otherwise noted.
2. Mounting: Pipe or wall as noted. Provide stainless steel brackets with stainless steel bolts.
3. Housing: Modular with separate compartments for electronics and field connections. Epoxy coated aluminum, unless otherwise noted.

G. Manufacturers:

1. Rosemount; 2051TG with valve manifold
2. Endress+Hauser; Cerebar PMP71 with valve manifold
3. Or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install instruments in accordance with manufacturer's instructions and Section 16010.

END OF SECTION

SECTION 13455

I/O LIST

PART 1 GENERAL

1.01 SUMMARY

- A. The I/O list is not a take-off list. Refer to Drawings and Specifications for additional information. If there is any discrepancy between this list and the P&ID drawings, the P&ID shall govern.
- B. Abbreviations used in the Instrument Index are defined on the Drawings.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 I/O LIST

- A. I/O List attached.

END OF SECTION



City of Beverly Hills Zone 9 PRS: I/O LIST

DEVICE	LOOP DESCRIPTION	PLC	RACK	POINT	TYPE	ZERO STATE	ONE STATE	COMMENTS	P&ID
JS-001	AC POWER OKAY	PLC-1	1	0	DI	POWER FAIL	POWER OKAY		SHEET 9
YS-001	PANEL DOOR OPEN	PLC-1	1	1	DI	CLOSED	OPEN		SHEET 9
YS-002	BUILDING INTRUSION	PLC-1	1	2	DI	CLOSED	OPEN		SHEET 9
ZSC-001	VALVE #1 CLOSED	PLC-1	1	3	DI	CLOSED	OPEN		SHEET 9
ZSC-002	VALVE #2 CLOSED	PLC-1	1	4	DI	CLOSED	OPEN		SHEET 9
	--- SPARE ---	PLC-1	1	5					
XC-001	VALVE #1 PILOT VALVE COMMAND	PLC-1	1	6	DO	CLOSE	OPEN		SHEET 9
XC-002	VALVE #2 PILOT VALVE COMMAND	PLC-1	1	7	DO	CLOSE	OPEN		SHEET 9
PIT-001	UPSTREAM PRESSURE	PLC-1	1	0	AI				SHEET 9
PIT-002	DOWNSTREAM PRESSURE	PLC-1	1	1	AI				SHEET 9
	--- SPARE ---	PLC-1	1	2					
FIT-001	FLOW METER	PLC-1	1	3	AI				SHEET 9
	--- SPARE ---	PLC-1	1	4					

Type	Point
AI	3
AO	0
DI	5
DO	2
Total I/O	10

SECTION 13485
INSTRUMENT INDEX

PART 1 GENERAL

1.01 SUMMARY

- A. The Instrument Index is not a take-off list. Refer to Drawings and Specifications for additional information. If there is any discrepancy between this list and the P&ID drawings, the P&ID shall govern.
- B. Abbreviations used in the Instrument Index are defined on the Drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 INSTRUMENT INDEX

- A. Instrument Index attached.
 - 1. Instrument ranges for instruments with incomplete range information shall be provided during construction.

END OF SECTION

INSTRUMENT INDEX

TAG NO.	DESCRIPTION	P&ID NO.	PANEL NO.	INSTALL. DETAIL	OPTIONS	
PIT-001	PRESSURE TRANSMITTER	sheet 9	PLC-1	2 sheet 7	RANGE TRANSMITTER OUTPUT DISPLAY AND INTERFACE PROCESS CONNECTION	0-800 PSI 4-20MA w/HART PROTOCOL LCD DISPLAY ½ - 14 NPT FEMALE
PIT-002	PRESSURE TRANSMITTER	sheet 9	PLC-1	2 sheet 7	RANGE TRANSMITTER OUTPUT DISPLAY AND INTERFACE PROCESS CONNECTION	0-800 PSI 4-20MA w/HART PROTOCOL LCD DISPLAY ½ - 14 NPT FEMALE
FIT-001	FLOW INDICATING TRANSMITTER	sheet 9	PLC-1	Mfg. Rec.	RANGE PRESSURE RANGE POWER SUPPLY SIGNAL OUTPUT SIGNAL RANGE	EI. 321.00 300PSI MAX 24 VOLTS 4-20 MA 0-21 MA

SECTION 16010

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

Materials, installation, testing, start-up and training of the electrical system complete with meter socket, load center, SCADA Panel, and all equipment specified and shown on the Contract Drawings.

B. Related Work:

1. Special Provisions – Submittal Procedures

1.02 REGULATORY AGENCIES AND STANDARDS

A. Regulatory Agencies: Installation, materials, equipment and workmanship shall conform to the latest provisions of the following agencies:

1. National Fire Protection Association Standard 70 – National Electrical Code.
2. Occupational Safety and Health Act (OSHA).
3. Uniform Building Code (UBC).
4. Local authorities having lawful jurisdiction pertaining to the work required.
5. California Code of Regulations (CCR), Title 24, Part 3, California Electrical Code.

B. Underwriters' Laboratories, Inc. (UL): Materials, appliances, equipment and devices shall conform to the applicable UL standards.

C. Standards: Where referenced in these Specifications or on the Drawings, the publications and standards of the following organizations apply:

1. American Society of Testing and Materials (ASTM). National Electrical Manufacturers Association (NEMA).
2. National Fire Protection Association (NFPA).
3. American National Standards Institute (ANSI).
4. Institute of Electrical and Electronics Engineers (IEEE).
5. Insulated Power Cable Engineers Association (IPCEA).
6. International Electrical Testing Association, Inc. – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (NETA ATS).

SECTION 16010

GENERAL ELECTRICAL REQUIREMENTS

1.03 UTILITY COMPANY COORDINATION

- A. The Contractor shall coordinate and perform all work required for service by Southern California Edison (SCE). Application for service paperwork has been initiated by Owner. Make any service and installation agreements that the utility company may require.
- B. Furnish and install electric service entrance equipment in accordance with the serving utility's requirements. Coordinate with the serving utility to ensure timely connection by the utility. Obtain utility company approval of service entrance and metering equipment shop drawings prior to starting fabrication.

1.04 SUBMITTALS

- A. The Contractor shall coordinate submittals with the work so that the project will not be delayed. No extension of time will be allowed because of failure to properly schedule submittals.
- B. Submit shop drawings in accordance with Special Provisions – Submittal Procedures.
- C. Submit operation and maintenance manuals in accordance with Special Provisions.
- D. Submit shop drawings for all equipment and materials within 30 days after contract drawings approved.
- E. Submit shop drawings by Specification section, unless listed otherwise. Separate sub-sections by either tab dividers or separately bound booklets. Each section submittal shall be complete, with shop drawings provided for all components. Partial shop drawings for specification sections shall be rejected.
- F. Shop drawings returned to the contractor with a "Revise as Noted and Resubmit" status shall be resubmitted within fifteen (15) days.
- G. Submit shop drawings for review at least 20 days before reviewed drawings will be required for commencing the work.
- H. The following submittals should be assembled and delivered in separate binders:
 - 1. Meter socket
 - 2. Load Center
 - 3. SCADA Panel
 - 4. Conduit, Boxes, Handholes, Cable and Wiring Devices
 - 5. Electrical Miscellaneous Components – ground equipment, lights, poles, etc.
- I. Each submittal shall be bound in a three ring binder, which is sized such that when all material is inserted, the binder is not over 3/4 full. Binder construction shall allow easy removal of any page without complete manual disassembly. Spiral ring type binders are not acceptable.

SECTION 16010

GENERAL ELECTRICAL REQUIREMENTS

1. Each binder shall be appropriately labeled on the outside spine and front cover with the project name, contract number, equipment supplier's name, specification section(s), and major material contained therein.
2. An index shall be provided at the inside of the front cover. This index shall itemize the contents of each tab and sub tab section. Also list the project name, contract number and equipment's supplier's name, address and phone number on the index page.
3. Field equipment shop documents, panel equipment shop documents, drawings, and bill of materials shall be grouped under separate tabs. Shop documents shall be ordered in the same sequence as their corresponding Contract specification subsection. Failure to mark applicable products and to cross out non-applicable products shall cause rejection of the entire submittal.
4. Data summary sheets shall be provided to sub tab all shop documents for each individual piece of equipment. Data summary sheets shall be on blue paper.

The data summary sheets shall have the following information:

- a. Product identification; name used herein and on the Contract Drawings.
 - b. The manufacturer's model number, part number or other designation.
 - c. This shall include the specific numbers of all options.
 - d. Tag number per the Drawings.
- J. Do not commence any work until the required submittals are approved by Engineer according to Special Provisions: Submittals.

1.05 OPERATION AND MAINTENANCE MANUALS

- A. Submit Operation and Maintenance Manuals. The manuals shall describe the equipment and meet all the requirements in the Special Provisions and include the following:
1. Operating instructions and start-up procedures including receiving and installation requirements.
 2. Maintenance instructions listing preventive and corrective maintenance procedures. Corrective maintenance procedures shall identify the most probable failures and the appropriate repairs. Test measurement levels shall be referenced to specific test points on the installed equipment.
 3. Spare parts data shall be furnished for each item of material and equipment specified. The data shall include a complete list of parts and supplies, with current unit prices and source of supply. A list and itemized price breakdown of spare parts recommended for stocking shall be furnished. The parts selected shall be those, in the manufacturer's judgment, will be involved in the majority of maintenance difficulties encountered.

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4. A table listing the tag number, manufacturer and manufacturer's model number shall be provided to summarize the Bill of Material.
5. Control schematics, ladder diagrams and interconnection drawings.
6. Catalog cuts and technical manuals for all components of the system.
7. Originals of all guarantees and warranties issued for the various items of equipment, showing all dates of expiration.
8. Originals of all factory and field test results.
9. Final as-builts of all shop drawings, incorporating manufacturing and field changes. All drawings will be by 11x17 inch sheet size and also electronic format, AutoCAD on CD.
10. For items referenced under AutoCAD Record Drawings included in this Specification, provide a CD with files as required in "AutoCAD Record Drawings."
11. All catalog cut information, warranties, testing results and technical manuals shall be provided on CD in PDF format, in addition to hardcopy.
12. Operation and maintenance manuals to be delivered and approved prior to final approval and project completion.

1.06 RECORD DRAWINGS

- A. During progress of job, keep up-to-date one set of electrical drawings stamped with "As-Built". Dimension from the following readily obtained base lines:
 1. Exact location, type and function of concealed control equipment and devices.
 2. Exact elevation and locations and size of underground conduits.
 3. Show the dimensions, location and routing of electrical work which will become concealed.
- B. Maintain "As-Built" drawings weekly in conjunction with the actual progress of installation. Accurate progress drawings shall be available on site for examination by the Owner's representative.
- C. At completion of the project, deliver "As-Built" drawings to the Owner's representative.
- D. The Contractor shall guarantee the accuracy of the "As-Built" record drawings, and the AutoCAD record drawings for a period of one year after the Owner has accepted the project. During this time, the Contractor shall bear all costs associated with correcting deficiencies and inaccuracies of these Drawings. During this time, the Contractor shall also bear all costs necessary to field investigate any deficiencies, or inaccuracies and field trace wires if required by Project Engineer.

1.07 AUTOCAD RECORD DRAWINGS

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GENERAL ELECTRICAL REQUIREMENTS

- A. Provide two identical copies of the record drawings CD using AutoCAD drafting software.
- B. These drawings shall include information as described. The drawings shall reference wire numbers, wire colors, terminal block numbers and also tag names coded for all cables, conduits, wireways and all components and equipment. Methodology for assigning tag numbers for components and equipment shall be based on ANSI Standard 5.1-1984.
- C. The Contractor shall resubmit two identical copies of the entire AutoCAD drawing files for each revision necessitated.
- D. Provide AutoCAD record drawings for the following:
 - 1. Electrical Record Drawings, including schematic, and interconnect drawings with wire labels.
 - 2. Power Distribution.
 - 3. Conduit and Cable Routing Drawings, including labels.
 - 4. SCADA Panel wiring schematics and panel layout and Bill of Materials

1.08 CONSTRUCTION PROGRESS NOTIFICATION

- A. Provide written notification to Engineer one week prior to the start of the following construction events. Acceptable delivery methods for this notification shall include hand delivery at the weekly construction meeting, or by mail or by fax.
 - 1. Installation of underground work. Obtain Inspector's approval prior to backfill. The Inspector may direct uncovering of any work not so approved.
 - 2. Installation of meter socket.
 - 3. Start of wire pulling.
 - 4. Scheduled start date for field test, startup and training.

1.09 ELECTRICAL SUPERVISION

- A. Provide the electrician supervisor services at the job site for the man-days and requirements listed below, travel time excluded, at no extra cost to the Owner:
 - 1. Three man-days to assist the Owner's Representative in the startup and verification of system operation.
 - 2. Additional time as required to attend construction meetings when either:
 - a. Electrical submittals are being reviewed.
 - b. Electrical work, testing, or startup is being done.

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3. Additional time as required to maintain and update the field copy of the "As Built" drawings at least on a weekly basis when electrical work is being done. Each weekly update to the "As-Built" drawings shall be completed prior to the weekly construction meeting.

PART 2 - MATERIALS

2.01 GENERAL

- A. Similar materials and equipment shall be the product of a single manufacturer.
- B. Provide and install equipment and materials shown on the Drawings and as specified unless noted as "Not in Contract", "Future" or as "Existing to Remain". Provide only products which are new, undamaged and in the original cartons or containers.
- C. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current design.
- D. Materials and equipment shall be suitable for storage, installation and operation in an ambient of 0°C to 40°C except where more stringent conditions are stated in individual equipment specifications.
- E. Factory finished electrical equipment, wireways and panels with manufacturer's standard primer and enamel topcoats, unless stated otherwise in the individual equipment specifications. Provide 1 pint of the equipment manufacturer's touch-up paint.
- F. Concrete housekeeping pads are required for the Electric Equipment lineup. Housekeeping pads shall be 3 inches above finished grade, 6 inches longer on sides and 3 inches in front, than the supported equipment, unless otherwise shown on drawings.

2.02 TESTING LABORATORY APPROVALS

- A. Electrical materials and equipment shall be listed, certified or found acceptable by a recognized testing laboratory. Results of tests and inspections by the testing laboratory shall be submitted for review and approval to the local authorities having jurisdiction upon request. In testing the equipment, the following shall be considered:
 1. Suitability for installation and use in conformity with the provisions of the NEC.
 2. Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided.
 3. Wire bending and connection space.
 4. Electrical insulation.
 5. Heating effects under normal conditions of use and also under abnormal conditions likely to arise in service.
 6. Arcing effects.

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7. Classification by type, size, voltage, current capacity and specific use.
 8. Other factors which contribute to the practical safeguarding of persons using or likely to come in contact with the equipment.
- B. Recognized testing laboratories are as follows:
1. Underwriters Laboratories, Inc. (UL).
 2. Electrical Testing Laboratories (ETL).
 3. Other testing laboratories will be acceptable if approved in writing by the local authorities having lawful jurisdiction.
- C. Provide the testing laboratory label on equipment material and devices.

2.03 WARRANTY

- A. Equipment materials and installation shall be guaranteed for a period of one year after the date of final acceptance of the work by the Owner. Repair or remove and replace any and all work that is found to be defective in workmanship and/or materials within said one year periods, without expense whatsoever to the Owner.
- B. Respond to repairs within 48 hours after notice from the Owner.
- C. Warranties, Guarantees, Certificates, etc: Shall be furnished for all equipment and materials under this Division, and shall be properly filled out as of date of acceptance and delivered to the Owner.
- D. The Owner reserves the right to perform maintenance with their own staff, as necessary to meet Owner operational requirements, without voiding warranties.

2.04 NAMEPLATES

- A. Nameplates shall be fabricated from black-letter, white-face laminated plastic phenolic engraving stock, Formica type ES-1, or equal. Each shall be fastened securely using fasteners of stainless steel screws, screwed into inserts or tapped holes as required, or attached by adhesive cement glue. Engraved characters shall be block style with no characters smaller than 1/8-inch high. All electrical equipment shall have a nameplate attached. This applies to exterior conduits, pullboxes, splice boxes, manholes, MCCs, control panels, transformers, switches, etc. Exterior conduits shall have phenolic tags adhesive epoxied to the interior of manholes. Interior conduits shall have stainless steel stamped tags with stainless steel tie wire. Every conduit shall be labeled, both ends.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Terminate wires and cables at the proper termination point per the manufacturer's recommendations. The Drawings indicate connections for typical equipment only. If the equipment or connections are different from what is shown, provide the modifications

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GENERAL ELECTRICAL REQUIREMENTS

necessary for a safe and properly operating installation in accordance with the equipment manufacturer's recommendations.

- B. The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment and other items. Verify field conditions to determine exact location based on physical size and arrangement of equipment, finished elevations and obstructions.
- C. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the Electrical systems shall be accomplished without additional cost or delays to the Owner.

3.02 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

- A. Demonstration of the functionality of the systems shall not be construed as acceptability of the complete system. Acceptance will only be made on satisfactory demonstration of the functionality of the system as a whole.
- B. If, in the opinion of the Engineer, test results show improper adjustment, operation, or performance of any equipment, the Contractor shall remedy the situation at no additional cost.

END OF SECTION

SECTION 16060

GROUNDING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: Grounding
- B. Related Work:
 - 1. Section 16010: General Electrical Requirements
 - 2. Section 16123: Wire and Cables

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with the Special Provisions.
- B. Submit material list and catalog cuts for all grounding materials and equipment. Indicate size, material and manufacturer.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Include test results as part of the Operation and Maintenance Manuals in accordance with the Special Provisions.

PART 2 - MATERIALS

2.01 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms

2.02 GENERAL

- A. Materials shall comply with Section 16010.

2.03 GROUND RODS

- A. Provide copper-clad steel, $\frac{3}{4}$ -inch diameter, minimum 10 feet long, with hardened steel points.

2.04 GROUND CONNECTORS

- A. Products shall be listed and labeled as grounding connectors for the materials used.
- B. Above ground installations: Mechanical and/or compression type connectors.
- C. Below ground installations: Compression type connectors only.

2.05 GROUND CONDUCTORS

- A. Underground ground conductors not in conduit shall be annealed bare standard copper

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GROUNDING

conforming to ASTM B8. Size shall be #3/0 copper minimum unless noted otherwise on the Drawings.

- B. Ground conductors in conduit shall comply with Section 16123 for Power Wire and have green insulation.

2.06 GROUND WELLS

- A. Ground wells shall be 10-1/2" x 17-1/2" pull boxes with steel bolt down type cover, inscribed "GROUND".

PART 3 - EXECUTION

3.01 GROUND ELECTRODE

- A. Bond the metallic piping system to the grounding system in accordance with NEC Article 250. Bond all structural steel, water pipes, rebar mats and as shown on the Drawings for a complete ground electrode system.

3.02 EQUIPMENT GROUNDING

- A. Connect the ground buses of panelboards, switchboards, and motor control centers to the ground bus within the main service switchboard with a grounding conductor.
- B. Install insulated throat grounding bushings on all conduits. Ground raceways and non-current carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding in addition to the grounding conductor installed in each conduit. Grounding as part of the conduit system shall be in addition of any ground conductors shown on the drawings. Connect each conduit grounding bushing to the equipment ground bus with a ground conductor sized in accordance with NEC Article 250.
- C. Ground transformer enclosure and wye transformer's secondary.
- D. Ground all gates, fences, and handrails, even if not shown on Drawings. Grounding conductor from ground grid to gates, fences and handrails shall be #2 AWG minimum.

3.03 FIELD TESTING

- A. Before placement of sidewalks, landscape and paving, measure the resistance of each electrode to ground using a ground resistance tester. Perform the test not less than two days after the most recent rainfall and in the afternoon after any ground condensation (dew) has evaporated.
- B. After all individual ground electrode readings have been made, interconnect ground grid as required and measure the system's ground resistance at the panel ground bus and at each ground electrode.
- C. Do not energize the electrical power system unless the system ground resistance is less than 5 ohms at all points tested. For system ground resistance greater than 5 ohms and for individual electrode ground resistance of 5 ohms or more, notify the Engineer.

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GROUNDING

- D. Inspect and test in accordance with NETA ATS, Section 7.13.

END OF SECTION

SECTION 16111

RACEWAYS, BOXES AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included:
 - 1. Raceways
 - 2. Boxes
 - 3. Fittings
 - 4. Supporting Devices
- B. Related Work:
 - 1. Section 16010: General Electrical Requirements
 - 2. Section 16060: Grounding

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with Section 16010.
- B. Submit material list and catalog cuts for devices and materials.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Raceways, boxes and fittings shall comply with Section 16111.

2.02 RIGID STEEL CONDUIT AND FITTINGS

- A. Material:
 - 1. Rigid Steel Conduit and Fittings: ANSI C80.1 and UL-6, hot dipped galvanized after threading.
- B. Fittings:
 - 1. Locknuts: Steel or malleable iron.
 - 2. Bushings: Threaded, grounding type, malleable iron, with 105°C rated plastic insulated throat. Provide grounding type bushings on all rigid steel conduits. Plastic bushings with a temperature rating of 105°C may be used for PVC conduits or conduits containing 24 VDC circuits.
 - 3. Box Connectors for Exterior, Damp and Wet Locations: Provide watertight

threaded hubs consisting of sealing fitting with tapered conduit thread, neoprene O-ring, and 105°C rated insulating throat with grounding and bonding lug.

4. Couplings: Threaded, hot dipped galvanized after fabrication.
5. Conduit Seals:
 - a. Drain and breather: Stainless steel.
 - b. Fiber and sealing compound: UL listed for use with the sealing fitting.

2.03 RIGID NONMETALLIC CONDUIT (PVC) AND FITTINGS

- A. Material: Polyvinyl chloride (PVC), 90°C rise rating, conforming to NEMA TC-2 and UL-651.
- B. Conduit, Excluding Elbows, Risers, or Bends: Schedule 40 PVC.
- C. Elbows, Risers, or Bends: Rigid nonmetallic conduit for elbows, risers, or bends are not acceptable. Refer to Part 3, Conduit Usage Schedule.
- D. Couplings, adapters, bell ends, expansion couplings, elbows and turns of 30° degrees shall be factory made to NEMA standards TC-2 and TC-3.
- E. Joint Cement: As recommended by manufacturer as suitable for the climate, furnished with instructions to achieve watertight joints.

2.04 PVC COATED RIGID METALLIC CONDUIT AND FITTINGS

- A. Material: Polyvinyl chloride (PVC) coated rigid steel conduit, hot-dip galvanized inside and out with hot-dip galvanized threads, conforming to NEMA RN-1 and UL-514B. Acceptable Manufacturers OCAL, Robroy, or approved equal.
- B. Fittings shall be PVC-coated ferrous, general service and corrosive location, UL listed.
- C. Rigid Hubs, Form 8 covers, and Liquid tight fittings shall be PVC-coated with uncoated male threads and locknut. Refer to Part 3, Conduit Usage Schedule.

2.05 All female ends of PVC-coated conduit fittings shall have a flexible PVC sleeve which extends from the female ends of the fitting and which will overlap the PVC coating on the conduit when the fitting has been installed. The length of the sleeve extensions shall be at least equivalent to the nominal conduit size for sizes up through 2 inch. For sizes 2 – 6 inches, the length of the sleeve extensions shall be at least 2 inches. The inside diameter of the overlapping sleeve shall be less than the outside diameter of the PVC-coated conduit.

2.06 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Single strip steel, hot dipped galvanized prior to conduit fabrication with overall PVC jacket. Conform to UL-360.
- B. Fittings: Hot-dip or mechanically galvanized with insulated throat, locknut and sealing ring.

2.07 CONDUIT BODIES

- A. Provide threaded - hub cast ferrous or aluminum boxes. Provide with open type neoprene gaskets and matching cast ferrous covers, secured with at least two captive Type 304 stainless steel screws.

2.08 OUTLET BOXES

- A. Exposed Boxes: Cast iron or aluminum, with threaded hubs and mounting lugs.

2.09 JUNCTION AND PULL BOXES

- A. General: Construct of 12-gauge steel for boxes larger than 30" wide by 30" high, and 14 gage for smaller boxes. Provide factory made standard sizes and shop fabricate when non-standard size boxes are shown. Comply with UL and NEMA standards. Use where conduit bodies are not practical.
- B. Interior, exposed dry locations NEMA 1 pull boxes hot-dipped galvanized after fabrication in accordance with ASTM 123.
- C. Outdoor and wet locations or where indicated as weatherproof. Where located outdoors, in wet locations, or indicated as weatherproof and where threaded-hub cast boxes and fittings are not practical, provide pull boxes constructed of code-gauge steel, prime coated, and finish with two coats of rust-resistant paint. Color shall match surrounding decor. Install cover with Type 304 stainless-steel bolts. Provide NEMA 3R construction.

2.10 SUPPORTING DEVICES

A. Channel and Channel Conduit Clamps

- 1. Steel Channel: Steel channel 1-5/8 inches wide by 1-5/8 inches or 3-1/4 inches high by 12-gauge metal thickness conforming to ASTM A570, Grade 33. Hot-dip galvanize channels after fabrication per ASTM A123. Provide fittings and two piece U shaped conduit clamps formed from ASTM A570 Grade 33 Steel and hot-dipped galvanized after fabrication in accordance with ASTM 123. Provide Unistrut P1000HG for 1-5/8 inch channel, Unistrut P1001HG for 3-1/4 inch channels or equivalent.
- 2. Non-Metallic Channel: Glass-reinforced polyester or vinylester channel 1-5/8 inches wide by 1-5/8 or 3-1/4 inches high with 100% ultra-violet surface veil. Provide with two-piece U shaped polyurethane conduit clamps, glass fiber reinforced polyurethane fittings and vinylester-threaded rods. Provide Aickinstrut Inc., or equivalent.
- 3. Stainless Steel Channel: Provide stainless steel channel 1-5/8 inches wide by 1-5/8 inches by 12-gauge thickness, or as noted on Drawings.

B. Anchor bolts and Screws

- 1. Materials:
 - a. Indoor, Dry Locations: Anchor bolts and screws shall be ASTM A307 galvanized steel. Nuts shall be hex, ASTM A563 galvanized steel.

- b. Outdoor, Wet or Corrosive Areas: Anchor bolts and screws shall be Type 316 ASTM A276 stainless steel. Nuts shall be hex Type 316 stainless steel, ASTM A194, Grade SM, or ASTM F594, Type 316 stainless steel.

2. Types:

- a. Concrete: epoxy adhesive anchor bolts.

C. Conduit Clamps:

- 1. Beam Clamps: Malleable iron, electro galvanized finish.
- 2. Conduit Clamps: Malleable iron with hot dipped galvanized finish.
- 3. Clamp Backs: Malleable iron with hot dipped galvanized finish.
- 4. PVC Coated Clamps: Same as above except with .40 mil PVC coating.

2.11 UNDERGROUND PULL BOXES

A. General: Provide precast concrete units complying with ASTM C858 with a load designation of A-16. Dimensions indicated on drawings are inside box dimensions. Provide units manufactured by Associated Concrete Products, Brooks Products, Jensen Precast or equivalent.

B. Handholes: Refer to drawings for size. Provide handholes with concrete bolt down covers in unpaved areas and with flush mounted cast iron traffic covers with bolt downs and lifting hook in paved areas.

C. Concrete pull boxes and vaults: Provide with pull-in iron, hot-dipped galvanized cover with hot-dipped galvanized frame, and two galvanized cable racks with porcelain blocks on each of the two longest sides. Provide parkway rated covers in non-traffic areas and AASHTO H-20 traffic rated covers in traffic areas. Refer to Drawings for size. Secure covers with two stainless steel pentahead bolts to stainless steel insert nuts. After cables have been pulled and inspected, seal box between cover and frame with a mastic compound similar to Permagem, Dukaseal, or equivalent.

- 1. For pullboxes 2 feet by 3 feet and larger provide end hinged, torsion spring opening assist type cover assemblies. Provide single leaf assemblies for 2 feet by 3 feet pullboxes. Provide double leaf assemblies for pullboxes larger than 2 feet by 3 feet.

D. Cover Identification: engrave or bead weld handhole and pullbox covers to indicated services within pullbox as follows:

1.	<u>Service</u>	<u>Identification</u>
2.	Power	Electric
3.	General Area Lighting	Lighting
4.	Telephone	Telephone
5.	Ground Rods	Ground

- E. Joint Sealing Compound: Provide joint sealing compound conforming to Federal Specification SS-S-00210. Provide Associated Concrete Products Quickseal or equivalent.

2.12 CONCRETE – ENCASED DUCT BANKS

- A. Concrete shall conform to ASTM C94, with 2 day 2000 PSI comprehensive strength and minimum cement content of 376 pounds per cubic yard. Use a color additive for identification purposes: Brick red Colorfull, as manufactured by Owl Manufacturing Company, Arcadia, California; coral red Chrimix C-22 as manufactured by L.M. Scofield Company, Los Angeles, California; or equivalent. Add the color additive while the concrete is being mixed using the quantity per cubic yard of concrete recommended by the manufacturer for the class of concrete indicated.

2.13 CONDUIT TAGS

- A. Provide 3/8 inch high by 2-inch wide stainless steel tags with 3/16-inch machine printed or engraved lettering to all conduits, both ends. Lettering shall identify each conduit with a unique identifier based on ANSVISA STD. 5.1-1984.
- B. Attach conduit tags to conduit with stainless steel wire.

PART 3 - EXECUTION

3.01 CONDUIT AND SUPPORT USAGE SCHEDULE

- A. General: Install the following types of conduits, fittings and supports in locations listed, unless otherwise noted in the drawings.
- B. Interior Exposed
 - 1. Material: Galvanized rigid steel.
- C. Exterior Exposed
 - 1. Material: Galvanized rigid steel.
- D. Embedded in Concrete (excluding transitions through wetwell walls and equipment pads and all elbows, which shall be PVC coated rigid steel conduit):
 - 1. Material: Galvanized rigid steel.
- E. Underground Direct Burial, or Below Concrete Slabs:
 - 1. Material, (Excluding elbows, risers and bends): Rigid non-metallic PVC.
 - 2. Bends, elbows, and risers shall be made with PVC coated rigid steel conduit using threaded adapters.
- F. Final connections to instruments (pressure switches, valve limit switches etc.)
 - 1. Material: Liquid-tight flexible conduit and galvanized rigid steel fittings and supports.

2. Length: Minimum three feet conduit lengths for conduits 3 inches or larger. Minimum two feet for remaining conduit sizes. Maximum six-foot length.

3.02 RACEWAY FILL

- A. The conductor fill for all conduits shall be based on Annex C of the NEC, THW conductors or as shown on the Drawings, whichever is larger. The intent of this requirement is to furnish larger diameter conduit than the NEC Code requires for specific cable insulation. Compute the maximum conduit fill using NEC requirements for type THW conductors (or larger if applicable), although the actual wiring may be with conductors having smaller cross-sections.

3.03 BENDS

- A. Provide no more than three (3) 90-degree conduit bends or the equivalent number of smaller radius bends in any conduit run between boxes or equipment.
- B. Length of Run: 300 feet maximum, less 100 feet for each equivalent 90-degree bend.

3.04 CONDUIT INSTALLATION, GENERAL

- A. Conduit runs are shown schematically. Install concealed unless specifically noted on Drawings. Supports, pull boxes, junction boxes, and other ancillary equipment are not usually shown. Provide pull boxes and junction boxes where shown.
- B. Run exposed conduits parallel and perpendicular to surface or exposed structural members and follow surface contours as much as practical to provide a neat appearance.
- C. Make bends and offsets so that the inside diameter of conduit is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
- D. Cap all conduits immediately after installation to prevent entrance of foreign matter.
- E. Do not use diagonal runs except for concealed areas or when specifically shown in the drawings.
- F. Treat all threaded joints of rigid steel conduit with T&B Kopr-Shield before installing fittings, except where conduit is run in dry locations.
- G. Conduit Terminations:
 1. The ends of all rigid steel conduit or PVC coated rigid steel conduit shall be cut square, field reamed, all burrs removed and cleaned for pulling wire.
 2. Install conduits squarely to the box when terminating with locknuts and provide one locknut outside the box and one locknut and bushing inside the box. Install locknuts with dished side against the box. When terminating in threaded hubs, screw the conduit or fitting tight into the hub so that the end bears against the fire protection shoulder.
 3. When chase nipples are used, install the raceway and coupling square to the box

and tighten the chase nipple leaving no exposed threads.

4. Duct seal all conduits within Switchgear/MCC and SCADA Panel that are routed to exterior locations. Do not route conduits below or within concrete footing except to cross footing at 90- degree angles.

3.05 GROUNDING

- A. Provide grounding in accordance with Section 16060.
- B. Use grounding bushings for all rigid steel conduits. Bond to equipment frame and grounded conductor.
- C. Provide a grounding conductor in flexible and liquid tight flexible conduit, size conforming to NEC Article 250 -Equipment Grounding Conductors.

3.06 CONDUITS EMBEDDED IN CONCRETE AND BELOW SLABS

- A. Install conduits and sleeves passing through slabs, walls, columns or beams so as not to impair the strength of construction. Secure conduit to prevent sagging or shifting during concrete pour.

3.07 SUPPORTS

A. Maximum Spacing of Raceway Supports:

Raceway Size (Inches)	No. of Conductors In Run	Location	Support Spacing (feet)
HORIZONTAL RUNS			
3/4	1 or 2	Flat ceiling or wall	5
3/4	1 or 2	Where it is difficult to provide supports except at intervals fixed by the building construction	7
3/4	3 or more	Any location	7
1 & larger	1 or 2	Flat ceiling or wall	6
1 & larger	1 or 2	Where it is difficult to provide supports except at intervals fixed by the building construction	10
1 & larger	3 or more	Any locations	10
Any	....	Concealed	10
VERTICAL RUNS			
3/4	....	Exposed	7
1, 1-1/4	....	Exposed	8
1-1/2 and larger	....	Exposed	10

3.08 CONDUIT PENETRATIONS

- A. Unless otherwise indicated, dry-pack with nonshrink grout around raceways, which penetrate concrete block, masonry and concrete walls above grade, floors, or ceilings.
- B. Maintain the integrity of all damp-proofing and water proofing membranes that are penetrated by raceways and boxes.
- C. Nonshrink grout shall conform to the Corps of Engineers specification for Nonshrink Grout, CRD-621-88 and to these Specifications. Use a nongas-liberating type, cement base, premixed product requiring only the addition of water for the required consistency.

3.09 DAMAGED CONDUITS

- A. Replace all conduits that are damaged.
- B. Replace crushed or clogged conduit or any conduit whose inner surface is damaged or not smooth.
- C. Repair cuts, nicks or abrasions in the zinc coating of galvanized conduit with galvanizing repair stick, Enterprise Galvanizing "Galvabra" or equivalent.

3.10 EMPTY CONDUITS

- A. Provide 1,250-pound strength, 1/4-inch diameter braided yellow polypropylene pull cord in empty conduits.
- B. Provide a waterproof label on each end of the pull cords to indicate the destination of the other end in addition to conduit labels.

3.11 OUTLETS FOR GENERAL WIRING

- A. Use multi-gang boxes and device plates where several devices are located in the same general area. Obtain back box requirements for systems provided under other sections and provide them per those requirements.

3.12 UNDERGROUND PULL BOXES

- A. Set handholes and pull boxes level on a crushed rock base 18 inches thick with horizontal dimensions same as bottom of handhole plus 12 inches all around. Crushed rock shall be 3/4-inch maximum size, 1/4" minimum size. Set units parallel or perpendicular with adjacent structures.
- B. Seal pull box joints located between box cover, extension and bottom with joint sealing compound.
- C. Install covers flush within finished paved or concrete surfaces. In unfinished areas, install covers one inch (1") above finished grade.
- D. Prior to project completion, clean out debris and dirt in pull boxes with concrete bottoms.

3.13 UNDERGROUND CONDUITS

- A. Provide 24-inch-minimum cover at finished grade for direct burial underground conduit.

Provide 3-inch-minimum sand above and below conduit.

- B. Provide 24-inch minimum cover at finished grade above top of concrete for concrete-encased duct banks. Provide 2-inch minimum separation between conduits and 3-inch minimum concrete encasement around conduits. Extend the concrete encasement under any floor slabs or equipment mounting pads to the point of raceway termination. After the concrete envelope has set, pull a bristle brush through each raceway to remove debris. Underground conduits shall be concrete encased unless shown as direct buried on the Drawings.
- C. Where other utility piping systems are encountered or being installed along a raceway route, maintain a 12-inch-minimum vertical separation between raceways and other systems at crossings. Maintain a 12-inch-minimum separation between raceways and other systems in parallel runs. Do not place raceways over valves or couplings in other piping systems. Refer conflicts with these requirements to the Engineer for instructions before further work is done.
- D. Thoroughly clean conduits before laying. During construction and after completion, the conduit ends shall be kept plugged to prevent water from washing mud into the manholes or pull boxes.
- E. Terminate conduit in end bells in manholes and pull boxes and enter at right angles to the wall.
- F. Place conduit separators every 4 feet on centers and securely anchor to prevent movement.
- G. Earthwork
 - 1. The Contractor shall perform all excavation, trenching, compaction, and backfilling necessary or required for the construction of the conduits and appurtenances, as shown on the drawings. Excavations shall include the removal and disposal of all materials of whatever nature encountered, including all obstructions of every nature that would interfere with the proper construction and completion of the work. The Contractor will encounter rocks of various sizes within the trench and will be required to remove the material to an approved location.
 - 2. The work shall also include all pumping, ditching, and other required measures for the removal or exclusion of water from all excavations. It shall be the responsibility of the Contractor to dispose of all water.
 - 3. The Contractor shall also take care of drainage water from the construction operations, and of storm water and wastewater reaching the right of way from any source, so that no damage will be done to the trench, pipe, or other structures. The Contractor shall be responsible for any damage to persons or property on or off the right of way due to such drainage water, or to the interruption or diversion of such storm or wastewater on account of the Contractor's operations.
 - 4. All earthwork including materials, excavation, and backfill will conform to SSPWC, Sections 200, 207, 211, 300, 302, 306, or any other relevant section
- H. Excavation:
 - 1. All excavation work, including any required shoring or other provisions for worker

protection, shall be performed in accordance with these Technical Provisions, the applicable provisions of Subsection 306-1.1 of the SSPWC, the "Construction Safety Orders" issued by the State of California Division of Industrial Safety, and the County of Los Angeles Excavation Permit.

2. Excavation for the conduit and appurtenances shall be in open-cut trenches with vertical sides.
3. If it becomes necessary to excavate more than four (4) inches below the established grade line in order to remove rock, hardpan, shale, other interfering objects or due to Contractor error, the void shall be filled with pipe bedding material and compacted in accordance with SSPWC, Section 306-1.2.1 and this section at no additional cost to the Owner
4. The Contractor shall saw cut the existing A.C. pavement or concrete. Pavement breakers or stompers shall not be allowed. Contractor shall vacuum or remove AC or concrete cuttings during the saw cutting operation and shall not be allowed to wash AC or concrete cuttings into the storm drain system per the County of Los Angeles permit requirements.
5. All native material excavated from the proposed pipe trench excavation shall become the property of the Contractor and shall be disposed of by him outside the limits of work in accordance with the applicable ordinances and regulations of governmental agencies having jurisdiction. Costs of said disposal shall be the sole responsibility of the Contractor and no additional compensation shall be made therefor. It shall be the responsibility of the Contractor to locate suitable disposal sites, and obtain permits or other required authorizations

I. Conduit Bedding:

1. Conduit bedding shall be defined as that material supporting, surrounding, and extending from 4 inches below the bottom, to 12 inches above the top of conduit. Bedding material shall be sand, shall be free from clay and organic materials, and shall be of such particle size that 90-100% will pass a No. 4 sieve and not more than 5% will pass a No. 200 sieves performed in accordance with ASTM C136 and SSPWC, Section 306-1.2.1
2. For conduit bedding material, a sample of conduit bedding material shall be submitted to the Owner before construction. The Owner will perform a sieve analysis in accordance with ASTM C136 to determine if the conduit bedding material meets the requirements defined above.

J. Backfill:

1. Backfill shall be considered as starting 12 inches above the conduit to the street subgrade or finished ground. Backfilling operations shall conform to the applicable provisions of SSPWC, Subsection 306-1.3.
2. Backfill material shall be imported Crushed Aggregate Base (CAB) or Processed Miscellaneous Base material (PMB), or Crushed Miscellaneous Base (CMB) and contain no rocks or stones greater than two (2) inches in any dimension. Broken pavement or similar materials shall not be allowed. Backfill material shall be imported and approved by the Owner prior to placement of backfill.
3. Backfill within the conduit trench shall be compacted to ninety-five percent (95%)

of relative compaction from the bedding material to the street subgrade or finished ground. Hand-directed mechanical tamping or other similar approved methods shall be permitted when cover over the top of the conduits is greater than twelve (12) inches.

4. Backfill materials shall be compacted in maximum lift thickness of eight (8) inches. Use of equipment, which compacts by impact, vibration, or rolling, will not be permitted until cover over the conduits is in excess of twelve (12) inches. The depth of the compacted material on each side of the conduits shall be approximately the same during the entire backfilling operation.
5. The moisture content of the soil as determined by the required soil density shall be uniformly distributed throughout each layer. All backfill above the conduit bedding shall be mechanically compacted in accordance with SSPWC, Section 306-1.3.2
6. Compaction of trench backfill by ponding or jetting will be permitted when, as determined by the Owner or the Owner's representative, the backfill material is of such character that it will be self-draining when compacted and that foundation materials will not soften or be otherwise damaged by the applied water and no damage from hydrostatic pressure will result. Ponding and jetting methods shall be conducted in accordance with SSPWC, Subsection 306-1.3.3. Water jetting may be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required compaction.
7. Where supports of any nature are used in the trench, said supports shall all be removed unless otherwise approved by the Owner. Where tight sheeting is used, it shall be removed systematically as soon as practicable after backfilling by pulling alternate pieces along each side of trench, alternating also from one side of trench to the other.
8. All surplus excavated material not used in the compacted backfill of the conduit trench shall be disposed of by the Contractor at his own expense. It shall be the responsibility of the Contractor to locate such suitable disposal sites, and obtain permits or other required authorizations.
9. For backfill material, a sample of backfill material shall be submitted to the Owner before construction. The Owner will perform a sieve analysis in accordance with ASTM C136 to determine if the conduit backfill material meets the requirements defined above

K. Trench Resurfacing and Pavement Replacement:

1. The Contractor shall reconstruct all asphaltic concrete, concrete and dirt areas damaged or removed by the installation of the electrical system improvements. Trench resurfacing and replacement of AC and concrete pavement shall conform to SSPWC, Subsection 306-1.5 and the County of Los Angeles Excavation Permit requirements, where applicable.
2. Furnish materials, equipment and perform labor required to execute this work as specified and as necessary to complete the contract, including, but not limited to these major items:
 - a. Placement of temporary asphaltic concrete (AC) pavement.

- b. Removal and disposal of existing temporary AC pavement.
- c. Preparing subgrade, saw cut trench edges and edges of excavations before placement of asphaltic concrete or concrete pavement.
- d. Placement, spreading, compacting and surfacing of asphaltic concrete or concrete pavement per the County of Los Angeles Excavation Permit requirements (See Appendix A).
- e. Adjusting all metal frames and covers to the grade of the finished pavement
- f. The job site must be clear and free of all loose asphaltic concrete or construction debris during and after construction by an approved method.
- g. All Portland cement concrete and asphalt concrete pavements, gutters, driveways, curbs, and sidewalks, excavated or damaged shall be removed between neat vertical cuts, of an approved type or in the case of curbs, gutters, and sidewalks, between vertical cuts made by acceptable methods at the nearest score marks beyond the damaged portion as required in each case by the County of Los Angeles, Department of Public Works or Owner.
- h. All driveways, private roads, parking lots and other facilities not under the jurisdiction of a public authority, excavated or damaged by the Contractor, shall be reconstructed by the Contractor with the same kinds of materials as used in the original construction and to the same thickness and other applicable dimensions, as nearly as may be, in such manner as to restore the affected portions of all said driveways, parking lots and other facilities to a sound and serviceable condition satisfactory to the District; provided that the thickness of replaced concrete driveways shall be not less than 4 inches. The improvements to be restored by the Contractor shall include all pavements and other classes of surfacing whether in main roadways, parking lots or in shoulders, all curbs, gutters, driveways, sidewalks, drainage structures, lighting standards, walls, fences and any other surface improvements removed or damaged by the Contractor in course of his operations under contract.
- i. In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall cut back and rim the edges so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement, gutter, driveway, curb, or sidewalk. Damaged edges of pavement within street right-of-way or parking lot areas shall be trimmed back by saw cutting.
- j. Wherever the cut line of the pavement is within 24 inches of the curb face or the gutter line, as the case may be, the pavement shall be removed to the curb face or gutter line and replaced in kind.
- k. Wherever sidewalks, parking lots, driveways, or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks, driveways, or private roads promptly after backfilling and shall maintain them in a satisfactory condition for the period of time fixed by the District and authorities having jurisdiction over the affected portions before proceeding with final restoration or, if no

such period of time is so fixed, shall so maintain said temporary sidewalks, driveways, or private roads until the final restoration thereof is made.

L. Materials:

1. Materials shall conform to the requirements of the County of Los Angeles Excavation Permit requirements where applicable (See Appendix A).
2. Asphaltic concrete shall be per the County of Los Angeles requirements and shall meet the requirements of Section 203-6 of the SSPWC. The viscosity grade of paving asphalt shall be AR4000. County of Los Angeles inspector shall determine the exact proportions of aggregate and the amount of asphalt binder.
3. For bidding purposes, the Contractor shall assume the asphalt concrete mix design and limits will be:
 - a. 3/4" Base Course: Type III-B-2 (5.4% Asphalt) from the bottom of the existing pavement section plus 1" to within 1-1/2" of the existing surface.
 - b. 3/8" Surface Cover: Type III-E-5 (6.6% Asphalt) from the bottom of the base course to the top of the existing surface.
4. All paving equipment shall conform to the County of Los Angeles excavation permit requirements and Section 39-5 of the State of California Standard Specifications. Aggregate base for the pavement structural section shall be either Crushed Aggregate Base (CAB) or Crushed Miscellaneous Base (CMB) per the County of Los Angeles requirements.

M. Field Conditions:

1. Trench width may vary greatly due to the excavation and removal of rocks. The bidder shall verify actual field conditions and carefully examine the site of the work contemplated. It will be assumed that the bidder has investigated, and is satisfied, as to the conditions to be encountered.

N. Requirements:

1. Temporary resurfacing shall be minimum 2-inches thick and placed wherever excavation is made through pavement, sidewalk, or driveways. Contractor shall be required to install temporary A.C. pavement immediately after trench backfill is completed. Permanent resurfacing shall comply with the County of Los Angeles Permit requirements where applicable.
2. Contractor shall schedule final trench resurfacing with two weeks after completion of work. Contractor shall schedule final 1-1/2" AC Surface Course within 24 hours of completing the Base Course.

O. Inspection:

1. The Contractor shall notify the Owner a minimum of 48 hours prior to starting work.

P. Method of Measurement:

1. The actual area (square footage) of the trench resurfaced will be the basis of measurement.

3.14 CONDUIT IDENTIFICATION

- A. Identify conduits with conduit tags at the following locations:
 1. Conduit stub ups within electrical equipment.
 2. Underground pull boxes and handholes.
 3. Within 12 inches at entrances into electrical equipment, field devices, pull boxes and junction boxes.
 4. Every conduit shall be labeled at both ends.

3.15 WARNING TAPES

- A. Bury warning tapes approximately 12 inches below grade, above all underground conduits and duct banks. Align parallel to and within 3 inches of the centerline of the conduit or duct bank.
- B. Warning tape shall be yellow, 6-inch minimum width. Utilize tape made of material resistant to corrosive soil. Use tape with printed warning that an electric circuit is located below the tape. Manufacturers and types: ITT Blackburn Type YT, Griffolyn Co., Terra-Tape, or equivalent.

3.16 ADJUSTING AND CLEANING

- A. Upon completion of installation of raceways and boxes, inspect interiors of raceways and boxes; clear all blockages and remove burrs, dirt, and vacuum clean any construction debris.

END OF SECTION

SECTION 16123
WIRES AND CABLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included:
 - 1. Wires and cables, 600 volts and less
- B. Related Work:
 - 1. Section 16010: General Electrical Requirements

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01300.
- B. Submit catalog cuts and material list for each conductor type. Indicate insulation material, conductor material, voltage rating, manufacturer and other data pertinent to the specific cable, such as shielding type, number of pairs and applicable standards.

PART 2 - MATERIALS

2.01 GENERAL

- A. Wires and cables shall comply with Section 16123.

2.02 POWER WIRE

- A. Conductor material: Class B stranded, soft annealed copper per ASTM B-3.
- B. Insulation: THHN/THWN-2, 600-volt insulated, color coded per Part 3: Identification.
- C. Minimum conductor size: No. 12 AWG.

2.03 CONTROL WIRE (EXTERNAL TO SCADA PANEL)

- A. Conductor: Class B stranded soft annealed copper per ASTM B-3.
- B. Insulation: THHN/THWN-2, 600-volt insulated, color coded per Part 3: Identification.
- C. Minimum Conductor Size: No 14 AWG.

2.04 CONTROL WIRE (CONNECTIONS WITHIN SCADA CONTROL PANEL)

- A. Conductor: Stranded Soft Annealed Copper.
- B. Insulation: Type THHN or THW, color code shown on Drawings of the RTU control panel.

C. Minimum Conductor Size: No. 14 AWG.

2.05 INSTRUMENTATION CABLE – ALL LOCATIONS

A. Provide PVC coated shielded twisted pair, No. 16 AWG, 600 volt rated, Belden 8719 or equivalent.

2.06 CONDUCTOR CONNECTOR/SPLICES

A. Aboveground Dry and Damp Locations, #10 AWG and Smaller: Wire nuts, 3M "Scotchlock", Ideal "Super Nut", Buchanan "B-Cap", or equivalent.

B. Aboveground Dry and Damp Locations, #8 AWG and Larger:

1. Use one piece, standard length barrel, copper compression splice. Provide Thomas and Betts two way connectors, Burndy "Hylink", Teledyne "Penn-Union Penn Crimps" or equivalent.

C. In-ground Handholes and Pull Boxes, #10 AWG and smaller: As specified above plus sealing with individual sealing packs of Scotchcast 400 Resin or equivalent.

2.07 MOTOR TERMINATIONS

Splice conductors to motor leads with copper compression terminal lugs bolted together and insulated with an EPDM rubber slip on lug cover. Provide 3M electrical products 1000V or less non shielded cable motor lead splicing kits, Thomas & Betts #MSC or equivalent.

2.08 PULLING COMPOUND

Use only cable pulling compound that is approved by the manufacturer of the cable as being compatible with cable insulation and jacket materials.

2.09 CONDUCTOR TAGS

A. Wire identification - all wires, field and internal to equipment, shall be identified with heat shrinkable machine printed sleeve markers or clip-on markers covered with clear plastic heat shrinkable tubing. Hand lettered wire labels are not acceptable and shall be replaced at the Contractor's expense. All wires that are electrically the same (connected to common termination points) and do not pass through a contact or other switching device shall have the same wire identification.

B. The wire labeling code for each end of the same wire shall be identical. Tubing shall be sized for the wire and shrunk into place with the properly sized heat gun. The wire identification code for field and panel wiring shall be the number/letter designated on the "elementary" (schematics) and "loop" diagrams. Wire labels shall be T&B SM series, Raychem Thermofit TMS or approved equal.

2.10 ELECTRICAL TAPE/SHRINKABLE INSULATORS

A. Vinyl Tape: 7 mil, 600 volt rated, flame retardant, hot and cold weather resistant vinyl tape conforming to UL 510. Provide 3M Super 33+ Scotch vinyl tape or equivalent.

- B. Vinyl Tape for Color Coding: 7 mil, 3/4" wide, hot and cold weather resistant vinyl tape conforming to UL 510. Provide 3M 35 Scotch vinyl tape or equivalent.
- C. Vinyl Mastic: 90 or 125 mil self fusing, rubber based insulating vinyl mastic laminated to PVC. Provide 3M 2200 or 2210 or equivalent.
- D. Rubber Tape: EPR rubber, 90 degrees C continuous rated. Provide 3M 130C Scotch Tape or equivalent.
- E. Varnished Cambric Type: Adhesive backed, 9-mil, bias cut cotton tape, coated with yellow insulating varnish.
- F. Shrinkable Insulators: Provide heat or cold shrinkable insulator tubing. Provide Thomas and Belts "Shrink-Kon" heat shrink insulators, 3M thick wall heat shrinkable cable sleeves, 3M 8420 series cold shrink cable sleeves or equivalent.

PART 3 - EXECUTION

3.01 WIRE INSTALLATION

- A. Install wiring and cable in conduit unless otherwise noted.
- B. To reduce pulling tension in long runs, coat cables with pulling compound.
- C. Remove debris and moisture from the conduits, boxes and cabinets prior to cable installation.
- D. Group conductors in panelboards, motor control centers, cabinets, pull boxes and switchboard wireways; tie with plastic ties; and fan out to terminals.
- E. Terminate phase conductors A, B and C reading left to right, front to back or top to bottom looking into the front of the equipment.
- F. Install control wire and instrument cable between devices without splices.

3.02 IDENTIFICATION (EXTERNAL TO SCADA PANEL)

- A. Color Coding of Power Wire: Provide color coding throughout the entire network of feeders and circuits (600 volts and below) as follows:

	240/120	208/120	480/277
<u>Phase</u>	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>
Phase A	Black	Black	Brown
Phase B	Red	Red	Orange
Phase C	---	Blue	Yellow
Neutral	White	White	Gray
Ground	Green	Green	Green

- B. Conductors used for 24 VDC shall be blue. Conductors designated as foreign voltage shall be yellow.
- C. Conductors No. 10 AWG and smaller shall have factory color-coding with solid color insulation.
- D. Conductors No. 8 AWG and larger shall have factory color coding with solid color insulation or shall have black insulation with on-site application of colored tape at conductor terminations and at splices.
- E. Control wires shall have colored insulation. Provide separate color codes for each wire in conduit that has up to seven wires. Conduits with more than seven wires shall have at least seven types of colored insulation.
- F. Tagging of Conductors: Tag control wires and instrument cable in panels, pullboxes, handholes, wireways and at control devices. Tag control wires and instrument cables with wire numbers as shown on the shop drawing submittals or contract drawings. Tag power wires in pullboxes, handholes and wireways with motor control center or panelboard number and circuit numbers. In panelboards, tag conductors with circuit numbers one inch from termination at circuit breaker.

3.03 WIRE SPLICING AND CONNECTING

- A. Tighten electrical connections and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B, or NETA Standards.
- B. Retighten bolt-type connectors 24 to 48 hours after initial installation and before taping.
- C. Insulate splices with tape or shrinkable insulators. Tape connections as follows: Step 1 - apply a minimum of 4 layers of varnished cambric tape. Step 2 - apply a minimum of six layers of rubber tape half-lapped. Step 3 - apply a minimum of six layers of vinyl tape half-lapped.

3.04 INSULATION RESISTANCE TESTS (CIRCUITS BELOW 600 VOLTS)

- A. Inspect and test in accordance with NETA ATS, Section 7.3.
- B. Perform insulation resistance test of all systems up to 600V. Each complete circuit, including the feeder and everything connected thereto, shall be tested and shall have an insulation resistance between conductors and between each conductor and ground of not less than 2,000,000 ohms (2 megohms). All circuits which do not pass this test shall be inspected for grounds; and if required, the Contractor shall replace the wires or cables and repeat the test until insulation resistance of 2 megohms is obtained.

END OF SECTION

Control Narratives Explanation of Terms

This document defines the control narrative modes for the operation, control and communications of the new SCADA (Supervisory Control and Data Acquisition) system.

Equipment shall be controlled in different pre-defined modes to provide a consistent control philosophy. Modes identify both location (local or SCADA) and type (manual or automatic) which may be selected by an operator for a specific device. The equipment will have Local Manual and may have Local Automatic control mode. The Supervisory Control And Data Acquisition (SCADA) system may have either SCADA Manual or SCADA Automatic control mode. The data from the site will be communicated back to the main SCADA screens. Operators shall have the ability to monitor the data from the site at the City's SCADA workstations.

- 1) **Local Manual Control.** This mode allows the operator, physically at the site, to operate the equipment without the need of the SCADA system. This may be entirely a mechanical operation. Example: the solenoid control portion of the valve actuator is powered down and the manual hydraulic control valve is opened or closed using the hand-crank on the valve. In this case the SCADA system may or may not be monitoring the operation. In this mode the SCADA system will have no ability to override this function. This mode is generally reserved for maintenance and testing.
- 2) **Local Automatic Control.** In this mode, equipment will operate indefinitely without the need for SCADA master communications, but will require a functioning local PLC system. The PLC logic will continue to run the process and operators will be able to change setpoints from the local OIT (Operator Interface Terminal). However, operators will not be able to manually control equipment or change setpoints from SCADA system. This is the default mode when communication is lost between the local PLC and the SCADA system.
- 3) **SCADA Manual Control.** In this mode, operator can manually control equipment from a SCADA workstation at a central location. Communication to the SCADA system is required. While the controlled equipment is set to operate in SCADA Manual Control, it will ignore automatic setpoints. The controlled equipment will only actuate based on operator commands.
 - a) Example: If, when in SCADA Automatic Control, the PRV is called to open or close based on predefined set-points, then when in SCADA

Manual Mode the valve will be commanded to open or close and will remain in that state regardless of the predefined set points.

- 4) **SCADA Automatic Control.** In this mode, automatic control is performed by the local PLC with control setpoints coming from the master SCADA system. In some cases, the control actuation of the valves may come from the SCADA master system.

Operators will input setpoints for automatic control at the SCADA system. This mode requires good communication between all intermediate radio sites and the SCADA system.

- a) However, if communications were lost or disabled for operational reasons, the local PLC would continue to operate safely under the last received setpoints.

Loss of Communication

- If there is a loss of communication from SCADA to a site, the local PLC will maintain operation of the site in Local Auto mode. If communication outage is less than a predefined time (30 minutes), the local PLC will maintain the last good setpoint values from SCADA system.
- If communication failure lasts for 30-minutes or more, the local PLC shall switch the setpoints for Local Auto mode to preset "safe" values. This program shall maintain safe operation of the site until communication with SCADA system can be restored.

Alarms

The local PLC will contain interlocks to prevent equipment damage and to provide safe operation of the system, as necessary. The alarms and status of the equipment are monitored and displayed at the SCADA workstation as indicated. The following alarms will typically require a reset to clear the fault/alarm in order to re-establish operations:

Site alarms will be shown on the SCADA computer. These include, but are not limited to:

- Communication failure
- Local PLC Panel 120VAC power failure
- Local PLC Panel UPS fault
- Local PLC Panel high temperature
- Local PLC Panel intrusion
- Local PLC Panel 24 VDC power failure

Operators will work with integrator to set critical priority alarms for dial-out. There will be two severities identified: critical alarms and notification alarms.

- For critical alarms, a broadcast text message and an auto dialer will be activated. The auto dialer will call the on-duty operator. The operator will respond to the site as soon as possible resolve or clear the upset condition. Should the assigned first operator not be available after 5 rings, the dialer will automatically call the second assigned operator on duty. If the second operator is also not available after 5 rings, then the dialer will call the third operator.
- For notification alarms, a broadcast text message will be sent to operations staff. The operator may not need to respond to the site, as the alarm may not require immediate operator intervention.

Reports

The following daily and Monthly operational reports will be generated for this site:

- Total flow
- Communication outages

Trends

The following trends will be generated for each site:

- Flow rate

Control Narrative for the Zone 9 PRV Station:

This document defines the proposed control strategy for the operation, control and communications of the proposed new SCADA (Supervisory Control and Data Acquisition) system as it applies to the Zone 9 PRV facility.

Source Water

The source of water for the Zone 9 PRV facility is supplied from the City of LA at a pressure of approximately 215PSI. This facility provides water and pressure to Beverly Hills Zone 9 at a pressure less than 145PSI.

Communication Methods

The following communication methods are proposed for this site:

- 1) The Zone 9 PRV facility site-cellular modem will communicate back to the main SCADA system via a connection to the internet.
- 2) Redundant communication will be provided via cellular modem and DSL backup to the main SCADA system.

Control Modes

- *Local Manual Control:* Operators will have the ability to manually instruct the valves to open or close.
- *Local Auto Control:* In this mode, the PRV will open/close based on the downstream pressure. Once the PRV is open it will modulate based on predefined hydraulic pressure mechanically set on the valve. Operators can change the setpoints via the local OIT.
- *SCADA Manual Control:* **This is the preferred operational mode.** Operators will have the ability to manually instruct the valves to open or close.
- *SCADA Auto Control:* In this mode, the PRV will open/close based on the downstream pressure. Once the PRV is open it will modulate based on predefined hydraulic pressure mechanically set on the valve. Operators can change the setpoints via the local OIT and from SCADA.

SCADA system will display flow, upstream pressure, and downstream pressure in all control modes.

Loss of Communication

Site will use standard loss of communication strategy (refer to Control Narratives Explanation of Terms).

Alarms

Site will have the following alarms:

- Low Pressure
- High Pressure
- Low Flow
- High Flow
- Vault Flood
- Communication failure
- Local PLC Panel 120VAC power failure
- Local PLC Panel UPS fault
- Local PLC Panel high temperature
- Local PLC Panel intrusion
- Local PLC Panel 24 VDC power failure

Reports

The following reports will be generated for the PRV station:

- Total flow
- Communication outages

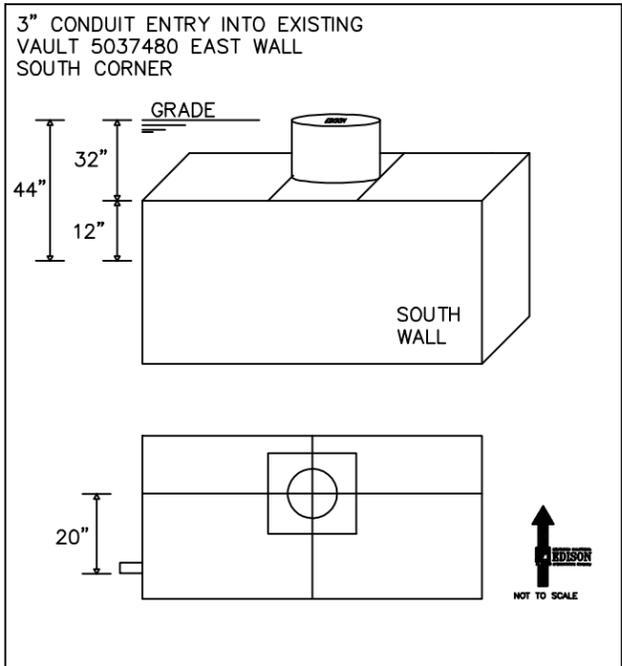
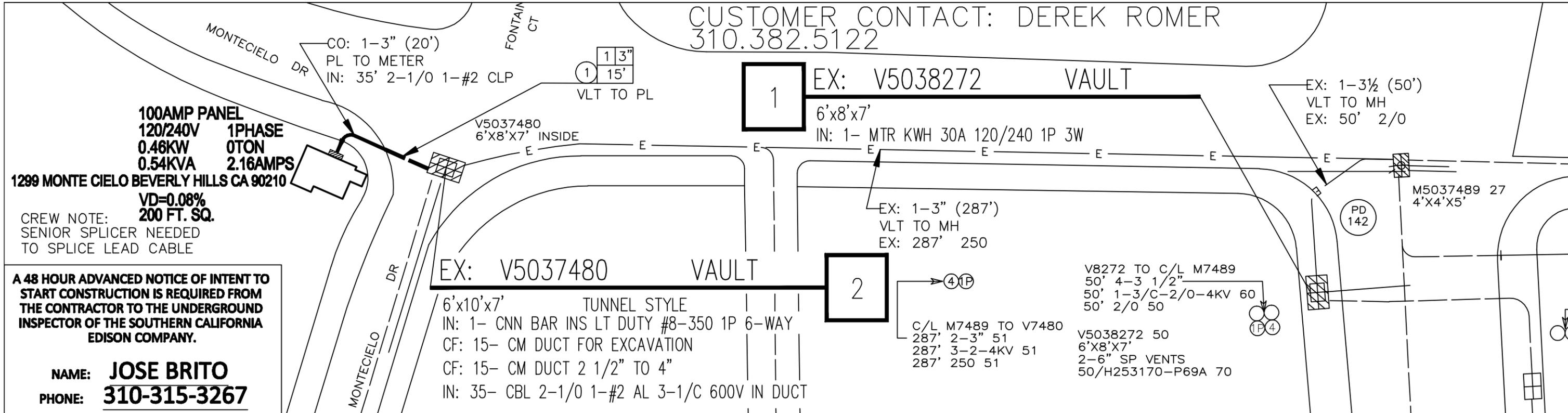
Trends

The following trends will be generated for the PRV station:

- Flow
- Upstream Pressure
- Downstream Pressure

APPENDIX E – Southern California Edison Final Drawings 747299 0.01

CUSTOMER CONTACT: DEREK ROMER
310.382.5122

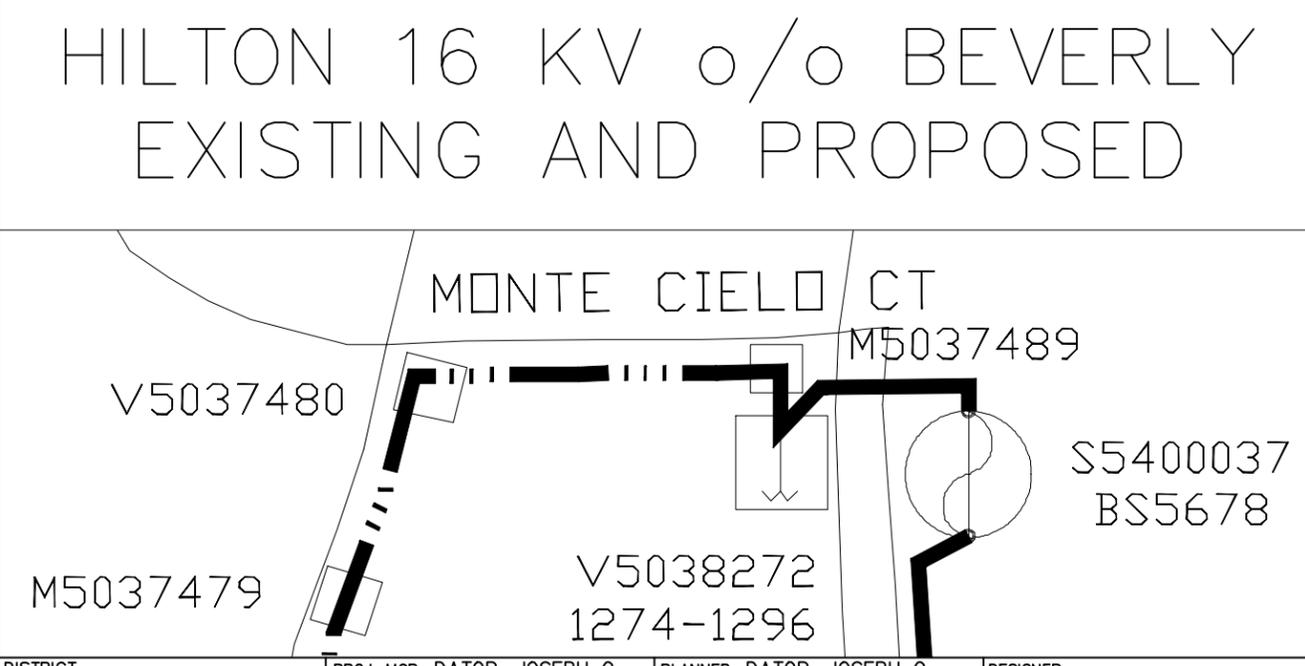


UNDERGROUND SERVICE ALERT
Dial 811
Call USA
For Underground Locating
2 Working Days Before You Dig

WARNING
THE EXCAVATOR MUST TAKE ALL STEPS NECESSARY TO AVOID CONTACT WITH UNDERGROUND FACILITIES WHICH MAY RESULT IN INJURY TO PERSONS OR DAMAGE TO FACILITIES IN THE AREA. THE INDICATED LOCATIONS OF EDISON UNDERGROUND FACILITIES, AS PROVIDED, ARE BELIEVED TO BE ACCURATE, HOWEVER, THE FINAL DETERMINATION OF EXACT LOCATIONS AND THE COST OF REPAIR TO DAMAGED FACILITIES IS THE RESPONSIBILITY OF THE EXCAVATOR.

SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL Company

SCALE: 1" = 30'



TLM DATA:

	SIZE	KVA	#CUST	%LOAD
EXIST	50	70.2	5	140.48%
PROP	50	70.74	6	141.48%
		VD = 0.08%	FLICKER = N/A	

PROJECT REQUIREMENTS

OUTAGE REQUIRED	<input checked="" type="checkbox"/>
PWRD-88 REQUIRED	<input checked="" type="checkbox"/>
ENVIRO CLEAN UP CREW	<input type="checkbox"/>
TRAFFIC CONTROL REQUIRED	<input type="checkbox"/>
PED TRAFFIC CONTROL REQ	<input type="checkbox"/>
LANE CLOSURE PERMIT REQ	<input checked="" type="checkbox"/>
NOTE: PULLING CABLE IN STREET	
EXCAVATION PERMIT REQ	<input type="checkbox"/>
NOTE: N/A	
EDISON EASEMENT REQUIRED	<input type="checkbox"/>
RAPTOR / EAGLE AREA	<input checked="" type="checkbox"/>

DISTRICT 42 - SANTA MONICA	PROJ. MGR. DATOR, JOSEPH C PHONE	PLANNER DATOR, JOSEPH C PHONE 310.803.3444	DESIGNER DATOR, JOSEPH C
PROJECT NO. 1141475	SERVICE REQUEST 2061852	MSR NO. 7618304	PRODUCT-1 1058102-NEW METER & SERVICE
CIRCUIT / VOLTAGE HILTON 16KV		THOMAS GUIDE	PRODUCT-2
SUB / PG NO. BEVERLY		CIRCUIT CODE	PRODUCT-3
INVENTORY MAP 70-62D-6	J.P.A. NO.	PROPOSED CONSTRUCTION (LOCATION)	
		1299 MONTE CIELO DR BEVERLY HILLS, CA 90210	
TYPE	DATE	APPROVED BY	CHECKED BY
	12/3/15	SMALL / TORRES	
SHEET 1 of 4		DESIGN\DRWG NO. 747299_0.01	
Southern California Edison Company			

NOTE:
ALL ELECTRICAL DUCTS AND STRUCTURES WILL CONFORM TO GENERAL ORDER #128 (RULES FOR CONSTRUCTION OF UNDERGROUND ELECTRICAL SUPPLY AND COMMUNICATION PRESCRIBED BY THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA, JANUARY 2006).

WHERE CONDUITS ARE PICKED UP OR INTERCEPTED, CONDUIT SHALL BE MANDRELLED AND PULL ROPE INSTALLED FROM TERMINAL TO TERMINAL.

LEGEND CODE DEFINITIONS

- CI - CUSTOMER CONTRACTOR INSTALLED: MATERIALS FURNISHED AND INSTALLED BY APPLICANT AT EDISON'S EXPENSE AND ARE DEEDED TO EDISON. (EXCEPTION: STREET LIGHT ELECTROLIERS WILL BE INSTALLED BY EDISON'S CONTRACTOR.)
- CO - CUSTOMER CONTRACTOR OWNED: MATERIALS FURNISHED, INSTALLED, OWNED, AND MAINTAINED BY APPLICANT.
- CF - CUSTOMER CONTRACTOR FURNISHED: MATERIALS FURNISHED AND INSTALLED BY APPLICANT AT APPLICANT'S EXPENSE THAT MAY BE DEEDED TO EDISON.
- IN - INSTALL: MATERIALS FURNISHED AND INSTALLED BY APPLICANT IF APPLICANT INSTALLED PROJECT OR BY EDISON IF EDISON INSTALLED PROJECT. (EXCEPTION: FOR AN APPLICANT INSTALLED LINE EXTENSION, STATION NOS. HAVING AN ASTERISK ADJACENT TO AN "IN" LEGEND CODE REPRESENTS MATERIALS TO BE PROVIDED BY APPLICANT AND INSTALLED BY EDISON IN ALL CASES. REFER TO DPB 8258, PROJECT MATERIAL LIST BY ASSEMBLY WITHIN A STATION.)
- MI - MEMO INSTALL: SAME AS IN-INSTALL.
- MR - MEMO REMOVE: MATERIALS REMOVED BY EDISON.
- RM - MEMO REMOVED: MATERIALS REMOVED BY EDISON.
- SI - SHOOFLY IN: MATERIALS FURNISHED AND INSTALLED BY EDISON FOR TEMPORARY CONSTRUCTION.
- SR - SHOOFLY REMOVE: MATERIALS REMOVED BY EDISON FOR TEMPORARY CONSTRUCTION.
- TR - TRANSFER: EDISON LABOR REQUIRED TO TRANSFER EXISTING FACILITIES.

D31: Rev. 11/85

CONCRETE PRODUCTS

Precast concrete item complete with neck. Cover and inserts may be obtained from any of the following listed and approved manufactureres:

JENSEN PRECAST

14221 San Bernardino Ave., Fontana, Calif. 92335
 Phone: (909) 350-4111
 (800) 257-6100

OLDCASTLE PRECAST

10650 Hemlock Ave., Fontana, Calif. 92337
 Phone: (909) 428-3700
 (800) 626-3860

FOR HANDHOLE AND PULLBOX MANUFACTURERS, SEE UGS HP 200.

D41: Rev. 01/21/09

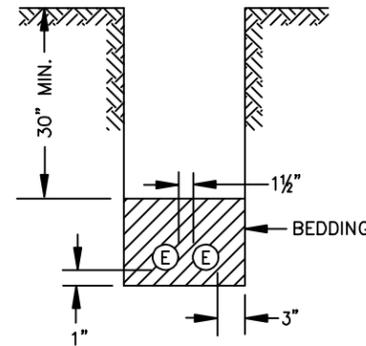
Applicants expressly represent and warrant that all work performed and all material used in meeting Applicants' obligations herein are free from defects in workmanship and are in conformity with Southern California Edison Company's requirements. This warranty shall commence upon receipt by Applicants of the Company's final acceptance and shall expire one year from that date. Applicants agree to promptly correct to the Company's satisfaction and that of any governmental agency having jurisdiction and at Applicants' expense any breach of this warranty which may become apparent through inspection or operation of underground electric system by the Company during this warranty period.

CONNECTING TO EXISTING SCE STRUCTURES

- Per SCE requirements, customers are not allowed to enter, intercept or tie-in to existing SCE structures, equipment or conductors. This work will only be performed by SCE. Contact the appropriate SCE inspector to schedule an appointment. Customers may connect to an existing duct stub without a SCE inspector present.
- Per CPUC/SCE's Rule 15 B.1.A and Rule 16 D.1.A., the customer will provide all necessary excavations (with the exception of excavation under pads and primary splice boxes), material (including conduit and structures) and encasement, to be utilized in the intercept/tie-in process.
- The customer must adhere to all applicable Cal-OSHA, local, city, state and federal regulations, (including, but not limited to, all necessary shoring and traffic control in place to perform the intercept/tie-in work by SCE's underground civil contractors(s))
- Intercept/tie-in work must be coordinated with SCE's civil contractors through the Division Inspector/CCM to limit exposure of excavation(s). Customer is responsible for securing excavation(s).

D08: 12/10/07

**TYPICAL CONDUIT BANK SECTION
SEE UGS CD 120**



DIRECT BURIAL
SIMILAR CONSTRUCTION FOR FEWER CONDUIT
2 CONDUITS MAX.

D81: Rev. 09/23/09

CONDUIT RADIUS REQUIREMENTS:

- A: The minimum radius for bends are:
 36" for conduits 3" in diameter or smaller
 48" for conduits 4" and 5" in diameter
 60" for 6" diameter conduit
- B: The minimum radius for sweeps are:
 36" for conduits 3" in diameter or smaller
 12'-6" for conduits 4" in diameter and larger,
 unless otherwise noted.

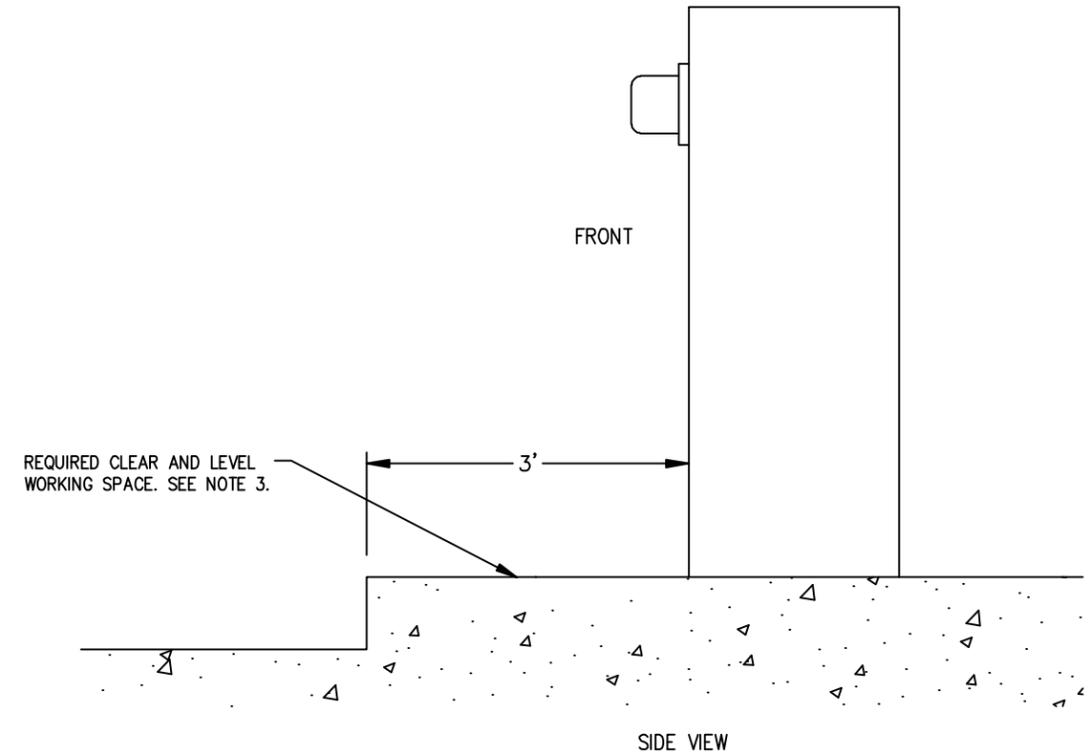
CUSTOMER-OWNED CONDUIT MATERIAL* AND CONCRETE ENCASEMENT ARE TO BE INSTALLED IN ACCORDANCE WITH EDISON ELECTRICAL SERVICE REQUIREMENTS.
 *SUBJECT TO APPROVAL BY LOCAL INSPECTION AUTHORITIES

D14: Rev. 01/85

TIE-IN MADE THROUGH SIDE WALL OF STRUCTURE

(Vault, Manhole, PME, SOE/CST, BURD, Slab Box, Pull Box, PMH) The customer is responsible to trench to the structure entrance point and bring the conduit to within 5' of the structure being entered. The customer is to provide slip coupling and conduit.

**PANEL CLEARANCE
UNDERGROUND SERVICE CONNECTIONS 0-600 VOLTS
SEE ESR 3-16**



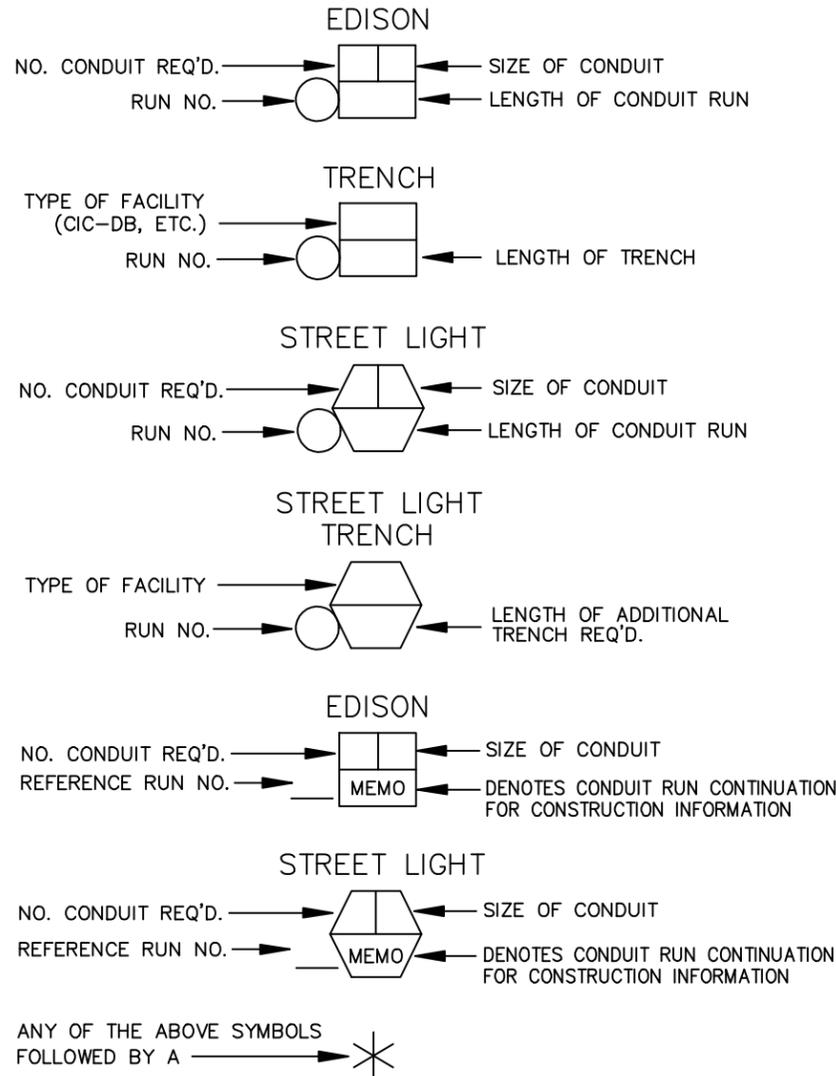
NOTES:

1. A MINIMUM OF THREE (3) FEET OF CLEAR, LEVEL WORK SPACE IS REQUIRED IN FRONT OF ALL TERMINATION, METERING, AND SERVICE EQUIPMENT.
2. SEE ESR-5 FOR METER-MOUNTING HEIGHT REQUIREMENTS. METER MOUNTING HEIGHT WILL BE MEASURED FROM THE STANDING AND WORKING SPACE TO THE CENTERLINE OF THE METER(S).
3. WHEN SERVICE EQUIPMENT IS INSTALLED ON AN ELEVATED PORTION OF THE FLOOR/GROUND, OR HOUSEKEEPING PAD, THE PAD SHALL BE FLUSH WITH AND EXTEND A MINIMUM OF THREE (3) FEET. THIS IS MEASURED FROM THE FRONT OF THE SERVICE EQUIPMENT OR THE OUTER DOOR(S) OF THE SWITCHBOARD NEMA 3R ENCLOSURE WHEN INSTALLED. IN NO CASE SHALL THE MAXIMUM METER HEIGHT OF SIX (6) FEET THREE (3) INCHES BE EXCEEDED.
4. TO MAINTAIN A SAFE, CLEAR, AND LEVEL WORKING AREA IN FRONT OF NEW OR EXISTING METER AND SERVICE EQUIPMENT, A CONCRETE SLAB OR OTHER SUITABLE PERMANENT HARD SURFACE, ACCEPTABLE TO THE COMPANY, MUST BE USED.
5. FOR SWITCHBOARDS ABOVE 600V, FIVE-FOOT MINIMUM OF CLEAR AND LEVEL STANDING AND WORKING SPACE IS REQUIRED IN THE FRONT, REAR, AND SIDE OF ANY SECTION WHERE SUCH PART SUPPORTS OR PROVIDES ACCESS TO METERING, TESTING EQUIPMENT, OR SERVICE CABLE TERMINATION SECTIONS.

D99: 07/08/07

DISTRICT 42 - SANTA MONICA		PROJ. MGR. DATOR, JOSEPH C PHONE		PLANNER DATOR, JOSEPH C PHONE 310.803.3444		DESIGNER DATOR, JOSEPH C	
PROJECT NO. 1141475	SERVICE REQUEST 2061852	MSR NO. 7618304	PRODUCT-1 1058102-NEW METER & SERVICE		ASSOC DESGN		
CIRCUIT / VOLTAGE HILTON 16KV		THOMAS GUIDE	PRODUCT-2		ASSOC DESGN		
SUB / PG NO. BEVERLY		CIRCUIT CODE	PRODUCT-3		ASSOC DESGN		
INVENTORY MAP 70-62D-6		J.P.A. NO.		PROPOSED CONSTRUCTION (LOCATION)			
				1299 MONTE CIELO DR BEVERLY HILLS, CA 90210			
12/3/15		SMALL / TORRES					
TYPE	DATE	APPROVED BY	CHECKED BY	DRAWN BY	PAX #	SHEET	
Southern California Edison Company						2 OF 4	
						DESIGN\DRWG NO. 747299_0.01	

LEGEND OF CONDUIT SYMBOLS (CONVENTIONAL U. G.)



DENOTES THE FOLLOWING:

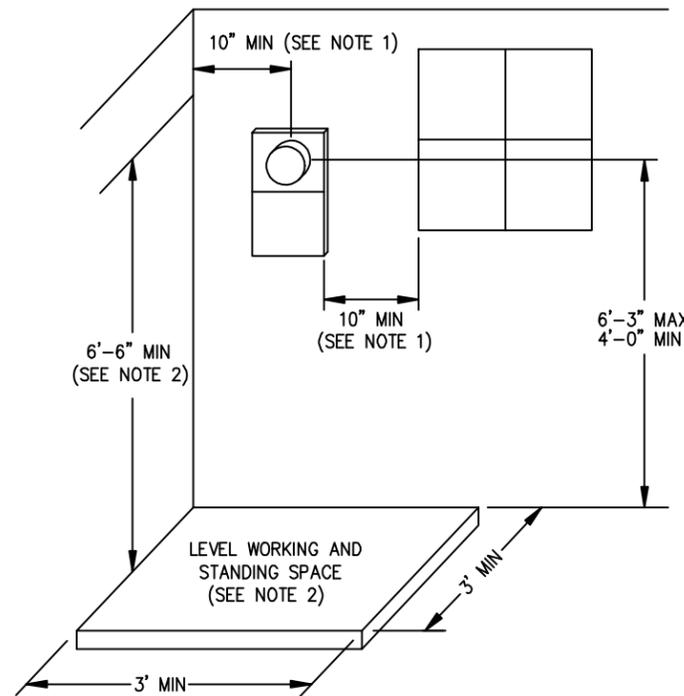
DB CONDUIT WITHOUT ENCASEMENT IS ACCEPTABLE FOR PORTIONS OF TRENCH WITH ONLY ONE OR TWO CONDUITS

SEMI-ENCASEMENT IS REQUIRED FOR PORTIONS OF TRENCH WITH ONLY THREE OR FOUR CONDUITS

FULL ENCASEMENT IS REQUIRED FOR MORE THAN FOUR CONDUITS

D18: Rev. 5/08/2006

WORKSPACE SURFACE-MOUNTED OR SEMI-FLUSH METER INSTALLATION SEE ESR 5-25

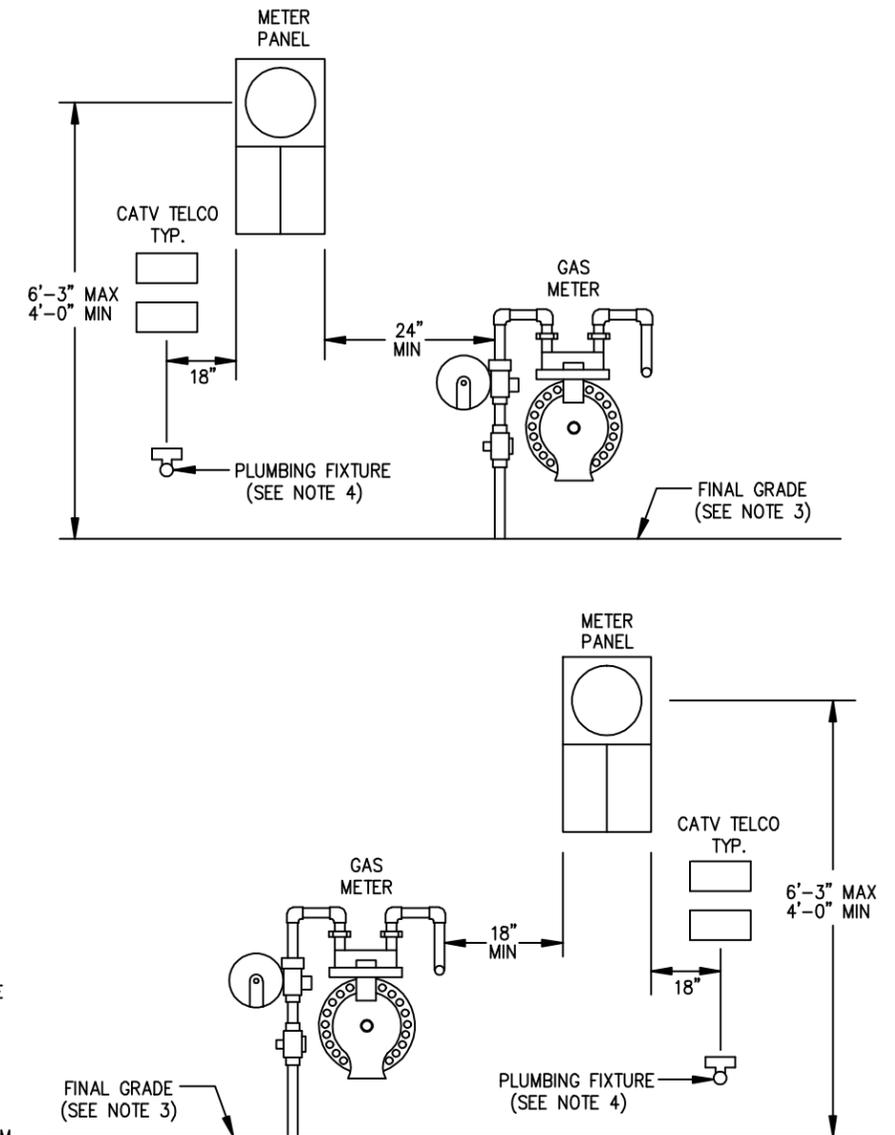


NOTES:

1. THE HORIZONTAL CLEARANCE FROM THE CENTERLINE OF THE METER TO THE NEAREST SIDE WALL OR OTHER OBSTRUCTION SHALL BE 10 INCHES MINIMUM. A HORIZONTAL CLEARANCE FROM THE EDGE OF THE METER PANEL TO THE EDGE OF A WINDOW OR DOORWAY (INCLUDING SLIDING GLASS DOORS) SHALL BE 10 INCHES MINIMUM. A GAS METER OR PLUMBING FIXTURE THAT DOES NOT PROTRUDE MORE THAN 6 INCHES OUT FROM THE WALL, OR EXTEND LESS THAN 18 INCHES HORIZONTALLY FROM THE OUTSIDE EDGE OF THE METER PANEL, SHALL NOT BE CONSIDERED AN OBSTRUCTION. SEE ESR FIGURE 5-4 (PAGE 5-24)
2. A LEVEL WORKING AND STANDING SURFACE, CLEAR AND UNOBSTRUCTED, ENTIRELY ON THE PROPERTY OF THE CUSTOMER, SHALL BE PROVIDED. THE MINIMUM WIDTH OF THE WORKSPACE SHALL BE 36 INCHES OVERALL, BUT NEED NOT BE CENTERED BENEATH THE METER. THE MINIMUM DEPTH OF THE WORKSPACE SHALL BE 36 INCHES. WHERE METERS ARE ENCLOSED IN A CLOSET OR RECESSED IN AN ENCLOSURE, THE DEPTH OF THE WORKSPACE IS MEASURED FROM THE OUTER FACE OF THE CLOSET OR RECESS. THE MINIMUM HEIGHT OF THE WORKSPACE SHALL BE 78 INCHES.

D123 Rev. 04/22/15

SEPARATION OF METER ASSEMBLIES FOR ELECTRIC & GAS SERVICES SEE ESR 5-24



NOTES:

1. SIZE AND DIMENSION OF PANELS WILL VARY. DRAWINGS ARE NOT TO SCALE.
2. THIS DRAWING PERTAINS TO BOTH OVERHEAD AND UNDERGROUND ELECTRIC SERVICE APPLICATIONS.
3. MAINTAIN A 3 FOOT CLEAR, LEVEL, AND UNOBSTRUCTED WORKSPACE IN FRONT OF ELECTRIC SERVICE EQUIPMENT.
4. PLUMBING FIXTURES THAT EXTEND MORE THAN 6 INCHES OUT FROM WALL SURFACE MUST BE LOCATED 18 INCHES MINIMUM FROM THE OUTSIDE EDGE OF THE METER PANEL.

D122 Rev. 04/22/15

DISTRICT 42 - SANTA MONICA		PROJ. MGR. DATOR, JOSEPH C PHONE		PLANNER DATOR, JOSEPH C PHONE 310.803.3444		DESIGNER DATOR, JOSEPH C	
PROJECT NO. 1141475	SERVICE REQUEST 2061852	MSR NO. 7618304	PRODUCT-1 1058102-NEW METER & SERVICE		ASSOC DESGN		
CIRCUIT / VOLTAGE HILTON 16KV		THOMAS GUIDE		PRODUCT-2		ASSOC DESGN	
SUB / PG NO. BEVERLY		CIRCUIT CODE		PRODUCT-3		ASSOC DESGN	
INVENTORY MAP 70-62D-6		J.P.A. NO.		PROPOSED CONSTRUCTION (LOCATION)			
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TYPE	DATE	APPROVED BY	CHECKED BY	DRAWN BY	PAX #	SHEET 3 OF 4	DESIGN\DRWG NO. 747299_0.01
Southern California Edison Company							

